Black Point Quarry Project
Municipality of the District of Guysborough, NS

Environmental Impact Statement

# TABLE OF CONCORDENCE and SUMMARY REPORT

Vulcan Materials Company

February 2015

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| | | |
|---|---|---|
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## 1.0 INTRODUCTION AND ENVIRONMENTAL ASSESSMENT CONTEXT

Vulcan Materials Company (Vulcan), a U.S.-based aggregate producer and Morien Resources Corporation (Morien), a Nova Scotia-based resource development company, have jointly prepared this Environmental Impact Statement (EIS), which outlines the proposed development, operation, and decommissioning and abandonment of a hard rock quarry and marine terminal at Black Point in Guysborough County, Nova Scotia (**Figure 1**). **Black Point Aggregates Inc.**, a wholly owned subsidiary of Vulcan Materials Company, is the named Proponent of the Project. Following the environmental assessment process, Black Point Aggregates Inc. will develop and operate the quarry and marine terminal.

This Environmental Impact Statement (EIS) has been prepared to obtain approval pursuant to the federal *Canadian Environmental Assessment Act, 2012* (CEAA, 2012) and, at the same time, approval for a Class I undertaking pursuant to the provincial *Environmental Assessment Regulations* made under the Nova Scotia *Environment Act*.

The EIS has been prepared to respond to Project-specific *Guidelines for the Preparation of an Environmental Impact Statement* pursuant to CEAA, 2012 and the Nova Scotia Registration Document pursuant to the Nova Scotia Environment Act, which were developed for the Project by the Canadian Environmental Assessment Agency (CEA Agency) and Nova Scotia Environment (NSE) with input from other government departments and agencies and the public.

| | |
|---|---|
| Project: | Black Point Quarry Project |
| Proponent: | Black Point Aggregates Inc. |
| Postal Address: | 1200 Urban Center Drive<br>Birmingham, Alabama<br>USA 35242 |
| Contact Name: | Mr. Frank Lieth, Vice President |
| Telephone (Direct) | 770-454-3626 |
| Telephone (Mobile) | 404-293-1933 |
| Fax | 205-298-2927 |
| Email | liethf@vmcmail.com |

## 2.0 PROJECT OVERVIEW

The Black Point Quarry Project property has a total surface area of 354.5 ha of which the finished quarry will occupy approximately 180 ha while the processing plant, administration and stockpile areas together will occupy approximately 28 ha. Rock reserves in the proposed quarry are estimated at more than 400 million metric tonnes (MT).

Rock will be quarried using industry standard drilling and blasting procedures from the granite reserve creating a quarry pit that will expand in depth and size over the 50+ year lifetime of the mine. As mining progresses a series of rock benches will be created in the quarry pit for safety reasons. Quarried rock will be crushed, screened, washed and stockpiled on site, then offloaded

via a deep water marine terminal into Panamax-sized bulk carrier ships for transport to markets along the eastern and Gulf coast markets of the United States

The anticipated average annual production rate will exceed 1.0 MT with a peak production rate of 7.5 MT per year, which is roughly 5.0 MT of product sales should market conditions support that sales volume. The Project is anticipated to have capital costs on the order of US$80-$110 million and will be a significant employer in Guysborough County throughout its expected 50+ year lifespan. No public funding is currently being sought for this Project.

## 2.1 Project Need and Justification

The purpose of the Black Point Quarry Project is to supply construction aggregate to markets predominantly on the eastern and Gulf coasts of the United States and possibly to markets in eastern and central Canada. Although construction aggregates have numerous end uses, their general application is in the production of building materials such as concrete and asphalt.

While materials used to produce construction aggregates are relatively abundant, these resources must be located in areas that are geographically accessible. In addition, the rights and permits to recover the resources must be obtainable, and there must be sufficient market capacity to support the planned production of the mining operation. Finally, aggregates must meet strict quality requirements related to the chemical and physical characteristics of the rock. Most rocks do not meet these geographic conditions and quality specifications and cannot qualify as viable construction aggregate resources.

In the U.S. market, the majority (80% or more) of aggregates are transported by truck from the quarry to the consumer. This form of transport is expensive and limits the typical aggregate operation to a market radius of about 80 km from the quarry. The south eastern U.S. aggregate market is a prime target for bulk vessel transported aggregate due in part to the geologic absence of suitable aggregate resources in coastal areas.

The revenue generated from the Project will provide economic benefit to the people and governments of Guysborough County and Nova Scotia through direct and indirect employment, royalties and taxes paid, dollars invested into goods and services directly by the Project Proponent, and indirect dollars that will go into local businesses and services from employees and contractors working on the Project and at the quarry.

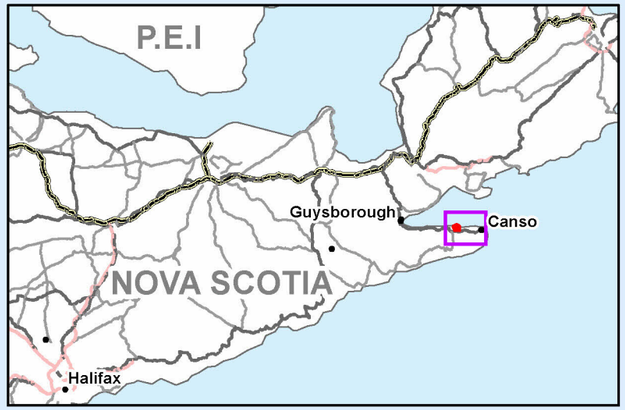
## 2.2 Project Location

The lands to be developed are owned by the Municipality of the District of Guysborough (MODG) and will be leased to the Proponent. The approximate center of the Project site is located at:

45º21’13.25”N

61º08’56.15”W

The generalized property boundaries are shown on **Figures 1** and **2.** Table 1 provides coordinates for the four corners of the Property and the submerged Crown Land Lease, currently being reviewed by the province that will host the marine terminal.




N

LEGEND

- Building
- Property Boundary
- Wilderness Area
- NSDNR Wetland
- Waterbody
- Watercourse
- Contour (5m)
- Utility Line
- Designated Water Supply Area
- Natural Watershed Municipal Surface Water Supply
- Operational Non-Designated Parks and Reserves

Chedabucto Bay

Canso Islands National Historic Site of Canada

Half Island Cover Beach
Huss Head
Half Island
Gaulman Point
Lower Half Island Cover Beach
Yellow Rocks
Fogherty Head
Black Point
Fox Bay
Fox Island
Lazy Head
Fox Island Main Beach
Indian Cove
Tickle Island
French Point
Durells Island
Davis Island
Long Point
Piscatiqui Island
Grassy Island
Tickle Road - Union Street
Main Street
Fogherty Lake
Murphys Lake
Upper Fox Island
Lumsdens Lake
Three Mile Lake
Fogartys Lake
Cavanaugh Lake
Whistlehouse Lake
Ice Lake
Dobsons Lake
Hayden Lake
Southwest Lake
Hendsbee Lake
Lukemans Lake
Hazel Hill Lake
Trout Lake
Eastern Lookout Lake
Blowdown Lake
Walshs Lake
Charles Lake
Lookout Hill
Muskrat Lake
Spinney Gully
Swaines Lake
Young Lake
Snows Island
White Lake
Allens Lake
Western Lookout Lake
Basin Lake
Lookout Hill Rocky Lake
Eastern Lake
Third Lake
Smelt Lake
Publicover Lake
Seven Island Lake
Cooeycoff Lake
Dover Lake
Dover Road
Canso Coastal Barrens Wilderness Area
Dover Basin
St. Andrews Island
Mud Lake
Big Branch Lake
Mahons Lake
Grassy Lake
Kavanaughs Lake
Highway 316
Little Branch Lake
Negrowac Lake
Dover Harbour
Gun Cove Island
Little Mud Lake
Dans Lake
Warrens Lake
Valentines Lake
Gull Lake
Round Lake
Moose Lake
Snyders Lake
Maguire Lake
Black Duck Cove
Andrews Lake
Bonnett Lake Barrens Wilderness Area

0 0.5 1 2 3 Kilometers

SCALE: 1:60,000
WHEN PLOTTED CORRECTLY AT 11 x 17
NAD 1983 UTM Zone 20N

NOTES

This map is for conceptual purposes only and should not be used for navigational purposes.

Basedata: Nova Scotia Natural Resources, downloaded, June 2014; Orthoimagery from GeoNOVA, 2007.

**MORIEN RESOURCES AND VULCAN MATERIALS**

BLACK POINT QUARRY

SITE LOCATION

| | | |
|---|---|---|
| October 24, 2014 | Rev 1.0 | Figure No. 1 |
| Project No. 210.05913.00000 | | |

SLR Consulting (Canada) Ltd.

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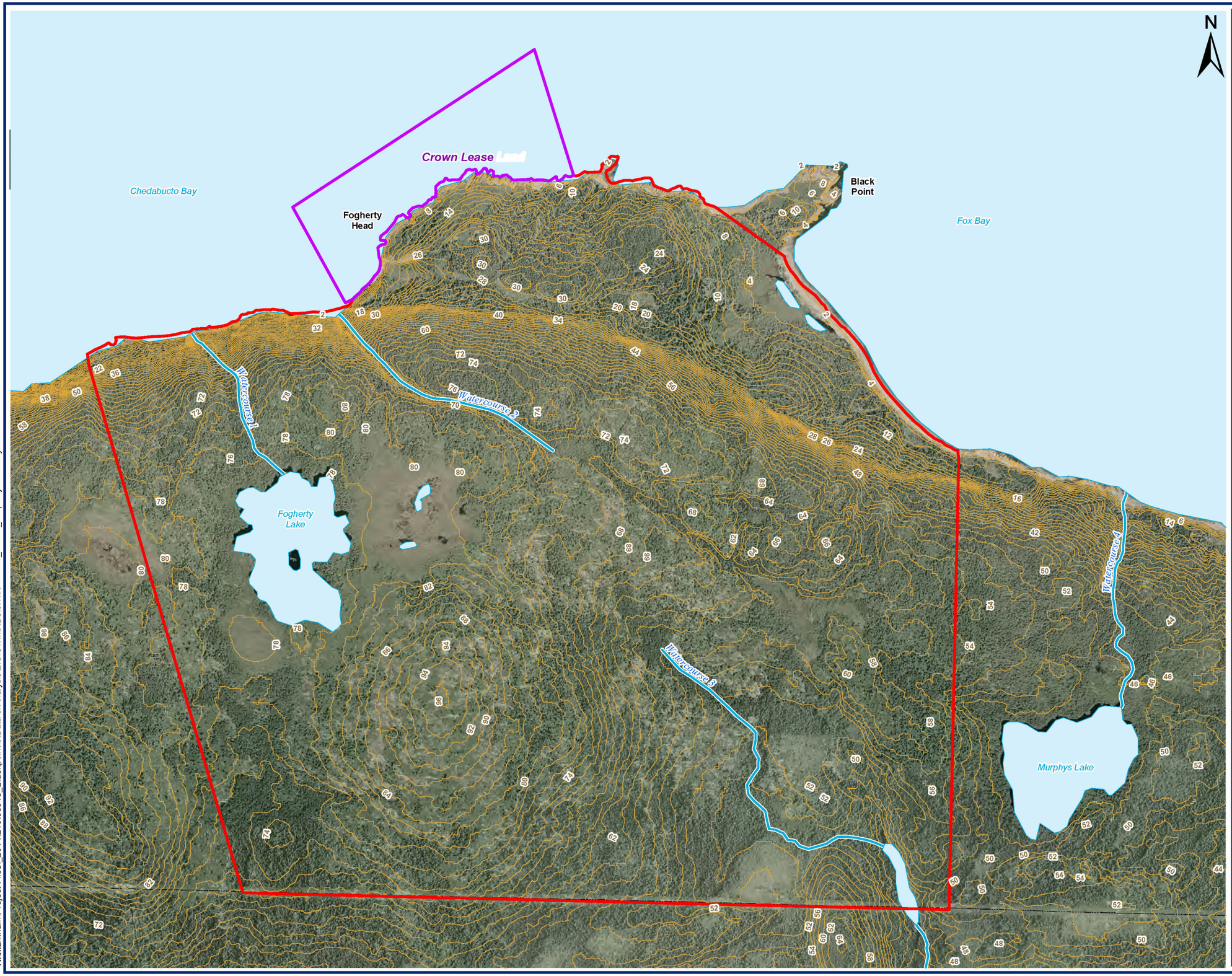


N

LEGEND

- Property Boundary
- Crown Lease Land
- Waterbody
- Watercourse
- LIDAR Contour (2m)
- Utility Line

0 100 200 400 Meters

SCALE: 1:10,000
WHEN PLOTTED CORRECTLY AT 11 x 17
NAD 1983 UTM Zone 20N

NOTES

This map is for conceptual purposes only and should not be used for navigational purposes.

Basedata: Nova Scotia Natural Resources, downloaded, June 2014; Orthoimagery from GeoNOVA, 2007.

**MORIEN RESOURCES AND VULCAN MATERIALS**

BLACK POINT QUARRY

PROPERTY BOUNDARIES

| | | |
|---|---|---|
| October 22, 2014 | Rev 1.0 | Figure No. 2 |
| Project No. 210.05913.00000 | | |

SLR Consulting (Canada) Ltd.

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**Table 1:**
**Proposed Boundary Coordinates**

| Boundary Location | Easting | Northing |
|---|---|---|
| **Terrestrial Property** | | |
| North West Corner | 643573.480 | 5023895.438 |
| South West Corner | 644005.711 | 5022431.120 |
| South East Corner | 645930.498 | 5022389.912 |
| North East Corner | 645955.893 | 5023627.756 |
| **Submerged Crown Lands Lease** | | |
| North West Corner | 644130.37 | 5024312.49 |
| South West Corner | 644275.16 | 5024050.04 |
| South East Corner | 644900.62 | 5024394.53 |
| North East Corner | 644791.83 | 5024744.29 |

## 2.3 Project Components

The primary components associated with the Project include:

1. An unpaved access road from provincial Route 16 into the quarry;
2. The quarry and primary crushing area;
3. The processing (finishing) plant consisting of secondary and tertiary processing (crushing and washing) and a stockpile laydown area;
4. Modular buildings that comprise the administration complex; and,
5. A 160 m long marine terminal and load-out facility.

The locations of the primary project components are depicted in **Figure 3.**

### *2.3.1 Access Road*

A single private unpaved access road to the quarry, processing plant and marine terminal will be constructed prior to mining. The access road will be 10 m wide and proceed north from Route 16 to the southern property boundary, a distance of approximately 800 m. From the southern property boundary, the road will be extended easterly and northerly approximately 2.5 km to access the processing area and marine terminal.

### *2.3.2 Open Pit Quarry and Primary Crusher*

The final quarry footprint will comprise approximately 180 ha (**Figure 3)**. The quarry will be developed initially in a westerly direction before proceeding in a southerly direction and to a grade at or near elevation -30 m asl (i.e., 30 m below sea level).

Benches will generally be 15 m in height, although during the initial development phases, face heights could be less. Safety benches will be established every two benches and will have a width of approximately 7.5 m. The final slopes for the quarry will have face angles of 85 degrees with a maximum pit slope of 65 degrees. Working benches will have face angles of 70 to 75 degrees.

Freshly mined rock will be transported to and reduced in size by a primary crusher located on a bench on the east side of the quarry. The crushed material will then be transported via conveyor to the processing plant.

### *2.3.3 Processing Plant*

The processing plant site is approximately 28 ha and will be located in the northern section of the Project site along Chedabucto Bay as shown on **Figure 3**. This area will be used for secondary and tertiary crushing, screening, washing and conveying, as well as stockpiling aggregate products, equipment, fuel and material storage, ship loading and administrative buildings.

The area will contain two ponds beginning in Phase 3 (development phases are described below), located on the western edge of the plant site against the cliff. Each pond will be sized to hold approximately 6,100 $m^3$. One of the ponds will be dedicated to stormwater retention and the other for process water. During Phase 1, temporary ponds will be utilized as required to manage stormwater. In Phase 2, one of the permanent ponds will be constructed and dedicated to stormwater retention.

This portion of the site will also include two surge piles, various aggregate product piles (fractionated, screenings and base material) and approximately 1,000,000 tons of product ready for shipment.

Based upon the preliminary design, there will be five phases of the processing plant ranging from an initial portable circuit utilized for site development to a large fixed plant capable of producing an anticipated peak production of 7.5 MT and producing 5.0 MT of saleable product. Plant development phases are shown on **Figure 4** to **Figure 8.**

Phase 1

A small portable plant with a capacity up to 1,000 tonnes per hour (TPH) will be utilized for initial site development. The plant will consist of two portable track-mounted crushing plants that include vibrating feeders and a number of conveyors. The plant will be used to produce a coarse fill material for site development needs. Power for the plant will be provided by diesel powered generators.

Phase 2

In the second phase plant, two additional track mounted crushing modules will be added to the Phase 1 equipment. This plant will produce a fine graded fill material for final site development needs. Power for this plant will be provided by diesel powered generators built into the track mounted crushing units.

Phase 3

Major components of Phase 3 include the Phase 2 equipment described above, two additional portable track-mounted screening plants and one track mounted tertiary crushing plant with a belt feeder and conveyors.

These additional mobile units will be used to begin production to meet the initial aggregate sales demand. Power for the additional units will utilize diesel powered generators with combined capacity of 260 kW in addition to the existing generators identified in Phases 1 and 2. Production during Phase 3 is expected to be approximately 500 TPH.

Marine terminal construction (see below) is expected to begin during Phase 3.

Phase 4

When the sales demand dictates a higher production rate, the mobile plant will be replaced by a fixed plant. The plant will have a flexible design that will allow it to be expanded as the market demand increases. The initial fixed plant will have the capability to produce up to 1,400 TPH through the tertiary plant. Electrical power for the plant will be provided via Nova Scotia Power Inc.

Phase 5

As the sales demand increases and production rates approach the limit of the initial fixed plant, the final phase will be initiated. This plant will upgrade the tertiary portion of the Phase 4 plant by installing a parallel, identical tertiary processing circuit. Production through the finishing plant will be increased to 2,800 TPH.

### *2.3.4 Administrative Buildings*

Approximately 2.5 ha will be dedicated for an administrative area located on the eastern edge of the plant site (**Figure 8**). In this area, two buildings (modular or fixed) will be erected. One will contain offices and the administrative functions while the other will contain facilities for on-site workers such as a locker/shower room, washroom, first aid station, lunchroom, quality control laboratory and shop. This area will also include a site to store fuel and other maintenance fluids. Mobile equipment will be parked adjacent to the shop.

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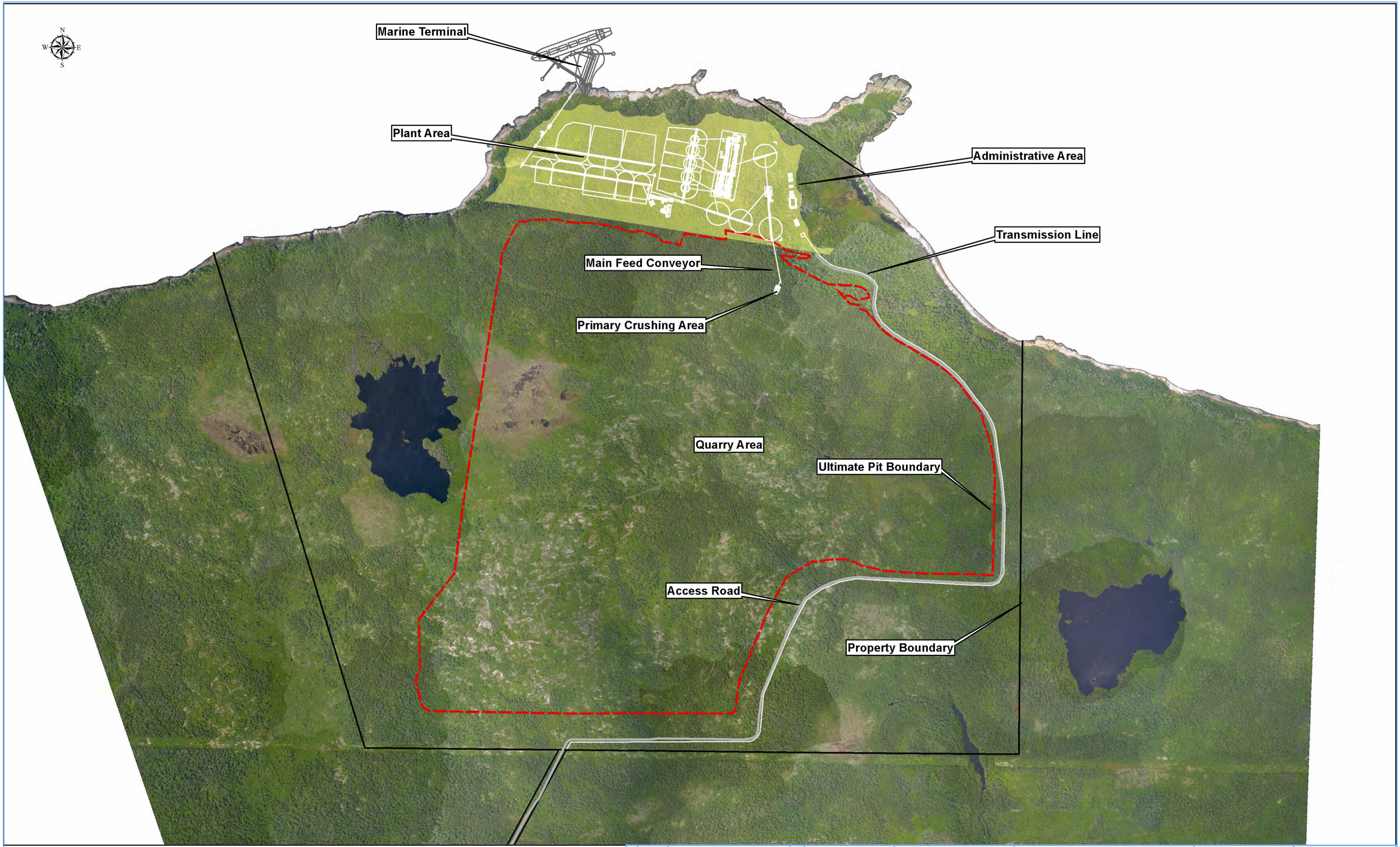


0 125 250 500 750 1,000 Meters

Morien Resources Corp.

| | | | | |
|---|---|---|---|---|
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| | | | | |
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| | | | | |
| | | | | |
| DATE | REVISION | BY | ISSUE DATE: | |

Vulcan Materials Company

Site Components

REGION: NOVA SCOTIA
PLANT: BLACK POINT
DWN BY: CKR | DATE: 01/16/2015 | CHK BY:
JOB NO: | SCALE: 1 in = 250 m
PATH:
DWG. NO.: Figure 3

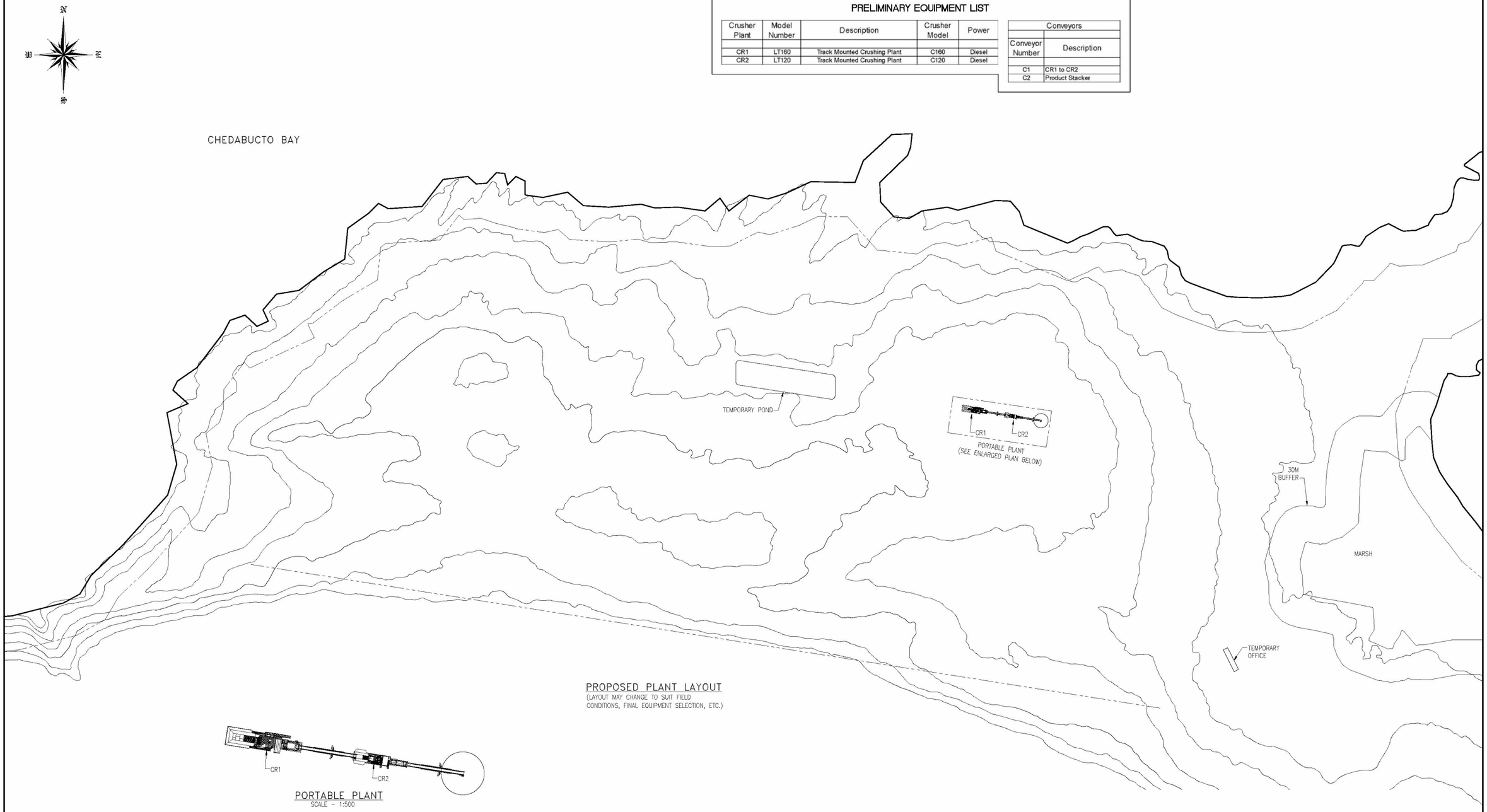
PLOTTED: | LAST UPDATE:

C1092-016

## PRELIMINARY EQUIPMENT LIST

| Crusher Plant | Model Number | Description | Crusher Model | Power |
|---|---|---|---|---|
| CR1 | LT160 | Track Mounted Crushing Plant | C160 | Diesel |
| CR2 | LT120 | Track Mounted Crushing Plant | C120 | Diesel |

| Conveyors | |
|---|---|
| Conveyor Number | Description |
| C1 | CR1 to CR2 |
| C2 | Product Stacker |




PROPOSED PLANT LAYOUT
(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)




PORTABLE PLANT
SCALE – 1:500

GRAPHIC SCALE – METERS 100 0 100 200 300

GRAPHIC SCALE – FEET 100 0 100 200 300 400 500 600 700 800 900 1000

Figure 4 - Phase 1

Morien Resources Corp.

| | | | |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | | | |
| – | | INITIAL RELEASE | |
| | DATE | REVISION | BY |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

PLANT LAYOUT (PHASE 1)

STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN BY: CB DATE: 6/27/14
CHECKED BY: LJ DATE: 9/15/14
PROJ. NO.
FILE SERVER
SCALE: 1 : 1500
SHEET 1 OF 1
DWG. NO.
FIGURE 3.0-16
REV

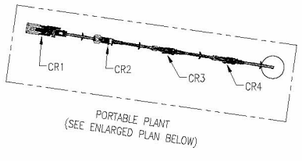
C1092-017

## PRELIMINARY EQUIPMENT LIST

| Crusher Plant | Model Number | Description | Crusher Model | Power |
|---|---|---|---|---|
| CR1 | LT160 | Track Mounted Crushing Plant | C160 | Diesel |
| CR2 | LT120 | Track Mounted Crushing Plant | C120 | Diesel |
| CR3 | LT300HP | Track Mounted Crushing Plant | HP300 | Diesel |
| CR4 | LT300HP | Track Mounted Crushing Plant | HP300 | Diesel |

| Conveyors | |
|---|---|
| Conveyor Number | Description |
| C1 | CR1 to CR2 |
| C2 | CR2 to CR3 |
| C3 | CR3 to CR4 |
| C4 | Product Stacker |

CHEDABUCTO BAY




PORTABLE PLANT
(SEE ENLARGED PLAN BELOW)

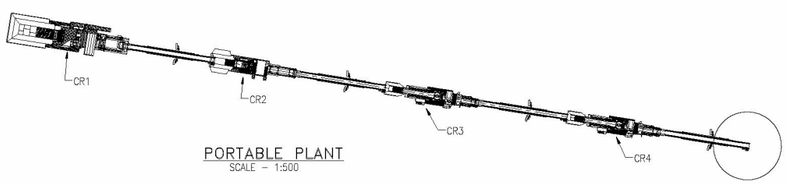
POND

30M BUFFER

MARSH

TEMPORARY OFFICE

PROPOSED PLANT LAYOUT
(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)




PORTABLE PLANT
SCALE – 1:500

100 GRAPHIC SCALE – METERS 0 100 200 300

GRAPHIC SCALE – FEET 100 0 100 200 300 400 500 600 700 800 900 1000

Figure 5 - Phase 2

Morien Resources Corp.

| | | | |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | | | |
| – | INITIAL RELEASE | | |
| | DATE | REVISION | BY |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

PLANT LAYOUT (PHASE 2)

STATE: NOVA SCOTIA
PLANT: BLACK POINT
PROJ. NO.
FILE SERVER
DRAWN BY: CB
CHECKED BY: LJ
DATE: 6/27/14
DATE: 9/15/14
SCALE: 1 : 1500
SHEET 1 OF 1
DWG. NO.: FIGURE 3.0-17
REV.: REV

C1092-018

## PRELIMINARY EQUIPMENT LIST

| Crusher Plant | Model Number | Description | Crusher Model | Power |
|---|---|---|---|---|
| CR1 | LT160 | Track Mounted Crushing Plant | C160 | Diesel |
| CR2 | LT120 | Track Mounted Crushing Plant | C120 | Diesel |
| CR3 | LT300HP | Track Mounted Crushing Plant | HP300 | Diesel |
| CR4 | LT300HP | Track Mounted Crushing Plant | HP300 | Diesel |
| CR5 | LT300HP | Track Mounted Crushing Plant | HP300 | Diesel |

| SCREEN PLANT | MODEL NUMBER | DESCRIPTION | SCREEN SIZE | POWER |
|---|---|---|---|---|
| SC1 | ST620 | TRACK MOUNTED SCREENING PLANT | 6' X 20' | DIESEL |
| SC2 | ST620 | TRACK MOUNTED SCREENING PLANT | 6' X 20' | DIESEL |

| Conveyors | |
|---|---|
| Conveyor Number | Description |
| C1 | CR1 to CR2 |
| C2 | CR2 to CR3 |
| C3 | CR2 to CR3 |
| C4 & C12 | SC2 to CR5 |
| C5 | SC1 To C9 |
| C6 & C7 | Product Stackers |
| C8, C9 & C10 | SC1 to CR4 |
| C11 | CR4 to SC2 |
| C13 | CR5 to C11 |
| C14 & C15 | Product Stackers |

CHEDABUCTO BAY

MARINE TERMINAL

CNV-39

CNV-38

DUMP HOPPER

SC2

78's 35%

57's 39%

DUST 14%

DUST 12%

CR4

SC1

CR3

CR5

CR1

CR2

POND

POND

30M BUFFER

MOBILE EQUIPMENT DEPLOYMENT AREA

FUEL AND MAINTENANCE FLUID STORAGE

FUEL DISPENSING

MARSH

MAINTENANCE FLUID DISPENSING

SHOP

OFFICE

PROPOSED PLANT LAYOUT

(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

100 GRAPHIC SCALE – METERS 0 100 200 300

GRAPHIC SCALE – FEET 100 0 100 200 300 400 500 600 700 800 900 1000

Figure 6 - Phase 3

Morien Resources Corp.

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | | | |
| – | | INITIAL RELEASE | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

PLANT LAYOUT (PHASE 3)

STATE: NOVA SCOTIA | PLANT: BLACK POINT

DRAWN BY: CB | CHECKED BY: LJ | PROJ. NO. | FILE SERVER

DATE: 6/27/14 | DATE: 9/15/14 | SCALE: 1 : 1500 | SHEET 1 OF 1

DWG. NO. FIGURE 3.0-18 | REV.

C1092-019

## PRELIMINARY EQUIPMENT LIST

**Screen Towers**

| Tower No. | Item No. | Description | Size | TPH | Total HP |
|---|---|---|---|---|---|
| ST1 | SCR001 | Scalping Screen | 8x24 TD | 2800 | 60 |
| ST2W | SCR02B | Sizing Screen (West) | 8x24 TD | 1400 | 60 |
| ST3W | SCR03C | Sizing Screen (West) | 8x24 TD | 903 | 60 |
| | SCR03D | Sizing Screen (West) | 8x24 TD | 903 | 60 |
| ST4W | SCR04D | Sizing Screen (West) | 8x20 TD | 361 | 50 |
| | SCR04E | Sizing Screen (West) | 8x20 TD | 355 | 50 |
| | SCR04F | Sizing Screen (West) | 8x20 TD | 361 | 50 |
| ST5 | SCR05A | Wash Screen (South) | 10x20 TD | 1500 | 100 |
| | SCR05B | Wash Screen (North) | 10x20 TD | 1500 | 100 |

**Crushers**

| Dwg. Label | Item No. | Description | Size | TPH | Total HP |
|---|---|---|---|---|---|
| C1 | CRS001 | Gyratory | 54x74 | 2800 | 500 |
| C2 | CRS002 | Secondary Standard | MP1000 | 2259 | 1000 |
| C3A | CRS03A | Tertiary Short Head (West) | H8800 | 590 | 1000 |
| C4A | CRS04A | Tertiary Short Head (West) | H6800 | 269 | 450 |
| C5A | CRS05A | Tertiary Short Head (West) | H6800 | 269 | 450 |

**Conveyors:**

| Name | Description |
|---|---|
| CNV001 | Primary Crusher to Transfer 1 |
| CNV002 | Transfer 1 to Primary Surge |
| CNV003 | Primary Reclaim to Scalping Tower |
| CNV004 | Scapling Tower to Secondary Surge |
| CNV005 | Base Stacker |
| CNV006A & B | Secondary Surge Reclaim |
| CNV007 | Tower 2 to CNV008 Stacker, 1 1/2x1 |
| CNV008 | Stacker, 1 1/2x1 |
| CNV09A | Tertiary Discharge Belt To Transfer 1 |
| CNV10A & B | Transfer 1 To Tower 3 |
| CNV11A & CNV12A | Tower 3 to H6800 Crushers |
| CNV013, CNV014 | Tower 3 to 1x3/4 Pile |
| CNV015, CNV016 | Tower 3 to 3/4x1/2 Pile |
| CNV17A & B, CNV18A, B & C | Tower 3 to Tower 4 |
| CNV019, CNV020 | Tower 4 to CNV020 to 1/2x3/8 Pile |
| CNV021, CNV022 | Tower 4 to CNV022 to 3/8x#8 Pile |
| CNV23A | Tower 4 to CNV011A & B |
| CNV024, CNV025 | Tower 4 to Screenings Pile |
| CNV026 | Base/Screengs Reclaim |
| CNV027 | Fraction Reclaim |
| CNV028, CNV29A & B | Fraction Reclaim to Wash Tower |
| CNV030 | Sand Screws to Reclaim |
| CNV031 | Wash Tower Bypass Belt |
| CNV032 | Wash Tower to Tripper |
| CNV033, CNV034, CNV035 | Tripper and Stackers |
| CNV036, CNV037, CNV038 | Reclaim to Ship Loader |
| CNV039 | Ship Loader |

CHEDABUCTO BAY

MARINE TERMINAL

CNV39

DUMP HOPPER

CNV038

984,000± Total Tons

204,000 Tons

214,780 Tons

214,780 Tons

LOADOUT TUNNEL

CNV036

CNV034

CNV033

CNV035

30,000± Tons

115,000± Tons

LOADOUT TUNNEL

CNV037

CNV032

115,000± Tons

30,000± Tons

30,000± Tons

POND

POND

CNV030

CNV29A

CNV29B

CNV028

SAND SCREWS

WASH TOWER ST5

FINES RECOVERY SYSTEM

CNV031

CNV027

CNV026

BLENDING TUNNEL

1 1/2 X 1

1 X 3/4

3/4 X 1/2

1/2 X 3/8

3/8 X #4

CNV014

CNV016

CNV020

CNV022

CNV024

FINISHING PLANT

ST2W

CNV008

C3A

C4A

C5A

CONTROL TOWER

ST3W

ST4W

#4

CNV025

BASE

SECONDARY SURGE

CNV006A

CNV004

SECONDARY STATION

C2

ST1

CNV005

CNV003

PRIMARY SURGE

CNV002

CNV001

PRIMARY

FUEL DISPENSING

MOBILE EQUIPMENT DEPLOYMENT AREA

FUEL AND MAINTENANCE FLUID STORAGE

MAINTENANCE FLUID DISPENSING

SHOP

OFFICE

SUBSTATION

30M BUFFER

MARSH

PROPOSED PLANT LAYOUT

(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

100 GRAPHIC SCALE – METERS 0 100 200 300

GRAPHIC SCALE – FEET 100 0 100 200 300 400 500 600 700 800 900 1000

Figure 7 - Phase 4

Morien Resources Corp.

| | | | |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | | | |
| – | | INITIAL RELEASE | |
| | DATE | REVISION | BY |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

PLANT LAYOUT (PHASE 4)

STATE: NOVA SCOTIA | PLANT: BLACK POINT

DRWN BY: CB | CHKD BY: LJ | PROJ. NO. | FILE SERVER

DATE: 6/27/14 | DATE: 9/15/14 | SCALE: 1 : 1500 | SHEET 1 OF 1

DWG. NO. FIGURE 3.0-19 | REV

C1092-020

# PRELIMINARY EQUIPMENT LIST

**Screen Towers**

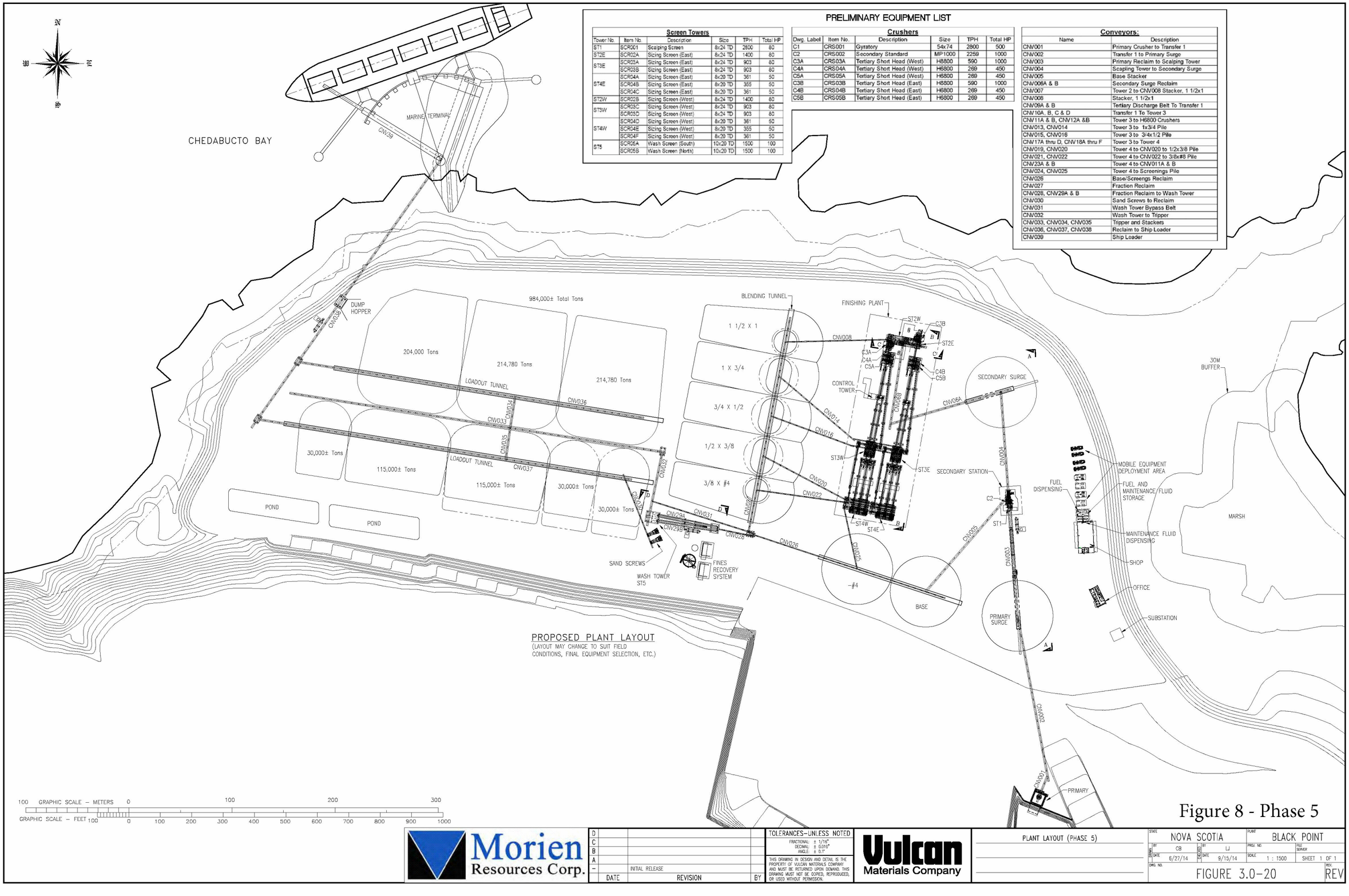
| Tower No. | Item No. | Description | Size | TPH | Total HP |
|---|---|---|---|---|---|
| ST1 | SCR001 | Scalping Screen | 8x24 TD | 2800 | 80 |
| ST2E | SCR02A | Sizing Screen (East) | 8x24 TD | 1400 | 80 |
| ST3E | SCR03A | Sizing Screen (East) | 8x24 TD | 903 | 80 |
| | SCR03B | Sizing Screen (East) | 8x24 TD | 903 | 80 |
| ST4E | SCR04A | Sizing Screen (East) | 6x20 TD | 361 | 50 |
| | SCR04B | Sizing Screen (East) | 8x20 TD | 355 | 50 |
| | SCR04C | Sizing Screen (East) | 6x20 TD | 361 | 50 |
| ST2W | SCR02B | Sizing Screen (West) | 8x24 TD | 1400 | 80 |
| ST3W | SCR03C | Sizing Screen (West) | 8x24 TD | 903 | 80 |
| | SCR03D | Sizing Screen (West) | 8x24 TD | 903 | 80 |
| ST4W | SCR04D | Sizing Screen (West) | 8x20 TD | 361 | 50 |
| | SCR04E | Sizing Screen (West) | 8x20 TD | 355 | 50 |
| | SCR04F | Sizing Screen (West) | 6x20 TD | 361 | 50 |
| ST5 | SCR05A | Wash Screen (South) | 10x20 TD | 1500 | 100 |
| | SCR05B | Wash Screen (North) | 10x20 TD | 1500 | 100 |

**Crushers**

| Dwg. Label | Item No. | Description | Size | TPH | Total HP |
|---|---|---|---|---|---|
| C1 | CRS001 | Gyratory | 54x74 | 2800 | 500 |
| C2 | CRS002 | Secondary Standard | MP1000 | 2259 | 1000 |
| C3A | CRS03A | Tertiary Short Head (West) | H6800 | 590 | 1000 |
| C4A | CRS04A | Tertiary Short Head (West) | H6800 | 269 | 450 |
| C5A | CRS05A | Tertiary Short Head (West) | H6800 | 269 | 450 |
| C3B | CRS03B | Tertiary Short Head (East) | H6800 | 590 | 1000 |
| C4B | CRS04B | Tertiary Short Head (East) | H6800 | 269 | 450 |
| C5B | CRS05B | Tertiary Short Head (East) | H6800 | 269 | 450 |

**Convevors:**

| Name | Description |
|---|---|
| CNV001 | Primary Crusher to Transfer 1 |
| CNV002 | Transfer 1 to Primary Surge |
| CNV003 | Primary Reclaim to Scalping Tower |
| CNV004 | Scapling Tower to Secondary Surge |
| CNV005 | Base Stacker |
| CNV006A & B | Secondary Surge Reclaim |
| CNV007 | Tower 2 to CNV008 Stacker, 1 1/2x1 |
| CNV008 | Stacker, 1 1/2x1 |
| CNV09A & B | Tertiary Discharge Belt To Transfer 1 |
| CNV10A, B, C & D | Transfer 1 To Tower 3 |
| CNV11A & B, CNV12A &B | Tower 3 to H6800 Crushers |
| CNV013, CNV014 | Tower 3 to 1x3/4 Pile |
| CNV015, CNV016 | Tower 3 to 3/4x1/2 Pile |
| CNV17A thru D, CNV18A thru F | Tower 3 to Tower 4 |
| CNV019, CNV020 | Tower 4 to CNV020 to 1/2x3/8 Pile |
| CNV021, CNV022 | Tower 4 to CNV022 to 3/8x#8 Pile |
| CNV23A & B | Tower 4 to CNV011A & B |
| CNV024, CNV025 | Tower 4 to Screenings Pile |
| CNV026 | Base/Screengs Reclaim |
| CNV027 | Fraction Reclaim |
| CNV028, CNV29A & B | Fraction Reclaim to Wash Tower |
| CNV030 | Sand Screws to Reclaim |
| CNV031 | Wash Tower Bypass Belt |
| CNV032 | Wash Tower to Tripper |
| CNV033, CNV034, CNV035 | Tripper and Stackers |
| CNV036, CNV037, CNV038 | Reclaim to Ship Loader |
| CNV039 | Ship Loader |




PROPOSED PLANT LAYOUT
(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

100 GRAPHIC SCALE – METERS 0 100 200 300

GRAPHIC SCALE – FEET 100 0 100 200 300 400 500 600 700 800 900 1000

Figure 8 - Phase 5

Morien Resources Corp.

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | | | |
| – | | INITIAL RELEASE | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

PLANT LAYOUT (PHASE 5)

STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN: CB 6/27/14
CHECKED: LJ 9/15/14
PROJ. NO.
FILE SERVER
SCALE: 1 : 1500
SHEET 1 OF 1
DWG. NO.: FIGURE 3.0-20
REV

### *2.3.5 Marine Terminal*

A rubble mound with conveyors and related infrastructure installed on a stone breakwater constructed of coarse rock will be built as the marine terminal. Caissons and mooring dolphins will be used for berthing the ship. Preliminary engineering drawings for the terminal are shown in **Figure 9 to Figure 12**. The major components of the terminal are:

- Three breasting caissons used for berthing the ship.
- Two mooring dolphins.
- Eleven slewing rail piers that support the slewing rail, which in turn allows the shiploader to move in an arc.
- One slewing rail caisson to support the slewing rail.
- Shiploader pivot point caisson, which provides the lateral stability of the shiploader.
- Rubble fill with an access road for maintenance.
- The shiploader arm that delivers aggregate product to the ship.

The shiploader is a telescoping system approximately 136 m long when fully extended. It will have a loading capacity approaching 5,000 TPH. The rubble mound portion of the terminal will be approximately 160 m in length. It will be constructed with a clean rock-filled base, armour stone protection on all sides and include a crushed stone surface. This structure will have a seafloor footprint of approximately 11,078 $m^2$ which includes the combined seafloor surface area occupied by the rubble fill, caissons and dolphins.

## 2.4 Project Activities

### *2.4.1 Site Preparation, Cut and Fill*

Site preparation will begin with clearing of vegetation and removal/stockpiling of organic material and overburden on the 28 ha plant site and administrative area. Following this, this area will require cut and fill to provide a level surface to construct the processing plant.

A cut or excavation of approximately 600,000 $m^3$ and a fill of 835,000 $m^3$ will be needed to level the area prior to construction. The plant and administrative area will be designed with 1 meter of cross slope drainage which will direct all storm water to two sedimentation ponds. The site preparation and construction phase of the plant site and administrative area is anticipated to occur over a 36 month period.

### *2.4.2 Marine Terminal Construction*

The marine terminal will be constructed from shore using fill and rock (i.e. rip-rap) sourced from the site. Typical construction support includes cranes to lift in reinforcing steel, concrete trucks and pumps and lights for night time activity. The completion of each caisson, once sunk, will take approximately one month. The slewing rail piers will be supported by piles which will be installed from a barge. There will be approximately eleven piers which are expected to have four piles each.

C1092-02



SITE LOCATION PLAN

AREA OF WORK

BLACK POINT

CROWN LAND
PGPI NO.
07-25-50082

CHEDABUCTO
BAY

FOX
BAY

FOGHERTY
LAKE

MURPHYS
LAKE

EXISTING TRANSMISSION LINE

## SITE LAYOUT PLAN

SCALE: 1:5000

1:5000

50 0 50 100 150 200 250 300 350 M

NOTE:
(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS,
FINAL EQUIPMENT SELECTION, ETC.)

Morien Resources Corp.

EASTPOINT ENGINEERING

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | 2014/08/28 | ISSUED FOR PERMIT | BT |
| – | | | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

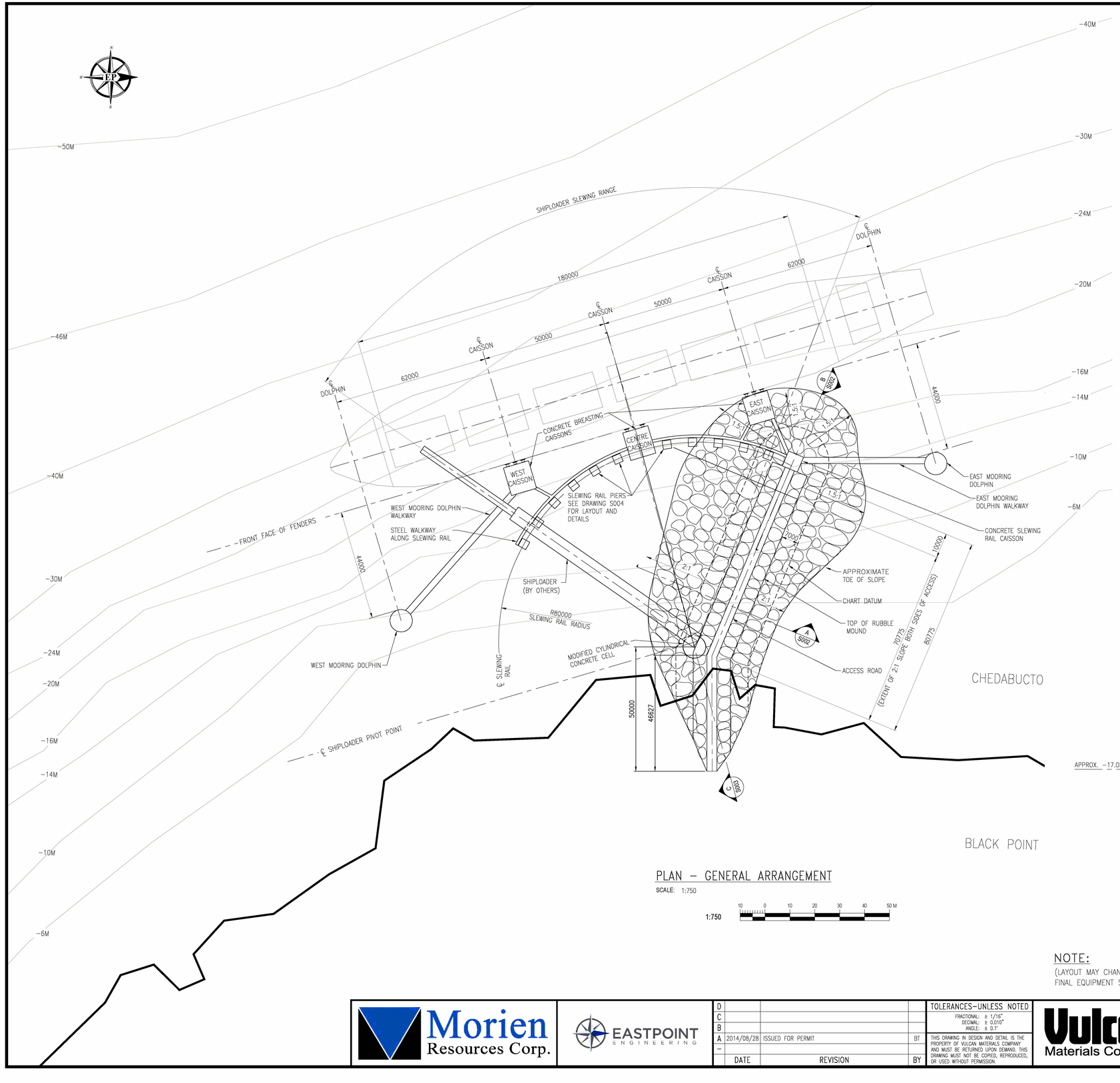
SITE LAYOUT PLAN

MARINE TERMINAL

EASTPOINT DRAWING NUMBER S001

STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN BY: QHS
CHECKED BY: BT
PROJ. NO.: 55126
FILE SERVER: EASTPOINT
DATE: 2014/09/05
DATE: 2014/08/28
SCALE: AS NOTED
SHEET 1 OF 4
DWG. NO.: FIGURE 9
REV.: A

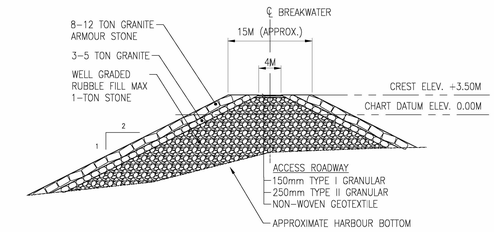
| AREA OF IMPACT AT SEA FLOOR | |
|---|---|
| RUBBLE MOUND | 7916M² |
| BREASTING CAISSONS (3) | 1120M² |
| MOORING DOLPHIN (2) | 1050M² |
| SLEWING RAIL AND PIER | 992M² |




PLAN – GENERAL ARRANGEMENT

SCALE: 1:750

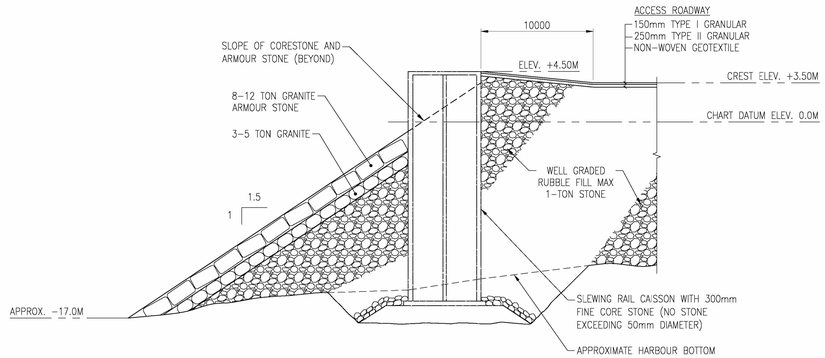
1:750 — 10 0 10 20 30 40 50 M




A S002 SECTION – TYPICAL RUBBLE MOUND

SCALE: 1:500

1:500 — 5 0 5 10 15 20 25 30 35 M




B S002 SECTION – RUBBLE MOUND AT CAISSON

SCALE: 1:250

1:250 — 5 0 5 10 15 M

NOTE:

(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

Morien Resources Corp.

EASTPOINT ENGINEERING

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | 2014/08/28 | ISSUED FOR PERMIT | BT |
| – | | | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°

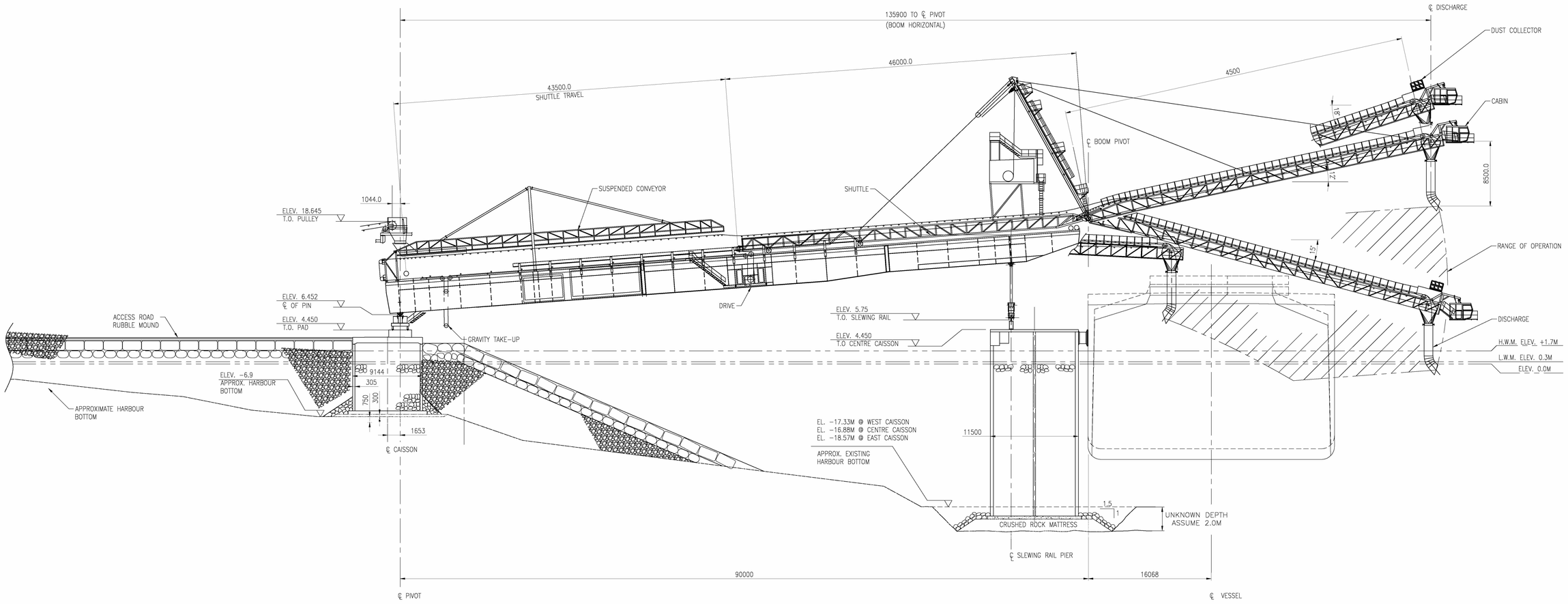


Vulcan Materials Company

GENERAL ARRANGEMENT

EASTPOINT DRAWING NUMBER S002

STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN BY: QHS
CHECKED BY: BT
PROJ. NO.: 55126
FILE SERVER: EASTPOINT
DATE: 2014/09/08
DATE: 2014/08/28
SCALE: AS NOTED
SHEET 2 OF 4
DWG. NO.: FIGURE 10
REV.: A




B
S002 SECTION

SCALE: 1:250

1:250

5 0 5 10 15 M

NOTE:

(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

Morien Resources Corp.

EASTPOINT ENGINEERING

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | 2014/08/28 | ISSUED FOR PERMIT | BT |
| – | | | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°

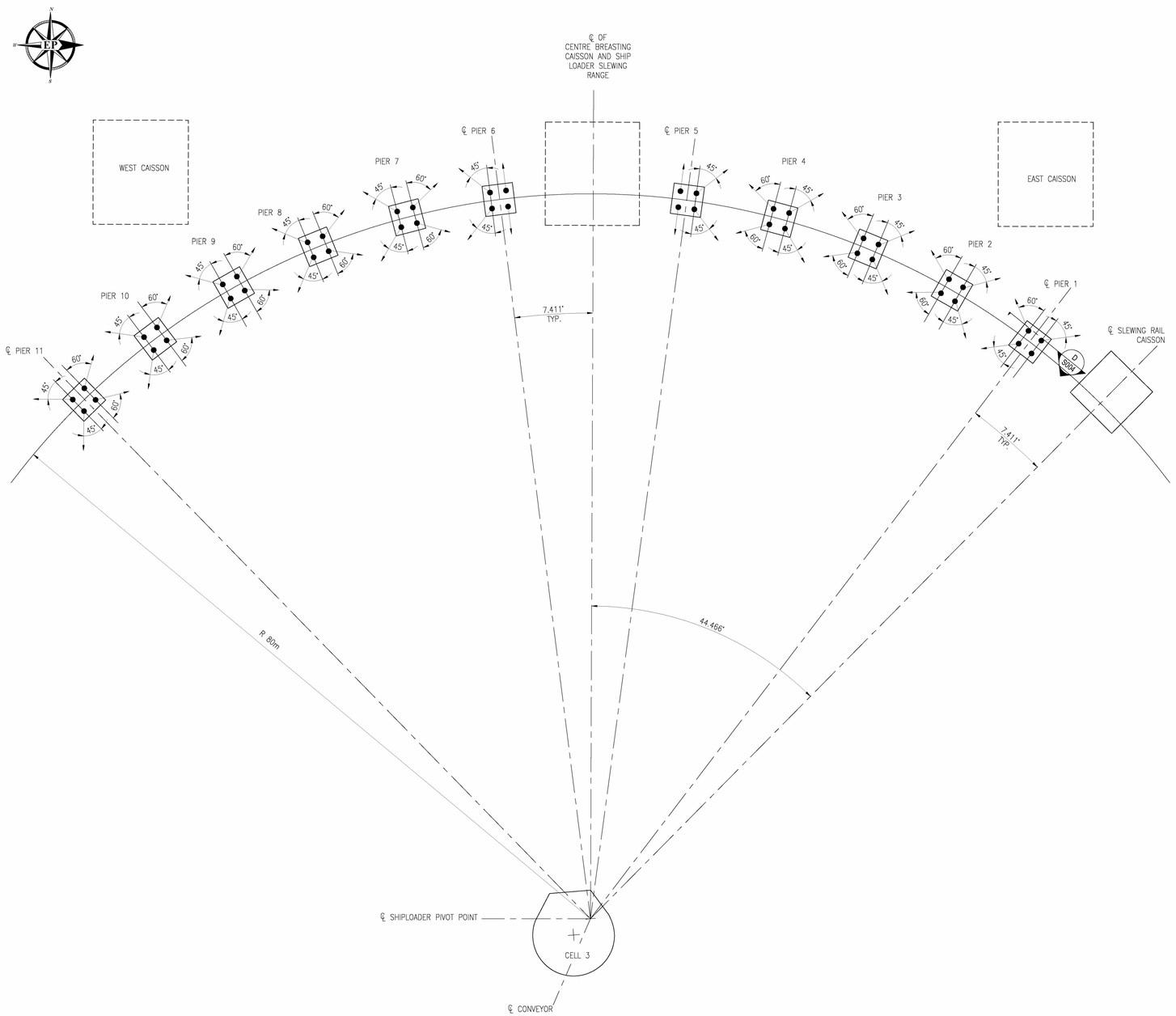


Vulcan Materials Company

SECTION VIEW

EASTPOINT DRAWING NUMBER S003

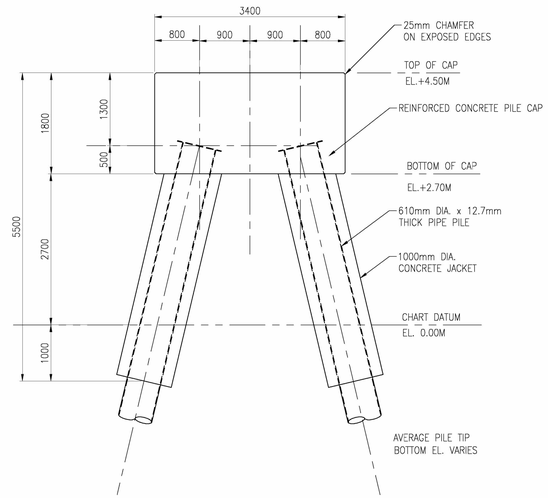
STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN BY: QHS
CHECKED BY: BT
PROJ. NO.: 55126
FILE SERVER: EASTPOINT
DATE: 2014/09/05
DATE: 2014/08/28
SCALE: AS NOTED
SHEET 3 OF 4
DWG. NO.: FIGURE 11
REV.: A




PLAN – SLEWING RAIL PIER LAYOUT

SCALE: 1:250

1:250 5 0 5 10 15 M




D S004 SECTION – TYPICAL SLEWING RAIL PIER

SCALE: 1:50

NOTE:

(LAYOUT MAY CHANGE TO SUIT FIELD CONDITIONS, FINAL EQUIPMENT SELECTION, ETC.)

Morien Resources Corp.

EASTPOINT ENGINEERING

| | DATE | REVISION | BY |
|---|---|---|---|
| D | | | |
| C | | | |
| B | | | |
| A | 2014/08/28 | ISSUED FOR PERMIT | BT |
| – | | | |

TOLERANCES–UNLESS NOTED
FRACTIONAL: ± 1/16"
DECIMAL: ± 0.010"
ANGLE: ± 0.1°



Vulcan Materials Company

SLEWING RAIL PIER LAYOUT PLAN AND SECTION

EASTPOINT DRAWING NUMBER S004

STATE: NOVA SCOTIA
PLANT: BLACK POINT
DRAWN BY: QHS
CHECKED BY: BT
PROJ. NO.: 55126
FILE SERVER: EASTPOINT
DATE: 2014/09/05
DATE: 2014/08/28
SCALE: AS NOTED
SHEET 4 OF 4
DWG. NO.: FIGURE 12
REV.: A

The piles will be installed using pile driving hammers and churn drills and will be anchored in the bedrock. At this time, no dredging appears to be required. Silt curtains and acoustic blankets will be considered during installation, as needed. All marine construction will be completed using conventional marine construction techniques.

Prefabricated steel for the slewing rail and the shiploader will be delivered to the site via barge. Installation will be conducted utilizing cranes and work barges. The loadout conveyor (equipped with aggregate spill containment) will extend from the onshore loadout system to the shiploader. Any piles required for the loadout conveyor in the nearshore area would be located in the rubble fill.

### *2.4.3 Quarrying*

The site will be developed as an open pit quarry using conventional surface mining methods. The mining cycle will include four basic actions:

- Loosening and stockpiling of the vegetation, overburden, and loose rock by dozer and/or track hoe equipment;
- Drilling and blasting to establish benches, haul roads, and sumps for stormwater management;
- Loading of loosened rock into haul trucks by track-mounted and/or rubber tired loading equipment; and
- Transportation of the quarried rock by haul trucks to a discharge point at the edge of the quarry for feed to the primary crusher.

It is anticipated that blasting will occur 30 days per year during the initial project phases, and increase to a maximum of about 200 days per year at full operation. A typical production shot will have less than 100 drill holes each drilled approximately 15 to 17 m deep. Shots utilized for quarry development such as haul roads and sumps will have variable depths generally from 3 to 10 meters.

Freshly mined rock will be transported to and reduced in size by a primary crusher located on a bench on the east side of the quarry. The crushed material will then be transported via conveyor to the processing plant.

### *2.4.4 Processing Plant Operation*

Phase 1

Blasted material will be trucked to the mobile plant and dumped adjacent to the primary module. A loader will then feed the material into the plant. The coarse fill material will be stockpiled by conveyor.

Phase 2

Operation of this plant will be identical to that of the Phase 1 plant. The fine graded fill material will be stockpiled by conveyor and no washing of aggregate will occur during Phase 1 or Phase 2. All material produced will be a base or crusher run product.

Phase 3

Operation of the Phase 3 plant will be similar to that of the earlier phases. In this plant, various products will be stockpiled via conveyor and trucked to the marine terminal. The conveyor feeding the ship loader will include a loadout hopper that can be filled with a plant loader.

Phase 4

In this plant, blasted material will be trucked to the primary crusher where it will be dumped into the primary hopper. There it will be crushed and conveyed to a primary surge pile located near the "secondary" where it will be fed into the plant. As the material is processed with further crushing and screening, it will be conveyed to product piles that are located over "reclaim" tunnels, that is, tunnels equipped with conveyor systems that allow the products to be moved. Products can then be reclaimed to the wash tower for rinsing or bypassed around it. Material will then be stockpiled over the loadout reclaim tunnels that will convey product to the marine terminal.

Phase 5

As noted above, this plant will upgrade the tertiary portion of the Phase 4 plant by installing a parallel tertiary processing circuit. Production through the finishing plant will be increased to 2,800 TPH. Processing and loadout of the material will be identical to the Phase 4 plant but with a higher capacity. The parallel circuit will be identical to the original tertiary to minimize design time and costs.

### *2.4.5 Ship Loading*

The shiploader will load aggregate into the holds of ships (up to 70,000 tonnes) and barges that will transport the material to the end markets. Aggregate loading onto the ships will be via conveyors and will approach 5,000 TPH once the full load-out system is completed. It is estimated that it will take approximately 18 to 24 hours to load the largest ships and that approximately 90-100 ships will be loaded per year once the plant reaches peak production.

### *2.4.6 Decommissioning*

The Proponent will the lease the property from the MODG for the life of the quarry, estimated to be sometime after 2070. The land will be returned to the MODG following the completion of operations, equipment decommissioning, removal of plant and marine terminal infrastructure, and the acceptance of site decommissioning and reclamation activities.

In accordance with the requirements of the provincial Pit and Quarry Guidelines (NSEL 1999), the Proponent will prepare a written plan approved by NSE to provide for partial or total abandonment and rehabilitation of the site. It is anticipated that the plan will include an initial rehabilitation plan, progressive rehabilitation measures and / or a final rehabilitation plan. The Proponent will also post interim and final security bonds for the quarry, as required by the Pit and Quarry Guidelines and the *Approval and Notification Procedure Regulations*.

The rehabilitation plan will be developed for the Project site and submitted to regulators for review as part of the provincial Part V Industrial Approval application. The plan will include short-term and long-term reclamation efforts as well as details of the proposed final reclamation plan such as topography, maximum slopes, re-vegetation plans, and potential future land uses once the quarry operation is complete.

All equipment and related infrastructure including the processing plant, machinery and equipment will be removed from the site, provided this is requested by the Municipality who may

wish to keep certain infrastructure on site. The plant site and administrative areas will be graded to allow for future commercial, industrial, recreational, or residential land use, or to allow for restoration of the area to existing conditions to provide wildlife habitat. The pit will be allowed to fill with fresh water to an elevation near sea level.

To avoid disturbance of the marine environment and for potential future use, the rubble mound, mooring dolphins, caissons, slewing rails, and buoys will likely be left in place. The shiploader arm and ancillary mechanical equipment including suspended conveyors, dust collectors and drive belts will be removed from the Project site.

## 2.5 Project Schedule

Table 2 provides a generalized project schedule that presents the major construction and operational milestones.

**Table 2:**
**Generalized Project Schedule**

| Year | Activity Undertaken or Anticipated |
|---|---|
| 2010-11 | Baseline ecological studies initiated |
| | Initial engagement with the public, regulatory agencies and First Nations |
| 2012-2013 | Properties assembled by the MODG (beginning in 2007-2008) |
| 2014 | Environmental Assessment Initiated<br>• Consultation and engagement undertaken:<br>• Meetings and site visits with First Nations representatives<br>• Consultation and site visits with Regulatory Agencies<br>• Meetings with residents and local fishermen<br>• Open Houses, presentations, and meetings of the Citizen's Liaison Committee (CLC)<br>• Submission of the draft EIS for review by the CEA Agency and NSE |
| 2015 | Submission of the Environmental Impact Statement report<br>Completion of the environmental assessment |
| 2016 | Permits and Approvals |
| Early 2017 | Updated Market Evaluation |
| 2017-2018 | Establishment of Sales Yards Receipt of Aggregate by Vessel from Black Point |
| 2018-2021 | Construction and Equipment Testing (Limited Production) |
| 2021 | Commence Full Scale Operations |
| 2070+ | Closure and Decommissioning |

# 3.0 SCOPE OF THE PROJECT AND THE ASSESSMENT

## 3.1 Scope of the Assessment

### *3.1.1 Scope of the Project to be Assessed*

The Project is a proposed aggregate quarry comprising the construction, operation and decommissioning of an open pit, processing plant and marine terminal located on a property leased from the Municipality of the District of Guysborough (MODG). The scope of the Project to be assessed under CEAA, 2012 and the Nova Scotia *Environmental Assessment Regulations* includes the following components and activities:

- The stock piles, overburden storage and waste rock;
- The open pit quarry;
- Water supply needs and water management;
- Drilling and blasting activities;
- Solid and hazardous waste and sewage management treatment and systems;
- The processing of extracted materials;
- Noise and dust management;
- Access and power sources and infrastructure;
- The nature and geotechnical properties of geological materials;
- Navigation activities in Canadian waters;
- The construction, operation, maintenance, foreseeable modifications, closure, decommissioning and restoration of the sites and facilities;
- The time of year, frequency, and duration of all project activities; and
- Wharf and port infrastructure and facilities.

No facilities for the manufacture and storage of explosives will be present on site and no capital and maintenance dredging work are expected to be required at this time; these items are excluded from the Project scope.

### *3.1.2 Factors to be Considered*

This EIS considers the factors listed in subsection 19(1) of CEAA, 2012 as well as section 79 of the *Species at Risk Act* and section 9.1 of the CEA Agency's Guidelines issued for this Project. This includes consideration of the environmental effects of the Project, the significance of effects, public and First Nation comments, mitigation measures, follow up monitoring programs the purpose of the Project, alternative means of undertaking the Project and the effects of the environment on the Project.

### *3.1.3 Scope of the Factors to be Considered*

As provided in Section 5(1) of CEAA, 2012, the environmental effects that are to be considered regarding an "act or thing, a physical activity, a designated project or a project" are:

- *(a) a change that may be caused to the following components of the environment that are within the legislative authority of Parliament:*
  - *(i) fish and fish habitat as defined in subsection 2(1) of the* Fisheries Act*,*
  - *(ii) aquatic species as defined in subsection 2(1) of the* Species at Risk Act*,*
  - *(iii) migratory birds as defined in subsection 2(1) of the* Migratory Birds Convention Act, 1994*, and*
  - *(iv) any other component of the environment that is set out in Schedule 2;*
- *(b) a change that may be caused to the environment that would occur*
  - *(i) on federal lands,*
  - *(ii) in a province other than the one in which the act or thing is done or where the physical activity, the designated project or the project is being carried out, or*
  - *(iii) outside Canada; and*
- *(c) with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on*
  - *(i) health and socio-economic conditions,*
  - *(ii) physical and cultural heritage,*
  - *(iii) the current use of lands and resources for traditional purposes, or*
  - *(iv) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance*

Under Section 5(1) of CEAA, 2012, additional factors must be considered when the Project requires a federal authority to exercise a power or perform a duty or function conferred on it under any Act of Parliament other than CEAA, 2012. In this case, authorizations, approvals and/or permits are required from Fisheries and Oceans Canada and Transport Canada (as a minimum) and so the following environmental effects are also taken into account:

- *(a) a change, other than those referred to in paragraphs (1)(a) and (b), that may be caused to the environment and that is directly linked or necessarily incidental to a federal authority's exercise of a power or performance of a duty or function that would permit the carrying out, in whole or in part, of the physical activity, the designated project or the project; and*
- *(b) an effect, other than those referred to in paragraph (1)(c), of any change referred to in paragraph (a) on*
  - *(i) health and socio-economic conditions,*

- *(ii) physical and cultural heritage, or*
- *(iii) any structure, site or thing that is of historical, archaeological, paleontological or architectural significance*

Given this, the scope of the assessment also includes:

- Federal powers, duties or functions that may permit the carrying out of the project or associated activities;
- The environmental and other regulatory approvals and legislation applicable to the project at the federal, provincial, regional and municipal levels;
- Government policies, resource management, planning or study initiatives pertinent to the project;
- Treaties or self-government agreements with Aboriginal groups that are pertinent to the project;
- Relevant municipal planning strategies, land use bylaws, land use zoning, community plans and development permitting processes; and
- The regional, provincial and/or national objectives, standards or guidelines that have been used to assist in the evaluation of any predicted environmental effects.

## 3.2 Environmental Assessment Methods

### *3.2.1 Overview of Approach*

The goal of applying a defined environmental assessment methodology is to carefully examine the Project and related activities to ensure they will not cause "serious or irreversible harm to the environment, especially with respect to environmental functions and integrity, system tolerance and resilience, and/or the human health of current or future generations" (CEA Agency 2014).

To establish the appropriate scope of an environmental assessment, it is standard practice to limit the assessment to those environmental components that are valued or of interest for ecological, scientific, cultural, regulatory and/or economic reasons. These components are referred to as Valued Components (VCs).

Once the existing condition for each VC is known, the environmental assessment:

1. Predicts the Project-related environmental effects or impacts and evaluates the scope and scale of these effects;
2. Describes a number of mitigation measures and practices that the Proponent will use to avoid, minimize, eliminate, mitigate, or compensate for the effects;
3. Assesses the cumulative effects from other probable future projects; and
4. Determines the residual effects remaining after mitigation and assesses the significance of these effects on each VC.

### *3.2.2 Identification of VCs*

An internal issues-scoping exercise was undertaken to identify the VCs of both general and project-specific interest. For the Black Point Quarry Project, provisional VCs were identified through:

- Discussions with federal and provincial regulatory agencies;
- A review of the EIS Guidelines prepared for this Project;
- A review of applicable provincial and federal regulation;
- Discussions with government scientific authorities;
- Previous environmental studies conducted on site;
- Comments raised through various public meetings and outreach events;
- A review of information submitted in support of nearby and similar environmental assessments; and
- The professional experience of the Project team.

Based on this methodology, the following VCs were selected for assessment:

1. Air Quality and Climate Change
2. Noise
3. Ambient Light
4. Geology, Soil & Sediment Quality
5. Groundwater Resources
6. Marine and Surface Water Resources
7. Terrestrial Ecosystems, Habitat & Vegetation
8. Wetlands
9. Terrestrial Wildlife
10. Freshwater Species and Habitat
11. Marine Species and Habitat
12. Species at Risk
13. Local Economy, Land and Resource Use
14. Tourism and Recreation
15. Commercial Fisheries
16. Archaeological and Heritage Resources
17. Aboriginal Land and Resource Use

### *3.2.3 Boundaries*

Temporal boundaries represent the duration over which the Project activities interact with each VC. In general, the temporal boundaries are (a) the construction period, and (b) the operating life of the Project, through to decommissioning and reclamation.

Spatial boundaries are those geographic limits that help define the scale and range of the interactions between the Project and each VC. The following spatial boundaries are used for this assessment.

1. The **Project Area** is confined to all territory within the limits of the Project property boundary;

2. The **Affected Area** is the area which could potentially be affected by Project components or activities immediately beyond the PA. The Affected Area is similar to the area directly adjacent the Project property but can be larger depending on the component being considered.

The extent to which the Affected Area is within the spatial boundaries of the Project is VC-specific and dependent on biological and physical considerations. For most VCs the Affected Area is generally within two kilometers of the Project Property limit.

3. The **Study Area**: the Study Area is defined by considering all Project-environment interactions, including diffuse or longer range effects such as noise and light, which can only be modeled at this time. It may include, for example, the waters of Chedabucto Bay south of the shipping lanes where the Project-related marine activities and interactions will occur; for other VCs the SA may include the MODG where the majority of the social and economic effects can be expected.

Technical boundaries represent limits to the Project team's ability to asses a VC, pathway or receptor. A technical boundary is a theoretical or actual limitation on the ability to measure, assess, and/or monitor potential environmental effects.

Administrative boundaries are those limits that originate through regulatory, public policy or economic reasons. Where applicable, administrative boundaries are described in each VC chapter.

## 4.0 ALTERNATIVE MEANS OF UNDERTAKING THE PROJECT

Section 19(1)g of CEAA, 2012 requires that federal environmental assessment consider alternative means of undertaking a project and the consequent environmental effects of such alternative scenarios.

Table 3 summarizes the alternatives assessment.

**Table 3:**
**Summary of the Alternative Means of Undertaking the Project**

| Project Component | Alternative Means | Technical Feasibility | Economic Feasibility | Environmental Effects | Preferred Option |
|---|---|---|---|---|---|
| Quarry Location | Black Point Site | Technically Feasible | Economically Feasible | A number of environmental effects are associated with any quarry development; no significant residual environmental effects are anticipated at the Black Point site. | Yes |
| | Other Nova Scotia Sites | Not Technically Feasible considering the range and specificity of the geographical and resource requirements | Not Economically Feasible based on the Proponent's analysis and given the high-bulk low-cost nature of the aggregate resource | Not assessed since no feasible alternative site was identified | No |
| Rock Extraction Method | Drilling and Blasting | Technically Feasible | Economically Feasible | Environmental effects are similar in both alternatives: will result in noise and dust impacts | Yes |
| | Ripping | Not Technically Feasible considering the hardness and density of the granite resource | Not Economically Feasible | Environmental effects are similar in both alternatives: will result in noise and dust impacts | No |
| Development and Transportation | Rock Face Open Pit | Technically Feasible | Economically Feasible | Environmental effects are largely similar under both mining options | Yes |
| | Glory Hole Open Pit | Not Technically Feasible primarily due to worker safety considerations | Economically Feasible but additional infrastructure would significantly increase production costs | Potential social (human health) effects are greater in the glory hole scenario due to increased worker exposure to accidents and malfunctions | No |
| | Transport via Ship from Dedicated Terminal | Technically Feasible | Economically Feasible | Environmental effects relate primarily to Local Economy, Land and Resource Use; shipping related effects are similar in both scenarios. | Yes |
| | Truck Transport to an Existing Terminal Followed by Transport via Ship (e.g., Auld's Cove) | Technically Feasible | Not Economically Feasible due to truck transportation costs, which would eliminate profitability | Significantly more environmental and economic impacts due to truck traffic through rural and residential areas. Increased air and noise emissions in this scenario. | No |

| | | | | | |
|---|---|---|---|---|---|
| Marine Terminal Location | Eastern Location | Technically Feasible | Economically Feasible | Environmental effects are similar under both alternatives. The VCs Marine Species and Habitat and Commercial Fisheries and Aquaculture would be affected in a similar manner at both terminal locations. | Yes |
| | Western Location | Not Technically Feasible due to shallow water depths | Economically Feasible | As above; this location is also slightly more sheltered from winds originating to the northeast. | No |
| Marine Terminal Construction | Rubble Mound Wharf | Technically Feasible and permits the secure storage of acid generating rock; more operationally efficient since it permits vehicular access to ship mooring points for maintenance | Economically Feasible; less expensive to design, build and maintain | Both approaches would affect Marine Species/Habitat and Commercial Fisheries to approximately the same degree. Rubble Mound Wharf occupies more seafloor than the Concrete Caisson Wharf but the rubble would eventually act as lobster habitat. | Yes |
| | Concrete Caisson Wharf | Technically Feasible but less stable in severe weather; more dangerous to maintain since boat access would be needed. | Economically Feasible | Concrete Caisson Wharf occupies less seafloor than the Rubble Mound Wharf but would shade the seafloor, negatively affecting habitat quality and use. | No |
| Stockpile Locations | Western End Opposite the Marine Terminal | Technically Feasible | Economically Feasible: this location is both operationally and economically more practical. | In both alternatives, several wetlands would be lost | Yes |
| | Eastern End near Wetland 2 | Technically Feasible although it greatly increases the complexity of operation and may introduce occupational health and safety risks | Not Economically Feasible: this location requires a complete reconfiguration of processing plant and a much longer conveyor system to deliver aggregate to the marine terminal. | In addition to wetland loss, Wetland 2 is potentially exposed to runoff from the stockpiles in this alternative | No |
| Waste Management | Collection tank for septic wastes with transport and treatment at the Canso | Technically Feasible and practical | Economically Feasible and cost effective | Minimal impact to Groundwater Resources and Marine and Surface Water Resources. | Yes |

| | | | | | |
|---|---|---|---|---|---|
| | municipal waste water treatment facility | | | | |
| | Other septic treatment systems: conventional septic tank and leach field, raised bed systems, rotating biological contactors, peat-based treatment systems, constructed wetlands, and recirculating sand filtration | Not Technically Feasible due to lack of soil cover (conventional leach field): Technically Feasible but poor operational records when applied to operations at this scale (non-conventional treatment systems). | Economically more expensive to design, purchase, operate and maintain | Varying long term impacts can be expected to Groundwater Resources and Marine and Surface Water Resources through treated effluent discharge. | No |
| | "Crusher fines" storage outside of the quarry | Technically Feasible | Economically Feasible but more expensive considering the increased transport distance to the storage site and the greater number of times the materials would be handled | Increased risk of accidental discharge with potential negative effects on Marine and Surface Water Resources, Terrestrial Ecosystems, Habitat & Vegetation, Wetlands, and Terrestrial Wildlife. Similar anticipated effects (i.e., minimal) on Groundwater Resources in both alternatives. Increased handling and transport increases impacts to air quality. | No |
| | "Crusher fines" storage within the quarry | Technically Feasible | Economically Feasible | No risk of accidental discharge to the environment (potentially affecting Marine and Surface Water Resources, Terrestrial Ecosystems, Habitat & Vegetation, Wetlands, and Terrestrial Wildlife | Yes |
| Electrical Supply | Tie-in to the existing electrical transmission line | Technically Feasible | Economically Feasible; more expensive over the short term but costs are recovered over the longer term. | Environmental effects associated with habitat and vegetation loss within the right of way are minimized by using the same right of way for the access road. | Yes |
| | Use of multiple on-site generators | Technically Feasible | Economically Feasible but more expensive over the long term due to fuel, lubricant and transport costs, as well as maintenance and operating costs | Increased risks of fire and fuel spills given the generators' fuel requirements; increased impacts to ambient noise levels; increased GHG emissions | No |

# 5.0 PUBLIC AND ABORIGINAL ENGAGEMENT

The Proponent implemented a comprehensive consultation program with the following objectives:

- to identify issues and concerns of interest to the affected communities, stakeholder groups and residents;
- to assist in judging the nature and intensity of Project benefits or impacts;
- to solicit local information and expert opinions; and
- to fulfil regulatory requirements.

## 5.1 Public Engagement

The Proponent has informed stakeholders of the Project, explained the planning and regulatory processes, advertised consultation and engagement opportunities and solicited input into the Project Description and the EIS report. Engagement tools and techniques that have been applied during the public consultation program include:

1. a Project-specific website – www.blackpointquarry.ca
2. a stakeholder database including email and mailing lists used for email outreach to interested residents and others;
3. an open house event, public information sessions and public presentations;
4. public notices regarding key milestones and Community Liaison Committee membership;
5. interviews with provincial and local media outlets;
6. a Project newsletter distributed via mail drops, newspaper inserts and email;
7. the Community Liaison Committee (CLC);
8. government agency briefings (federal, provincial and local); and
9. other stakeholder group meetings and door-to-door introductions to residents.

### *5.1.1 Stakeholder Consultation Activities*

To date, eleven outreach communications have been provided to people and organizations on the mailing list (Table 4).

**Table 4:**
**Stakeholder Outreach Communications**

| Date | Item | Distribution Method | Approximate Total Distribution |
|---|---|---|---|
| April-09-14 | Open House Announcement | Ad in the Guysborough Journal | 1,200 people; newsstands, subscribers, businesses |
| April-14-14 | Morien Press Release re: Vulcan and the Project | Newswire / Press Release | >900 Canadian news outlets |
| April-17-14 | Open House Announcement | Canada Post Mail Drop | 3,000 households; does not incl farms, business, apartments |
| April-22-14 | Display Boards, Vulcan Presentation Booklets | Hand-outs at the Open House | 200+ attendees |
| April-30-14 | CLC Member Solicitation | Ad in the Guysborough Journal | 1,200 people; newsstands, subscribers, businesses |

| | | | |
|---|---|---|---|
| July-07-14 | Project Fact Sheet | Canada Post Mail Drop | 3,000 households; does not incl farms, business, apartments |
| July-30-14 | Summer 2014 Newsletter | Pamphlet in the Guysborough Journal | 1,200 people; newsstands, subscribers, businesses |
| August-27-14 | CLC Member List | Ad in the Guysborough Journal | 1,200 people; newsstands, subscribers, businesses |
| Dec-19-14 | Frequently Asked Questions | Canada Post Mail Drop | 3,000 households not including farms, business, apartments |
| Jan-13-15 | GCIFA Endorsement | Newswire / Press Release | >900 Canadian news outlets |
| Feb-4-15 | Winter 2015 Newsletter | Canada Post Mail Drop | 3,000 households not including farms, business, apartments |

The first Open House was held at the Queensport Fire Hall in Guysborough on April 22, 2014. The goal of the Open House was to inform the community about the Black Point Project and the environmental assessment process, and describe anticipated Project timelines. A second Open House has been tentatively scheduled for mid-March, 2015.

The Proponent has been asked by several media outlets to provide comment or updates on the Project. The Proponent was interviewed on ten occasions since April 2014.

The Summer 2014 Black Point Quarry Project Newsletter was distributed on July 30, 2014. The Winter 2015 newsletter was distributed on February 4, 2014. The Newsletters were emailed to the Project stakeholder mailing list and was distributed by Canada Post to residents in Guysborough County. Copies are available on the Project website.

In mid-2014, the Proponent established a Community Liaison Committee consisting of eight local representatives to help document community concerns and distribute updates regarding the Project. The CLC has met on two occasions to date, in August and in October, 2014. The next CLC meeting is tentatively scheduled for mid-March, 2015.

The Black Point Quarry Project team has been consulting with government officials and regulators (municipal, provincial, and federal) on an ongoing basis. The objective of these consultations is to provide information and updates on the Project and the environmental assessment, and also to receive input and guidance as appropriate.

Additionally, several presentations have been given to various groups interested in the Project. These community presentations are provided in Table 5.

Table 5:
Community Presentations

| Presentation Topic | Group | Date |
|---|---|---|
| Black Point Marine Aggregate Quarry Update | Mining Society of Nova Scotia | June 6, 2014 |
| Introduction to Vulcan Materials and the Project | Strait of Canso Superport Days | July 10, 2014 |
| Project Introduction and Jobs in the Mining Industry | Fanning Academy, Grades 9-12 | October 16, 2014 |
| Geology Presentation | Fanning Academy, 4th grade | October 16, 2014 |
| Project Introduction and Jobs in the Mining Industry | Guysborough Academy, Grades 9-12 | October 28, 2014 |
| Geology Presentation | Guysborough Academy, Middle | October 28, 2014 |

| | School | |
|---|---|---|
| Introduction to Vulcan Materials and the Project | Geology Matters Conference, NS Department of Natural Resources | November 13, 2014 |
| Introduction to Vulcan Materials and the Project | Strait Area Chamber of Commerce | December 2, 2014 |

The Proponent has met with representatives of the Guysborough County Inshore Fishermen's Association (GCIFA) on three occasions since April, 2014 and has met local fishermen individually and in groups on at least four occasions.

To ensure the residents bordering the proposed Project had the opportunity to learn about the Project, pose questions, express concerns. Proponent representatives went door-to-door along Half Island Cove Road, Upper Fox Island and Fox Island Main in July, 2014. In total, 17 of 25 addresses were visited and face-to-face meetings held. Of the 8 unvisited residences, 4 occupants were not home while 4 addresses were not occupied (i.e., for sale or apparently abandoned).

### *5.1.2 Stakeholder Questions and Comments*

Stakeholder issues have been formally compiled since January 2014 and are generally grouped by stakeholder group: local residents in the immediate Project vicinity, people in the commercial fishing industry, Aboriginal groups, and other interested stakeholders. Issues and concerns can be summarized by the following themes:

1. Questions regarding the training and skill requirements, technical operation and timing of the Project;

2. General concerns regarding environmental effects in the terrestrial environment, typically related to property values, noise, dust and water quality; and

3. Questions and concerns respecting Project effects to the commercial fishing industry, typically regarding siltation, shipping routes, fishermen displacement and the loss of fishing grounds, effects of the marine terminal and Project operation (including blasting) on the behaviour of commercial species and the possibility of invasive species imported in vessel bilge water.

Specific questions are concerns by stakeholder group are documented in Section 11 of the EIS. A log of meetings held and questions raised is presented in Appendix M Attachment 4 of the EIS.

## 5.2 Aboriginal Engagement

The Proponent has undertaken several measures to identify the concerns of Mi'kmaq communities, through their designated representatives, about potential environmental effects of the Project, and to promote First Nation involvement in the Project.

The Proponent has addressed early engagement with the Aboriginal community in Nova Scotia as a priority and has developed an Aboriginal Community Engagement Strategy, which commenced several years prior to the filing of the Project Description in February 2014. The premise of the engagement strategy is that, through effective engagement, the Proponent can establish an effective relationship with Aboriginal communities and organizations.

The Proponent's objectives were to:

- inform Aboriginal communities about its proposal;
- solicit information on the Aboriginal issues and concerns with respect to the proposed Project; and
- identify ways and means for Aboriginal engagement in the planning process and approaches to a mutually beneficial Project implementation.

### *5.2.1 Aboriginal Organizations*

Based upon a preliminary assessment of the Project location and the known activity of Mi'kmaq communities in Nova Scotia, several communities and Mi'kmaq organizations were identified as potentially affected and/or having a direct interest in the Black Point Quarry Project. These communities and organizations are listed in Table 6.

**Table 6:**
**Key Mi'kmaq Communities and Groups**

| Category | Communities/Organizations |
|---|---|
| Mi'kmaq communities | Paqtnkek First Nation |
| | Millbrook First Nation |
| | Sipekne'katik First Nation |
| Mi'kmaq organizations | Assembly of NS Mi'kmaq Chiefs Kwilmu'kw Maw-Klusuaqn (KMK) Negotiations Office |
| | KMK Benefits Committee Sipekne'katik Negotiations Office |
| Provincial government organizations | Nova Scotia Office of Aboriginal Affairs |

### *5.2.2 Aboriginal Consultation Activities*

The engagement activities undertaken to date are listed in Table 7. In addition, invitations to all Public meetings/Open House events were sent to representatives of the Mi'kmaq communities identified in Table 6.

**Table 7:**
**Mi'kmaq Engagement Activities**

| Mi'kmaq Community Engagement Activities | Date |
|---|---|
| **Face to Face Contacts with Chiefs** | |
| **Paqtnkek** | Oct 12, 2010 (initial meeting with Chief) |
| **Millbrook** | Mar 21, 2011 (initial meeting with Band Manager)<br>May 7, 2014 |
| **Sipekne'katik** | Jun 18, 2014<br>Aug 12, 2014 (site visit) |
| **Presentations / Meetings with Communities** | |
| **Sipekne'katik Band Council** | Jun 17, 2014<br>Aug 11, 2014<br>Aug 12, 2014 (site visit) |
| **Presentation at regional Tribal Council/Provincial Tribal Organization Meetings** | |
| KMK staff | Oct 13, 2011 (initial meeting with CEAA)<br>Nov 21, 2011<br>Sept 20, 2013 (with CEAA)<br>Mar 11, 2014<br>May 27, 2014<br>Jun 18, 2014 (site Visit) |
| KMK - Benefits Committee | Sep 10, 2014 |
| Assembly of Nova Scotia Chiefs | Through KMK |
| **Site Visits** | |
| J. Walsh, M. Nevin | 18 June, 2014 |
| J. Copage, I. Knockwood, J. MacDonald | August 12, 2014 |
| Chief W. Marshall, K. Prosper | October 27, 2014 |

### *5.2.3 Aboriginal Questions and Comments*

Issues and concerns identified during the Aboriginal engagement process are summarized in Table 8. Based on discussions during these engagement sessions, there is a general understanding between The Proponent and Mi'kmaq communities that the engagement process will continue to facilitate open dialogue on matters related to Mi'kmaq interest regarding environment and economic development.

**Table 8:**
**Comments and Issues Raised by Mi'kmaq Communities**

| Subject Area | Comments/Concerns/ Suggestions | Study Team Responses/Actions |
|---|---|---|
| Opportunities (Economics, Training, Other) | Seeking engagement in accordance with Proponents Guidelines, issued by the NS Government | Initiated communication with Chiefs and KMK; made commitments in a draft MOU pertaining to development of long-term relationship and provision of Project benefits. |
| | Potential for collaboration and employment | Negotiation of a collaborative benefits agreement. |
| | Potential for training and skills development | Including training in negotiation of benefits agreement. |
| | Potential for support for KMK operations | MOU includes negotiation of support to facilitate development of benefits agreement. |
| Planning Process | MEK Study | MEKS updated and submitted for review. |
| | Environmental protection | Providing opportunity for direct review of the EA document (made presentation and provide means to facilitate |

| Subject Area | Comments/Concerns/ Suggestions | Study Team Responses/Actions |
|---|---|---|
| | | feedback). |
| Review of EIS Guidelines/KMK meetings | Request internal review of MEKS | Agree. A copy of the MEKS has been provided for review and comment. |
| | Concerns for fish, fish habitat, and Mi'kmaq fisheries | A MEK Study has been prepared as part of the EA process. This includes a discussion of potential effects on fishing. The Proponent's engagement program with Mi'kmaq communities has addressed potential project-related effects and establishes commitments for effects management and communication. |
| | Identified concerns for archaeological assessment | A MEK Study and archaeological assessments have been prepared as part of the EA process. This includes a discussion of potential effects on archaeological sites. The Proponent's engagement program with Mi'kmaq communities also addresses potential project-related effects and establishes commitments for archaeological fieldwork and documentation.<br>In addition the Proponent has committed to a separate site visit being undertaken with a qualified Mi'kmaq archaeologist prior to project implementation |
| | Kwilmu'kw Maw-klusuaqn Negotiation Office may coordinate Mi'kmaq representation in CLC. | The Proponent has established a CLC and invited Mi'kmaq community to be represented; the Sipekne'katik band is represented. |
| | Identified expectations for impact benefits agreement. | The Proponent has commenced and will continue to engage Mi'kmaq communities in the Project's planning and development process. As such the Proponent is in the process of negotiating with the Kwilmu'kw Maw-klusuaqn Negotiation Office a comprehensive Cooperation Agreement. |
| Consultation and Engagement | Crown responsibilities and activities regarding consultation with Mi'kmaq communities about the Project. | Maintaining direct dialogue with Mi'kmaq organizations and communities without prejudice. Maintaining arm's length discussions with Office of Aboriginal Affairs. |
| | Distinction between Crown Consultation and Proponent Engagement. | Proponent is ensuring Project staff is not directly involved in negotiations between NS Government and First Nations negotiators. |

The Proponent is in negotiations to conclude a memorandum of understanding (MOU) with the Assembly of Nova Scotia Chiefs through the KMK Benefits office and a separate MOU is being negotiated with the Sipekne'katik First Nation. The purpose and focus of these MOUs is to guide ongoing discussions regarding collaborative benefits agreements between the Project and Mi'kmaq communities. Discussions have been ongoing since spring, 2014 and are proceeding in an open and constructive manner.

## 6.0 SUMMARY OF THE ENVIRONMENTAL EFFECTS ASSESSMENT

### 6.1 Air Quality and Climate Change

Air Quality is identified as a VC since air quality concerns associated with the generation of dust have been raised by community residents and First Nations. Air quality is also a pathway to the food chain via the transport of dust and deposition of contaminants on vegetation and surface water. Air quality within the quarry is of interest to provincial workplace health and safety regulators.

### *6.1.1 Potential Environmental Effects*

The construction and operation of the facility will result in dust emissions (total particulate matter [TPM], total suspended particulate [TSP], particulate matter up to particle size 10 microns [$PM_{10}$] and particulate matter up to particle size 2.5 microns [$PM_{2.5}$]). The sources of dust emissions associated with the Project include:

- crushers
- screens
- material loading/unloading
- material conveyors and transfer
- wind erosion of material storage piles and exposed areas
- blasting
- overburden removal, and
- vehicle traffic (haul roads).

Fuel combustion in mobile and fixed equipment, vehicles, and ships will result in emissions of criteria air contaminants including sulphur dioxide, nitrogen oxides, volatile organic compounds, carbon monoxide, and particulate matter. Fuel combustion will be a source of Project greenhouse gas emissions, which include carbon dioxide, methane, and nitrous oxide.

In order to quantify air contaminant dispersion during quarry operations, including those from vessel emissions, a detailed air dispersion modelling study was undertaken. The air dispersion modelling results demonstrate that even under worse case scenarios, Project-related air contaminants at the nearest residences are far below the maximum acceptable concentrations established by provincial and federal regulation. In particular, the predicted 1-hour and 24- hour maximum, and the annual average concentrations for nitrogen dioxide (NO2), sulphur dioxide (SO2), and particulate matter (including TSP, PM10 and PM2.5), as well as the 1-hour and the 8-hour maximum concentrations for carbon monoxide (CO) were found to be at least 50% below their respective objectives. This in turn demonstrates that air impacts at federal lands further from the property will be negligible.

The details of the air quality assessment are provided in Section 7.1 of the EIS report.

## 6.2 Noise

Activities such as blasting and aggregate processing will produce noise and have the potential to alter the ambient noise conditions of the local area. Noise concerns have been raised by residents living to the east and west of the Property. Changes to ambient noise may also affect a variety of wildlife, migratory birds and Species at Risk (SAR) through driving them out of the area and/or other effects on their behaviour.

Construction of the marine terminal will likely result in temporary increases to noise in the marine environment, which may in turn affect nearby marine biota. Noise may alter the behaviour patterns of certain marine species, which may in turn affect these species at different times of their life cycles. Shipping associated with the marine terminal will add to the noise already present in the marine environment.

### *6.2.1 Potential Environmental Effects*

Under the worst case scenario, the predicted noise levels at the nearest residences during the daytime and evening range from 47 dBA to 55 dBA, complying with the most stringent noise limit of 55 dBA. Quarry production noise is generally characterised by low-frequency "rumbling" noise that does not vary much with time. Quarry noise will be audible at a "moderate to quiet" level in nearby residential areas.

The predicted noise levels at the nearest residences during night-time range from 25 dBA to 41 dBA, complying with the night-time limit of 55 dBA. The night-time noise level would not be expected to disturb the sleep of most people in the long term.

The minimum blasting distance to the nearest residence (800 m) is respected in all directions from the Property boundary.

## 6.3 Ambient Light

The Project site is currently undeveloped and night time ambient light conditions are low. Changes to ambient light conditions have the potential to negatively affect wildlife, including birds, in the immediate area. Increases in night time light levels may also be perceived as a nuisance by local residents.

### *6.3.1 Potential Environmental Effects*

Ambient light levels will increase during the construction of the processing plant, associated infrastructure and the marine terminal. Other lighting introduced to the site will come from vehicle headlights moving around the site as well as entering and exiting the site at the intersection with Route 16.

The topography blocks views of the quarry from the south and so there will be no significant light trespass on any buildings along Route 16. From the west, the topography prevents direct line of sight view to the quarry, processing plant and marine terminal, except for viewers standing directly on the coast and those who may look toward Black Point from the east side of Gaulman Point. From these vantage points, the marine terminal and stockpiles will be visible, but the quarry will be largely concealed behind a vegetated coastal buffer.

To the east, direct line of sight viewers are located on the east side of Indian Cove along Fox Island Cove Road. Black Point can also be seen from the beach at Indian Cove, located 3.5 km east of the proposed processing plant. From this direction, much of the processing plant, quarry and marine terminal is expected to be shielded from view by Black Point itself (which will remain forested), as well as a 30 m wide vegetated buffer left along the coast. It is likely the tallest components of the processing plant (conveyers, tops of stockpiles, and lighting fixtures) may be visible from these eastern viewpoints.

At night, many nocturnal animals use moonlight and starlight to forage for food and detect predators. Objects in the night sky may be used as aids to navigation for migrating birds. Patterns of light and darkness are also used to regulate circadian cycles; to control the behavior of diurnal, nocturnal and crepuscular animals[1]; to determine day length; and as a directional cue

[1] Diurnal animals are most active during the day; nocturnal animals are most active at night; crepuscular animals are most active at dusk and dawn.

for navigation. Lighting needed to illuminate working areas and for navigational purposes at the marine terminal can have an adverse effect on migrating birds. Birds that enter these illuminated areas can become confused possibly resulting in collisions and mortality.

## 6.4 Geology, Soil and Sediment Quality

Geology, Soil and Sediment quality was identified as a VC primarily due to the anticipated disturbance of potentially acid generating rock during site levelling for the processing plant, as well as concerns expressed by fishermen with respect to the discharge of sediment-laden water from the Project site and the consequent effects on lobster and their habitat.

### *6.4.1 Potential Environmental Effects*

The granite rock that will be quarried for aggregate is not acid generating. In contrast, Halifax Formation sedimentary rocks that underlay a small portion of the site near the coast (approximately 11.8 ha) may generate acid and/or leach metals when exposed to oxygen. This water may negatively affect the nearshore marine environment if allowed to drain to Chedabucto Bay.

Discharge or runoff of sediment-laden water during construction and operation may have harmful effects on nearby lobster habitat or lobster life stages.

## 6.5 Groundwater Resources

Groundwater extracted from dug and drilled wells is used for drinking water purposes by the nearest residents living to the east, west and south of the Project site. A total of 23 residences are located in the vicinity of the Project (within 2 to 3.5 km); of these, 17 employ dug wells while 6 employ drilled wells. No water wells are installed in the granite rock that will be quarried.

Groundwater quality and quantity also contributes to the health and sustainability of local ecological systems.

### *6.5.1 Potential Environmental Effects*

The Project will remove granite from within the Property boundaries, ultimately creating a pit approximately 130 m deep. Once pit development begins, surface precipitation that originally landed on the granite and flowed laterally to help recharge nearby wetlands and lakes will be redirected into the pit, negatively affecting these ecological features.

With respect to potential Project effects on the surface water aquifers that support dug wells, no Project-related impacts are expected. This is because these aquifers are fed by surface precipitation falling within the subcatchments that host the wells and not by precipitation falling on areas that will be developed for the Project. For those who use drilled bedrock wells to obtain potable groundwater, Project-related impacts to potable groundwater supply and quality will be negligible because:

1. There is no potable groundwater wells drilled in the granite.

2. Drilled wells within the highly fractured metasedimentary rocks access a chemically different groundwater than the one present within the granite. These aquifers are not only chemically different, they are structurally different. While a certain connectivity can be expected, the

fact that the water chemistry is different indicates that the connectivity is minimal and slow to occur.

3. Even at full pit build out, a thick barrier of granite (over 400 m wide) will remain between the pit wall and nearest metasedimentary bedrock where drilled wells are located (even further away). This thick barrier helps to isolate Project-related effects within the granite from affecting the aquifer tapped by wells in the metasedimentary bedrock.

4. The nearest drilled groundwater well is located 815 m from the pit boundary, far outside of the maximum potential drawdown cone resulting from the pit (400 m); the next nearest drilled well is more than 2.5 km from the pit boundary. The sheer distance provides a significant measure of security for drilled wells in the vicinity of the Project.

5. Because the groundwater movement within the granite is expected to be limited, no groundwater dewatering will be needed to prevent groundwater inflow into the pit (inflows will be simply collected in the sump). The lack of active dewatering wells means that the cone of influence is limited to the zone caused by passive drainage into the pit.

## 6.6 Marine and Surface Water Resources

Surface Water Resources are considered to be a VC because they sustain aquatic ecosystems and support terrestrial ecosystems, convey stormwater, and can either recharge groundwater resources or drain excess groundwater away from an area. Marine water quality is fundamental to healthy marine ecosystems and is critical to the long term success and sustainability of the commercial fishery. No terrestrial fish habitat is present on the site due to the natural acidity of the water.

### *6.6.1 Potential Environmental Effects*

The Project may impact upon the baseline hydrological regime by increasing or decreasing flows to, or water levels within surface water resources. This in turn may impact upon established aquatic ecosystems, or (during extreme events) additional runoff may increase the risk of flooding within the downstream environment. Additionally, the development may impact upon surface water quality through accidental spills or uncontrolled erosion, which may in turn affect established aquatic ecosystems. Downstream flow to Reynolds Brook, located 1.0 km south of the Property, is expected to be reduced by up to 18% at full quarry build out. This may have negative effects on fish populations (if present) during periods of low flow, or alternatively, may improve water quality by reducing inflows of low pH surface water.

Marine water quality may be negatively affected by sediment laden water in the form of discharge or stormwater runoff. Acid rock drainage generated from the disturbance of Halifax Formation rocks may also affect marine water quality.

## 6.7 Terrestrial Ecosystems, Habitat and Vegetation

Terrestrial ecosystems, habitat and vegetation express local and regional biodiversity and support ecological resilience. These features form the basis upon which local wildlife populations depend. First Nations have expressed concerns with respect to their continuing ability to harvest terrestrial resources within the Project and adjacent areas, as well as the overall effect of Project activities on ecological resources in general.

### *6.7.1 Potential Environmental Effects*

Terrestrial ecosystems and habitat will be permanently diminished or destroyed, and vegetation will be lost during the course of building and operating the Project. Indirect impairments to ecosystems and habitat may occur through Project-related activities such as water use, accidental spills, and dust emissions.

## 6.8 Wetlands

Wetlands are highly productive and diverse ecosystems that perform a number of biophysical and ecological functions. They may provide habitat or refuges for a diversity of species (including SAR), attenuate storm flows, recharge groundwater and provide discharge to downstream receptors during dry periods.

### *6.8.1 Potential Environmental Effects*

Over the 50 year life of the Project, development will directly affect a number of wetlands on the Project site, and may indirectly affect others through effects to surface and groundwater flows or from inputs from accidental hydrocarbon spills or quarry dust. Those wetlands directly affected will be permanently destroyed or diminished. These effects will not be felt at once, but rather progressively as the quarry expands over its 50 year production life.

## 6.9 Terrestrial Wildlife

Terrestrial wildlife species have ecological, aesthetic and recreational importance to the public and First Nations, primarily as a food source and as an economic and recreational resource. They also have inherent value as wild species and critical components of larger ecosystems.

### *6.9.1 Potential Environmental Effects*

Project development will impair or eliminate the productive capacity of some terrestrial habitat within the Project footprint. Other indirect interactions (airborne dust, emissions, noise, vibration, light, water use) may affect species and habitat adjacent to the Project.

The main impact on landbirds will be the loss of nesting and foraging habitat. Vegetation clearing and grubbing activities may also cause destruction of nests and nestlings or eggs if conducted during the breeding season. In addition to habitat loss, construction noise (including blasting) may have deleterious effects on animals in and near the Project area.

No evidence of breeding shorebirds was reported during the field surveys. Disturbance due to construction noise (including blasting) is expected to have minor impacts on breeding, migrating and/or wintering shorebirds, depending on when the activities take place.

Waterfowl along the marine shoreline and inland ponds and lakes may be disturbed by noise from blasting and other construction activities. Seabirds nest on a number of offshore islands and other inaccessible coastal areas, notably the Country Island Complex, the nearest point of which is approximately 13 km from the Project site. Minor disturbance of foraging terns from blasting and other construction noise is possible; however, the distance from the colony makes it unlikely that Roseate Terns will forage in the waters near the Project. Large gulls and Common and Arctic Terns nesting on Fox Island and Half Island, both approximately 3 km from the Project site, could potentially be disturbed by blasting noise. However, this distance is

greater than the 1 km buffer recommended by Environment Canada for high-disturbance activities such as drilling and blasting.

Habitat removal and fragmentation will result in displacement of mammals from within the Project footprint. Clearing and construction activities are expected to slightly reduce the available area used by terrestrial mammals and interrupt local movement to and from adjacent areas of suitable habitat. Project related noise (including blasting) may cause mammals in immediately adjacent areas to flee temporarily.

The loss of ponds, wetlands and riparian areas in the Project area will result in habitat loss for local amphibians and turtles, and increased sedimentation from dust generated by construction may further impact aquatic habitats. Snakes may utilize much of the Project area, and will be impacted by habitat loss as well as increased fragmentation which may inhibit movement between areas of suitable habitat.

Some loss of odonate (dragonfly and damselfly) breeding and feeding habitat is expected from the loss of wetlands, ponds and riparian areas within the Project area. Dust from construction activities may contribute to sediment loading in watercourses, potentially altering aquatic habitats. Lepidopterans (moths and butterflies) will be most affected by the loss of larval food plants, which varies from species to species; adults are highly mobile and therefore able to avoid areas impacted by Project activities.

## 6.10 Freshwater Species and Habitats

Fish and fish habitat are valued for their ecological services as a renewable resource base, and for their economic, cultural, spiritual and ceremonial benefits. As noted above, the watercourses and lakes on the Property do not contain fish due to acidic conditions. Nevertheless, other freshwater species and habitat are important biological components of larger ecological systems and are valued by the public and First Nations.

### *6.10.1 Potential Environmental Effects*

Project activities will remove some freshwater habitat and may indirectly affect other areas. Once quarrying ceases and the pit fills with water, the Project will ultimately create more freshwater fish habitat than currently exists on the site.

## 6.11 Marine Species and Habitats

Marine species and habitats are valued for their aesthetic, cultural, ecological and economic attributes by First Nations and the public at large. Marine SAR are of interest to scientists, regulators and public due to their inherent biological and cultural value and are protected under federal provincial legislation. The marine habitat in Chedabucto Bay supports productive and diverse fisheries. A number of fish species reside within the Bay, and additional species migrate from nearby water bodies to feed and spawn. Marine mammals associated with Chedabucto Bay typically include of seals, whales and porpoise.

### *6.11.1 Potential Environmental Effects*

The majority of the effects to marine species and habitat are associated with the construction and operation of the marine terminal since the construction of this feature will remove marine habitat. Construction of the marine terminal will permanently destroy approximately 1.1 ha of sea bottom habitat even as new habitat is created by the terminal foundations. To offset this habitat loss, habitat creation nearby is required by DFO. Transport of aggregate via seagoing

vessels will impact upon the marine environment through noise associated with vessel passage and potentially through accidental spills or other incidents at sea.

Potential environmental effects on marine sediment quality are described in Section 6.4 while potential effects on marine water quality are described in Section 6.6. Potential environmental effects to commercial fisheries are described in Section 6.15. Potential environmental impacts to marine SAR are described in Section 6.12.

## 6.12 Species at Risk

Species at Risk are identified as a VC due to their ecological role, scientific value and cultural attributes. Species at Risk may be regulated at the federal level, the provincial levels, or both. No critical habitat for any species at risk was identified on the Property.

### *6.12.1 Potential Environmental Effects*

The direct loss of habitat used by terrestrial or marine SAR is the primary concern of this VC, although SAR may be indirectly affected through noise, light and general activity at the Property.

Two vascular plant species of conservation concern (SOCC) are known to occur within the Project footprint. Four lichen SOCC were identified on the Project site. For most terrestrial fauna SAR/SOCC (including the one mammal, fourteen bird, and one odonate), potential effects are predicted to be similar to those for terrestrial fauna as a whole (Section 6.7).

Mainland Moose

The mainland Nova Scotia population of Eastern Moose, which is listed as Endangered under the *Nova Scotia Endangered Species Act (NSESA)*, could potentially be affected by the Project through:

- Loss of habitat (foraging, wintering, calving);
- Habitat fragmentation;
- Disruption of migratory routes;
- Mortality due to vehicle collisions;
- Increased poaching levels in area due to increased traffic;
- Noise disturbance; and
- Exposure to runoff from hazardous materials/contaminated soils.

Rusty Blackbird

To date, a total of fourteen bird SOCC have been reported from the Project site. Of these, a single species, the Rusty Blackbird is a SAR. This bird, which is also listed as Endangered under the *NSESA*, could potentially be affected through:

- Loss of habitat (foraging, nesting);
- Habitat fragmentation;
- Disturbance from construction noise (including blasting); and
- Exposure to runoff from hazardous materials/contaminated soils.

No terrestrial herpetile SAR or SOCC are known or suspected to occur on the Black Point site. A single invertebrate SOCC species, a dragonfly known as the Spot-winged Glider was detected on the site in 2010. No freshwater flora or fauna SAR or SOCC are known or suspected to occur on the Black Point site.

Several marine fish, mammal, and reptile SAR and/or SOCC have the potential to occur within the marine footprint and immediate vicinity of the Black Point Project site. Potential effects on marine fauna SAR and SOCC are predicted to be similar to those for marine fauna as a whole, which are discussed in detail in Section 6.11.

## 6.13 Local Economy, Land and Resource Use

Positive economic effects of the Project will benefit local residents, local businesses in the service sector and government at the municipal and provincial levels. Improvements in the regional economy can positively affect the population size and demographics as workers move to the area, purchase real estate, goods and services, and raise families. Real estate values can also be affected by a vibrant regional economy.

The Project will require a temporary labour force during construction and a smaller but significant labour force over the long term operation of the Project. In addition to direct hires, the Project will generate employment and economic activity through contracting for goods and services.

Current on-site land uses (trapping, local tourism) will be replaced by quarrying and associated activities. Existing and planned land uses on adjacent properties or within the Affected Area may be impacted through changes to the visual or acoustic environments.

### *6.13.1 Potential Environmental Effects*

The positive economic impacts are principally related to long term employment opportunities which typically result in amplified demand for goods and services, as well as improved tax revenues for municipal, provincial and federal governments.

One of the primary effects of the Project is to change the use of the Property from an undeveloped piece of land used occasionally for trapping and recreational activities (ATV passage and fishing in the nearshore), to a quarry that will be operated on a continuous basis, and where these current activities will be limited or no longer practical. Despite these land use changes, the current zoning reflects a long term municipal vision to promote economic development and so is compatible with the goals and objectives of the community.

## 6.14 Tourism and Recreation

Residents and tourists alike utilize the local terrestrial and marine landscapes for outdoor activities such as camping, hiking, fishing, boating, off-road motoring, and hunting. Tourism and recreational activities, as well as the infrastructure associated with these activities, such as accommodation, marinas, recreation centres and parks, make up the Tourism and Recreation VC.

### *6.14.1 Potential Environmental Effects*

The presence of a quarry may influence perceptions regarding noise and changes in the visual character of the coastal landscape, resulting in changes to resource use patterns by tourists. The Project may result in restrictions to currently accessible beaches and headlands within the

property footprint but not to nearby beaches such as Gaulmans Point and the beach at Indian Cove. Additionally, there will be little to no impact to the visual site lines from Marine Drive as the entrance area will be groomed, and the surrounding trees are anticipated to remain during the life of the Project. In addition, the quarry will be topographically lower than Marine Drive.

The quarry development has the potential to affect the tourism and recreation through a decrease in wilderness/nature oriented recreation and tourism within the Project Area and vicinity due to marine vessel traffic and actual or perceived noise, dust and light from the quarry. This in turn may negatively affect revenue at local campgrounds, rental accommodations and other service providers. The quarry may also result in an increase in expenditures on tourism services through increased discretionary spending by people hired at the Project.

## 6.15 Commercial Fisheries

Marine commercial fisheries represent an important, sustainable resource of historical, cultural, social and economic value to local communities and First Nations. As noted, there are no *freshwater* commercial or recreational fisheries on the Property. At the same time, aquaculture is not currently practiced along the south shore of Chedabucto Bay.

The primary species harvested on a commercial basis in Chedabucto Bay south of the established shipping lanes are:

- Lobster;
- Shrimp;
- Herring, Mackerel and Squid
- Snow Crab;
- Tuna; and
- Scallop

Sea urchin, rock crab, marine plants and eels are reportedly not fished on a commercial basis at this time, although local fishermen do have licenses that permit the harvest of these species. Mackerel is the primary salt-water recreational species in the area, but catch and release recreational Bluefin tuna fishing is also popular.

### *6.15.1 Potential Environmental Effects*

The presence and use of the marine terminal will result in limitations to lobster harvesting in the immediate area and, as a result, potential displacement into other areas of those who currently fish in the nearshore at the Black Point site. This limitation will occur for two reasons: (1) the construction of the marine terminal will remove approximately 1.0 ha of lobster habitat that is currently available for commercial exploitation, and (2) fishermen will likely steer clear of the active marine terminal for safety and out of concern for gear losses.

Potential sediment-laden water runoff from terrestrial construction activities and consequent negative effects to water quality may displace fish from the immediate near shore but is unlikely to result in their death.

The transit of empty and loaded aggregate transport vessels has the potential to interfere with other commercial fishing activities that occur in deeper water between the established shipping

lanes and the south shore of Chedabucto Bay. In addition to interference with on-going fishing, noise associated with this increased traffic may displace fish from the immediate area.

The added ship traffic may require fishermen who frequent deeper water to avoid preferred fishing grounds to accommodate Project-related ship traffic.

Accidental fuel spill or other discharges to the aquatic environment can alter water quality and physical habitat, which in turn can negatively affect life-cycle stages of commercially important species and their food supply. Accidental aggregate spills will not likely affect the commercial fishery since this material has already been washed to remove fine-grained sediment.

No underwater blasting will be required. Blasting on land is not expected to result in significant effects since blasting charges can be minimized to meet guidelines that are designed to be protective of aquatic species.

No impact is expected to the fixed berth mackerel, herring and squid trap fisheries since these berths are considerably removed from the Project site. A possible exception to this are the two mackerel traps located in Indian Cove approximately 4.0 km east of the marine terminal. Concerns have been raised by local fishermen that the marine terminal will divert mackerel from their normal coastal-hugging route that brings them into Indian Cove where the traps are located. Instead, the terminal may encourage the fish to remain offshore and travel directly from Black Point to Fox Island, rather than entering Indian Cove.

## 6.16 Archeological and Heritage Resources

Archaeological and Heritage Resources were identified in the EIS Guidelines as a potential VC as concerns have been raised regarding the possible existence of these resources during the public outreach phase of the environmental assessment.

A 2011 Archaeological Resource Assessment survey did not identify any archaeological or heritage resources, but potential post-European contact house foundations were identified on the Property near the coast during the 2014 Archaeological Resource Assessment.

### *6.16.1 Potential Environmental Effects*

Although 30 m buffer zones will be left undisturbed along the coastline (thereby protecting some of these finds), much of the coastal zone inside this buffer will be built upon, thus potentially disturbing, destroying or covering over some of these resources.

## 6.17 Aboriginal Land and Resource Use

Aboriginal culture in the form of traditional land and resource use is practiced on a regular basis in many Nova Scotia Aboriginal communities. Traditional hunting, fishing, and plant harvesting practices are deeply rooted and highly valued in these communities. Consideration of Aboriginal interests is legislated by federal and provincial laws and listed in the EIS Guidelines issued for this Project.

### *6.17.1 Potential Environmental Effects*

Based on the information compiled through the MEKS and findings during site visits conducted with Mi'kmaq Elders, harvesters, Chiefs, and organizational representatives, there is currently no direct Mi'kmaq use of the Project site for subsistence harvesting of food or furbearing

animals. Several Mi'kmaq communities are currently fishing marine species for livelihood purposes along the eastern shore. Of these, only the Waycobah shrimp trap fishery is operating in proximity to the Project. The Waycobah band holds the only Mi'kmaq shrimp trap license in the south side of Chedabucto Bay however this license is currently being fished by non-aboriginal license holders on behalf of the Band. No Mi'kmaq fishermen currently deploy lobster traps in the Project vicinity although they, like other LFA 31 license holders, have the right to fish anywhere within LFA 31.Potential Environmental Effects

As noted in the Mi'kmaq Ecological Knowledge Study completed for this Project, development effects may include:

1. potential disturbance of hitherto unidentified archaeological resources during the construction of the infrastructure as well as the quarry operation itself.

2. likely permanent loss of wildlife and plant resources which have been traditionally harvested within the immediate project footprint. This loss may result from the physical removal or displacement of specimens or restriction of access to potential harvesting areas.

3. potential harm or dispersing of wildlife due to noise resulting from increased human presence, traffic, blasting, and general mining activities.

4. potential disturbance or contamination of vegetation, wetlands and water bodies as a result of settlement of dust and other airborne pollutants associated with the Project. This can significantly depreciate the quality of local food and medicinal plants for human consumption as well as the quality of animal browse and water/wetland habitat.

5. potential degradation of the local marine and shoreline habitats surrounding the shipping terminal due to dust contamination, the potential for accidental aggregate spillage during loading, and possible contamination resulting from petroleum products associated with cargo vessels. However, based on the current information (section 6.17) it is concluded that the Project will not likely have a direct significant impact on Mi'kmaq livelihood fishing: the shipping route near the marine terminal has been modified to avoid preferred shrimping grounds.

## 6.18 Accidents and Malfunctions

The assessment of potential environmental effects resulting from accidents and malfunctions employs risk based approach that involves:

1. Identification of hazards associated with the Project infrastructure and activities to be undertaken on-site or off-site.
2. Identification of potential environmental effects or the anticipated consequences of the identified hazards by completing a qualitative risk assessment aimed and providing some perspective on the hazards and their consequences by rating the likelihood of the adverse environmental effects. This rating represents the overall assessment of significance for the potential adverse environmental effects of accidents and malfunctions.

Those hazards with the greatest potential to result in environmental effects are:

- **Structural Failures:** These include quarry pit slope failure, aggregate stockpile slope failure, processing plant/marine terminal infrastructure failure and sediment pond failure;

- **Accidents:** These include an explosives accident, marine spills, transportation accidents (including vehicle and marine collisions), hydrocarbon spills on land or in the water; and,

- **Other Malfunctions:** These include unspecified health and safety incidents, wildlife encounters and forest fires.

Each potential accident and malfunction was assessed according to likelihood of the event and given a risk rating from "negligible" to "high". Environmental effects are assigned a magnitude rating from "low" to "extreme". The combination of the likelihood of an event and the magnitude of its environmental effects is determined by plotting these ratings on the matrix. Increased risk is associated with accidents and malfunctions having a greater *likelihood* of occurrence and greater *magnitude* of effects. Accidents and malfunctions with an overall combined rating of greater than or equal to 4 are not considered to be significant events or consequences. The results are summarized in Table 9. The results indicate that all accidents and malfunctions described above have ratings ranging from 5 to 8. These events and their environmental effects are therefore considered not significant.

**Table 9:**
**Summary of Accidents and Malfunctions Assessment**

| Malfunction/Accident | Key VCs Potentially Affected | Risk Rating | Magnitude Rating | Overall Rating 1 = Maximum 9 = Minimum |
|---|---|---|---|---|
| Quarry Pit Slope Failure | Human Health and Safety | Negligible | High | 7 |
| Stockpile Slope Failure | Human Health and Safely<br>Surface Water Resources<br>Terrestrial Habitat and Vegetation | Negligible | Moderate | 8 |
| Sedimentation Pond Failure | Marine and Surface Water Resources<br>Terrestrial Habitat and Vegetation<br>Marine Species and Habitat<br>Species at Risk | Very Low | Low | 8 |
| Processing Plant Infrastructure Failure | Marine and Surface Water Resources<br>Marine Species and Habitat<br>Species at Risk | Very Low | Moderate | 7 |
| Marine Terminal Infrastructure Failure | Marine and Surface Water Resources<br>Marine Species and Habitat<br>Species at Risk | Very Low | Moderate | 7 |
| Terrestrial Spill | Human Health and Safely<br>Geology, Soil & Sediment<br>Groundwater Resources<br>Wetlands | Low | Moderate | 7 |
| Vessel Accident/Collisions | Human Health and Safely<br>Marine Species and Habitat<br>Species at Risk<br>Local Economy<br>Commercial Fisheries | Very Low | Very High | 5 |
| Explosives Accident | Human Health and Safely<br>Marine and Surface Water Resources<br>Terrestrial Habitat and Vegetation<br>Terrestrial Wildlife<br>Marine Species and Habitat | Negligible | Moderate | 8 |

| Malfunction/Accident | Key VCs Potentially Affected | Risk Rating | Magnitude Rating | Overall Rating 1 = Maximum 9 = Minimum |
|---|---|---|---|---|
| | Species at Risk | | | |
| Marine Spill | Human Health and Safely<br>Marine and Surface Water Resources<br>Marine Species and Habitat<br>Species at Risk<br>Local Economy<br>Commercial Fisheries | Very Low | Very High | 6 |
| Illegal Ballast Discharge | Marine and Surface Water Resources<br>Marine Species and Habitat<br>Species at Risk<br>Local Economy<br>Commercial Fisheries | Low | High | 5 |
| Transportation Accident | Human Health and Safely<br>Terrestrial Habitat and Vegetation<br>Terrestrial Wildlife | Low | Moderate | 8 |
| Forest / Site Fire | Human Health and Safely<br>Air Quality<br>Terrestrial Habitat and Vegetation<br>Terrestrial Wildlife<br>Tourism and Recreation<br>Aboriginal Land and Resources Use | Negligible | High | 7 |

## 6.19 Effects of the Environment on the Project

The natural environment has the potential to adversely interact with the Project through meteorological, climatological and seismological events. These events may include:

- Drought or extreme precipitation events leading to flooding;
- Extreme (high/low) temperatures;
- Rapid or increasing number of freeze/thaw events;
- Severe wind storms including hurricanes;
- Extreme marine conditions (high waves plus extreme winds);
- Ice storms and hail events;
- Late season sea ice; and
- Earthquakes.

The Project is located on a relatively exposed southern coastline exposed to northerly winds and considerable wave action. Initial designs have considered prevailing historical conditions, including extreme events, as well the anticipated effects of climate change on key weather variables. As the Project moves into the detailed design stage, additional consideration will be given to the effects of the environment on the Project.

In addition to design factors, potential adverse effects on the Project due to the environment will be mitigated through the monitoring and/or contingency planning. Therefore, the effects of the environment on the Project are anticipated to be not significant.

## 6.20 Cumulative Effects

Cumulative environmental effects are residual Project effects combined with the environmental effects of past, present, and future projects. For this assessment, the descriptions of the existing environment and of the current condition of each VC already include the effects of current projects occurring within or outside of the Project Area. The cumulative effects assessment thus focuses on the effects of other future projects and activities.

With respect to identifying potential cumulative effects:

1. there must be a measurable environmental effect of the project being proposed;
2. the environmental effect must be demonstrated to interact cumulatively with the environmental effects from other projects or activities; and
3. it must be known that the other projects or activities have been, or will be, carried out and are not hypothetical. That is, there must be some *probability* the cumulative environmental effect will occur rather than simply a *possibility*.

Based on these parameters, four projects were identified as potentially contributing cumulative effects to the Black Point Quarry Project:

Chedabucto Aggregates Quarry Expansion (Halfway Cove, Guysborough Co.)

Chedabucto Aggregates Limited in September 2014 indicated they will register the Chedabucto Aggregates Quarry Expansion for environmental assessment. The project is located approximately 13 km southeast of Guysborough. The proposed expansion is scheduled for 2015; production levels and operations are not expected to increase as a result of the proposed expansion.

Goldboro Liquefied Natural Gas Project (Goldboro, Guysborough Co.)

Pieridae Energy proposes to construct a natural gas liquefaction plant and marine terminal in Goldboro, Guysborough County. On March 21, 2014 the project was approved with conditions and the project is currently in the Front End Engineering and Design phase.

Maher Melford Container Terminal (Melford, Guysborough Co)

Melford International Terminal is proposing to develop a 315-acre container terminal and intermodal rail facility in Melford on the Strait of Canso. In late 2014 the Nova Scotia Minister of the Environment authorized an extension for the commencement of project work: the Proponent must, on or before October 23, 2016, commence work on the project unless granted an extension by the Minister.

Bear Head Liquefied Natural Gas Project (Port Hawkesbury, Cape Breton)

The Bear Head project near Port Hawkesbury received EA approval in 2004. Construction on the LNG facility began in 2005, but later ceased. In July 2014, the company Liquefied Natural Gas Ltd. announced it has purchased the project. In November 2014, Liquefied Natural Gas Ltd. announced plans to double the capacity of the proposed liquefaction and export terminal from 4 mtpa to 8 mtpa. A final investment decision on the Bear Head project is expected in late 2015 to 2016 and the facility could be in commercial operation in late 2018 to 2019.

In order to identify potential overlapping projects and systematically assess the likely cumulative effects for each VC, the Project team:

1. Researched the status of future planned or anticipated projects that could overlap in time or space with the Project; and

2. Defined the spatial and temporal boundaries that would be used to assess the degree and significance of the overlap (i.e., the cumulative effect) for each VC.

All VCs were examined for the potential to contribute to cumulative effects. Once future projects were identified, the infrastructure and activities associated with these projects were reviewed to determine the likelihood that potential effects on VCs at these projects would overlap in space with the VCs assessed for the Black Point Project. If an effect was likely, then these effects were further examined as to their potential to overlap in time (temporal overlap) with Black Point effects.

Chedabucto Aggregates quarry is located approximately 17 km west of Black Point. Given the distance from the Project Area and the limited scale of quarrying activities associated with the expansion, no overlap in space between the environmental effects produced at Chedabucto Aggregates and the Black Point Project is expected. Therefore, no cumulative effects are anticipated.

The Goldboro LNG project is located on Nova Scotia's eastern shore, approximately 45 km southwest the Black Point Project. The project is associated with a number of residual environmental effects but most of these effects are not considered to be significant. The project's GHG emissions could be regionally significant when combined with other large, regional GHG emitters, but the Black Point Project is not a significant GHG producer. Vessel traffic to the Goldboro marine terminal will remain many kilometres from Chedabucto Bay. Under these circumstances, there is no overlap in space between the effects produced at Goldboro and those expected at Black Point. Given this, no cumulative effects are anticipated.

Given their relative proximity and location with respect to the Black Point Project site, certain aspects of the Bear Head LNG and the Maher Melford Container Terminal projects are expected to overlap in space and time with VCs retained for the Black Point Project. These VCs include:

- Shipping and Navigation
- Local Economy, Land and Resource Use

With respect to Shipping and Navigation, the vessels used to transport aggregate will not be operated by Proponent crews and so mitigation of potential vessel collisions is, to a large extent, outside of the control of the Proponent. Nevertheless, the Proponent will review the safety and environmental records of shipping contractors prior to engaging them, with the aim of employing only the most reputable firms.

Marine traffic within Chedabucto Bay managed by the Canadian Coast Guard and the Proponent will communicate with the MCTS to the extent requested or required during adverse weather conditions. To the extent applicable, the Proponent will also

- Comply with the Eastern Canada Vessel Traffic Services Zone Regulations of the *Canada Shipping Act*;

- Comply with navigational and operational requirements of Atlantic Pilotage Authority and Coast Guard; and
- As needed, provide marine vessel volumes and schedules to marine management operators responsible for traffic movement; and

With respect to Local Economy, Land and Resource Use the Proponent is committed to meeting with local schools, trade unions and other organizations to describe labour and skill requirements, and to employ a procurement policy that favors local labour markets and suppliers.

Taking into account the basic mitigation measures described above, the residual adverse cumulative effects expected with respect to Shipping and Navigation are predicted to be insignificant. Cumulative effects to the Local Economy, Land and Resource Use are expected to be positive and potentially significant over the medium to long term.

## 6.21 Changes and Effects of Changes Under Federal Jurisdiction

As noted in Section 3.1.3, this section summarizes changes to components of the environment within federal jurisdiction; changes to the environment that would occur on federal or transboundary lands; changes to the environment that are directly linked or necessarily incidental to federal decisions; effects of changes to the environment on Aboriginal peoples; and the effects of changes to the environment that are directly linked or necessarily incidental to federal decisions.

Changes to Components Within Federal Jurisdiction

- Changes are expected to freshwater fish habitat in Reynolds Brook where reductions in flow of up to 18% may be expected in the brook section above Hendsbee Lake. Water quality improvements may also occur due to the reduced inflows of low pH water.
- Changes are expected to marine fish and fish habitat, including marine plants due to the construction of the marine terminal and the transit of marine vessels to and from the terminal.
- Changes to migratory bird behaviour and risk of mortality may occur due to light and noise associated with the Project.

Changes to the Environment Occurring on Federal or Transboundary lands;

The marine components of the Project, especially aggregate shipping, have the potential to result in changes to the environment on federal submerged lands and federal waters. No changes are anticipated on federally owned or federally managed terrestrial lands.

Changes to the Environment that are Directly Linked or Necessarily Incidental to Federal Decisions

A *Navigation Protection Act* approval and *Fisheries Act* authorisation will be required to construct the marine terminal. As a result of these approvals, changes in the marine environment may include effects on marine fish and fish habitat and commercial lobster and shrimp fishing.

Effects of Changes to the Environment on Aboriginal Peoples

The site is not currently visited for resource harvesting and there are currently no FSC fisheries at the Project site. Changes to the environment will not negatively affect health and socio-economic conditions (positive economic benefits may be realised), physical and cultural heritage, the current use of lands and resources for traditional purposes, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

Effects of Changes to the Environment Directly Linked or Necessarily Incidental to Federal Decisions

As noted a *Navigation Protection Act* approval and *Fisheries Act* authorisation will be required to construct the marine terminal. The marine terminal is not expected to result in adverse effects to heath, physical and cultural heritage, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance. In contrast, effects on socio-economic conditions may result from the terminal's effect on the commercial fisheries through:

- Change in risk of fish injury or death; and
- Change in fish or other habitat quality and use;

These potential changes are expected to be temporary and confined to the area around the marine terminal and to the designated shipping routes between the terminal and the main shipping lanes in Chedabucto Bay. With the implementation of the proposed Fisheries Offset Plan, these effects are not expected to significantly alter the socio-economic conditions for commercial or Aboriginal fishermen.

## 7.0 MITIGATION AND MONITORING MEASURES

The Proponent has committed to a number of mitigation measures to limit or eliminate adverse environmental effects and monitoring programs to verify predictions made in the environmental assessment. Table 10 summarizes the mitigation measures on a VC by VC basis, and lists the proposed follow and monitoring programs.

## Table 10:
## Proposed Mitigation Measures and Monitoring Programs

| VC | Mitigation | Monitoring |
|---|---|---|
| Air Quality and Climate Change (7.1) | • Regular maintenance of all equipment and emission control devices.<br>• The use of wet suppression and/or dust collection systems on crushers, screens, and conveyor transfer points. Some parts of the process due to high moisture content of the stone will not need water sprays or additional dust control.<br>• The application of water to the access and haul roads and aggregate stockpiles as needed.<br>• Use of qualified blasting contractors with blast design plans that incorporate dust emission controls.<br>• Construction of the haul roads using material with low silt content.<br>• Use of a binder substance within the dust suppression application (e.g. calcium chloride) during drier periods of the year to aid in keeping the roads moist for longer periods of time, when necessary..<br>• Use adaptive management to adjust dust control measures and/or operating conditions to account for changing conditions that affect dust control. Some of the control measures that will be implemented based on management determination of need include:<br>  ○ Increase in watering frequency of haul roads and stock piles.<br>  ○ Application of dust suppressants to the haul and access roads.<br>  ○ Reduction in allowable speed on haul and access roads.<br>  ○ Restriction or suspension of operation of part or all of the processing plant until dust can be controlled.<br>  ○ Suspension or modification of overburden handling activities.<br>  ○ Addition or modification of dust suppression systems to address specific points where dust is being generated, including spray nozzle additions and/or modifications.<br>  ○ Modify operation and dust controls during high wind events (>30 km/h) to control dust, if it cannot be controlled suspend operation until it can.<br>• Utilize multi-passenger vehicles to transport crew when possible.<br>• Use high quality, ultra-low sulphur diesel fuels or standard unleaded gasoline for mobile equipment at the operation. (Note: Ships will not be refuelled at the site; vessel fuel type is not within the Proponent's control).<br>• Reduce idling and shut off equipment when parked unless it is required to operate due to safety considerations, inspection requirements or maintenance activity. | • Daily dust and weather monitoring as described in the Environmental Management Plan.<br>• Regular individual worker / workplace health and safety testing.<br>• Agency-requested ambient air quality testing or monitoring as required.<br>• Implementation of a complaints log / response protocol at the site office. |

| VC | Mitigation | Monitoring |
|---|---|---|
| | • Turn off equipment that is idling and not in use.<br>• Utilize drill rig that has dust suppression incorporated into its design.<br>• Apply water to shot rock pile as needed to reduce emissions from loading and conveyance of material to the process.<br>• Ships must comply with International Marine Organization limits on $NO_X$, VOC, and $SO_2$ but enforcement is the responsibility of Transport Canada.<br>• Optimize load times to limit auxiliary engine idling on ships at dock. | |
| Noise and Vibration (7.2) | • Procure equipment that meets best practices in terms of noise emissions.<br>• Place as much distance as possible between the plant or equipment and residences.<br>• Maximize shielding from quarry walls, buildings and stockpiles as noise barriers.<br>• Use natural landforms as noise barriers.<br>• Include in tenders, subcontractor agreements and work method statements clauses that assure the minimization of noise and compliance with directions from management to minimize noise.<br>• Regularly train workers and contractors to use equipment in ways that minimize noise.<br>• Ensure that site managers periodically check the site, nearby residences and other sensitive receptors for noise problems.<br>• Procure equipment that meets US EPA Category IV air emission standards for off-road diesel equipment which tend to generate less noise than older equipment.<br>• Equipment that operates in the quarry pit should stay in the pit to the extent possible so that the pit walls attenuate the noise levels.<br>• Locate product stockpiles and other structures to the extent possible to attenuate the noise from the processing equipment.<br>• Restrict operating hours for the quarry and processing plants to 16-hours per day so that noise levels are reduced during night time.<br>• Restrict blasting to daytime hours and weekdays<br>• Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours and other relevant practices (e.g. minimizing the use of engine brakes and engine idling).<br>• Minimize the use of reversing alarms by designing the site layout to avoid reversing.<br>• Provide information/advance notification to neighbors before and during construction through media such as letterbox drops or meetings;<br>• Upon request, residents will be alerted to upcoming production shots (blasts) via automated telephone notifications (“robo-calls”).<br><u>Night-time Mitigation Measures</u><br>• Minimize the need for reversing alarms. | • As required by the NSE Pit and Quarry Guidelines, all blasts will be monitored to establish concussion and vibration levels. This is consistent with the Proponent’s standard operating practices at all quarries.<br>• As required by NSE, sound level monitoring will be undertaken at the property boundary or elsewhere as directed during daytime, evening and night-time to verify compliance with the Pit and Quarry guidelines.<br>• As part of the workplace health and safety program, noise monitors will be attached to workers on a regular basis to measure and monitor noise exposure over an eight hour shift. |

| VC | Mitigation | Monitoring |
|---|---|---|
| | • Avoid metal-to-metal contact on equipment.<br>• Ensure that periods of respite are provided in the case of unavoidable maximum noise level events. | |
| Ambient Light (7.3) | • Use full cut off luminaires where no light is emitted above the horizontal plane, where practical and where they don't comprise worker safety.<br>• Use only the lights needed to meet local lighting objectives.<br>• Where practical Minimize glare by keeping the main beam angle less than 70 degrees.<br>• Use floodlights with asymmetric beams where possible.<br>• Direct the site lighting away from residential properties.<br>• Where possible position lights as far away from site boundaries as practical.<br>• Where possible, keep lighting at low heights to reduce the chance of illuminating migrating birds.<br>• Pole mounted lighting will be pointed downward and shielded from the top and sides.<br>• To the extent possible, low intensity lighting will be used rather than high intensity lighting.<br>• Lights placed on the outside of the quarry work areas will be kept as low as possible and correctly aimed to prevent lighting non-essential areas.<br>• Lights for the marine terminal will be chosen and aimed to prevent where possible light shining directly into the water.<br>• Marine terminal lighting will be controlled so that minimal lighting will be used when the terminal is not in operation.<br>• If lighting is required at the perimeter of the site it will be aimed inward to prevent off site light trespass.<br>• Temporary lighting used during construction will be focussed on the intended work area and will be shielded to minimize spillage.<br>• To reduce night time ambient lighting effects, operations will be routinely monitored so that lighting can be switched off by work area when it is not needed.<br>• Consideration will be given to using light sources such as directional LEDs to give a better spread of lighting and reduce the overall intensity of the lighting systems.<br>• Consideration will be given to selecting lights that have a lesser effect on the wildlife to help reduce lighting effects on nocturnal species. | • Routine site monitoring as described in the Environmental Management Plan will include maintaining records of bird mortality so developing issues related to lighting can be identified.<br>• The Environmental Management Plan will include instructions on implementing the protocol "*Best practices for stranded birds encountered offshore Atlantic Canada*" (EC 2014e) for responding to avian strandings related to activities in the marine environment.<br>• Nightly site inspections will reveal opportunities for light reduction |
| Geology, Soil & Sediment Quality (7.4) | • Standard mitigation measures to manage acid generating rock, including the control and containment of drainage and the management of excavated rock as per NSE regulation.<br>• Sloping of the processing plant area to the south to collect surface water within the sedimentation ponds, prevent discharge to the ocean.<br>• Environmental Management Plan that describes standard ARD control measures. The | • The acid generating potential of bedrock will be assessed at the beginning of construction as per the Nova Scotia *Sulphide Bearing Material Disposal Regulations*.<br>• Discharge will be monitored through a Surface Water Monitoring Program elaborated within the Environmental Management Plan. |

| VC | Mitigation | Monitoring |
|---|---|---|
| | Environmental Management Plan will incorporate an Erosion and Sediment Control Plan to ensure drainage is properly managed and control structures inspected and a Stormwater Management Plan that describes the construction and operation drainage swales and stormwater management ponds. | |
| Groundwater Resources (7.5) | • Since no impacts to groundwater users are expected, no mitigation is proposed<br>• To mitigate reductions in groundwater flows that supply nearby wetlands, implement a Wetland Compensation Plan for wetlands damaged due to the Project. | • The groundwater wells will be monitored as part of the Groundwater Monitoring Program elaborated within the Environmental Management Plan. |
| Marine and Surface Water Resources (7.6) | • Sedimentation ponds will be used near the processing plant while the quarry pit will employ sumps to collect water inflows.<br>• Topographic controls (sloping the ground to the south) will ensure that overflow, should it occur, will collect against the south cliff and in the pit, rather than be permitted to discharge directly to the ocean.<br>• Double walled and or/fully bermed fuel and chemical storage reservoirs will be used.<br>• The Environmental Management Plan will include a discrete Erosion and Sediment Control Plan to ensure drainage is properly managed and control structures inspected and a Stormwater Management Plan that describes the construction and operation drainage swales and stormwater management ponds.<br>• The EMP will also include an Emergency Response and Spill Contingency Plan combined with incident prevention and emergency response training to minimize the risk of accidental spills and to rapidly react to any incident that may occur. The Emergency Response and Spill Contingency Plan will include spill dispersion modelling in the marine environment to aid in rapid and effect emergency response.<br>• The Proponent will contract with a local emergency response consultant to ensure that additional resources and expertise are available in the event of an accidental spill in the marine environment.<br>• To mitigate reductions in surface water flows that supply nearby wetlands, implement a Wetland Compensation Plan for wetlands damaged due to the Project. | • Discharge will be monitored through a Surface Water Monitoring Program elaborated within the Environmental Management Plan.<br>• The success of the Wetland Compensation Plan will be monitored over time as determined in collaboration with NSE; other water features not directly included in the Plan will be inspected to detect hydrological changes potentially caused by the Project – these inspections will be outlined in the Plan. |
| Terrestrial Ecosystems, Habitat and Vegetation (7.7) | • A general set of environmental mitigation measures will be defined in the Environmental Management Plan which will include an Erosion and Sediment Control Plan, a Stormwater Management Plan and an Emergency Response and Spill Contingency Plan.<br>• Minimize the Project footprint.<br>• Mark Project boundaries to prevent accidental impacts outside the work area.<br>• Remove/ and salvage topsoil; store separately and reuse for site restoration. | • The Environmental Management Plan will establish monitoring/inspection plans to ensure protective mitigation measures are implemented and effective.<br>• Daily inspection and record keeping will be described in the EMP. |

| VC | Mitigation | Monitoring |
|---|---|---|
| | • Dust-prevention and abatement measures outlined above will also protect local flora and habitats.<br>• Stabilize and rehabilitate areas of disturbance.<br>• Use local native vegetation in restoration; consideration will be given to the preferential use of vegetation types of interest to the Mi'kmaq.<br>• Vegetation management will be conducted by mechanical cutting (e.g., mower, brush cutter);<br>• Mitigation measures for the protection of watercourses (see Section 7.6 and 7.10) will help to protect terrestrial and freshwater aquatic vegetation and habitats. | |
| Wetlands (7.8) | • Mitigation developed for surface water quality will also protect wetlands (Sections 7.6).<br>• Mitigation against the potential effects of spills, malfunctions and accidents are described in Section 7.18.<br>• Wetlands will be avoided to the extent feasible during Project planning.<br>• Where wetlands cannot be avoided, the Project footprint in the wetland area will be minimized.<br>• A wetland alteration permit will be obtained from NSE prior to construction.<br>• Where a permanent loss of wetland function is identified, a **Wetland Compensation Plan** will be developed, subject to approval by NSE.<br>• Maintain a 30 m buffer around all undisturbed wetlands.<br>• Where the access road cuts across diffuse natural drainage paths culverts or drainage swales of sufficient size will be installed to maintain water flow at pre-construction levels.<br>• To the extent feasible, clean site runoff will be managed so that the amount of water entering adjacent wetlands is similar to pre-construction levels.<br>• Runoff collected along the roads will not be allowed to enter directly into wetlands, but shall be directed into vegetation buffers around wetlands.<br>• Integration of existing/remnant wetlands into the quarry's stormwater management system will be considered in the **Stormwater Management Plan** and in the **Environmental Management Plan**.<br>• Implement **Erosion and Sediment Control Plan.**<br>• Uncontaminated drainage will be directed away from areas under construction.<br>• Vegetation management in or near wetlands will be conducted by cutting (i.e., no use of herbicides).<br>• Dust-prevention and abatement measures outlined above will also protect wetlands. | • Efficacy of the erosion and sediment control measures will be monitored as outlined in the **Environmental Management Plan**.<br>• Monitoring of new or enhanced wetlands will be undertaken as per the **Wetland Compensation Plan.**<br>• Other water features not directly included in the Plan will be inspected to detect hydrological changes potentially caused by the Project – these inspections will be outlined in the Plan. |
| Terrestrial Wildlife (7.9) | • Minimize the Project footprint.<br>• Implement dust-prevention and dust abatement measures described above.<br>• Implement a **Wetland Compensation Plan.**<br>• Instruct workers to maintain good housekeeping practices and not leave out any food or garbage to avoid attracting wildlife. | • Routine site monitoring as described in the Environmental Management Plan will include maintaining records of bird mortality so developing issues related to lighting can be identified.<br>• The Environmental Management Plan will include provisions describing specific management actions for at risk species (e.g., |

| VC | Mitigation | Monitoring |
|---|---|---|
| | • To minimize impacts on nesting landbirds, clearing will take place outside of the breeding season for most bird species (April 1 to September 1). If some clearing is necessary during the breeding season the Proponent will assess if the work can be undertaken without contravention of the *Migratory Birds Convention Act* and a contingency plan developed in consultation with CWS in order to maintain compliance with the *Act*.<br>• If an Osprey, Bald Eagle or Northern Goshawk nest is found, even outside of the breeding season, a buffer zone will be placed around the nest and clearing will only occur outside of the buffer zone.<br>• To discourage ground-nesting or burrow-nesting species, no large piles or patches of bare soil will be left uncovered or un-vegetated during the breeding season.<br>• Should any ground- or burrow-nesting species initiate breeding activities on stockpiles or exposed areas, the Proponent will establish a 20 m buffer around the nest location and contact EC-CWS for further advice.<br>• Noise suppression equipment such as mufflers on mobile equipment and fixed/portable engines will be maintained in original OEM working condition<br>• The duration of noise disturbance will be minimized.<br>• Lighting will be restricted to areas where it is necessary.<br>• To minimize interference of nesting activities, workers will be asked to refrain from entering undisturbed habitat areas where no work is done.<br>• In the event that impacts on migratory birds are detected during construction, further mitigation will be developed in consultation with NSDNR and EC.<br>• Standard mitigation measures for noise (including blasting), as outlined in Section 7.2, will minimize impacts on terrestrial fauna.<br>• As recommended by EC, ships en route will maintain a minimum distance of at least 300 m from any colony or island occupied by seabirds and waterbirds.<br>• To minimize the risk to migrant birds, the minimum amount of pilot warning and obstruction avoidance lighting will be used on tall structures.<br>• Lighting for the safety of the employees should be shielded to shine down and only to where it is needed, without compromising safety.<br>• Street and parking lot lighting should also be shielded so that little escapes into the sky and it falls where it is required.<br>• The protocol "*Best practices for stranded birds encountered offshore Atlantic Canada*" (EC 2014e) will be used for stranded seabirds.<br>• White lights will be preferred for use on towers or high structures at night, as recommended by the US Fish and Wildlife Service (2003). Solid red or flashing red lights will be avoided as they appear | Mainland Moose, ground- or burrow-nesting species) |

| VC | Mitigation | Monitoring |
|---|---|---|
| | to attract nocturnal migrants more than white flashing lights.<br>• The operation of exterior decorative lights such as spotlights and floodlights, whose function are to highlight features of buildings or to illuminate an entire building, will be avoided unless safety is a factor.<br>• High intensity lights, including floodlights, will be turned off at night outside of working hours, if possible, especially during the spring and fall migration period.<br>• Where feasible, tinted or frosted glass windows will be used in buildings to reduce bird mortality from collisions. | |
| Freshwater Species and Habitat (7.10) | • As described in the Erosion and Sediment Control Plan, erosion control measures will be implemented to ensure that discharge water quality meets all relevant regulatory standards prior to discharge to receiving environment.<br>• As described in the Stormwater Management Plan, stormwater will be collected in the pit and in ponds near the processing plant to ensure that uncontrolled runoff will not occur.<br>• Overburden stockpiles, fuel and chemical storage facilities, and construction equipment will be located a minimum of 30 m from any pre-development water body.<br>• Flagging tape will be used to delineate temporary work areas and control construction access near retained wetlands and water bodies to protect natural substrates and vegetation contributing to habitat and bank stability;<br>• An Emergency Response Spill Contingency Plan will be prepared to prevent and manage the effects of any malfunctions and accidents. | • Fish habitat assessment and determination of presence/absence is proposed for Reynolds Brook above Hendsbee Lake. If fish are present, then a modest monitoring program is proposed for such time as quarry development begins to divert water away from its natural drainage to the south. This is not expected to occur before year 10 of quarry development.<br><br>During construction and operation monitoring will focus on:<br>• Condition and location of erosion and sediment control structures;<br>• Water quality testing of stormwater discharge as outlined in the Surface Water Monitoring Program;<br><br>• Ensuring overburden stockpiles, fuel and chemical storage facilities, and construction equipment are a minimum of 30m from any natural water body. |
| Marine Species and Habitat (7.11) | • An Environmental Management Plan will describe the following preventative and mitigation measures:<br>  ○ Application of appropriate timing windows for all in-water work.<br>  ○ Implementation of terrestrial erosion and sediment control measures.<br>  ○ Use of surface water monitoring to ensure that quality meets all relevant regulatory standards prior to discharge to receiving environment.<br>• Install overburden stockpiles, fuel and chemical storage facilities a minimum of 30 m from Chedabucto Bay.<br>• Implement an Emergency Response and Spill Contingency Plan for Accidents and Malfunctions.<br>• If effects from blasting vibrations exceed the DFO thresholds, then a site specific standard to protect fish and an appropriately scaled fish and fish habitat offset plan will be implemented. | • Fisheries Offset Program and associated monitoring for effectiveness.<br>• Concussion and ground vibration monitoring during each blast to ensure limits established by DFO for the marine environment are respected. |

| VC | Mitigation | Monitoring |
|---|---|---|
| | • Control ballast water release via "*Ballast Water Control and Management Regulations*" and the requirements as per the International Convention for the control and Management of Ship's Ballast Water and Sediments.<br>• Equip the ship loader with aggregate spill containment features.<br>• Implement a **Fisheries Offset Program** to recreate fish habitat that has suffered "serious harm". | |
| Species at Risk (SAR) and of Conservation Concern (SOCC) (7.12) | • Mitigation for potential effects on SAR and SOCC are similar to recommendations for terrestrial or marine fauna as a whole. Standard mitigation measures such as minimization of Project footprint, dust control, emissions control, and monitoring of air quality targets as detailed in Sections 7.7 and 7.1 will be sufficient to protect many SAR and SOCC, if present.<br>• Standard handling and storage procedures for hazardous material, as well as procedures for handling and disposal of contaminated soils (outlined in Section 7.18), will adequately mitigate the potential for exposure of Moose and bird SAR/SOCC to any hazardous materials or contaminated soils.<br>• Strict reporting policies for any suspected hunting activities will help to minimize any potential Moose poaching in the Project area.<br>• Imposing a 50 km/hr speed limit will reduce the potential for vehicle-moose collisions. It will also decrease encounters between humans and Moose.<br>• Exposed soils and soil stockpiles will be adequately covered or vegetated to deter Common Nighthawks from nesting on them.<br>• Should Common Nighthawks initiate breeding, the Proponent will establish a 20 m buffer around the location once identified, and contact CWS for further advice. | • Mainland Moose surveys (presence/absence and use) will be performed annually for up to three years after construction is initiated.<br>• Regular inspections for Common Nighthawk nests. |
| Local Economy, Land and Resource Use (7.13) | • Recreational users will be notified of restricted access by signage at the entrance to the construction site.<br>• Vessels will not be refuelled at the marine terminal and fuel used at the quarry will be kept in double hulled reservoirs or will be placed within secondary containment and will be protected against collision. This helps to minimize the risk of accidents at the terminal.<br>• Navigational safety mitigation measures and emergency response planning measures are presented in Section 7.18.3.<br>• As part of the Environmental Management Plan, implement an **Emergency Response and Spill Contingency Plan** in advance of any accident or malfunction causing a spill in the marine environment.<br>• The Proponent will contract with a local emergency response organisation to ensure supplementary emergency resources are available if needed. | • None proposed |
| Tourism and | • Recreational users will be notified of restricted access by signage at the entrance to the | • None proposed |

| VC | Mitigation | Monitoring |
|---|---|---|
| Recreation (7.14) | construction site.<br>• Vessels will not be refuelled at the marine terminal and fuel used at the quarry will be kept in double hulled reservoirs protected against collision. This helps to minimize the risk of accidents at the terminal.<br>• Navigational safety mitigation measures and emergency response planning measures are presented in Section 7.18.3.<br>• As part of the Environmental Management Plan, implement an **Emergency Response and Spill Contingency Plan** in advance of any accident or malfunction causing a spill in the marine environment.<br>• The Proponent will contract with a local emergency response organisation to ensure supplementary emergency resources are available if needed. | |
| Commercial Fisheries (7.15) | • Minimize the impact of construction in the marine environment during and after lobster fishing season to the extent possible. For example: standard construction best management practices and mitigation measures to control onshore sediment release to the marine environment will be implemented (Section 7.6 and Section 7.11).<br>• The quarry site office will be manned 24 hrs/day so that fishermen can telephone to receive information regarding vessel arrival and departures. The phone number can also be used to report loss or damage to gear caused by Project-related vessel traffic.<br>• Construction and regular use of the marine terminal will require a safety exclusion zone around the terminal. Loss of these fishing grounds will be mitigated through the creation of new lobster habitat as described in the **Fisheries Offset Program** to be established in collaboration with local fishermen and DFO.<br>• Routine communication with potentially affected Mi'kmaq will occur through the CLC to which they have been invited to sit as members or through other means as established by both parties. | • Monitoring terminal operations and fishing access in response to concerns expressed by local fishing community, as needed;<br>• Monitoring of the effectiveness of the marine **Fisheries Offset Program** for a minimum of three years during and after marine terminal construction until it can be demonstrated that the program objectives have been met. |
| Archaeological/ Heritage Resources (7.16) | • Prior to construction, implement a **Cultural Resource Management Plan** to guide site personnel in the event that archaeological and heritage resources are identified during construction. The Plan specifies a notification procedure if remains are found, and will describe specific preservation measures as needed.<br>• These mitigation measures would be approved by the Minister of the Department of Communities, Culture and Heritage before site construction could begin.<br>• Exploratory excavation will likely be required in those areas that may be disturbed during Project construction. | • Follow up pre-construction excavation to investigate heritage resources that will be lost during project construction<br>• Monitor construction activities near known or suspected cultural resources. |
| Mi'kmaq Land and Resource Use | • While there is currently no Mi'Kmaq harvesting on the site or in waters immediately adjacent, it is intended that the non-hazardous portions of the Project site and adjacent waters will be accessible | • Monitoring of progress and implementation of MOU and any other agreements reached with other First Nation communities. |

| VC | Mitigation | Monitoring |
|---|---|---|
| (7.17) | to Mi'kmaq for harvesting for flora and fauna for food, social and ceremonial purposes, to the extent this is not precluded by safety consideration<br>• Any future potential Project impacts (environmental, social and economic) on these harvesting activities will be a matter of the formal and regular meetings with the Mi'kmaq community representatives.<br>• In the event that archaeological remains are excavated, recommended guidelines as directed by the Nova Scotia Communities, Culture, and Heritage Coordinator of Special Places will be employed. Should evidence of aboriginal archeological remains be uncovered all activity will cease until Mi'kmaq archaeological experts have had an opportunity to examine the site and determine appropriate action. | • Mi'kmaq resource harvesting activities will be reviewed with Mi'kmaq representatives at the Community Liaison Committee meetings. |

## 8.0 PROPOSED SIGNIFICANCE DETERMINATION

Thresholds are used to define a level beyond which a residual environmental effect (i.e., an effect that remains after the application of mitigation measures) would be considered significant or unacceptable. These thresholds are based on applicable regulation, if available, or on standards, resource management objectives, or the preservation of ecological sustainability. VC-specific significance thresholds defined for the Black Point Project are given in Table 11, which also demonstrates that no significant residual environmental effects are expected.

**Table 11:**
**Residual Adverse Effects, Significance Thresholds and Significance**

| VC and Residual Adverse Effects | Threshold for Determination of Significance | Significance of Residual Adverse Effect |
|---|---|---|
| **Air Quality and Climate Change** | | |
| Fugitive dust emissions from site preparation, quarrying, crushing, stockpiling, vehicle traffic and off loading | An exceedance of the Nova Scotia or CCME ambient air quality standards at a residential or commercial location outside the property boundary, where the exceedance is due to emissions from the operation and the event occurs more than twice in the period of time that the standard is based | Not Significant |
| Emissions of fuel combustion products from site vehicles and generators | As above | Not Significant |
| **Noise (Terrestrial)** | | |
| Ambient noise perceived by residents living around the site during construction (road building, vehicle traffic, blasting, crushing, marine terminal construction) | An exceedance of the maximum noise or vibration limits listed in the *Pit and Quarry Guidelines* at or beyond the property boundary, where the exceedance is due to noise from the operation and the event occurs more than twice in the period of time that the standard is based. | Not Significant |
| Ambient noise perceived by residents living around the site during operation (blasting, loading, crushing, screening, offloading) | As above | Not Significant |
| **Ambient Light** | | |
| Increased ambient light from the Project construction and operation, including operation of the marine terminal | Direct light trespass that according to the affected resident regularly interferes with the use and enjoyment of nearby residential properties on a permanent basis. | Not Significant |
| Attraction or disturbance of nocturnal wildlife and/or migrating birds | Evidence of unacceptable levels of bird mortality associated with Project lighting (mortality or injury of ten or more migratory birds in a single event, or of any number of species at risk birds). | Not Significant |
| **Geology, Soil and Sediment Quality** | | |
| Surface water discharge to the marine environment | An accidental release of low pH, acid rock drainage to the marine environment. | Not Significant |
| As above | An accidental release of total suspended solids in | Not Significant |

| VC and Residual Adverse Effects | Threshold for Determination of Significance | Significance of Residual Adverse Effect |
|---|---|---|
| | excess of the maximum values listed in the CCME (1999) Water Quality Guidelines for the Protection of Aquatic Life (Marine) and/or the Nova Scotia Pit and Quarry Guidelines (NSEL 1999). | |
| **Groundwater Resources** | | |
| Reduction in groundwater recharge to offsite surface water features; changes to groundwater quality | A decrease in groundwater supply to Adjacent Areas by 20% and/or an impairment in water quality such that groundwater discharge to surface waterbodies no longer meets Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life (CCME 1999 as updated). | Not Significant |
| **Marine and Surface Water Resources** | | |
| Changes to surface water quality | Discharge from the site exceeds the liquid effluent discharge standards in the *Pit and Quarry Guidelines* (NSEL 1999) or criteria listed in the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, both freshwater and marine (CCME 1999). | Not Significant |
| Effects on Reynolds Brook and Murphys Lake from diversion of surface and groundwater into the pit over time | A predicted change in the mean annual runoff within any off-site watercourse, or flow into any water body which changes by 20%.<br>A predicted change in peak flow of water discharged from the site which will measurably increase the risk of flooding to downstream watercourses | Not Significant |
| **Terrestrial Ecosystems** | | |
| Habitat loss / plant mortality | A decline in abundance and/or a change in distribution beyond which natural recruitment would not return the population to its pre-project level within several (3-5) generations. | Not Significant |
| **Wetlands** | | |
| Progressive habitat loss due to Project construction and operation over 50 years | An effect that is likely to cause a permanent net loss of wetland function as established during the wetland evaluation. | Not Significant following compensation |
| Changes to wetland hydrology and water quality resulting in habitat loss | As above. | Not Significant |
| **Terrestrial Wildlife** | | |
| Habitat loss / fragmentation | An effect that causes a decline in abundance and/ or a change in distribution beyond which natural | Not Significant |

| VC and Residual Adverse Effects | Threshold for Determination of Significance | Significance of Residual Adverse Effect |
|---|---|---|
| | recruitment would not return the population to its pre-project level within several (three to five) generations | |
| Wildlife disturbance | As above | Not Significant |
| Disturbance of seabirds and waterfowl | As above | Not Significant |
| **Freshwater Species and Habitat** | | |
| Effects on Reynolds Brook from diversion of surface and groundwater into the pit over time | A permanent, irreplaceable loss of Freshwater Species and Habitat that are part of or support a commercial, recreational or Aboriginal fishery. | Not Significant |
| **Marine Species and Habitat** | | |
| Temporary noise and vibration effects to marine biota | 1. Adverse and irreversible changes to critical habitats;<br>2. Serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish species that support such a fishery;<br>3. Permanent impairment of the ecological functioning of the biotic community; and/or<br>4. Increased ecological risk to a level that long term effects to the health of aquatic biota is predicted. | Not Significant |
| Permanent loss of habitat resulting from the construction and operation of the marine terminal | As above | Not Significant following Offset |
| **Species at Risk (SAR)** | | |
| Terrestrial Flora and Fauna SAR/SOCC - Clearing and site preparation will result in habitat loss and fragmentation and SOCC plant mortality | An effect that causes a decline in abundance and/ or a change in distribution beyond which natural recruitment would not return the population to its pre-project level within several generations and/or an adverse effect that causes a net loss of habitat function | Not Significant |
| Terrestrial Fauna SAR/SOCC - Change in behavior as a result of noise and light (including blasting). | As above | Not Significant |
| Marine SAR/SOCC - Loss of fish habitat due to construction of marine terminal | As above | Not Significant |

| VC and Residual Adverse Effects | Threshold for Determination of Significance | Significance of Residual Adverse Effect |
|---|---|---|
| Marine SAR/SOCC - Disturbance and potential change in behavior due to noise from ship traffic, pile driving and blasting | As above | Not Significant |
| **Economy, Land and Resource Use** | | |
| Change in land use from occasional recreational/trapping to quarry, with resulting limitations on these activities | Pervasive change in land use patterns within the Study Area that adversely affects a community's use of that land and/or is inconsistent with a designated land use established through a municipal planning process. | Not Significant |
| **Tourism and Recreation** | | |
| A decrease in wilderness/nature oriented recreation and tourism within the Project Area and vicinity due to vessel traffic and actual or perceived noise, dust and light | A permanent and widespread change in tourism or recreational activities such that people are no longer able to undertake these activities within the municipality and/or that result in a significant loss of tourism related revenue to local businesses. | Not Significant |
| **Commercial Fisheries** | | |
| Temporary loss of lobster fishing grounds due to the marine terminal construction and operation and, as a result, displacement of fishermen into other areas | 1. An uncompensated loss of habitat of those fish species that are used for, or support commercial, recreational and/or Aboriginal fisheries; or<br>2. A sustained decrease in earnings from a fishery due to lower catch quantity and/or quality, or increased fishing costs (i.e., due to longer travel times, loss of gear, additional license fees, etc). | Not Significant following Offset |
| **Archaeological and Heritage Resources** | | |
| None anticipated | An uncontrolled disturbance to, or destruction of, any historical resource considered by the First Nations, provincial regulators or local residents to be of major importance. | Not Significant |
| **Aboriginal Land and Resource Use** | | |
| Loss of future opportunities to harvest traditional terrestrial resources on portions of the property (there is currently no harvesting on the site) | Loss of fishing employment/income that could not be replaced within a reasonable time, loss of food resources not present in reasonable proximity to communities, or permanent loss of cultural relationship with the lands, flora and fauna. | Not Significant |
| Harm to or dispersion of local | As above | Not Significant |

| VC and Residual Adverse Effects | Threshold for Determination of Significance | Significance of Residual Adverse Effect |
|---|---|---|
| wildlife; Potential depreciation of the quality of local food and medicinal plants; Potential degradation of the local marine and shoreline habitats | | |

## 8.1 Conclusions of the Proponent

As progressively described within this EIS, a series of Project-environment interactions can be expected during the construction, operation and decommissioning of the Black Point Quarry Project. These interactions and their resulting effects on the environment are entirely consistent with and typical of environmental impacts of natural resource development projects in Nova Scotia and elsewhere in Canada. For many reasons the Project site is well suited for a quarry operation. The large, chemically stable granite resource is not used as a potable water supply, the nearest residential property are not situated at the property boundary but rather hundreds or thousands of meters away, the quarry face is directed across open water rather than toward residential development, the resource is located near a deep water, ice free shipping route to a major commercial market, prime fishing areas can be avoided or in the case of lobster habitat occupied by the marine terminal, can be recreated in the immediate vicinity, etc.

Given these considerations and a number of others, the Proponent concludes that the Project is not likely to result in any significant adverse residual environmental effects. In contrast, the Black Point Quarry Project is expected to result in long term direct and indirect employment opportunities, in addition to other positive economic benefits for the local, regional and provincial economies.

## 9.0 ACRONYM LIST

asl: above sea level

CEA Agency: Canadian Environmental Assessment Agency

CLC: Community Liaison Committee

dBA: A-weight decibels

EIS: Environmental Impact Statement

GCIFA: Guysborough County Inshore Fishermen's Association

ha: hectares

km: kilometers

KMK: Kwilmu'kw Maw-Klusuaqn Negotiations Office

m: meters

MODG: Municipality of the District of Guysborough

MOU: memorandum of understanding

MT: million metric tonnes

*NSESA: Nova Scotia Endangered Species Act*

$PM_{10}$: particulate matter up to particle size 10 microns

$PM_{2.5}$: particulate matter up to particle size 2.5 microns

SAR species at risk

SOCC: species of conservation concern

TPH: tonnes per hour

TPM: total particulate matter

TSP: total suspended particulate

VCs: Valued Components

SLR

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C1092-078