Whites Point Quarry
&
Marine Terminal

REVISED PROJECT DESCRIPTION

BILCON OF NOVA SCOTIA

November 2006

Table of Contents

List of Submissions

Table of Contents

List of Maps

List of Plans

List of Figures

7.0 PROJECT DESCRIPTION

The Whites Point quarry is a basalt rock quarry with a marine terminal for shipping processed aggregate products. Major components include a physical plant area for processing, screening, washing, and stockpiling aggregate products and a ship loading facility consisting of mooring dolphins, radial arm ship loader, and conveyors.

Land based infrastructure and activities will include the quarrying of approximately 120 hectares of the 152 hectare site over 50 years. Annual production of aggregate products is estimated to be 2 million tons. Rock would be extracted by drilling and blasting, then loaded, transported, crushed, screened, washed, and stockpiled at the processing plant area. The plant area comprises approximately 12 hectares and is located 30 metres above sea level. Other land based infrastructure includes quarry roads, a compound area comprising approximately 2 hectares, and dyked organic and sediment disposal areas comprising approximately 11.2 hectares. Surface area of the sediment/wash water ponds is approximately 10.6 hectares. All land development and activities will take place within the 152 hectare site.

An integral aspect of the land based development is an environmental preservation zone, approximately 30 metres wide which will separate the quarry area from adjacent properties. Landward from the environmental preservation zone along the coast, environmental control structures will be developed. These environmental control structures will consist of drainage channels, sediment retention ponds, and constructed wetlands. Also, on the uplands, dyked disposal areas for organic and sediment storage will be constructed. Incremental reclamation of disturbed areas is proposed approximately every five years.

Water based infrastructure and activities will include the ship loading of approximately 40,000 tons of aggregate weekly. Aggregate would be loaded into the hulls of bulk carriers for shipment to New Jersey, U.S.A. Marine infrastructure including conveyors, radial arm ship loader, and mooring dolphins would be constructed over the water and supported by pipe piles anchored to the bedrock in the intertidal and nearshore waters. The ship loading facilities will require a 4 hectare water lot lease and extend approximately 200 metres into the Bay of Fundy. Water depth at the mooring dolphins would be approximately 16 metres below chart datum.

The pipe pile construction technique used to support the marine facilities minimizes alteration to fish habitat. Minimal effects on bottom habitat and tidal movements will result from this construction method. As a result, no dredging or dredge disposal, or fill will be placed in the intertidal or nearshore marine waters.

Electricity would be the primary energy used for operating the land and marine facilities such as the radial arm ship loader, conveyors, and processing equipment. Diesel fuel will be used for mobile equipment such as loaders and trucks and stored in a double walled tank in the compound area. Ammonium nitrate-fuel oil based explosives will be used for blasting. Make-up water for aggregate washing will be obtained from storage of surface water runoff and pumped to the high rate thickener tank. After the aggregate is washed, the wash water will be recycled through the high rate thickener tank. A flocculent will be used in the tank to settle-out sediments. Sediments in the bottom of the tank would then be pumped to the dyked, sediment disposal area.

7.1 Need for, Purpose of, and Alternatives to the Proposed Project

Sections 7.1 through 7.2 address the "Need for", "Purpose of", "Alternatives to", and "Alternative Means" as presented in the Canadian Environmental Assessment Agency's Operational Policy Statement OPS-EPO/2-1998 (Ref. 197). These sections are presented from a private sector proponent's perspective. Alternatives To and Alternative Means are, at this stage of project development, broad in scope and conceptual in context.

Bilcon of Nova Scotia Corporation is a private, family owned business. Its parent company, Clayton Concrete Block and Sand manufactures concrete products in New Jersey, U.S.A. Bilcon needs a source of raw aggregate materials that is not subject to market fluctuations or market disruptions. Their development of the Whites Point quarry could satisfy this need for the next 50 years. Thus, the fundamental rationale for development of this quarry is to supply a stable "fixed market" with a raw material necessary for their manufacturing processes. The importance of achieving market stability cannot be overstated. Clayton Concrete Block and Sand presently purchases aggregate on the "open market". In order to ensure a dependable, uninterrupted supply, not subject to inconsistencies, Clayton Concrete Block and Sand, through Bilcon, intends to develop and control their own supply of aggregate exclusively for Clayton Concrete Block and Sand. In essence, this stability of a guaranteed market eliminates the instability of the competitive market place which has contributed to the demise of other mining ventures in Nova Scotia.

The main function of the quarry will be to produce aggregates for Clayton Concrete Block and Sand to manufacture concrete and value added concrete products. Since this is an export product, competition with local and regional quarries will not be a factor. In fact, construction and operation of the Whites Point quarry, without public money, will generate stable local, regional, and provincial economic benefits over the next 50 years. During operation, a stable employment environment will be created. Thirty-four, high paying, full time jobs will be realized in the regional area accompanied by local economic diversification. Diversification has been recognized as a corner stone for sustainability of rural coastal communities.

"Alternatives to" the project is defined as functionally different ways to meet the project need and purpose, from the perspective of the proponent – OPS-EPO/2-1998 (Ref 197).

Clayton Concrete Block and Sand presently recycles used concrete and other construction materials to supplement their demand for raw aggregate materials. Unfortunately the supply of recyclable materials does not meet their needs or provide a stable supply. Therefore the company is investigating alternatives to their present aggregate supply which will return an economic benefit to the company. Alternatives include purchasing aggregate on the open market and developing their own quarry to supply their needs.

The "do nothing" alternative will not result in a stable and reliable source of aggregate for Clayton Concrete Block and Sand. Also, an economic diversification opportunity for the Digby Neck and region would not be realized.

Past land use of the proposed Whites Point quarry site has included historic use as a pit, farming, boat haul-up, unmanaged forest lands, and recently, clear cutting. These past land uses have provided little or no economic diversification benefits for the local and regional area. Without a Planning Strategy in place for Digby County and much of the land in absentee ownership, these historic land use trends are likely to continue into the near future.

Alternative quarry sites were investigated in the Atlantic Provinces and Nova Scotia. These investigations included preliminary literature research and on-site evaluation of the existing physical, biological, and socio-economic conditions. General categories of criteria used at this stage of alternative evaluation included:

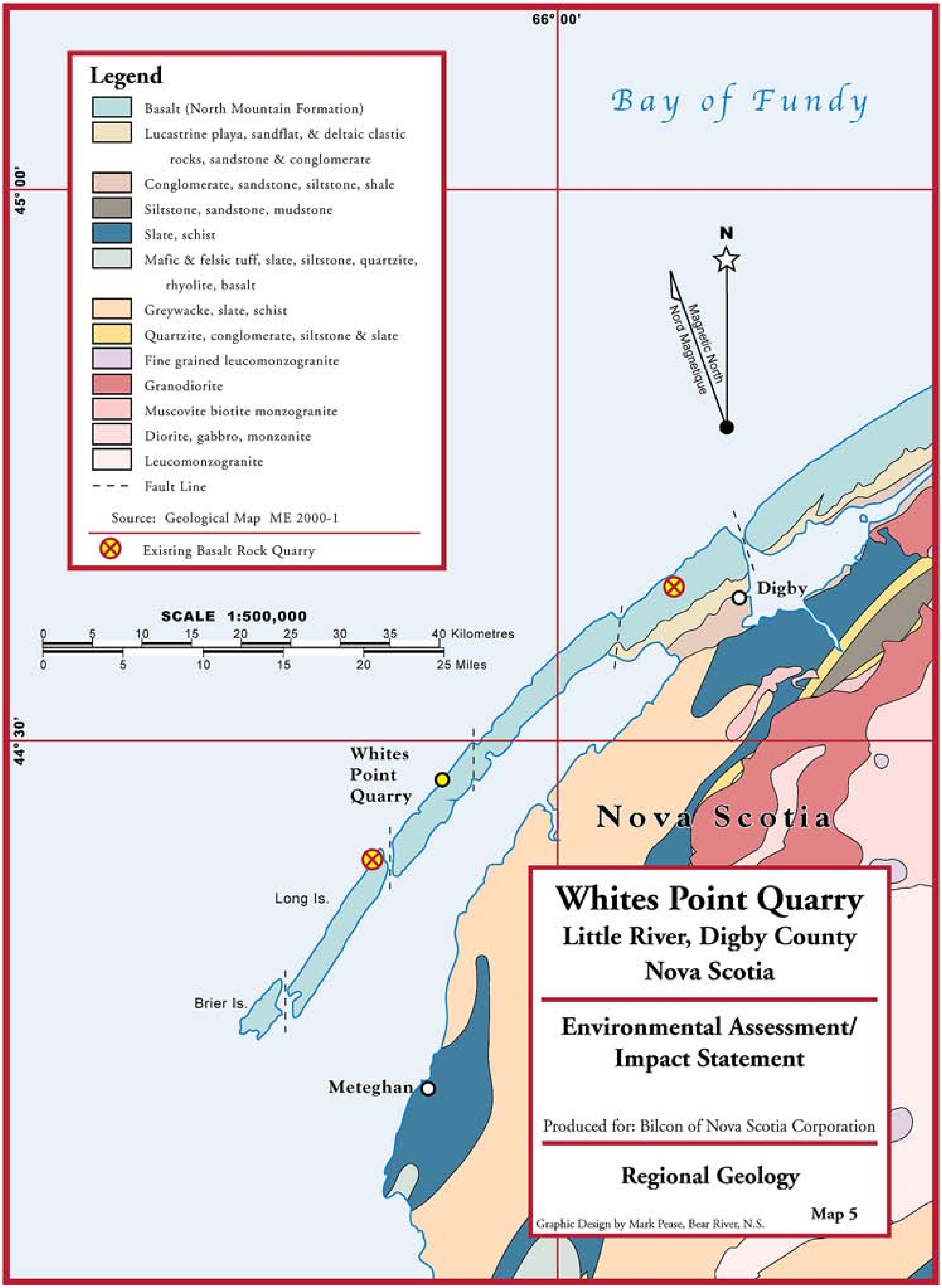
- Suitability of the geological resource
- Availability and size of land base
- Proximity to residential development
- Adequacy of transportation systems
- Engineering feasibility
- Economic diversity and sustainability
- Social/cultural health and quality of life
- Unique heritage resources
- Presence of species at risk and biodiversity
- Quality of fish habitat and wetlands

Preliminary evaluation of alternative sites on a provincial scale indicated certain sites possessed some negative attributes based on the general criteria categories mentioned above and were rejected at this stage of investigation.

On a regional scale, potential alternative locations for basalt rock quarries exist throughout the North Mountain Basalt Formation which extends from Brier Island to Cape Blomidon, see **Map 5** – Regional Geology. During preliminary investigations, alternative basalt rock quarry sites were investigated in this region. Several basalt rock quarries presently operate in Digby and Annapolis Counties. After preliminary regional studies concerning environmental sensitivities, subsurface investigations, and economic development costs, Whites Point was selected for further study. During the permitting process for the 3.9 hectare quarry in 2002, on-site environmental surveys were conducted. This information forms the basis of the rationale presented below.

Following are the general reasons for selection of the Whites Point site.

- Feasible water depth for the location of a marine terminal to ship aggregates by the most cost effective means of transportation. This means of transportation also eliminates the need for trucking through rural communities.


66° 00'
45° 00'
44° 30'
Bay of Fundy
Legend
Basalt (North Mountain Formation)
Lucastrine playa, sandflat, & deltaic clastic rocks, sandstone & conglomerate
Conglomerate, sandstone, siltstone, shale
Siltstone, sandstone, mudstone
Slate, schist
Mafic & felsic tuff, slate, siltstone, quartzite, rhyolite, basalt
Greywacke, slate, schist
Quartzite, conglomerate, siltstone & slate
Fine grained leucomonzogranite
Granodiorite
Muscovite biotite monzogranite
Diorite, gabbro, monzonite
Leucomonzogranite
Fault Line
Source: Geological Map ME 2000-1
Existing Basalt Rock Quarry
SCALE 1:500,000
0 5 10 15 20 25 30 35 40 Kilometres
0 5 10 15 20 25 Miles
N
Magnetic North
Nord Magnetique
Digby
Whites Point Quarry
Long Is.
Brier Is.
Meteghan
Nova Scotia
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Regional Geology
Map 5
Graphic Design by Mark Pease, Bear River, N.S.

- The quarry could be developed and not be visible from Highway #217, a seasonal tourist route. Permitted quarries in nearby Tiverton and Seabrook are highly visible from Highway# 217.
- Whale watching tours, recreational boating or adventure boating in the Bay of Fundy presently do not frequent the nearshore waters in the Whites Point area.
- A minimal depth of overburden exists on the site, especially below the 45 metre land elevation, which limits the potential for sediment production.
- Minimal nearshore sediment deposits exist, especially within the area of theproposed marine terminal construction, which will limit the potential for turbidity production during construction.
- Construction of the marine berthing facilities will be on bedrock thereby eliminating the necessity for dredging and dredge material disposal during construction and operation.
- No salmonid fresh water fish habitat exists within the active quarry site.
- Nationally (Canada), this region is in the lowest category of wetlands and provincially, the quarry site possesses no significant wetlands.
- The quarry is located so ship traffic to and from the marine terminal avoids passing through the designated conservation area of the endangered North Atlantic right whale.
- Winter refuge areas for the Harlequin duck, a species of concern, do not exist along the quarry coastline.
- No spawning rivers for the endangered inner Bay of Fundy (iBoF) salmon exist on the site and the probability of migrating iBoF salmon passing along the quarry shoreline is extremely unlikely.
- The geology of the quarry possesses high quality basalt rock, is of simple and stable character, of volcanic origin with limited permeability, and highly stable cut face integrity.
- Nationally (Canada), the quarry site is located in an area of low seismic hazard and no earthquakes have been recorded on Digby Neck.
- Provincially, the quarry site is highly unlikely to contain artifacts or heritage values of archaeological significance.

Environmental and socio-economic ramifications are likely with any project, however, through the course of investigation, the Whites Point Quarry and Marine Terminal did not present any likely significant adverse (negative) impacts that could not be mitigated with currently available technology or project management/operational procedures. The above reasons for site selection present an overview. Clearly, the preferred alternative, based on the general categories of criteria, which meets the need for the project and achieves the purpose of the project, is development of the proposed quarry site at Whites Point. The complete, documented rationale and analysis is contained in subsequent sections of the Environmental Impact Statement.

Panel Comment

7.1 Alternatives to the Project

*The Panel requires further information considering alternative quarry sites in Atlantic Canada and the United States: these are alternatives **to** the Project.*

Identify individual sites or areas considered and provide the rationale for removing each site/area from further consideration.

*The Panel will determine if further information is required to support the assessment of alternative **means** of undertaking the Project after the Proponent provides detailed discription information*

Response:

Overview

All volumes are reported in short tons unless otherwise noted. Prices are reported freight on board (f.o.b.) in U.S. dollars, unless otherwise noted. Aggregate is defined as any combination of sand, gravel, and crushed stone in their natural or processed state. Construction aggregate is typically defined as any combination of sand, gravel, and crushed stone in their natural or processed state sold to, or used by, the construction industry.

Construction aggregate is used mainly for construction purposes as aggregate with or without a binder. The main uses with a binder are in bituminous concrete and ready-mix concrete. Ready-mix and bituminous concrete is used in the construction and repair of roads, residential buildings, and commercial buildings. Road base, fill, unpaved road surfacing, riprap, anti-skid, railroad ballast, and roofing ballast are some of the major uses without a binder. The aggregate industry is the largest mining industry in the world in terms of production volume and second only to fossil fuels in terms of value (Regueiro, 2002).

The aggregate industry has generally been experiencing a significant increase in demand, pricing, and profitability. The industry, represented by the eight companies listed in "Stock Watch", has generally outperformed the companies in the S&P 500 Index over the last several years (Stephens, 2005).

The United States Geological Survey's (USGS's) estimated production of crushed stone sold or used by producers in the United States was approximately 1.79 billion tons in 2005, the highest level ever recorded. The growth in aggregates is tied, in large part, to increased construction, or the building, repair, and rebuilding of America's infrastructure and homes (see "Market Drivers"). The estimated average annual increase in crushed stone shipped for consumption in the United States has been approximately 4.0% since 1980. The average annual increase in the price of construction aggregate has exceeded 3.5% since 1984 (U.S. Department of Labor).

The growth in pricing is largely the result of increased demand, industry consolidation, and the depletion of the resource base. However, the constant dollar price of crushed stone has changed relatively little during the last 20 years.

Imports of crushed stone were approximately 16.5 million tons in 2005 or less than 1% of total U.S. consumption. The import sources for the 2001-2004 period (the most current reporting period) were Canada (41%), Mexico (38%), the Bahamas (20%), and other (1%). Canada's percentage of imports to the U.S. decreased compared to the 1991-1994 period. The import sources for the 1991-1994 period were Canada (51%), Mexico (28%), the Bahamas (11%), and other (10%).

Permitted construction aggregate reserves are being depleted. Construction aggregate producers are encountering difficulty in expanding existing operations and in developing new sites and building new plants. County and local regulators are increasingly limiting producers by enacting restrictive zoning and land use restrictions. Potential reserves are also being lost to development. The number of quarries operating in the U.S. dropped from 3,800 in 2000 to 3,100 in 2005 (USGS).

Because of the increase in demand, profitability and reserve depletion, the construction materials industry is experiencing consolidation with mergers, acquisitions and other business combinations reducing the total number of companies in the industry. The construction material industry has historically been made up of small, local companies, many of them family-owned. Large publicly traded and private companies are aggressively acquiring smaller companies to pursue the perceived advantages of larger size, vertical integration, and ownership of a diminishing resource base.

Because aggregate is a high bulk, low-cost commodity, the transportation cost to the site of use is a significant part of the total cost. In some areas the average cost of a ton of aggregate doubles when hauled a distance of 15 to 30 miles. Transportation costs are increasing in some areas due to highway congestion, the depletion of local sources, tolls, and the rising cost of fuel. As a result, construction aggregate suppliers and consumers are evaluating potentially more cost-effective alternatives to truck haulage, such as rail, barges, and ships, as a way to reduce transportation costs.

The trends in New Jersey's construction aggregate industry have been paralleling the national trends. New Jersey ranked 23rd nationally in the production of crushed stone in 2005 (USGS). Sales of crushed stone in New Jersey totalled approximately 29.4 million tons in 2005, which was the highest level ever recorded in the state. The previous record occurred in 2001 when sales of crushed stone totalled approximately 29.0 million tons.

All of New Jersey's quarries are confined to the northern half of the State because southern New Jersey is comprised of unconsolidated coastal plain sediments and there is no bedrock near the surface. Many of New Jersey's quarries will be depleted within 20 years, or less. No new quarries have been approved in New Jersey since at least 1970. Alternatives to truck haulage are being investigated to deal with the increasing cost of transportation, growing demand and resource depletion. At least two companies export stone to the Eastern Seaboard from Canada. Exporting stone, via rail, is being reexamined. Importing stone, via rail, has already occurred.

Market Drivers

Demand for construction aggregate is primarily driven by construction. The three sectors that are the major consumers of construction aggregate are public works construction, commercial and industrial construction, and residential construction. These construction sectors are typically subdivided into the following categories for discussion and analysis purposes:

- Private residential buildings (one and two family houses and apartments)
- Private nonresidential buildings (commercial and industrial buildings, churches, private schools, etc.)
- Public buildings (schools, hospitals, prisons, etc.)
- Heavy or non-building construction (highways, streets, bridges, airports, sewage plants, rail, dams, reservoirs, levees, etc).

Other factors that contribute to the demand for construction materials include population, employment, gross state product, etc.

Each region has a baseline demand for construction materials that responds to a continuing need for road construction and maintenance. Superimposed on this need are the requirements of cities and towns for housing, offices, hospitals, manufacturing plants, schools, etc. These requirements are generally tied, in part, to urban size, demographics, and economic growth rates. Adding to these requirements are the special demands of major construction projects such as interstate highways, airports, rail transit, flood control, and bridges.

Demand for construction materials typically parallels construction spending. As a result, demand for construction aggregate can generally be gauged by monitoring the trends in construction spending and other indicators such as population growth.

Historical and Forecast Demand

As previously noted, the estimated production of crushed stone sold or used by producers in the United States was approximately 1.79 billion tons in 2005, the highest level ever recorded. The estimated average annual increase in crushed stone sold or used by producers in the United States has been approximately 4.0% since 1980.

The estimated production of crushed stone sold or used by producers in the ***entire*** fifteen States that border the Eastern Seaboard was approximately 575.0 million tons in 2005. The five States in the southern portion of the Eastern Seaboard (Florida, Georgia, North Carolina, South Carolina, and Virginia) accounted for roughly three-quarters of this demand. The estimated average annual increase in crushed stone sold or used by producers in the in the ***entire*** fifteen States that border the Eastern Seaboard has been approximately 4.0% since 1980. The production of crushed stone sold or used by producers in proximity to (within 15 to 30 miles of) the Eastern Seaboard is not reported or estimated.

The consensus forecast is that the demand for crushed stone in the United States, and the ***entire*** fifteen States that border the Eastern Seaboard, will increase at an estimated average annual rate of approximately 1.5-4.0% over the next 25 years.

Historical and Forecast Supply

The coastal area from central New Jersey to Florida consists largely of unconsolidated coastal plain sediments. The unconsolidated sediments often extend inland for more than 40 miles. As a result, there is typically no bedrock near the surface, and there are no suitable supplies of crushed stone in proximity to the coastal areas south of central New Jersey. Crushed stone must therefore be transported from offshore sources or from U.S. quarries located north and west of the coast.

It is estimated that over 99% of the crushed stone demand in the U.S. and the fifteen States that border the Eastern Seaboard is supplied by quarries located in the United States.

It is estimated that imports of crushed stone into the eastern U.S. are less than 1% of total consumption. These imports originate mainly in Canada, Mexico, and the Bahamas. Canadian stone exported to the Eastern Seaboard originates primarily from Martin Marietta Material's Porcupine Mountain quarry located on the Straight of Canso at Mulgrave, N.S. and Florida Rock's Bayside quarry located at the Bayside Marine Terminal in the resort town of St. Andrew, N.B.

As previously noted, because aggregate is a high bulk, low-cost commodity, the transportation cost to the site of use is a significant part of the total cost. In some areas the average cost of a ton of aggregate doubles when hauled a distance of 15 to 30 miles. Transportation costs are increasing due to highway congestion, the depletion of local sources, tolls, and the rising cost of fuel. As a result, construction aggregate suppliers and consumers are evaluating opportunities that can utilize potentially more cost-effective alternatives to truck haulage, such as rail, barges, and ships, as a way to reduce transportation costs.

The feasibility of importing crushed stone is a function of numerous factors. Some of the salient factors that are considered by the stone supplier and the consumer, or end-user, are discussed in the section that follows (see Alternative Quarry Sites).

Forecasting the future supply of crushed stone imports is highly speculative because of the difficulty in forecasting the factors that impact the feasibility of importing/exporting crushed stone.

The amount of crushed stone imported from Canada, as a percentage of total crushed stone imports, will likely continue to decline. Demand for stone imported from the Canadian Maritime Provinces will likely be tempered by several factors. Roughly three quarters of the Eastern Seaboard demand comes from the five southernmost States (Florida, Georgia, North Carolina, South Carolina, and Virginia). The large distance to the southernmost States and increased competition from the closer Central American, South American, and Caribbean countries will likely limit growth in the Canadian Maritime export market. The northern ports in the eastern U.S. are also union facilities, which will tend to increase overall costs and reduce demand. These and other Eastern Seaboard markets can also be supplied with stone transported by rail or barge from U.S. quarries. Furthermore, many of Canada's Maritime ports are not accessible during the winter months and thus cannot provide a year around supply of stone. Canadian land costs are expected to rise as availability decreases. Canada will also likely be at a competitive disadvantage with its foreign competitors because of its higher taxes and higher labour, environmental, regulatory, and energy costs.

Regardless of the dynamics of the market, the amount of crushed stone quarried and exported by Nova Scotia and Canada's other Maritime Provinces can ultimately be controlled by the local, provincial, and Federal governments via zoning, land use planning, comprehensive resource management, etc.

Alternative Quarry Sites

The Clayton Company is the largest producer of concrete and block in New Jersey. Clayton's manufacturing and production facilities are primarily located in southern New Jersey. These facilities require in excess of two million tons of construction aggregate per year. This construction aggregate must meet the strict quality requirements of the New Jersey Department of Transportation (NJDOT) and the New York State Department of Transportation (NYSDOT).

The Company's sand, or fine aggregate, requirements are primarily supplied from captive sand mining operations, which are located in southern New Jersey. Southern New Jersey has no stone quarries because it is comprised of unconsolidated coastal plain sediments. Clayton's crushed stone must therefore be supplied from quarries located in the northern half of the State or offshore sources.

Permitted crushed stone reserves are being depleted in New Jersey. Many quarries will be depleted within 20 years, or less. No new quarries have been approved in New Jersey since at least 1970. Because the quarries are located miles away in the northern part of the State and because highway congestion, tolls, and fuel costs are rising, the cost of transporting stone to southern New Jersey via truck has increased dramatically and often exceeds the f.o.b. price per ton. As a result, Clayton began evaluating alternative quarry sites and potentially more cost-effective modes of transporting crushed stone to its facilities, as a way to reduce its stone costs and find a long-term, captive, dependable supply of stone.

New quarry sites are not available in New Jersey or southern New York because of issues such as land availability and cost, stone quality, land use, etc. Even if a suitable site were available in this region, the cost of transporting stone from the site to Clayton's southern New Jersey facilities would likely be prohibitive. As a result Clayton began investigating potential offshore sources of stone.

The feasibility of importing crushed stone is a function of numerous factors. Some of the salient considerations that the stone supplier and the consumer, or end-user, must evaluate are listed below.

Salient Considerations for the Supplier/Producer of Imported Crushed Stone

- Stone Quality and Quantity
- Land Availability and Land Cost for the Quarry and Loadout Facility
- Steaming Costs (Distance to consumer/end user, backhaul potential, ship availability, fuel costs, etc.)
- Proximity of the Quarry to Tidewater
- Environmental Sensitivity (Marine mammals and fisheries, threatened species, impact on surface and groundwater, housing setbacks, proximity to parks and preservation areas, etc.)
- Regulatory Considerations (Required and existing permits)
- Cultural Issues (First Nations protection, etc.)
- Loadout Site Issues (Water depth, tides, open water/ice, storms)
- Road and Utility Access
- Operating Costs (Currency exchange, tax rates, tariffs, labour, energy, equipment, environmental compliance, safety, etc.)
- Capital Expenditures for Stationary and Mobile Equipment

Salient Considerations for the Consumer/End-User of Imported Crushed Stone

- Quality and Cost of the Imported Stone
- Dependable Supply (Ability to ship year round and large stone reserve base)
- Offloading Site Considerations (Proximity to final end-use location, water depth, tides, open water/ice, storms, labour relation/union issues, etc.)

- Land Availability and Land Cost for the Offloading and Stockpile Facility
- Availability of Substitute Products (Recycled concrete, etc.)
- Capital Expenditures for Stationary and Mobile Equipment

Clayton had the somewhat unique ability to import crushed stone because it owns facilities that have the requisite offloading and stockpile area, water depth, etc. The challenge was to identify an offshore quarry site that meets the aforementioned criteria of the potential stone producer.

The search for a suitable quarry site in the Canadian Maritime Provinces was a collaborative effort with Canadian experts at the Nova Scotia Department of Natural Resources Minerals and Energy Branch, the New Brunswick Department of Natural Resources and Energy Minerals and Energy Division, etc.

The Canadian experts provided local expertise and contacts, technical and regulatory information and guidance, land use and ownership information, etc. They typically accompanied, and assisted, Bilcon's experts during site investigations. Bilcon also investigated the feasibility of a consummating a joint venture, a merger, or an acquisition with an existing Canadian venture.

The main areas, or the alternatives to the Project, that were targeted as part of the regional investigation are highlighted below. The salient parameters and the screening mechanism used to evaluate possible quarry sites or ventures are also shown.

Alternative Quarry Sites and Salient Parameters Evaluated as Part of Bilcon's Offshore Quarry Project

Location	Stone Quality	Steaming Costs	Land Cost, Availability and Usage	Overall Environmental Impact	Other Positive (+) or Negative (-) issues
Digby Neck NS	Excellent (verified by drilling)	Lowest (shortest distance to NJ)	Suitable	Minimal	Existing Permit (+)
South Atlantic Shore, NS	Potentially good, but variable	Low	Limited availability, high cost, use restrictions	Minimal	Close proximity to houses (-)
Northumber-land Strait, NS	Good to excellent	Intermediate to high	Suitable	Minimal	Canso locks limit ship tonnage (-)
Guysborough County, NS	Potentially good, but variable	Intermediate to high	Suitable	Intermediate near provincial park	Limited access to shore (-)
Cape Breton, NS	Potentially good	High	Limited by aboriginal issues	Minimal	Limited site access(-)
Grand Manan, NB	Potentially excellent	Low	Limited Availability	Intermediate	Limited access (-)
South Shore (Bay of Fundy), NB	Potentially good, needs verification	Low to intermediate	Limited Availability	Minimal	Limited shore access (-), Water depth (-)
Chaleur Bay, NB	Excellent	Very high	Suitable	Minimal	Distance to shore (-), Major transport hub (+)

Digby Neck was part of an area targeted as a "priority" for the completion of a report prepared by the Nova Scotia Department of Natural Resources Minerals and Energy Branch, on bedrock aggregate opportunities in Nova Scotia. Consequently, it was also a priority target for the regional study conducted by Bilcon.

Based on an analysis of the aforementioned parameters, Digby Neck was identified as the most advantaged site for development of a tidewater quarry.

7.2 Alternative Means of Carrying Out the Project

Alternative means for accomplishing the major components of the proposed project – land based quarrying and marine terminal construction and operation were investigated. This investigation included alternative means that are deemed to be technically and economically feasible.

The land based portion of the quarry and associated infrastructure is located primarily on previous disturbed lands (abandoned gravel pit, clear cut area, and the recently cleared 3.9 hectare quarry site). Buffer areas in the form of an environmental preservation zone surround the quarry operation. Sensitive and valued environmental components are included in the preservation zone. The quarry site comprises 152 hectares with approximately 120 hectares scheduled for development. Incremental reclamation procedures are proposed with priority along the coastline to provide a greater visual and environmental buffer along this sensitive zone.

Land based quarrying of this type of massive, hard, volcanic flow of basalt rock generally includes drilling and blasting rock faces. This means is considered to be the industry standard for this type of basalt to produce the proposed production of 2 million tons per year. The unfractured, massive nature of the rock structure existing on the Whites Point site basically precludes alternative means or methods of rock extraction such as ripping or auguring. However, alternative methods and processes for blasting and explosive use were investigated. In this regard, all blasting will be done to exceed the guideline criteria stated in "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters". Blast patterns, timing of delays, weight of explosives, and setbacks from the marine environment will be conducted in a conservative manner.

Also, rock processing will be enclosed and use the latest technologies to minimize noise such as rubber screens, and to minimize air borne particulates with closed circuit washing.

Environmental preservation zones around the quarry site in many places exceed the minimum regulatory requirements of the Nova Scotia Department of Environment and Labour.

Incremental reclamation procedures will also be implemented. Implementation procedures and compliance with regulatory requirements indicate no likely significant adverse (negative) impacts will result from quarrying that could not be mitigated with currently available technologies.

Existing marine infrastructure does not exist along the coastline of the proposed quarry site. As well, no known marine infrastructure presently exists within the region with the required ship loading capability. However, marine terminal location and construction methods were investigated to reduce marine habitat disruption and existing commercial fishing patterns. Alternative means of construction included in water blasting and dredging, rock fill, and pipe pile construction methods. Due to the sensitivities of the marine environment, blasting and dredging in the intertidal zone and nearshore waters was ruled out. Rock fill as part of marine terminal construction was also ruled out due to habitat and nearshore current alteration associated with fill placement.

Also, rock fill construction could result in excessive turbidity during placement. The least intrusive alternative – pipe pile construction – was therefore selected and is expected to produce no net loss of marine habitat that cannot be compensated. This proposed construction method will not result in a likely significant adverse (negative) impact.

Associated with the quarry operation is the means of transporting quarry products. Land transport by rail is not an alternative since rail lines in this region have been abandoned and removed. Land transportation using trucks is an alternative for transport of product to an existing marine terminal. This means was ruled out due to the excessive distance to a suitable existing marine terminal capable of handling the quarry products. Fossil fuel consumption and emissions contributing to "greenhouse gases" as well as probable social/community disruptions also supported ruling out truck transportation. Water transportation was judged to involve the least social and environmental impact and be the most cost effective method of quarry product transportation. Proposed shipping routes are planned to use designated shipping lanes and avoid sensitive marine mammal habitat in U.S. and Canadian waters. More specifically, routes will avoid designated endangered Right Whale conservation areas and critical habitat in U.S. and Canadian waters. The selected alternative transportation means will not result in a likely significant adverse (negative) impact.

The above discussions identify feasible economic and technical alternative means of carrying out the major components of the proposed project (quarrying, marine terminal and shipping). Whenever applicable guidelines, regulations, or standards present quantitative criteria or thresholds, were used to determine the least environmental effect of alternative means. Also, comparable projects that have been in operation with ongoing monitoring have been used as applicable to the proposed Whites Point quarry and marine terminal. However, at the stage of alternate means selection, qualitative criteria in conjunction with community traditional knowledge and multidisciplinary team professional judgment is heavily relied upon. Beneficial and adverse effects for the selected alternate will be presented in the following sections of this Environmental Impact Statement.

Options considered for the location and timing of project construction, especially marine construction, is proposed to avoid sensitive biological areas and life cycle periods. Sediment retention ponds are proposed to be constructed before land clearing begins and will be located in the abandoned pit area. Recently clear-cut areas will be used for temporary holding areas for stripped organic materials and for sediment disposal until needed for reclamation purposes. The selected site for the quarry compound area is proposed within the recently clear-cut area. Since the life of the project is 50 years, much of the existing undisturbed terrestrial habitat will be maintained until required for quarrying.

Proximity of sufficient water depth within a reasonable distance to the land influenced the location of the marine terminal. Fish habitat in the intertidal and sublittoral marine zones influenced the choice of pipe pile marine construction rather than an infill alternative to reduce the amount of fish habitat disturbed. Disruption of nearshore currents will be minimized as compared to the infill alternative.

Recycling of surface water runoff into the proposed closed circuit wash water system eliminates the need for deep well water supply for aggregate washing and dust suppression. Recycling of organic overburden materials as new on-site quarry areas are opened is proposed. Organic materials will be mixed with sediment materials to create the soil for the proposed incremental reclamation process. Clarification of wash water will be accomplished using flocculants as an integral part of the closed circuit wash water system.

Alternatives for ship loading include trucking aggregate materials to an existing marine facility or directly to the market. Both of these alternative means are not cost effective. The timing and scheduling of ship loading is dependent upon processing capacity. Loading of ships once per week coincides with production and stockpiling capacity.

Alternative means of transporting aggregate products from the Whites point Quarry by ship were investigated. Two alternative methods of shipping, one by a Bilcon of Nova Scotia Corporation owned bulk carrier, another by a “common” bulk carrier such as a ship owned by Canadian Steamship Lines. An advantage of an “owner” bulk carrier is a more dependable schedule of product shipment to a designated port in the northern New Jersey area. Also, the duration of the round trip from the Whites Point Marine Terminal would meet the scheduled weekly demand for delivery. At this time, the feasibility of a Bilcon owned bulk carrier was dismissed due to the long wait time for construction of a new bulk carrier and the cost at this initial stage of project development.

Options for reclamation and decommissioning (closure), assuming a 50 year project life, include reclamation when the quarry is scheduled for closure. This alternative means was rejected in favour of incremental reclamation for visual and environmental quality reasons. Decommissioning options could include not removing the marine terminal infrastructure and adapting for at that time (2058) marine demands. Other land use options would be investigated depending on demand at that time.

Mitigation measures for alternative means were evaluated during the analysis and selection of the preferred means of construction and operation. After selecting the means with the least environmental effect, in conjunction with feasible and technically achievable mitigation measures, the preferred means was determined. These selected means will be further analyzed in subsequent component sections of this Environmental Impact Statement.

Criteria are generally defined as a “standard, rule, or test by which a correct judgment can be made”. Alternative selection used customized criteria for this type of rock quarry since criteria specific to analyzing alternatives to rock quarries are not readily available. Therefore, generalized criteria from the literature were adapted. A summary of these sources and their applicability is presented below.

Ratcliffe (Ref. 160) proposed the following criteria for evaluating sites in Britain. These criteria were adopted by the Nature Conservancy Council (NCC) to protect a representative cross section of British habitat types and ecosystems of international importance. These consist of six primary criteria and four secondary criteria.

Primary criteria

Size of habitat or site
Diversity
Naturalness
Rarity
Fragility/sensitivity
Typicalness

Secondary criteria

Recorded history
Position in an ecological/geographical unit
Potential value
Intrinsic (or aesthetic) appeal

Dickson, Kern, Ruska, Cairns (Ref. 109) discusses criteria to evaluate quantitative and qualitative environmental component data such as diversity and productivity. They also propose a "working set of criteria that can be applied to each component of the assessment", and where a "uniform set of criteria cannot be established, each discipline be required to identify and carefully define criteria used in making value judgments".

National Energy Board Filing Manual (Ref. 203) suggests the following criteria for evaluation of likelihood and significance of residual adverse effects:

- Direction
- Magnitude
- Duration
- Frequency
- Spatial extent
- Reversibility
- Probability of occurrence
- Permanence; and
- Ecological context

And when defining significance, the use of clear criteria based on the:

- Magnitude
- Duration
- Geographic extent; and
- Degree to which the adverse effects are reversible or irreversible.

Ohio Biological Survey (Ref. 93) established generalized criteria for the evaluation of eighteen environmental components to determine their significance. Significance categories included the following:

- International/national significance
- Statewide/regional significance
- Local significance
- Degraded features

Evaluation criteria were developed for each environmental component by discipline to fit the above significance categories.

In addition to the criteria mentioned above, regulatory criteria which establishes acceptable thresholds, are used whenever possible to provide quantitative analysis of potential adverse or beneficial effects.

Traditional community knowledge (TCK) was gathered through individual personal contacts, while public involvement helped identify and select alternative means for construction and operation through the Community Liaison Committee.

7.2.1 Potential Environmental Effects on the Project

The location of the quarry and marine terminal on the Bay of Fundy coastline presents the possibility of potential adverse natural forces such as tides, wind, wave action, and storm surges. These individual and potential combinations of forces will present the greatest effect on components of the marine terminal (conveyor, ship loader, and berthing dolphins). Preliminary investigations and engineering indicates that the structural systems chosen will be capable of withstanding these natural forces. Detailed design studies will be conducted to ensure adequate infrastructure stability over the 50 year life of the project.

Land based components of the quarry infrastructure will be located above the 10 metre contour elevation and above the coastal flood plain. No significant streams or rivers exist on the site, thus no freshwater flood plains will present potential adverse changes to the land based development as a result of extreme rainfall events. Positive surface drainage will be maintained on the quarry site with drainage ways and sediment retention ponds designed for 100 year flood events.

Fog and atmospheric inversions may influence the timing of blasting activities at the quarry. Blasting will not be conducted during periods of fog or atmospheric inversions and will be delayed until clear weather prevails.

This area of the Bay of Fundy is ice free and ice should not pose a navigational hazard.

7.3 The Project

The Whites Point quarry is a small, basalt rock quarry designed to produce 40,000 tons of aggregate per week and approximately 2 million tons per year over a 50 year project life. Construction is expected to begin in 2008. The quarry is located on Digby Neck in Digby County, Nova Scotia along the Bay of Fundy. Regional location of the quarry and marine terminal is shown on **Map 1.**

The major infrastructure components include a rock processing plant, environmental control structures, marine terminal/ship loading facility and a compound area – see **Plan IR – 7 and Figures IR – 7, 2, 3, and 4 – R1.** This infrastructure is proposed for construction during 2007 – 2008. Construction, operation and reclamation plans for the 50 year life of the quarry in five and ten year increments are outlined on **Plans OP1 – R1 through OP8 – R1 and Figures IR8 – 1 through IR8 - 7.** Permanent infrastructure (roads, processing plant, marine terminal, compound area, and utilities) are proposed. No temporary facilities are proposed at this time.

For a more detailed discussion of construction, operation and maintenance, modifications and decommissioning and reclamation see **paragraphs 7.7, 7.8, 7.9, and 7.10.**

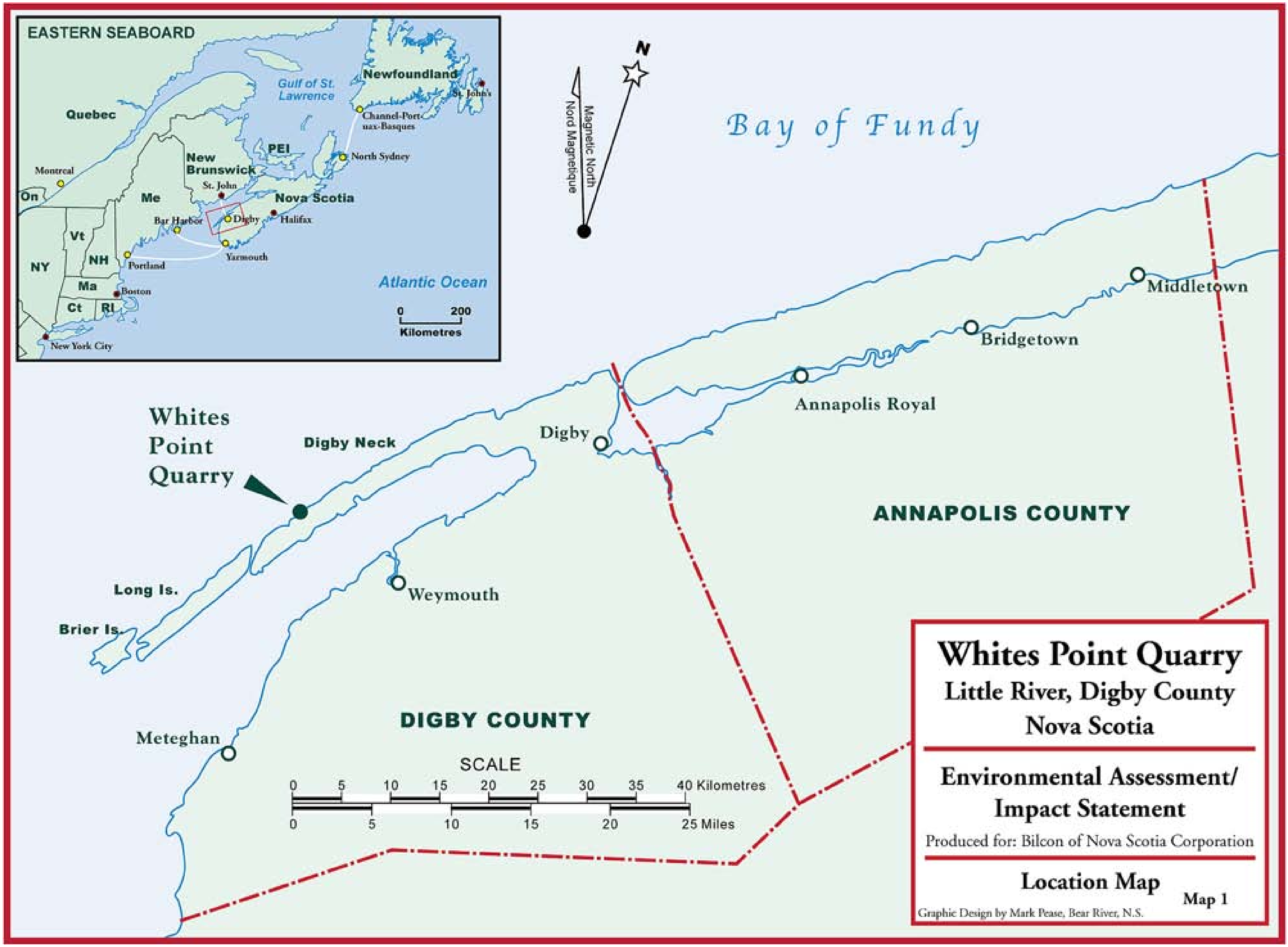
It is anticipated at this time that the marine terminal will only be used for berthing of work boats and ships to be loaded with quarried and processed aggregates. During quarry operation, the marine terminal could be used in the event of an emergency in the Bay of Fundy. During and after decommissioning of the quarry, the berthing facilities will be evaluated for further use as a marine facility based on market demand.

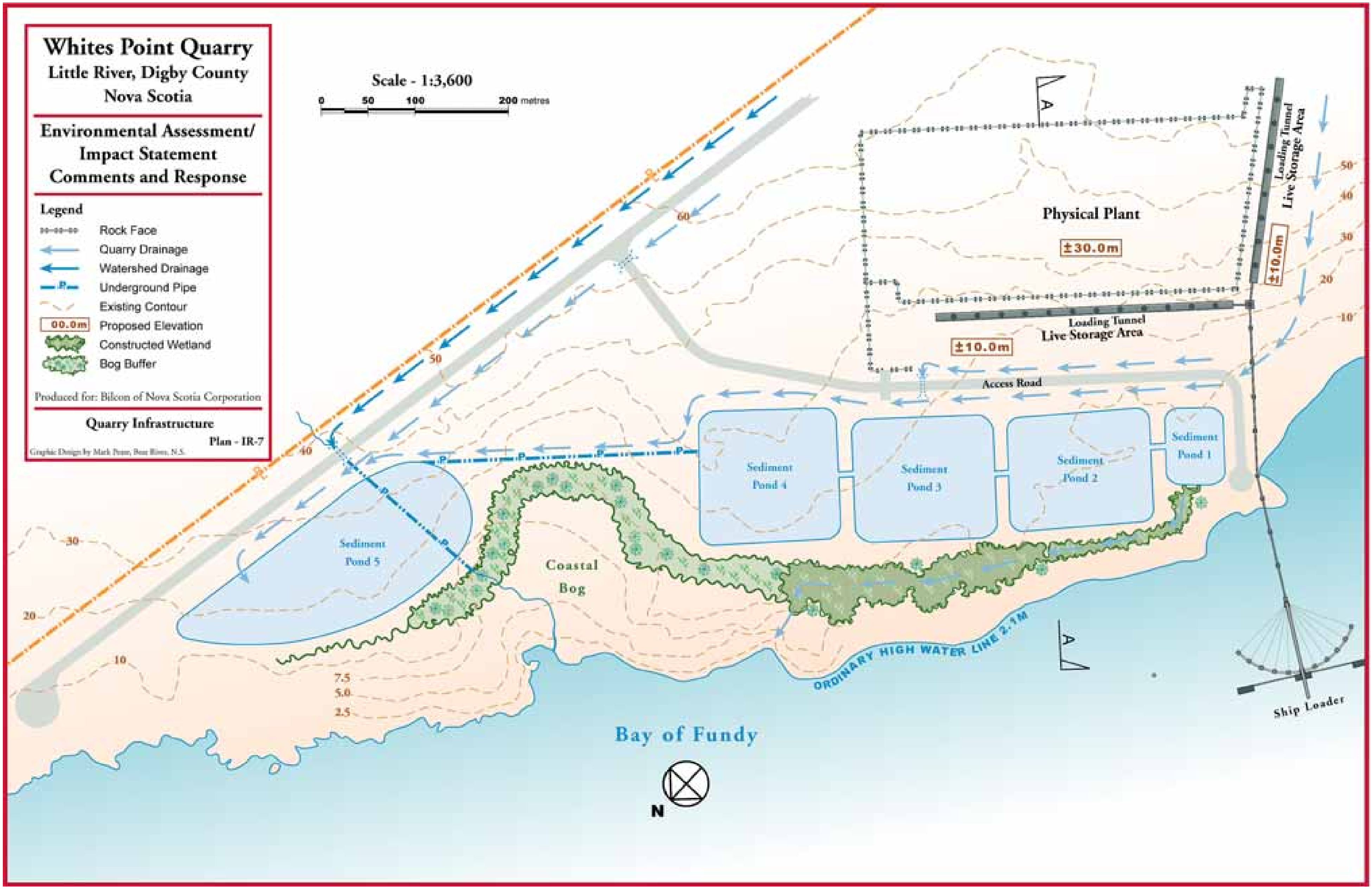
The overall site plans illustrating quarry infrastructure development over the 50 year life of the project (**Plans OP1 – R1 through OP8 – R1**) are presented at the same scale (1:10 000) as many subsequent physical, biological, and human resource plans presented in the EIS. This is a rather elementary, two-dimensional method which facilitates "overlaying" development and resource maps to identify compatibility or conflict.

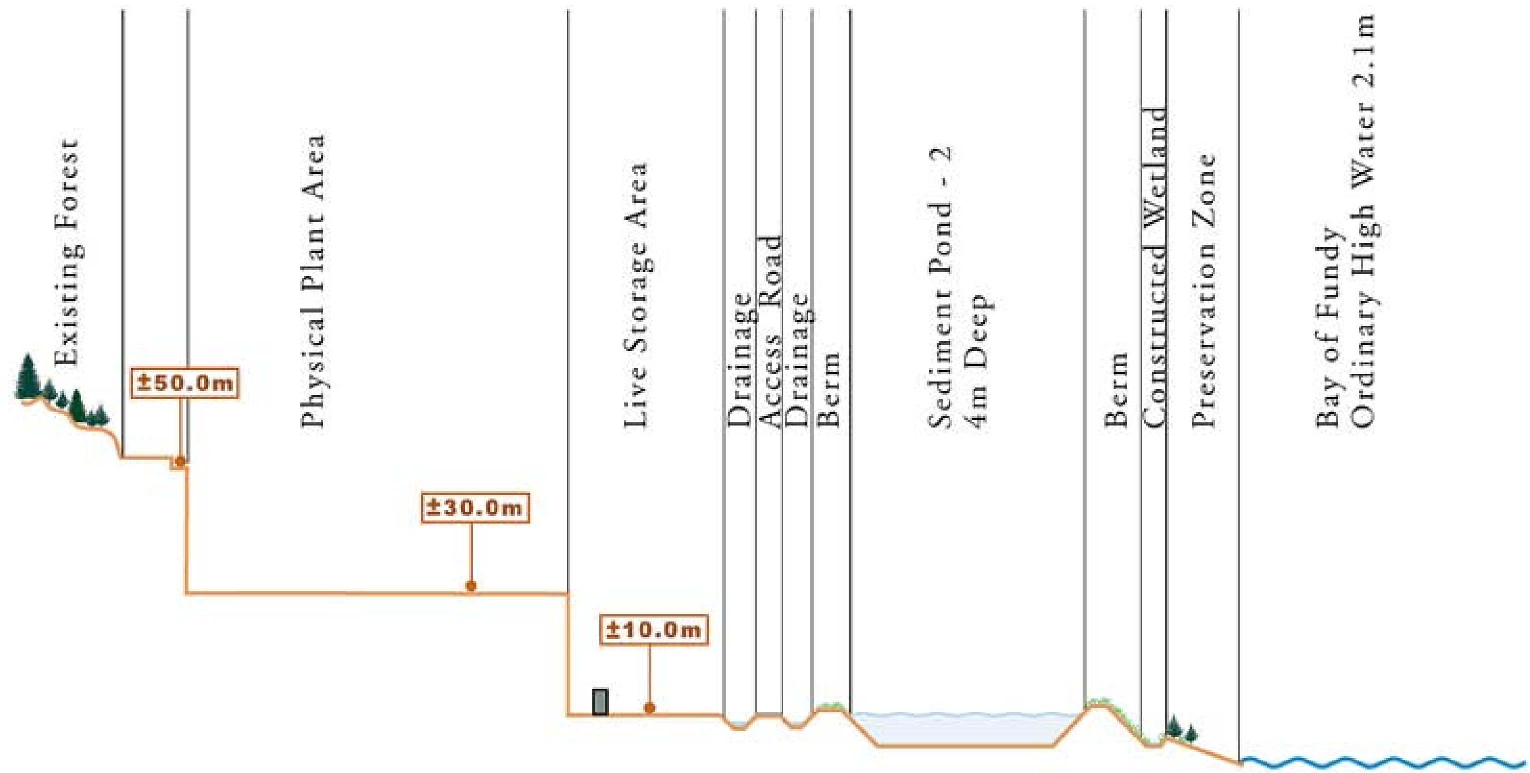
The boundary of the quarry property in relation to adjacent properties, roads, and land use is shown on **Map 2.** Properties with domestic water wells are shown on the same map. No rail lines presently exist in the project region.

No important environmental features, except several small wetlands, are known to exist immediately adjacent to the quarry property.

Safety features incorporated into the project design include the upgrading of the intersection of the quarry access road and Highway #217. Private access roads within the quarry will be gated and the Whites Cove Road right-of-way will be fenced for safety and security.


EASTERN SEABOARD
Quebec
Montreal
On
NY
Vt
NH
Ma
Ct
RI
Me
New Brunswick
St. John
PEI
Nova Scotia
Halifax
Digby
Yarmouth
Bar Harbor
Portland
Boston
New York City
Gulf of St. Lawrence
Newfoundland
St. John's
Channel-Port-aux-Basques
North Sydney
Atlantic Ocean
0 200
Kilometres
N
Magnetic North
Nord Magnetique
Bay of Fundy
Whites Point Quarry
Digby Neck
Long Is.
Brier Is.
Digby
Weymouth
Meteghan
Annapolis Royal
Bridgetown
Middletown
ANNAPOLIS COUNTY
DIGBY COUNTY
SCALE
0 5 10 15 20 25 30 35 40 Kilometres
0 5 10 15 20 25 Miles
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Location Map
Map 1
Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/ Impact Statement Comments and Response
Legend
Rock Face
Quarry Drainage
Watershed Drainage
Underground Pipe
Existing Contour
00.0m
Proposed Elevation
Constructed Wetland
Bog Buffer
Produced for: Bilcon of Nova Scotia Corporation
Quarry Infrastructure
Plan - IR-7
Graphic Design by Mark Peare, Bear River, N.S.
Scale - 1:3,600
0
50
100
200 metres
Physical Plant
±30.0m
±10.0m
±10.0m
Loading Tunnel
Live Storage Area
Loading Tunnel
Live Storage Area
Access Road
Sediment Pond 1
Sediment Pond 2
Sediment Pond 3
Sediment Pond 4
Sediment Pond 5
Coastal Bog
ORDINARY HIGH WATER LINE 2.1M
Ship Loader
Bay of Fundy
N
A
A
60
50
40
30
20
10
7.5
5.0
2.5



Section A - A

Whites Point Quarry

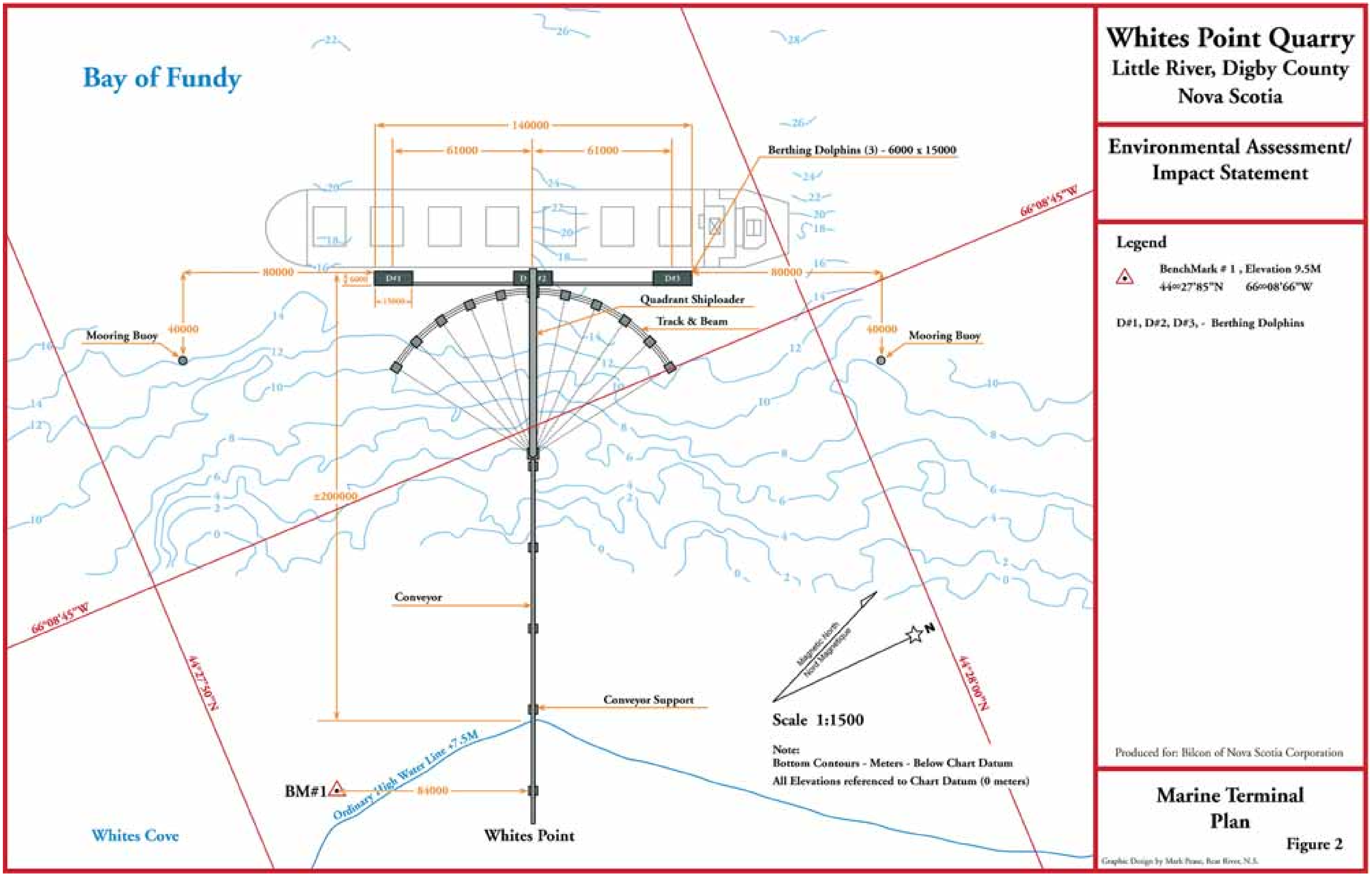
Quarry Infrastructure

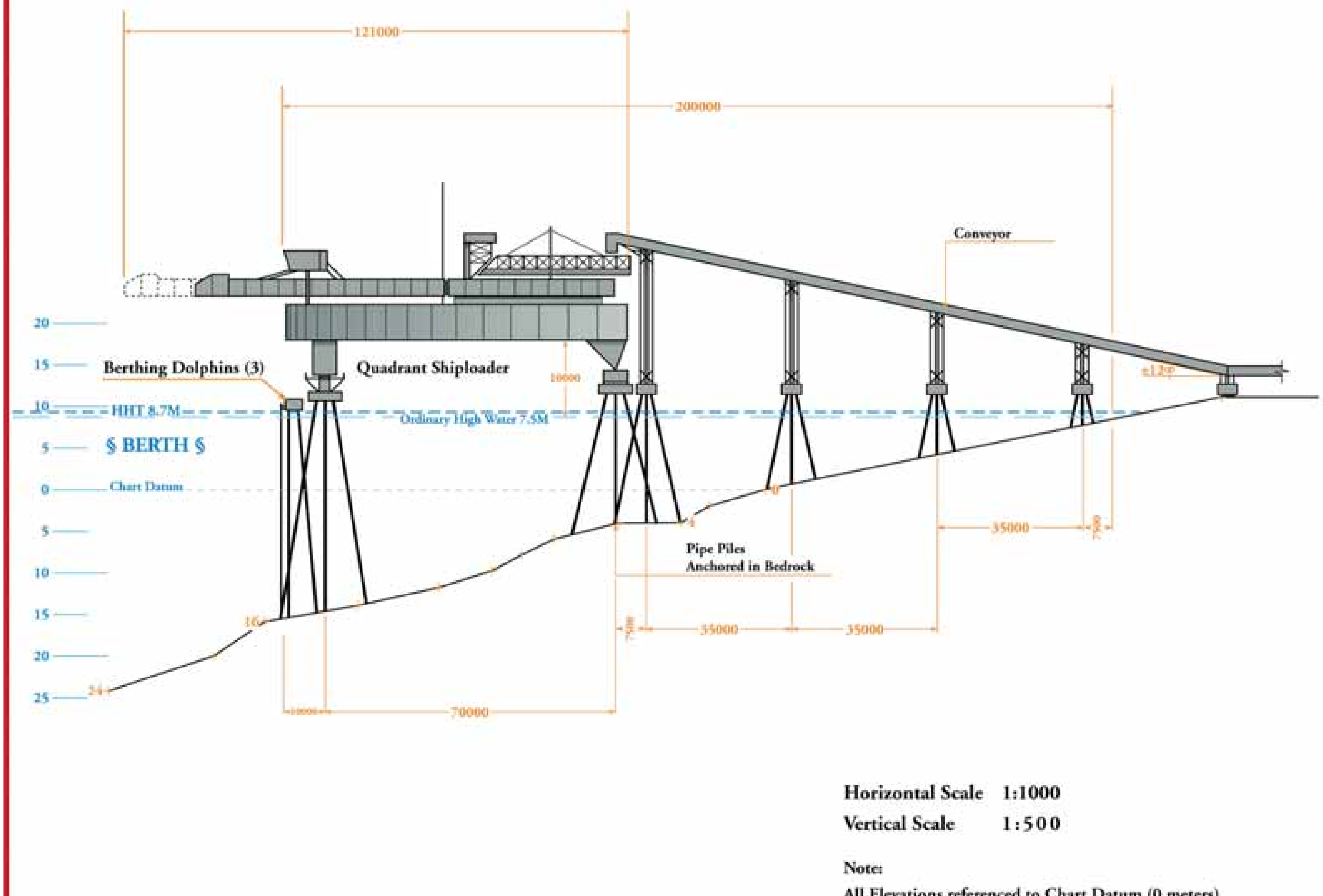
Scales:
1:3600 Horizontal
1:1200 Vertical

Figure IR-7

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Legend
BenchMark # 1 , Elevation 9.5M
44∞27'85"N 66∞08'66"W
D#1, D#2, D#3, - Berthing Dolphins
Produced for: Bilcon of Nova Scotia Corporation
Marine Terminal
Plan
Figure 2
Graphic Design by Mark Pease, Bear River, N.S.
Bay of Fundy
Whites Cove
Whites Point
140000
61000
61000
80000
80000
40000
40000
±200000
84000
Berthing Dolphins (3) - 6000 x 15000
Quadrant Shiploader
Track & Beam
Mooring Buoy
Mooring Buoy
Conveyor
Conveyor Support
BM#1
Ordinary High Water Line +7.5M
66°08'45"W
66°08'45"W
44°27'50"N
44°28'00"N
Magnetic North
Nord Magnétique
N
Scale 1:1500
Note:
Bottom Contours - Meters - Below Chart Datum
All Elevations referenced to Chart Datum (0 meters)



Whites Point Quarry

Little River, Digby County
Nova Scotia

Environmental Assessment/ Impact Statement

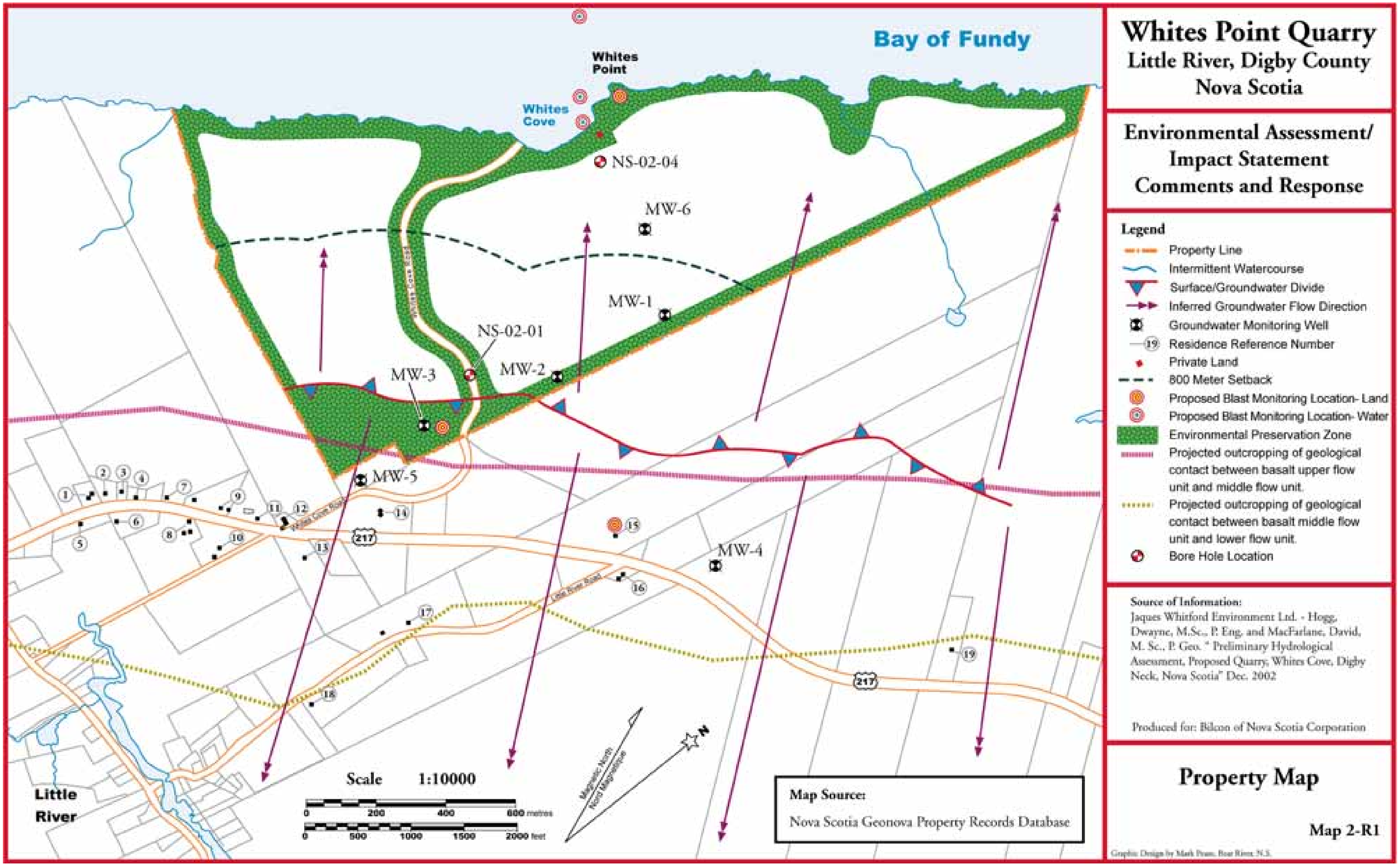
Produced for: Bilcon of Nova Scotia Corporation

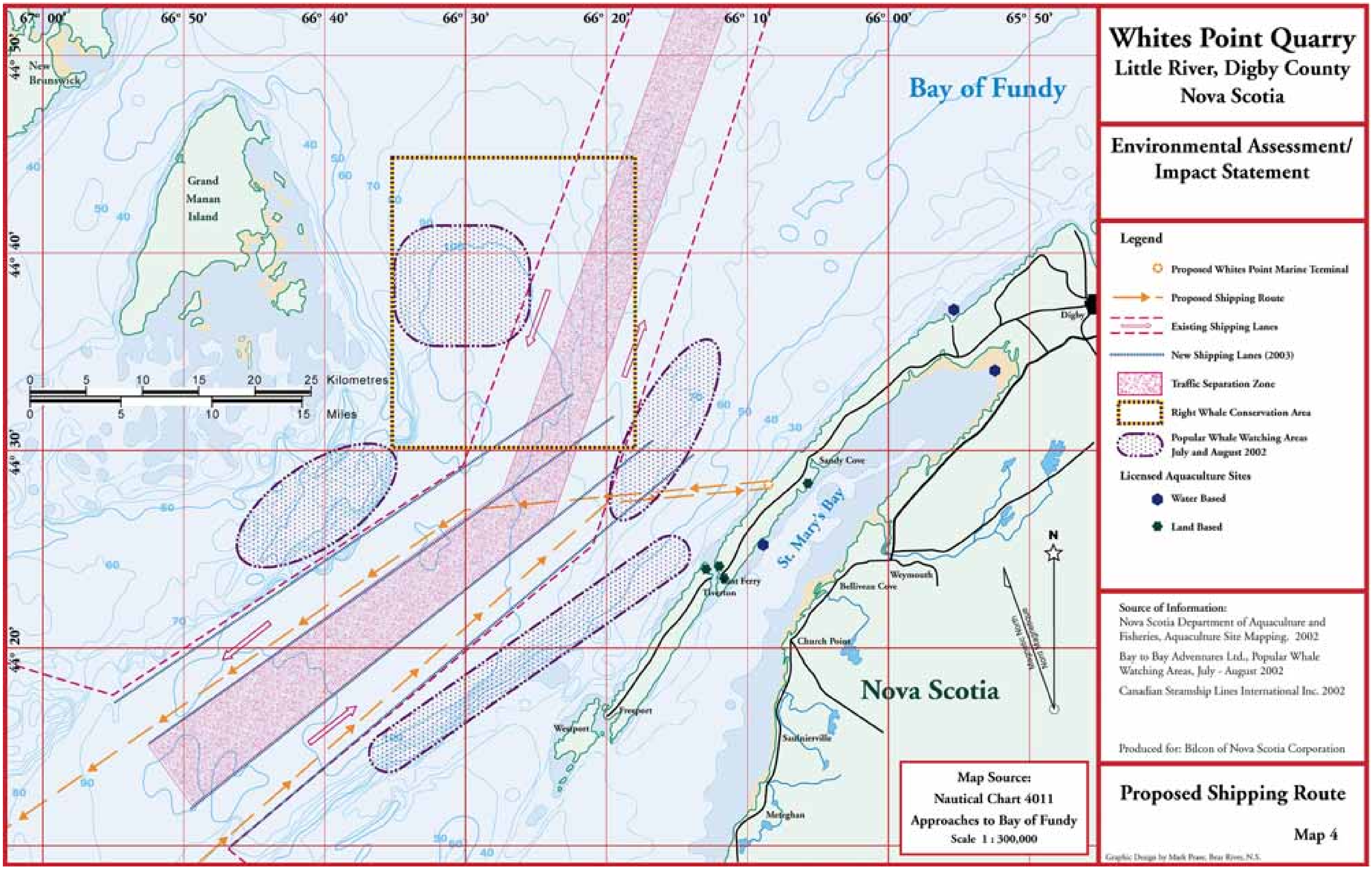
Marine Terminal Elevation

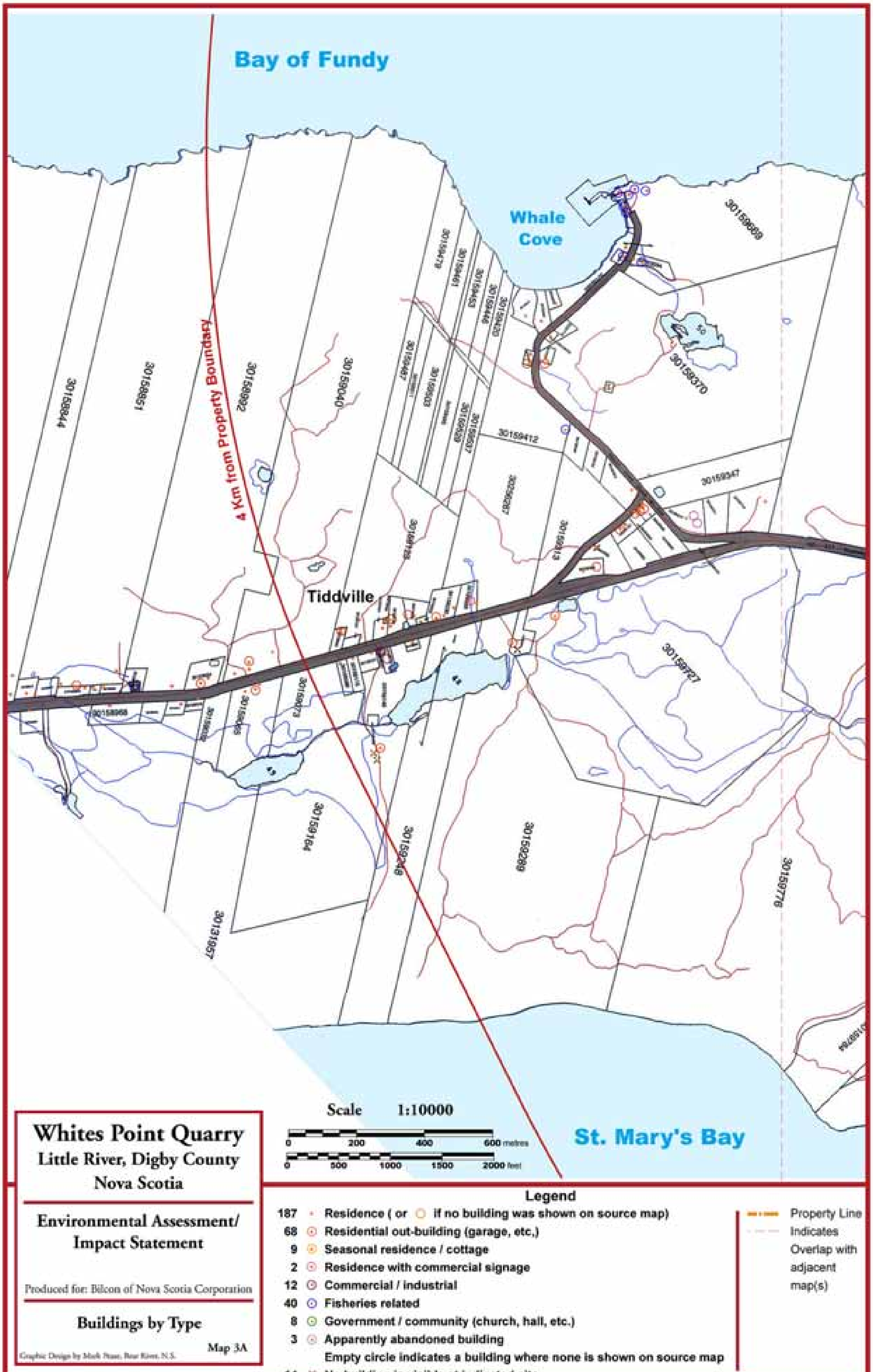
Figure 3

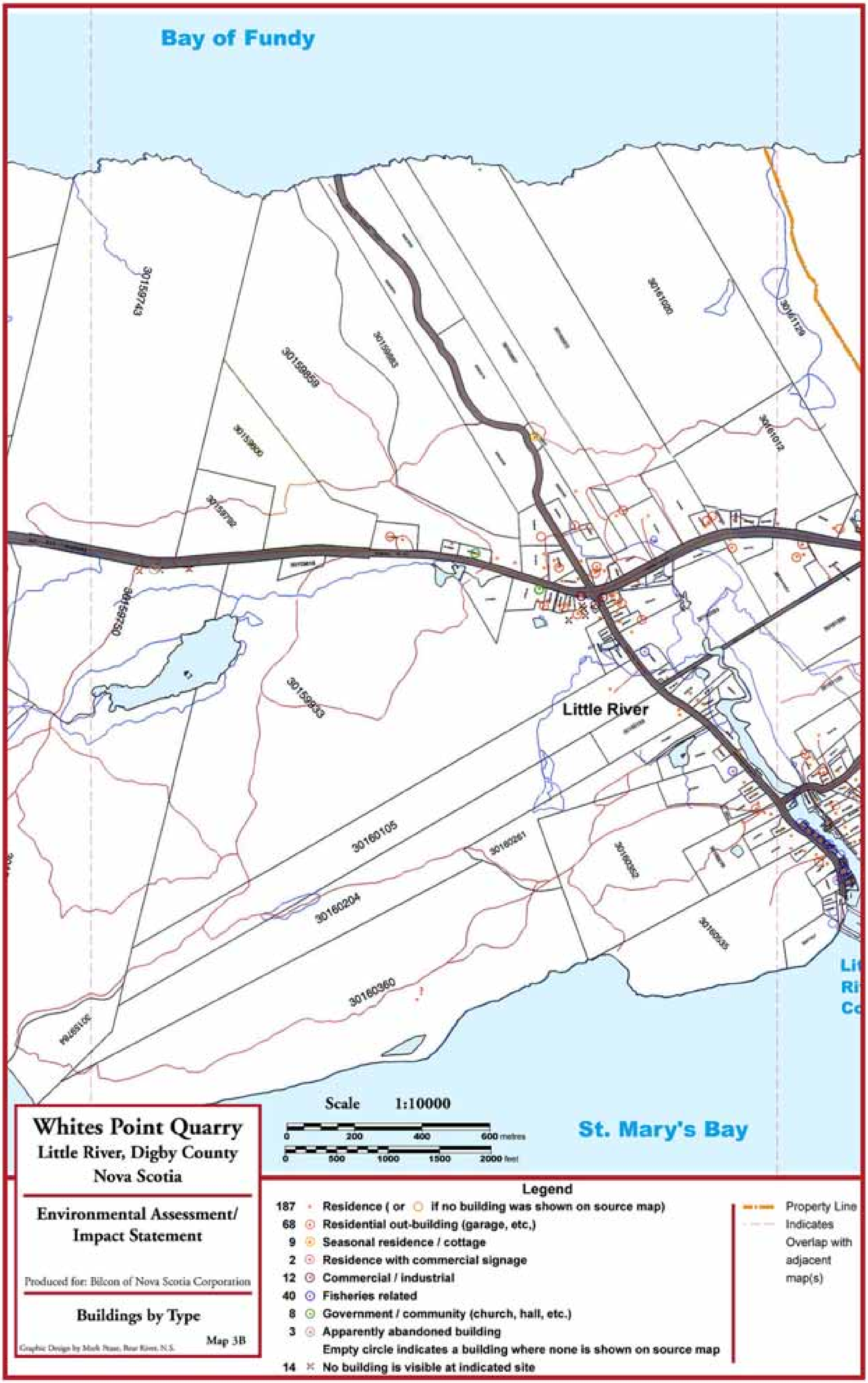
Graphic Design by Mark Peare, Bear River, N.S.

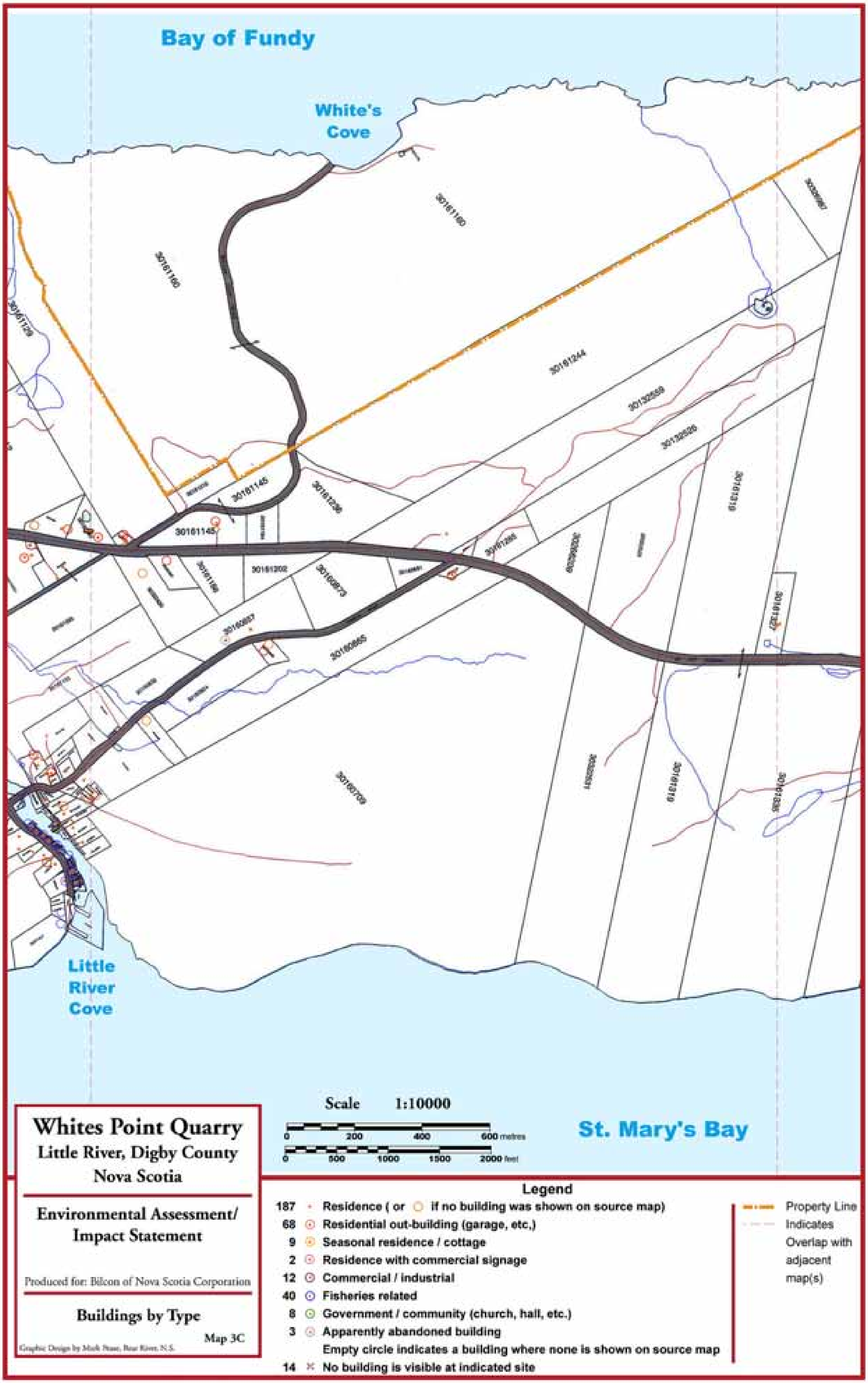

Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Legend
Environmental Preservation Zone - 30M wide
Security Fence
Landscaped Areas
Well
Septic Field
Electrical Power Poles
Produced for: Bilcon of Nova Scotia Corporation
Quarry Compound Plan
Figure 4-R1
Graphic Design by Mark Peare, Bear River, N.S.
Disposal Area Dyke
Organic Disposal Area
Fuel Storage
Maintenance Shop
Office
Electrical
Parking
Gate
Gate
To Quarry
Whites Cove Road
Scale 1:1200 (1 inch = 100 feet)


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Property Line
Intermittent Watercourse
Surface/Groundwater Divide
Inferred Groundwater Flow Direction
Groundwater Monitoring Well
Residence Reference Number
Private Land
800 Meter Setback
Proposed Blast Monitoring Location- Land
Proposed Blast Monitoring Location- Water
Environmental Preservation Zone
Projected outcropping of geological contact between basalt upper flow unit and middle flow unit.
Projected outcropping of geological contact between basalt middle flow unit and lower flow unit.
Bore Hole Location
Source of Information:
Jaques Whitford Environment Ltd. - Hogg, Dwayne, M.Sc., P. Eng. and MacFarlane, David, M. Sc., P. Geo. " Preliminary Hydrological Assessment, Proposed Quarry, Whites Cove, Digby Neck, Nova Scotia" Dec. 2002
Produced for: Bilcon of Nova Scotia Corporation
Property Map
Map 2-R1
Bay of Fundy
Whites Point
Whites Cove
NS-02-04
NS-02-01
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
Whites Cove Road
Little River Road
217
Little River
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Magnetic North
Nord Magnétique
N
Map Source:
Nova Scotia Geonova Property Records Database

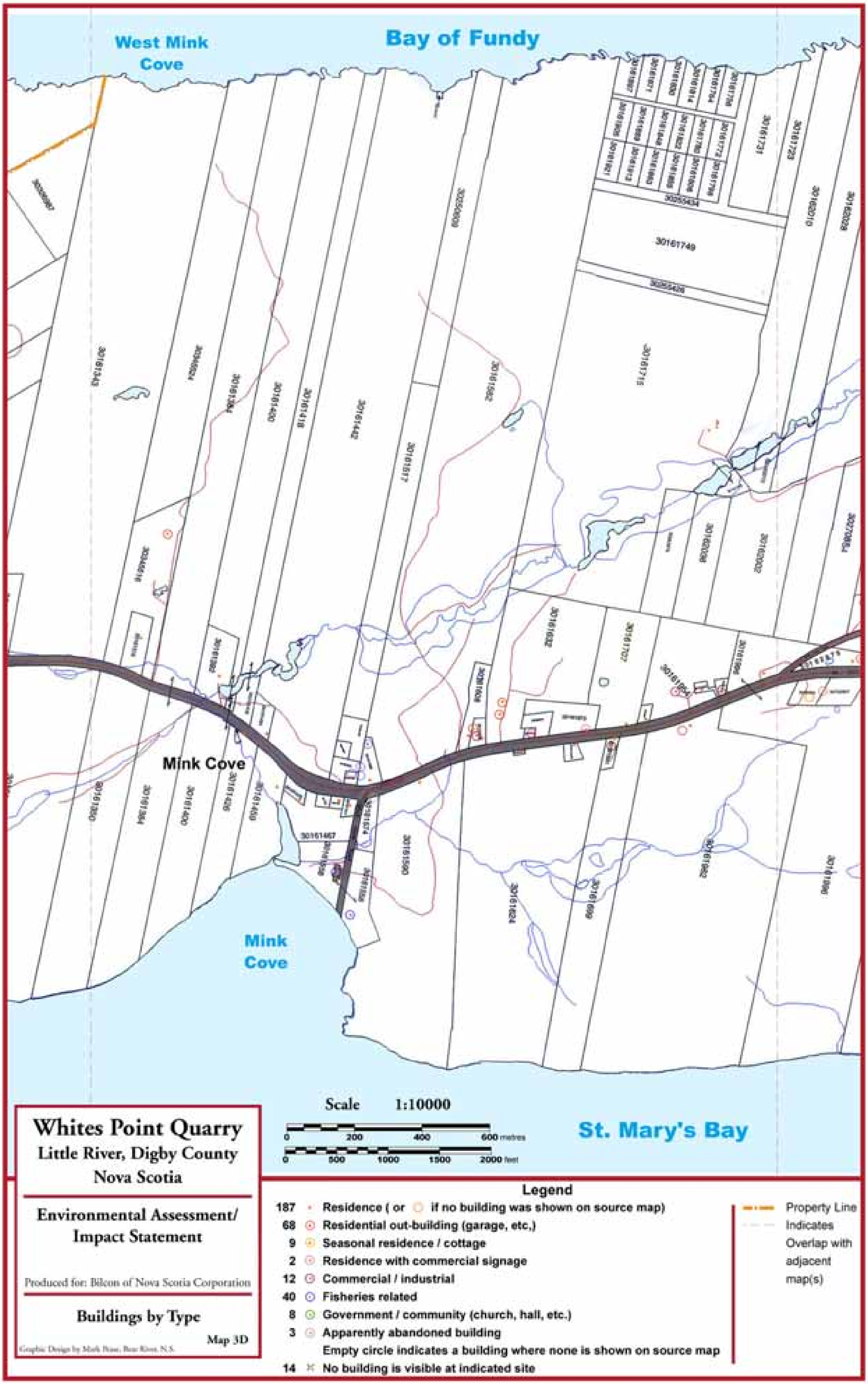

Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Legend
Proposed Whites Point Marine Terminal
Proposed Shipping Route
Existing Shipping Lanes
New Shipping Lanes (2003)
Traffic Separation Zone
Right Whale Conservation Area
Popular Whale Watching Areas
July and August 2002
Licensed Aquaculture Sites
Water Based
Land Based
Source of Information:
Nova Scotia Department of Aquaculture and Fisheries, Aquaculture Site Mapping, 2002
Bay to Bay Adventures Ltd., Popular Whale Watching Areas, July - August 2002
Canadian Steamship Lines International Inc. 2002
Produced for: Bilcon of Nova Scotia Corporation
Proposed Shipping Route
Map 4
Map Source:
Nautical Chart 4011
Approaches to Bay of Fundy
Scale 1 : 300,000
Bay of Fundy
Nova Scotia
New Brunswick
Grand Manan Island
St. Mary's Bay
Digby
Sandy Cove
Weymouth
Belliveau Cove
Church Point
Saulnierville
Meteghan
Freeport
Westport
Tiverton
Kilometres
Miles
N

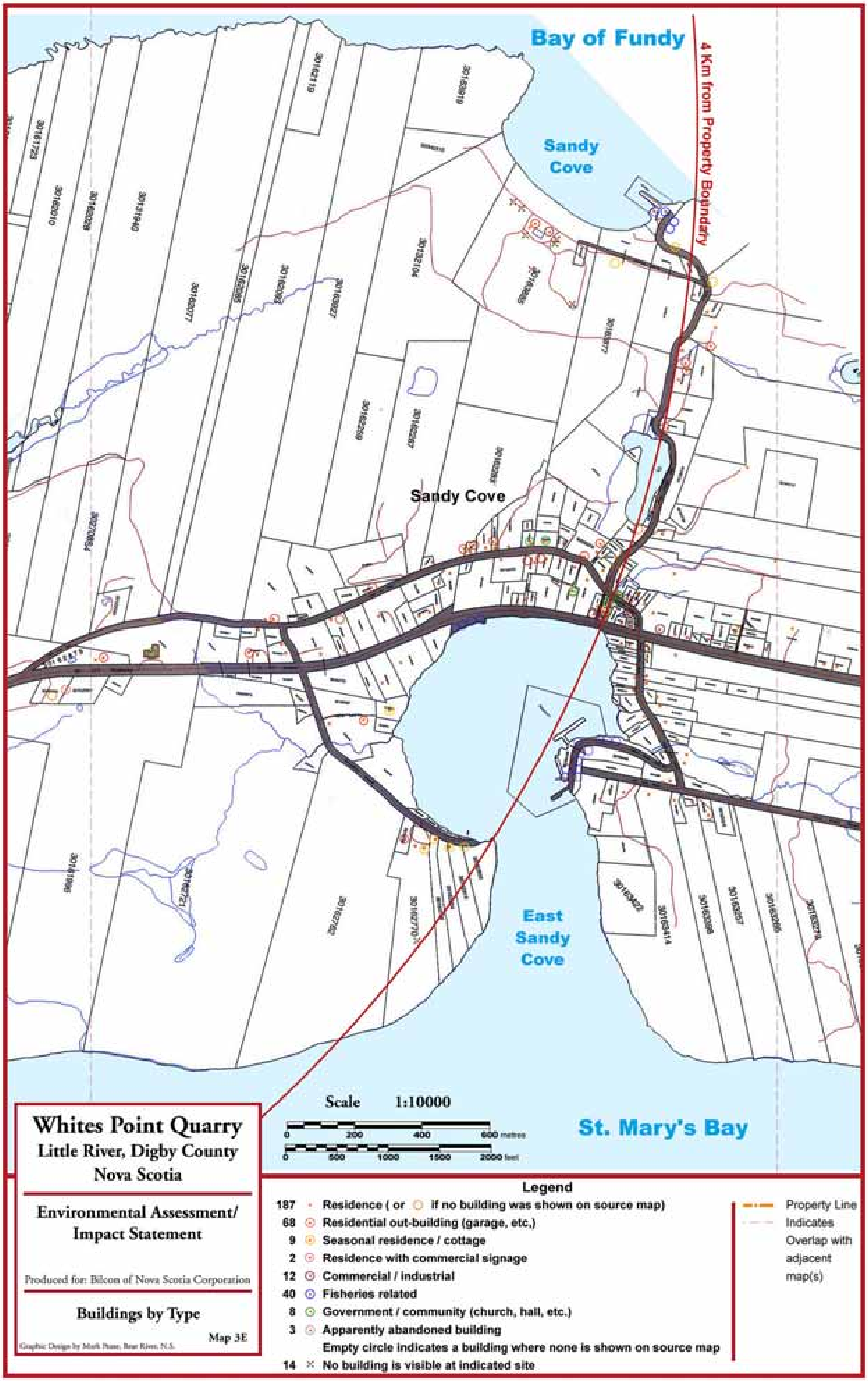

Bay of Fundy
Whale Cove
Tiddville
4 Km from Property Boundary
St. Mary's Bay
30158844
30158851
30158992
30159040
30159412
30159347
30159669
30158370
30159727
30159776
30159184
30159248
30150289
30131957
30158968
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Buildings by Type
Map 3A
Legend
187 Residence (or if no building was shown on source map)
68 Residential out-building (garage, etc,)
9 Seasonal residence / cottage
2 Residence with commercial signage
12 Commercial / industrial
40 Fisheries related
8 Government / community (church, hall, etc.)
3 Apparently abandoned building
Empty circle indicates a building where none is shown on source map
14 No building is visible at indicated site
Property Line
Indicates
Overlap with
adjacent
map(s)


Bay of Fundy
Little River
30160105
30160204
30160360
St. Mary's Bay
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Buildings by Type
Map 3B
Graphic Design by Mark Pease, Bear River, N.S.
Legend
187 Residence (or if no building was shown on source map)
68 Residential out-building (garage, etc,)
9 Seasonal residence / cottage
2 Residence with commercial signage
12 Commercial / industrial
40 Fisheries related
8 Government / community (church, hall, etc.)
3 Apparently abandoned building
Empty circle indicates a building where none is shown on source map
14 No building is visible at indicated site
Property Line
Indicates Overlap with adjacent map(s)

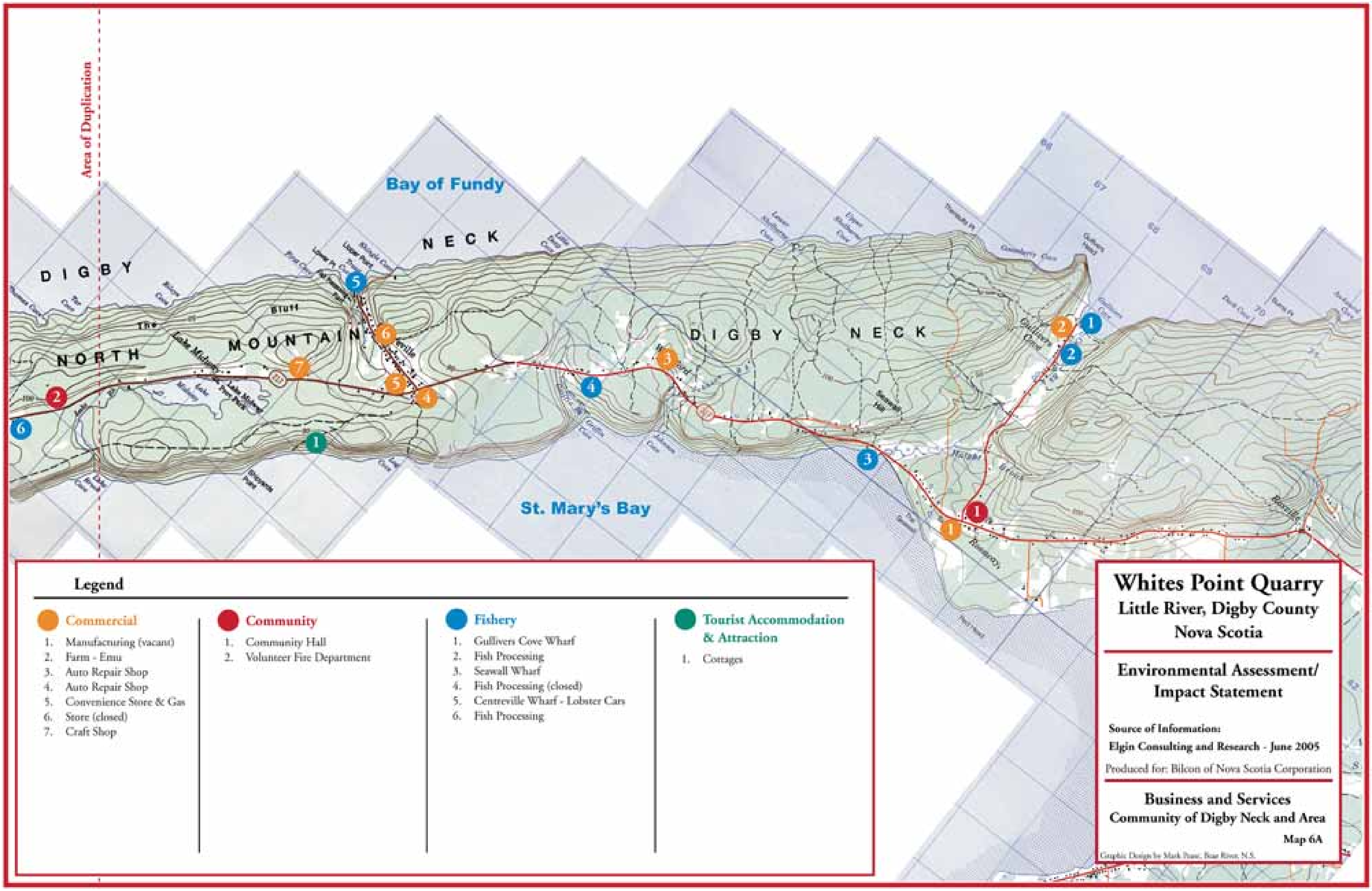


Bay of Fundy
White's Cove
Little River Cove
St. Mary's Bay
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Buildings by Type
Map 3C
Legend
187 Residence (or if no building was shown on source map)
68 Residential out-building (garage, etc,)
9 Seasonal residence / cottage
2 Residence with commercial signage
12 Commercial / industrial
40 Fisheries related
8 Government / community (church, hall, etc.)
3 Apparently abandoned building
Empty circle indicates a building where none is shown on source map
14 No building is visible at indicated site
Property Line
Indicates Overlap with adjacent map(s)


West Mink Cove
Bay of Fundy
Mink Cove
Mink Cove
St. Mary's Bay
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Buildings by Type
Map 3D
Legend
187 Residence (or if no building was shown on source map)
68 Residential out-building (garage, etc,)
9 Seasonal residence / cottage
2 Residence with commercial signage
12 Commercial / industrial
40 Fisheries related
8 Government / community (church, hall, etc.)
3 Apparently abandoned building
Empty circle indicates a building where none is shown on source map
14 No building is visible at indicated site
Property Line
Indicates Overlap with adjacent map(s)



Bay of Fundy
4 Km from Property Boundary
Sandy Cove
Sandy Cove
East Sandy Cove
St. Mary's Bay
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Produced for: Bilcon of Nova Scotia Corporation
Buildings by Type
Map 3E
Graphic Design by Mark Pease, Bear River, N.S.
Legend
187 Residence (or if no building was shown on source map)
68 Residential out-building (garage, etc.)
9 Seasonal residence / cottage
2 Residence with commercial signage
12 Commercial / industrial
40 Fisheries related
8 Government / community (church, hall, etc.)
3 Apparently abandoned building
Empty circle indicates a building where none is shown on source map
14 No building is visible at indicated site
Property Line
Indicates Overlap with adjacent map(s)


Area of Duplication
Bay of Fundy
St. Mary's Bay
DIGBY NECK
DIGBY NECK
NORTH MOUNTAIN
Legend
Commercial
1. Manufacturing (vacant)
2. Farm - Emu
3. Auto Repair Shop
4. Auto Repair Shop
5. Convenience Store & Gas
6. Store (closed)
7. Craft Shop
Community
1. Community Hall
2. Volunteer Fire Department
Fishery
1. Gullivers Cove Wharf
2. Fish Processing
3. Seawall Wharf
4. Fish Processing (closed)
5. Centreville Wharf - Lobster Cars
6. Fish Processing
Tourist Accommodation & Attraction
1. Cottages
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Source of Information:
Elgin Consulting and Research - June 2005
Produced for: Bilcon of Nova Scotia Corporation
Business and Services
Community of Digby Neck and Area
Map 6A

Whites Point Quarry
Little River, Digby County
Nova Scotia

Environmental Assessment/ Impact Statement

Source of Information:
Elgin Consulting and Research - June 2005

Produced for: Bilcon of Nova Scotia Corporation

Business and Services
Community of Digby Neck and Area

Map 6B

Graphic Design by Mark Pease, Bear River, N.S.

Legend

Commercial

8. Convenience Store
9. DOT Sand & Gravel Pit
10. Carpentry Services
11. Heating & Furnace Service
12. Auto Body Shop
13. Rock Processing
14. Consulting Services
15. Convenience Store
16. Boat Repair Shop
17. Construction Services
18. Rock Quarry
19. Convenience Store

Community

2. Volunteer Fire Department
3. Post Office (closed Sandy Cove)
4. Library (Anglican Church)
5. School
6. Post Office (Little River)
7. Post Office (Tiverton)
8. Community Hall (IOF)
9. Fire Department (Fundy Search And Rescue)

Fishery

6. Fish Processing
7. Sandy Cove West Wharf
8. Sandy Cove East Wharf
9. Fish Processing
10. Aquaculture
11. Aquaculture
12. Little River Wharf
13. Fish Processing
14. Fish Processing
15. Whale Cove Wharf
16. Aquaculture
17. East Ferry Wharf
18. Fish Holding
19. Tiverton Harbour
20. Tiverton Wharf
21. Fish Processing (closed)

Tourist Accommodation & Attraction

2. Restaurant (closed)
3. Country Inn
4. Campground (closed)
5. Whale & Seabird Cruises
6. Campground
7. Restaurant, Whale & Seabird Cruises
8. Whale & Seabird Cruises
9. Bed & Breakfast
10. Bed & Breakfast
11. Whale & Seabird Cruises
12. Whale & Seabird Cruises
13. Bed & Breakfast
14. Tourist Bureau & Museum
15. Bed & Breakfast

Few industrial development projects are known to be planned within the community of Digby Neck.

- A water bottling plant is under consideration near Gullivers Cove.
- A water based aquaculture development is presently proposed at Mink Cove.
- A small craft harbour was recently constructed at Tiverton on Long Island.

The quarry project is approximately 1 km west from the village of Little River within Digby County. Digby County presently does not have a Municipal Planning Strategy or Zoning By-Laws. Permitting for industrial development, such as a quarry, is the responsibility of the province. A permit was obtained from the Nova Scotia Department of Environment and Labour in 2002 for the operation of a 3.9 hectare quarry within the proposed Whites Point quarry site. Presently, there are no known regional-scale industrial management plans in place for Digby Neck or Digby County.

Major physical components of the quarry are shown on **Plan IR – 7 and Figures IR – 7, 2, 3, and 4 – R1. Plans OP1 – R1 through OP8 – R1** show the development plan in five and ten year increments for the 50 year life of the quarry. For details of the construction, operation and maintenance, and decommissioning and reclamation phases see **paragraphs 7.7, 7.8, and 7.10.** The properties closest to the quarry property are forested. The closest residential dwelling, not owned by Bilcon of Nova Scotia Corporation, is located approximately 450 metres from the active quarry area (the area of rock extraction). A total of 5 residences are located within 500 metres of the active quarry area and 19 within 500 – 1000 metres.

Various sizes of basalt rock aggregates ranging from ¼" to 1", grits, and concrete sand products will be produced for shipment from the quarry. Approximately 40,000 tons is planned to be shipped each week for a total of 2 million tons per year. Clearing and grubbing of land before quarrying will produce approximately 18,600m^3 of organic material for each 4 hectares cleared. Also, sediments from the aggregate washing process will produce approximately 55,500m^3 per year of sediment for disposal. Organics and sediments will be stored on-site in dyked disposal areas.

Phasing of construction, operation and maintenance, and decommissioning and reclamation are presented in **paragraphs 7.7, 7.8, and 7.10.** Briefly, the quarry will operate for approximately 44 weeks of the year with an 8 week maintenance period during winter months. Hours of operation will be from 0600 to 2200 including two workforce shifts. Specific management procedures for extraction, drilling and blasting, sediment control, and shipping (including ballast water management) are presented in subsequent sections of the Environmental Impact Statement.

7.4 Land Requirements

Lands within the Footprint of the Project

Bilcon does not have title to lands within the footprint of the project. The 152 hectare parcel of land is leased from the title holders (see Appendix 25) for a period of 90 years.

The owners of the land and Bilcon are aware that a small (50' x 50') parcel of land exists on the foreshore which is now owned by local residents. The precise location of this parcel is unknown. This parcel of land does not interfere with the quarry layout and there is no structure on this parcel. It is understood that the owners of this parcel have made application for a building permit to erect a cottage on the property but that the application was denied on the grounds that there is no access to the property for emergency vehicles or a right-of-way over private property to the parcel.

The owners of this small parcel have commenced legal action to establish the location of the parcel and to establish a right-of-way to the parcel from the Whites Cove Road and this matter is still before the courts. As noted above, none of the locations suggested for this parcel lie within the footprint of the quarry layout but would lie in the designated buffer zone.

Implications of the Private Property Held by Others and the Public Right-of-Way within the Quarry Site

The location of the 50' x 50' parcel of land held by the local residents on the foreshore of the 152 hectare parcel of land leased by Bilcon has not been precisely located but two options have been suggested by surveyors engaged by the owners of this parcel. Neither of these options lie within the boundaries of the working area of the quarry but lie in buffer areas.

- Since there is no structure on this parcel, the issue of blasting setback under provincial guidelines does not apply.

- The Whites Cove Road which provides access to Whites Cove from Highway #217 is an abandoned road still owned by the Department of Transportation but is not maintained. Severe scour, particularly on the lower section towards the Bay of Fundy, now restricts access to all but four-wheeled drive vehicles.

- The layout of the quarry operation is designed to work around the Whites Cove Road and the road itself will not be used by the quarry operation. New roads will be constructed to serve the various areas of quarry operation.

- If the Whites Cove Road cannot be acquired, Bilcon will fence the length of the road within the quarry footprint in order to maintain site security, and buffer areas will be maintained along the road.

Whites Cove Road

A series of sections are presented on **Figures WCR – 4, WCR – 4A, WCR – 5, WCR – 5A, WCR – 6** and **WCR – 6A** to illustrate the quarry operation with and without the Whites Cove Road. The location of where the sections are taken is shown on the Concept Quarry Plans (Mine Plan) **OP4 – R1, OP5 – R1,** and **OP6 – R1.** Sections for the with and without scenarios are located at the 40, 60, and 80 meter contour elevations along the Whites Cove Road.

Quarry with the Whites Cove Road

If the road remains in place, the following relationship with the quarry will result.

- During quarry construction and operational Years 1 – 10, construction and quarrying will not directly affect the Whites Cove Road.

- During quarry operational Years 11 – 15, quarry area 3 will begin to marginally affect the Whites Cove Road. In Years 16 – 20, quarry area 4 will begin production. As a result of quarrying in area 4, the situation as shown on **Figure WCR – 4** will result. As shown at the 40m elevation, the quarry floor is approximately 27m below the Whites Cove Road to the north and 25m below to the south.

- During quarry operational Years 21 – 30, quarry area 5 will begin production. As a result of quarrying in area 5, the situation as shown on **Figure WCR – 5** will result. As shown at the 60m elevation, the existing topography and forest north of the Whites Cove Road will remain unchanged at this time and the quarry floor is approximately 38m below the road to the south.

- During quarry operational Years 31 – 40, quarry area 6 will begin production. As a result of quarrying in area 6, the situation as shown on **Figure WCR – 6** will result. As shown at the 80m elevation, the quarry floor is approximately 50m below the Whites Cove Road to the north and 38m below to the south.

In all three cases illustrated above, the total width of the forested ridge containing the Whites Cove Road right-of-way and the proposed 30m environmental preservation zones is approximately 80m. The height above the quarry floor varies as indicated above. Eight-metre wide benches are provided when quarry faces are 20m in height to provide additional stability. The 20 metre or less faces with 8 metre wide benches are intended to comply with the Nova Scotia Occupational Health and Safety Act.

If the Whites Cove Road remains in place, no contingency plans are proposed at this time. The construction of facilities, quarry operations, environmental controls (drainage), and site reclamation at the Whites Point quarry has been planned to function with the Whites Cove Road in place.

Subsurface cores taken along the Whites Cove Road indicate a hard, massive basalt. This basalt rock is resistant to weathering, is stable, has a good cut slope stability and is able to stand in steep cuts. Considering the geology of the basalt and the width of the ridge, the stability of the road should not be a concern. Safety precautions regarding public use of the road are considered adequate with the proposed six-foot high security fencing. Also, the required safety precautions will be exercised by Bilcon during all blasting activities.

Quarry without the Whites Cove Road

If the road right-of-way is acquired by Bilcon, the following relationship with the quarry will result.

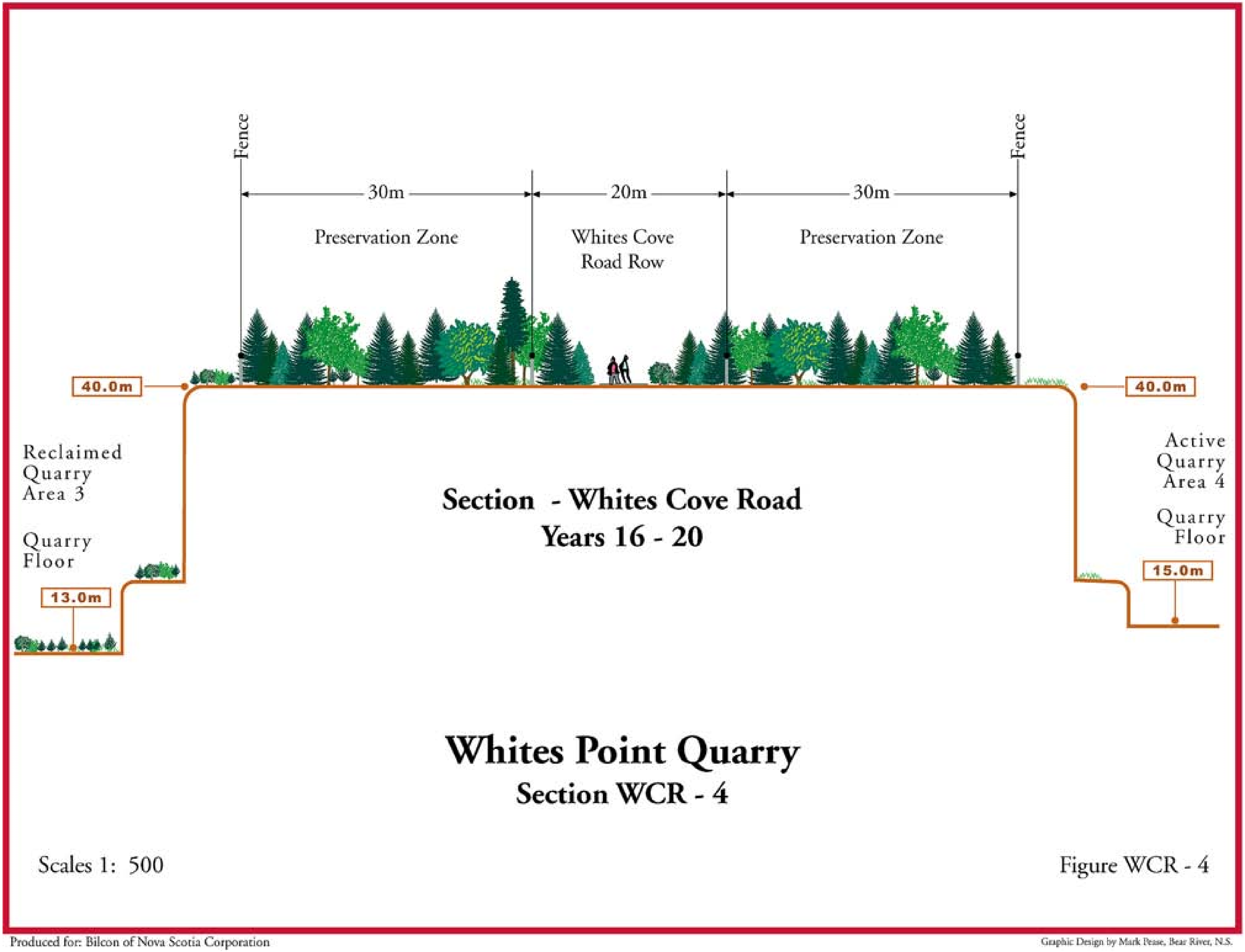
- During quarry construction and operational Years 1 – 10, construction and quarrying will not directly affect the Whites Cove Road.

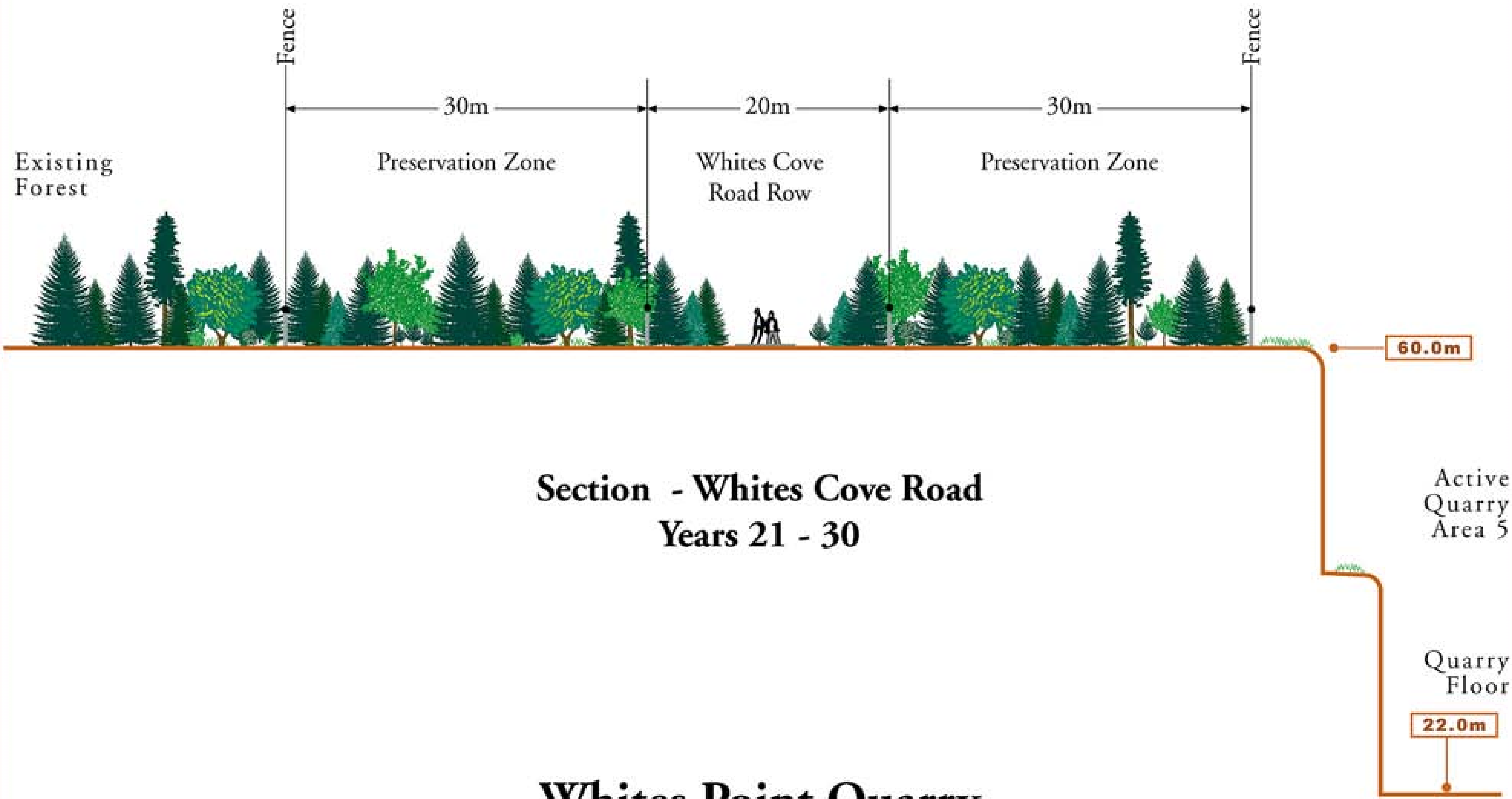
- During quarry operational Years 11 – 15, quarry area 3, north of the Whites Cove Road would be expanded into the road right-of-way and the environmental preservation zone. In Years 16 – 20, quarry area 4 will begin production. As shown on **Figure WCR – 4A**, at the 40m elevation, the floor of quarry area 3 and 4 will join.

- During quarry operational Years 21 – 30, quarry area 5 south of the Whites Cove Road will begin production. Quarry area 5 would be expanded into the road right-of-way and environmental preservation zone as shown on **Figure WCR – 5A**, at the 60m elevation.

- During quarry operational Years 31 – 40, quarry area 6 north of the Whites Cove Road would be expanded into the road right-of-way and environmental preservation zone. As shown on **Figure WCR – 6A**, at the 80m elevation, the floor of quarry area 5 and 6 will join.

If the Whites Cove Road is acquired by Bilcon, traditional public access to the Bay of Fundy shore would be cut off. Vehicular public access would be re-routed for commercial beach harvesters via the quarry road beginning at the Compound Area. For safety reasons, Bilcon's permission would be required for vehicles to use the quarry road. To compensate traditional users of the Whites Cove Road for the loss of a walking/hiking trail to the shore, Bilcon proposes to construct a hiking trail to the shore. This trail would be located along Bilcon's east property line.


Fence
Fence
30m
20m
30m
Preservation Zone
Whites Cove
Road Row
Preservation Zone
40.0m
40.0m
Reclaimed
Quarry
Area 3
Quarry
Floor
13.0m
Active
Quarry
Area 4
Quarry
Floor
15.0m
Section - Whites Cove Road
Years 16 - 20
Whites Point Quarry
Section WCR - 4
Scales 1: 500
Figure WCR - 4
Produced for: Bilcon of Nova Scotia Corporation
Graphic Design by Mark Pease, Bear River, N.S.



Section - Whites Cove Road
Years 21 - 30

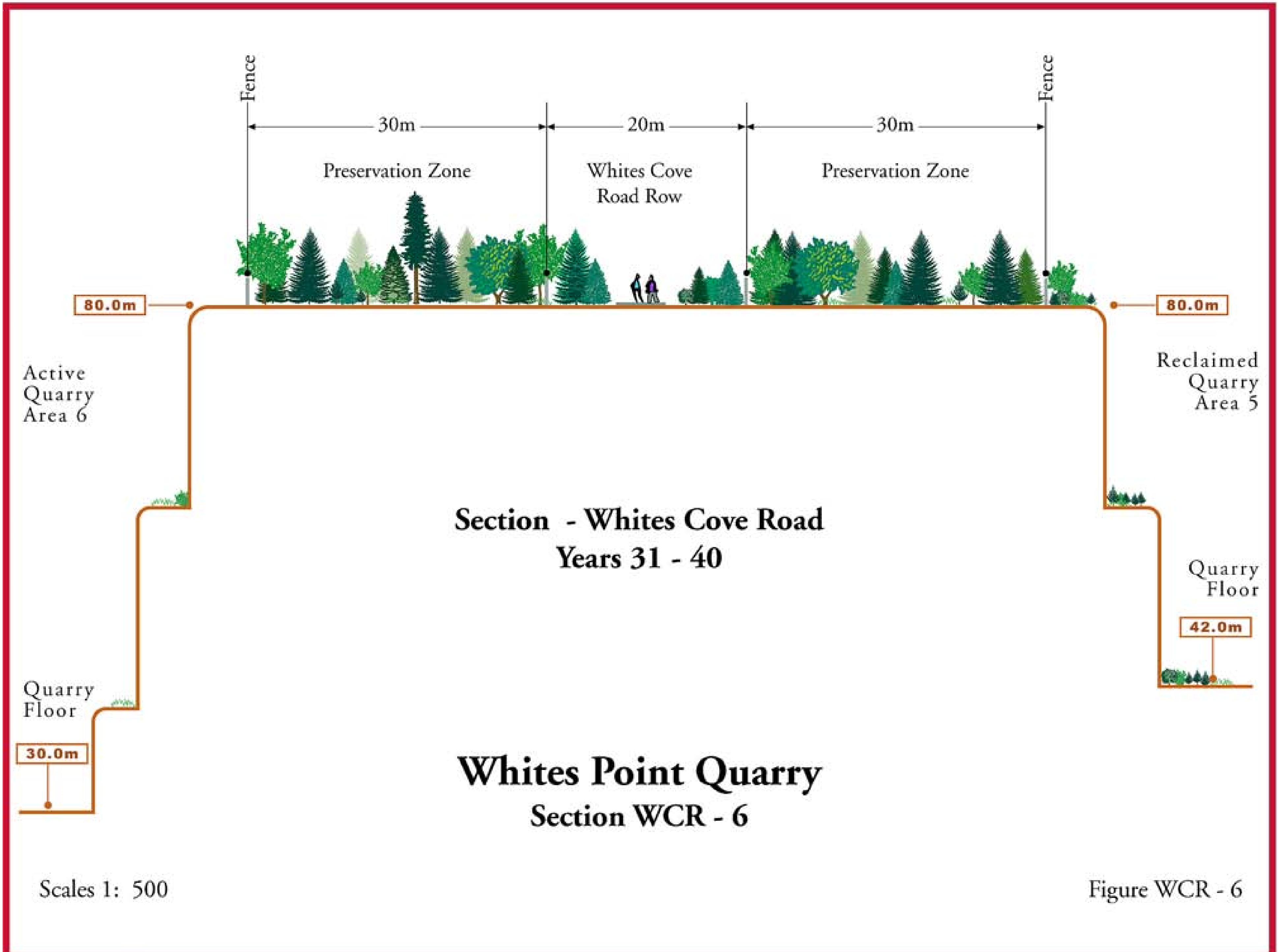
Whites Point Quarry
Section WCR - 5

Scales 1: 500

Figure WCR - 5

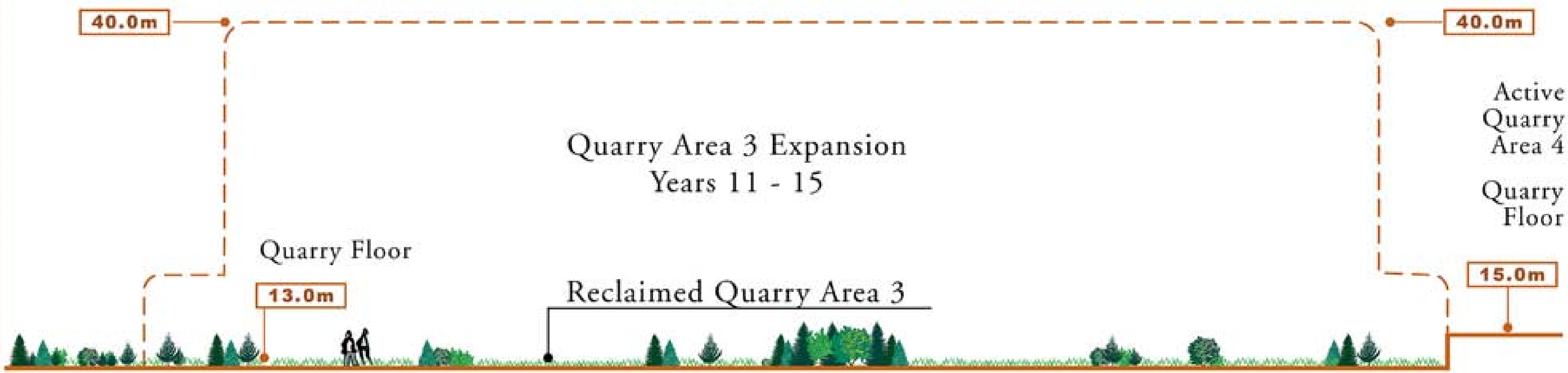
Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Section - Quarry Areas 3 & 4
Years 16 - 20

Whites Point Quarry

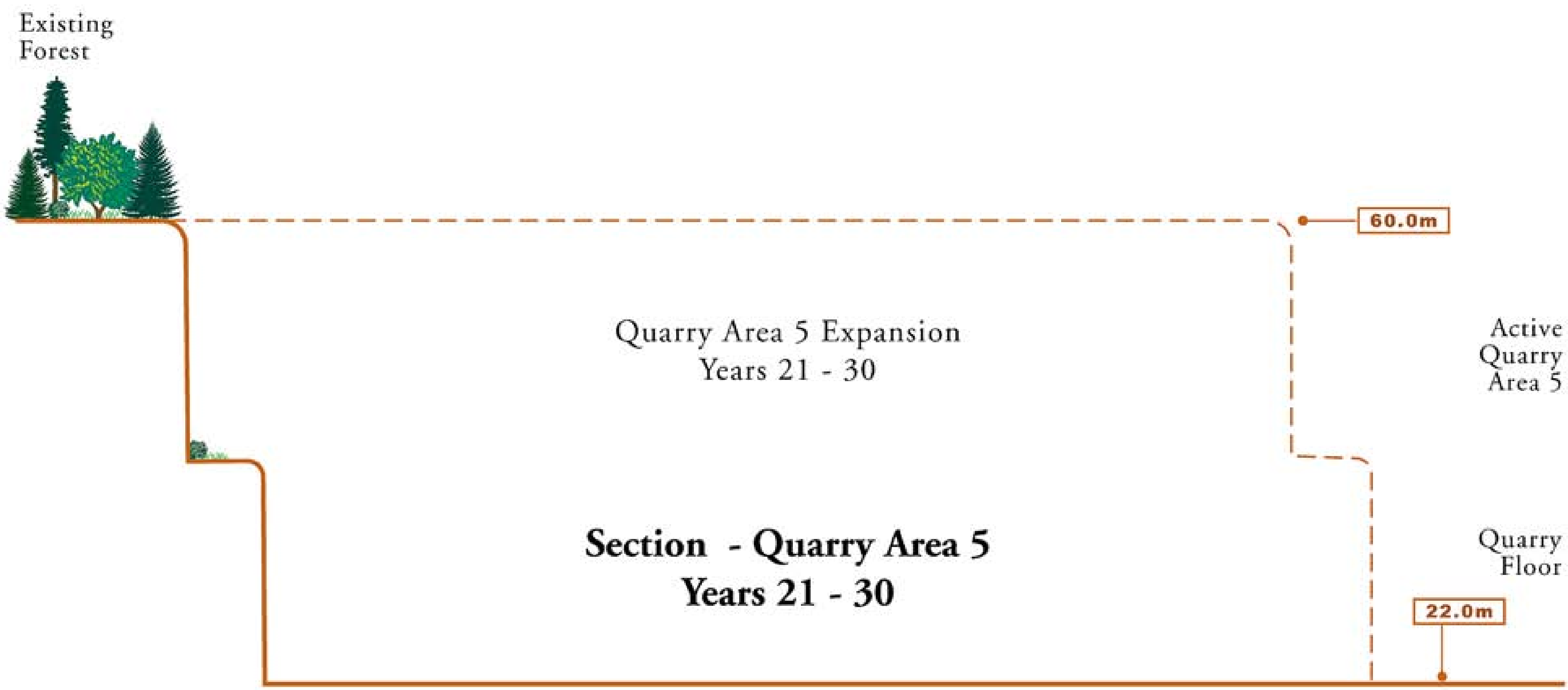
Section WCR - 4

Scales 1: 500

Figure WCR - 4A

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Whites Point Quarry

Section WCR - 5

Scales 1: 500

Figure WCR - 5A

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.

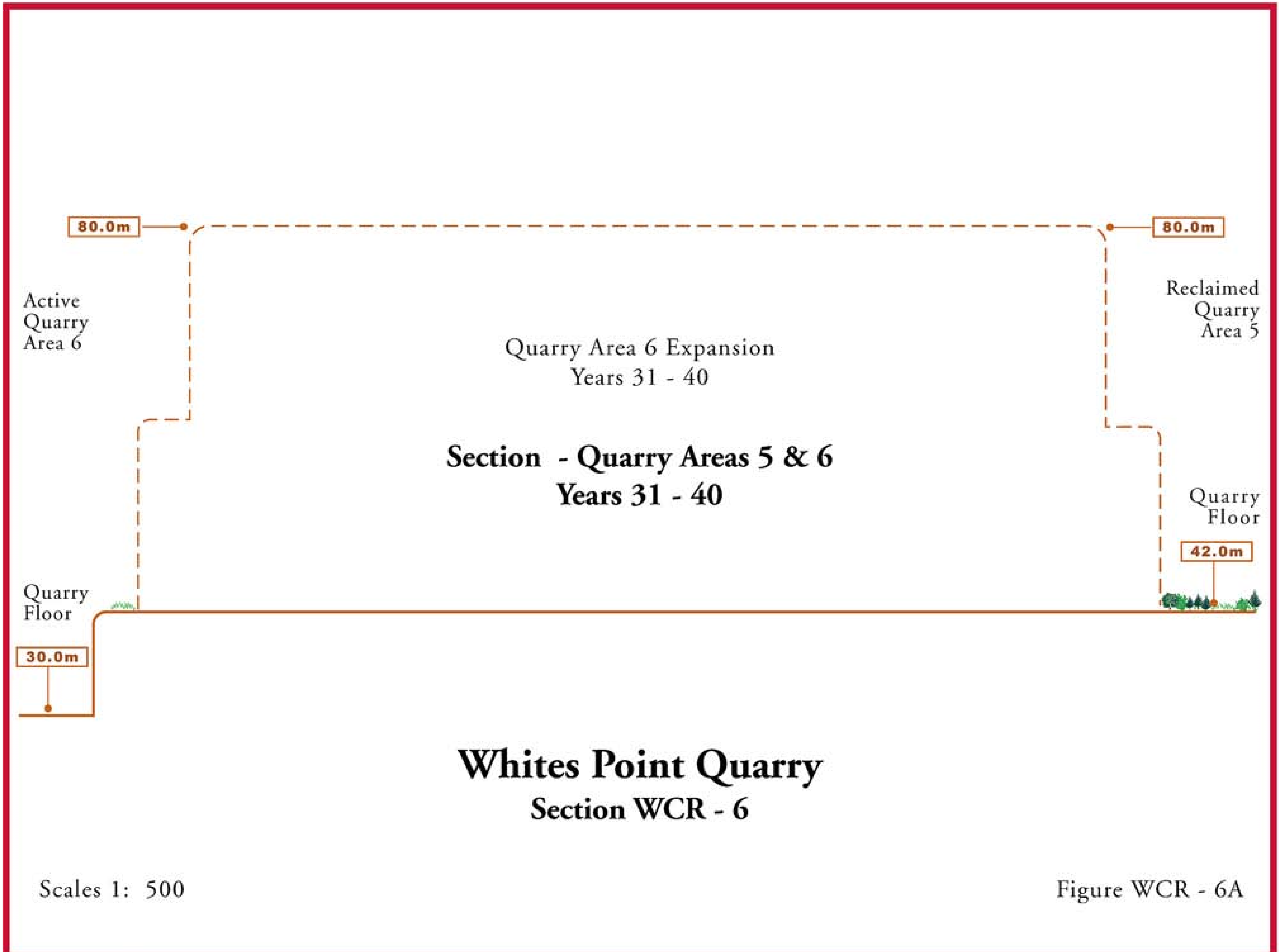


Figure WCR - 6A

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.

An additional major issue is the volume of silt, sand, and gravel arising from the scour of the road fill which is currently entering the Bay of Fundy. Acquisition of the road right-of-way would enable control structures to be put in place by Bilcon to prevent sediment from entering the Bay from the road structure.

Existing Rights-of-Way

The only existing right-of-way on the 152 hectare quarry site is the right-of-way of the Whites Cove Road, an abandoned road.

A right-of-way does not exist to the previously described 50' x 50' parcel of land not owned by the title holders of the 152 hectare parcel.

Riparian Rights

The following extract sets out the law with respect to Riparian Rights**.**

> "...I refer to *Water Law in Canada - The Atlantic Provinces* (Ottawa: Queen's Printer, 1973) by Gerald V. LaForest and Associates at p. 200:
>
> > *The owner of land adjoining a river stream or lake has certain rights respecting the water therein whether or not he owns the bed. These rights arise from his ownership of the bank, and from the Latin word for bank, ripa, they derive their name of riparian rights. The owner is similarly referred to as a riparian owner.*
> >
> > *It is sufficient for the land to be riparian that it comes in contact with a body of water for a substantial part of everyday in the ordinary course of nature, but such contact need not continue for the whole of the day. Thus land that comes in contact with the sea or a tidal stream at high tide is riparian land, and its owner is entitled to riparian rights in respect of it.*
>
> Riparian rights include the right of access to the water, the right of drainage, rights with respect to the quality of the water and rights with respect to the quality of the water and rights relating to the use of the water." (Corkum v. Nash).

Bilcon has leased all lands in Whites Cove, save a 50' x 50' lot. The leased lands extend up to the shore of the Bay of Fundy. By virtue of the extension of the boundaries to the shore, Bilcon has riparian rights including the right of access to the water, the right of drainage, rights with respect to the quality of the water and rights relating to the use of the water.

There is no other ownership of lands fronting up to the sea or extending to the high water mark and therefore there is no other land owner that can assert riparian rights.

There is one other property interest within the boundaries of Bilcon's lands in Whites Cove, that being a 50' x. 50' lot owned by Mary Scott and Carol Mahtab. There is litigation on the precise location of the lot but there is no part of the legal description of that lot that describes the boundaries of the property as extending to the shore of the Bay of Fundy, in contrast to the clear expression in the description for the Bilcon lands. Accordingly, the owners of the 50' x 50' lot are not in a position to assert riparian rights.

In the event that it was determined the location of the Scott-Mahtab lot was such as to establish riparian rights, the proposed development would not interfere with the rights of access from the lot.

Status of Fishing or Fishermen's Privileges

Counsel for Bilcon has been unable to determine any case law that establishes any doctrine for the issue of Fishing or Fishermen's privileges.

The closest concept that could be found is contained in the *Angling Act* which allows as follows:

> *3(1) Any resident of the Province shall have the right to go on foot along the banks of any river, stream or lake, upon and across any uncultivated lands and Crown lands for the purpose of lawfully fishing with rod and line in such rivers, streams or lakes.*

This allows individuals to cross woodlots and other uncultivated lands for the purpose of fishing but does not appear to create a right-of-way in the sense of something similar to a common law easement.

7.5 Schedule and Boundaries

Physical development of the Whites Point quarry and Marine Terminal spans fifty years including the construction phase in Year 1, the operational and maintenance phase in Years 2 through 49, and the decommissioning phase in Year 50. Quarry plans (mine plans) for the 152 hectare land area are shown on **Plans OP1 - R1 through OP8 - R1** for the fifty year life of the project. Following are time frames and spatial definition for construction and operation of the quarry and marine terminal development.

Year 1 - Construction

Construction of the quarry and marine terminal infrastructure is scheduled for Year 1. Conceptual layout for this infrastructure is shown on **Plan IR – 7, and Figures IR - 7, 2, 3 and 4 - R1.** Marine and land construction would proceed simultaneously. The marine terminal will require an approximate 4 hectare water lot, the physical quarry plant area approximately 12 hectares, and the compound area approximately 2 hectares.

Sediment retention ponds (2, 3, 4) are on approximately 6 hectares, a dyked organic disposal area on approximately 3.2 hectares, and a temporary rock storage area on approximately 8.0 hectares will be a first order of construction. The location of these areas is shown on **Plan OP1 - R1.**

Years 2 – 5 Operation

A transition from the construction phase to the operation phase will continue through years 2 – 5. The major construction/operational activities include the construction of a dyked sediment disposal area on approximately 8 hectares, site preparation for quarry area 1 on approximately 12 hectares, processing and shipment of stockpiled rock, construction of sediment retention pond 5 on approximately 4 hectares, reclamation of the area around sediment retention ponds 1 – 4, and reclamation of the dykes around the organic and sediment disposal areas. Quarrying, processing, and shipment of rock from quarry area 1 would begin. The location of these areas is shown on **OP1 – R1.**

Mine Plan - Area 1. Reference **Plan OP1 – R1, Quarry Area 1 and Figure IR 8 – 1.** Site preparation to create the “Temporary Rock Storage” area and sediment pond 5 will be completed at elevation 10 metres. An underground drainage pipe will be installed at this time for conveying any necessary surface water runoff to the coastal bog or to sediment pond 5. Quarrying would then begin at bench 1 at elevation plus or minus 13 metres. A **“Typical Section” IR8 - 1** is located on the attached **Plan OP1 – R1** and the Section appears on **Figure IR 8 – 1.**

Years 6 – 10 Operation

This time frame would include quarrying, processing, and shipment of rock from a portion of quarry area 2. Reclamation of the area surrounding sediment retention pond 4 would be completed. Site preparation of the remaining portion of quarry area 2 on approximately 12 hectares would be done. The location of these areas is shown on **Plan OP2 - R1.**

Mine Plan - Area 2. Reference **Plan OP2 – R1, Quarry Area 2 and Figure IR 8 – 2.** An extensive environmental preservation zone along the coastline is proposed for Quarry Area 2. Site preparation to create the berm and drainage channel will be completed at elevation plus or minus 10 metres. Also, a water pipe will be installed in conjunction with the berm to convey water from sediment pond 5 to sediment pond 4. Quarrying would then begin at bench 1 at elevation plus or minus 13 metres. A **"Typical Section" IR8 – 2** is located on the attached **Plan OP 2 – R1** and the Section appears on **Figure IR 8 – 2.**

Years 11 – 15 Operation

This time frame would include quarrying, processing, and shipment of rock from the remaining portion of quarry area 2 and reclamation of a portion of quarry area 2. Site preparation of quarry area 3 would begin on approximately 12 hectares of land. The location of these areas is shown on **Plan OP3 - R1.**

Mine Plan - Area 3. Reference **Plan OP3 – R1, Quarry Area 3 and Figure IR 8 – 3.** Site preparation to create the berm and drainage channel will be completed at elevation plus or minus 15 metres. Quarrying would then begin at bench 1 at elevation plus or minus 13 metres. A **"Typical Section" IR8 – 3** is located on the attached **Plan OP3 – R1** and the Section appears on **Figure IR 8 – 3.**

Years 16 – 20 Operation

This time frame would include the quarrying, processing, and shipment of rock from quarry area 3. Construction of sediment retention pond 6 and site preparation of quarry area 4 on approximately 18 hectares of land would be completed. The location of these areas is shown on **Plan OP4 - R1.**

Mine Plan - Area 4. Reference **Plan OP4 – R1, Quarry Area 4 and Figure IR 8 – 4**. Site preparation to create the sediment pond will be completed at elevation plus or minus 15 metres. Quarrying would then begin at bench 1 at elevation plus or minus 15 metres. Bench 2 would then begin at elevation plus or minus 22 metres. A **"Typical Section" IR8 – 4** is located on the attached **Plan OP4 – R1** and the Section appears on **Figure IR 8 – 4.**

Years 21 – 30 Operation

This time frame would include the quarrying, processing, and shipment of rock from quarry area 4. Reclamation of a portion of quarry area 4 and relocation of the organic disposal area to the previously quarried area 4 would be completed. Incremental site preparation of quarry area 5 on approximately 16 hectares of land would also be completed. The location of these areas is shown on **Plan OP5 - R1.**

Mine Plan - Area 5. Reference **Plan OP5 – R1**, **Quarry Area 5** and **Figure IR – 5.** The sediment disposal area would be relocated from its original location to quarry area 4. Quarrying would continue at bench 2 (22m), at bench 3 (32m), and at bench 4 (42m). A **"Typical Section" IR8 - 5** is located on the attached **Plan OP5 – R1** and the Section appears on **Figure IR 8 – 5.**

Years 31 – 40 Operation

This time frame would include the quarrying, processing, and shipment of rock from quarry area 5. Reclamation of a portion of quarry area 5 and relocation of the sediment disposal area would be completed. Incremental site preparation of quarry area 6 on approximately 20 hectares of land would be completed. The location of these areas is shown on **Plan OP6 - R1.**

Mine Plan - Area 6. Reference **Plan OP6 – R1, Quarry Area 6 and Figure IR 8 – 3 and Figure IR 8 – 6.** The organic disposal area would be relocated from its original location to quarry area 4. Quarrying would continue at bench 1 (13m) and at bench 2 (30m). A **"Typical Section" IR8 - 6** is located on the attached **Plan OP6 – R1** and the Section appears on **Figure IR 8 – 6.**

Years 41 – 49 Operation

This time frame would include the quarrying, processing, and shipment of rock from quarry area 6 and the incremental site preparation of quarry area 7 on approximately 12 hectares of land. Quarrying, processing, and shipment of rock from quarry area 7 would take place in the latter portion of this time frame and complete quarrying activities. Reclamation of a portion of quarry area 6 would be completed. The location of these areas is shown on **Plan OP7 - R1.**

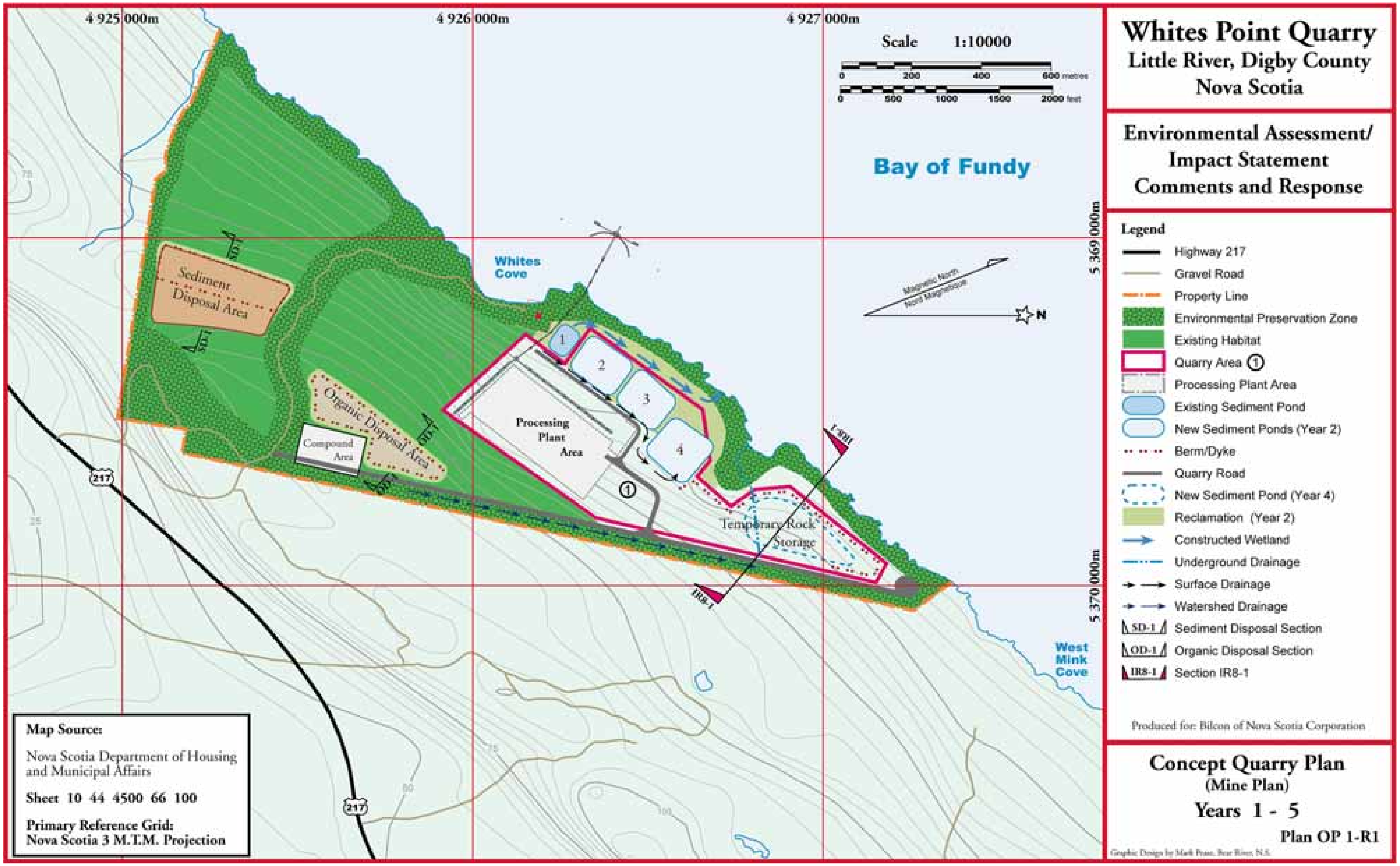
Mine Plan - Area 7. Reference **Plan OP7 – R1, Quarry Area 7 and Figure IR 8 – 7.** Quarrying would continue at bench 2 (30m). **A "Typical Section" IR8 - 7** is located on the attached **Plan OP7 – R1** and the Section appears on **Figure IR – 7.**

The intent is to maintain the quarry floor elevations above the water table and the contact of the upper and middle flow units as shown on the **Hydrogeology Sections A – A and B – B, Figure 6A and 6B** in section 9.1, page 21 of Volume IV of the EIS.

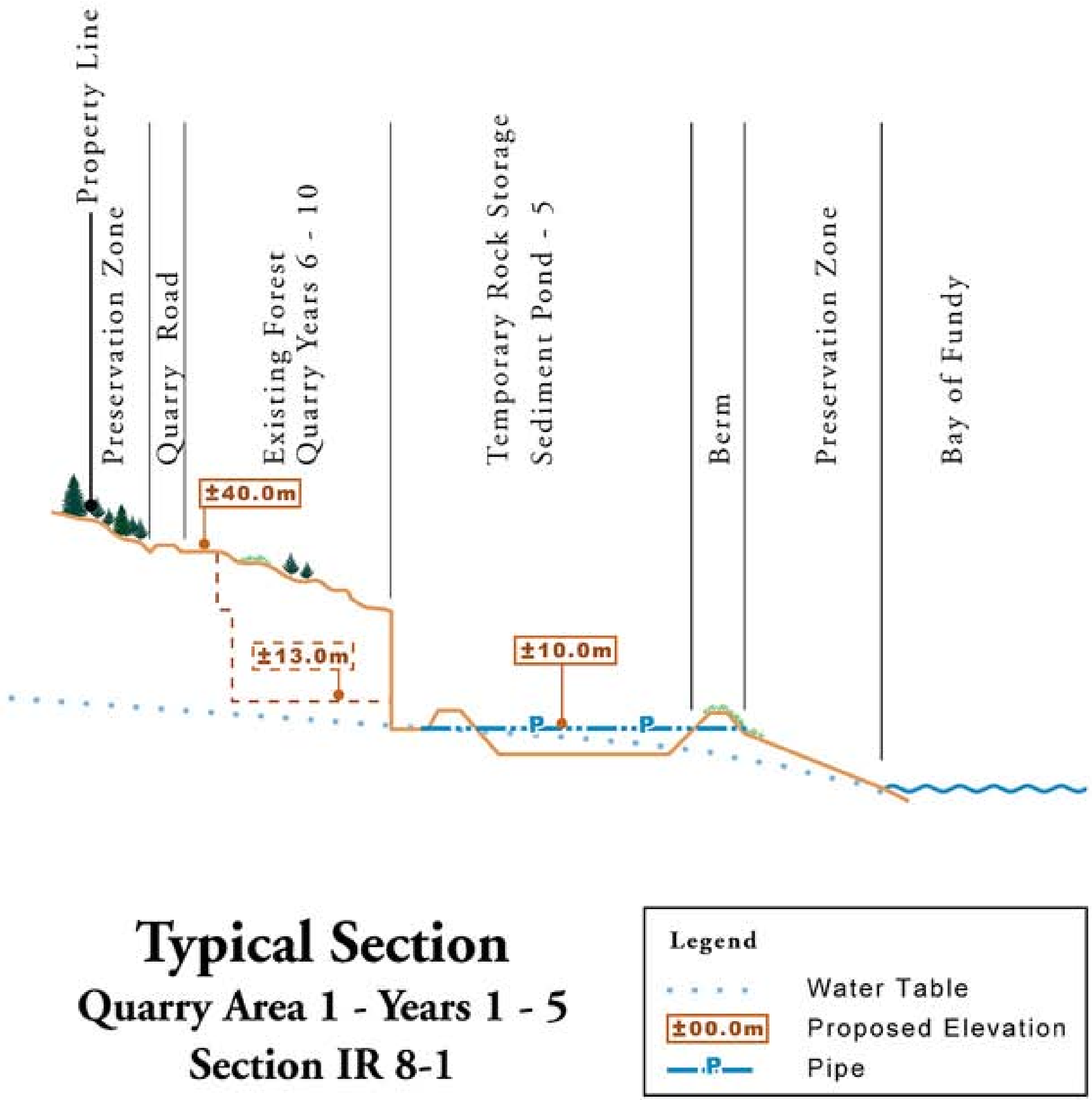
The seven quarry phases presented above reflect a 49 year life of the project. It should be realized that during any 5 or 10-year phase, multiple benches at varying elevations may be worked. The wall or working face at the Whites Point quarry will be 20m high or less with not less than an 8m wide bench for each vertical rise of 20m. This is intended to be in accordance with the Nova Scotia Occupational Health and Safety Act 2004.

Year 50 - Decommissioning

This time frame would include the decommissioning of the quarry including removal of the processing plant equipment, conveyors, and ship loader. Removal, grading, and reclamation of the organic and sediment disposal areas and final reclamation of quarry areas 6 and 7 including the physical plant area would be completed. The location of these areas is shown on **OP8 – R1.**



Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing Habitat
Quarry Area ①
Processing Plant Area
Existing Sediment Pond
New Sediment Ponds (Year 2)
Berm/Dyke
Quarry Road
New Sediment Pond (Year 4)
Reclamation (Year 2)
Constructed Wetland
Underground Drainage
Surface Drainage
Watershed Drainage
SD-1 Sediment Disposal Section
OD-1 Organic Disposal Section
IR8-1 Section IR8-1
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 1 - 5
Plan OP 1-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
Temporary Rock Storage
1
2
3
4
①
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section

Quarry Area 1 - Years 1 - 5

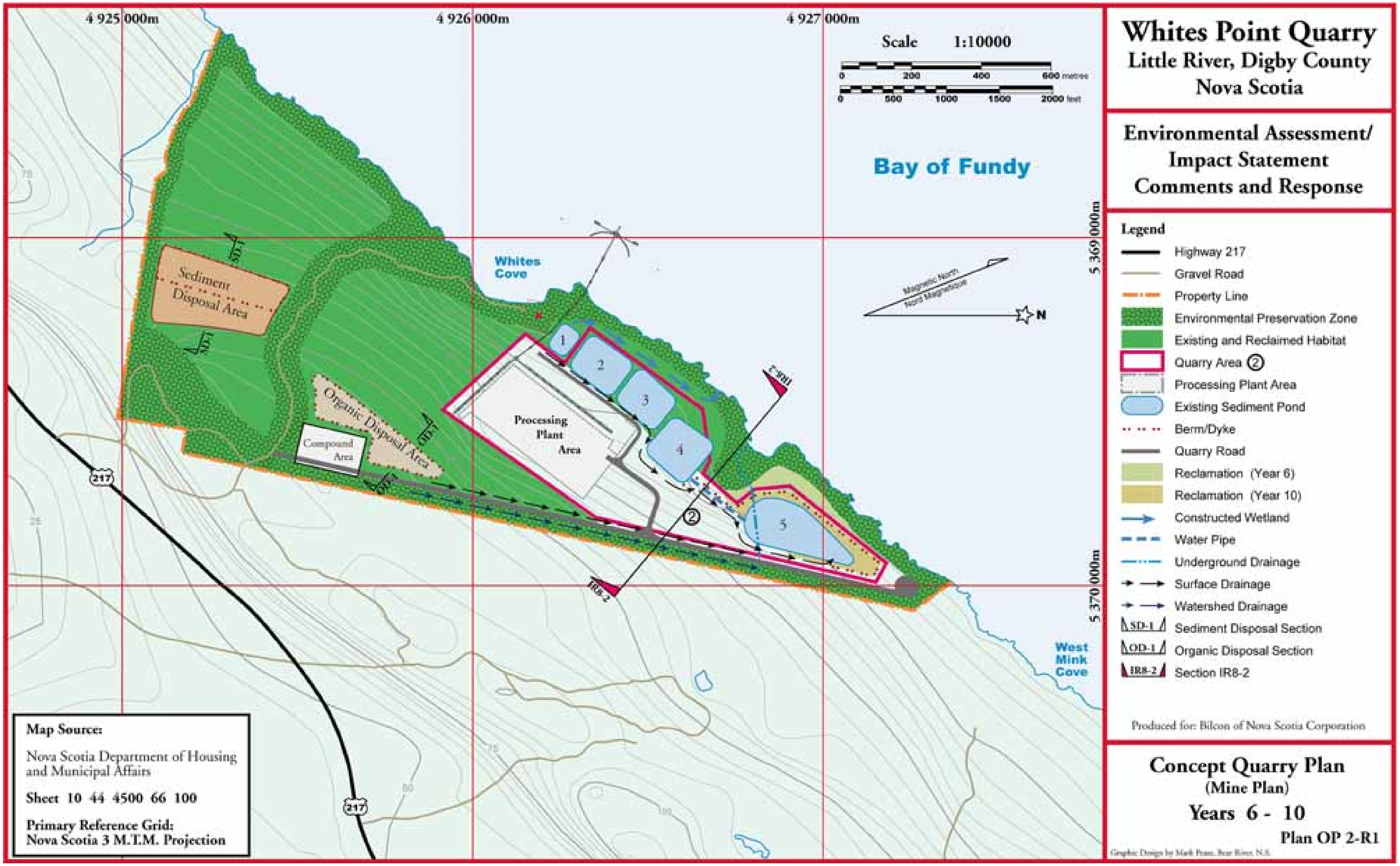
Section IR 8-1

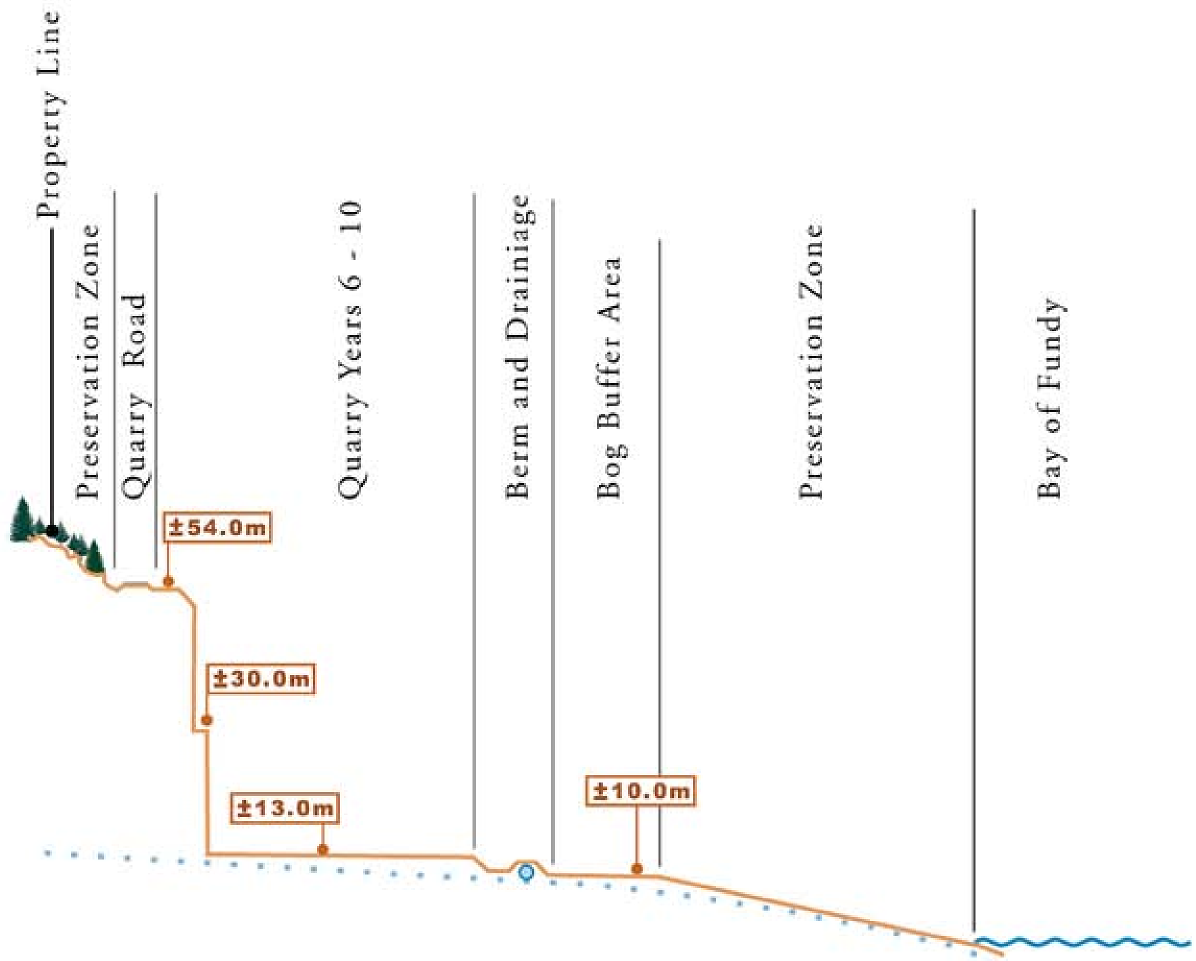
Scales:
1:3600 Horizontal
1:1200 Vertical

Figure IR8-1

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ②
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 6)
Reclamation (Year 10)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-1 Sediment Disposal Section
OD-1 Organic Disposal Section
IR8-2 Section IR8-2
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 6 - 10
Plan OP 2-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Bay of Fundy
Magnetic North
Nord Magnétique
N
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
1
2
3
4
5
IR8-2
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section

Quarry Area 2 - Years 6 - 10

Section IR 8-2

Legend

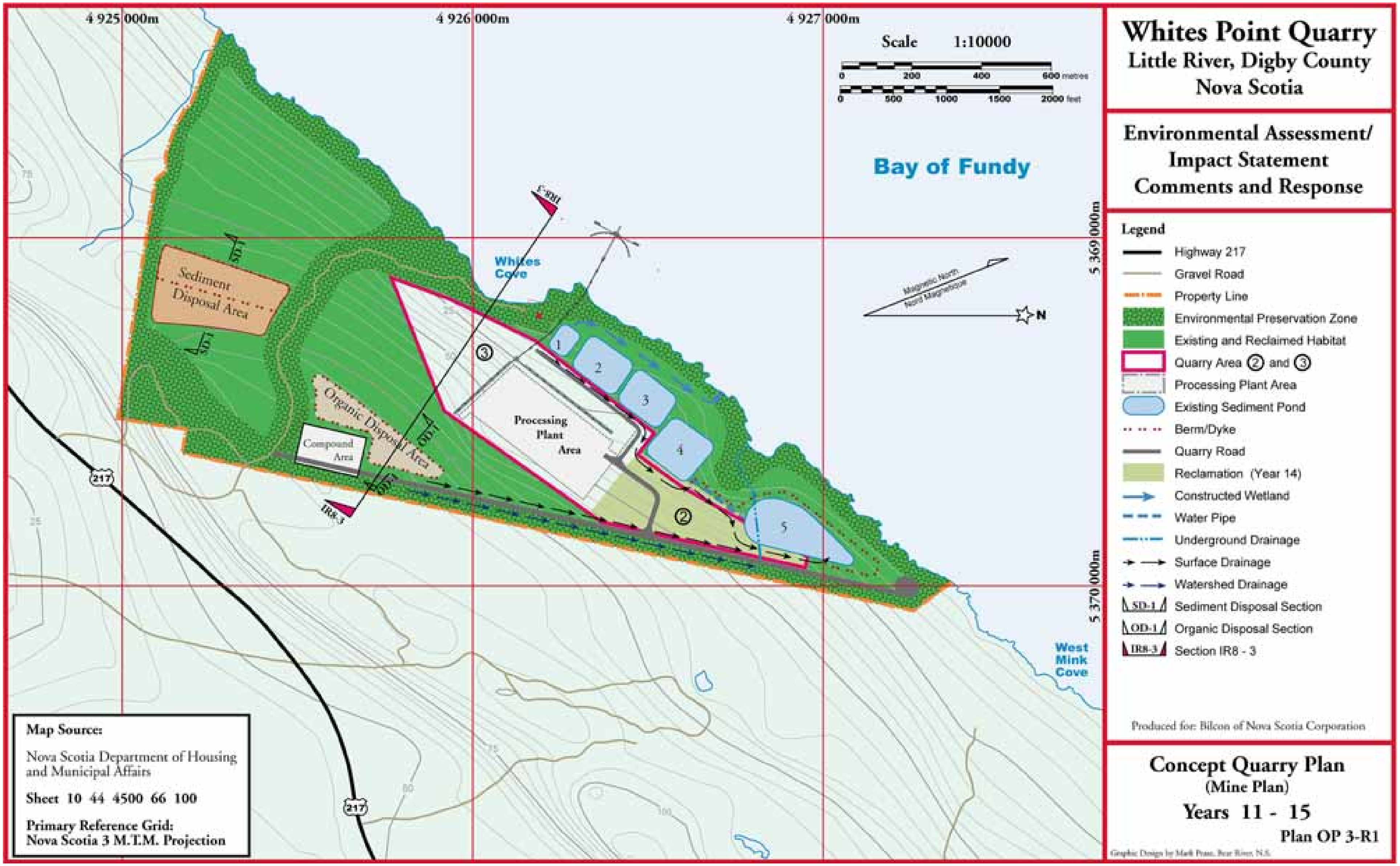
- Water Table
- ±00.0m Proposed Elevation
- Pipe

Scales:
1:3600 Horizontal
1:1200 Vertical

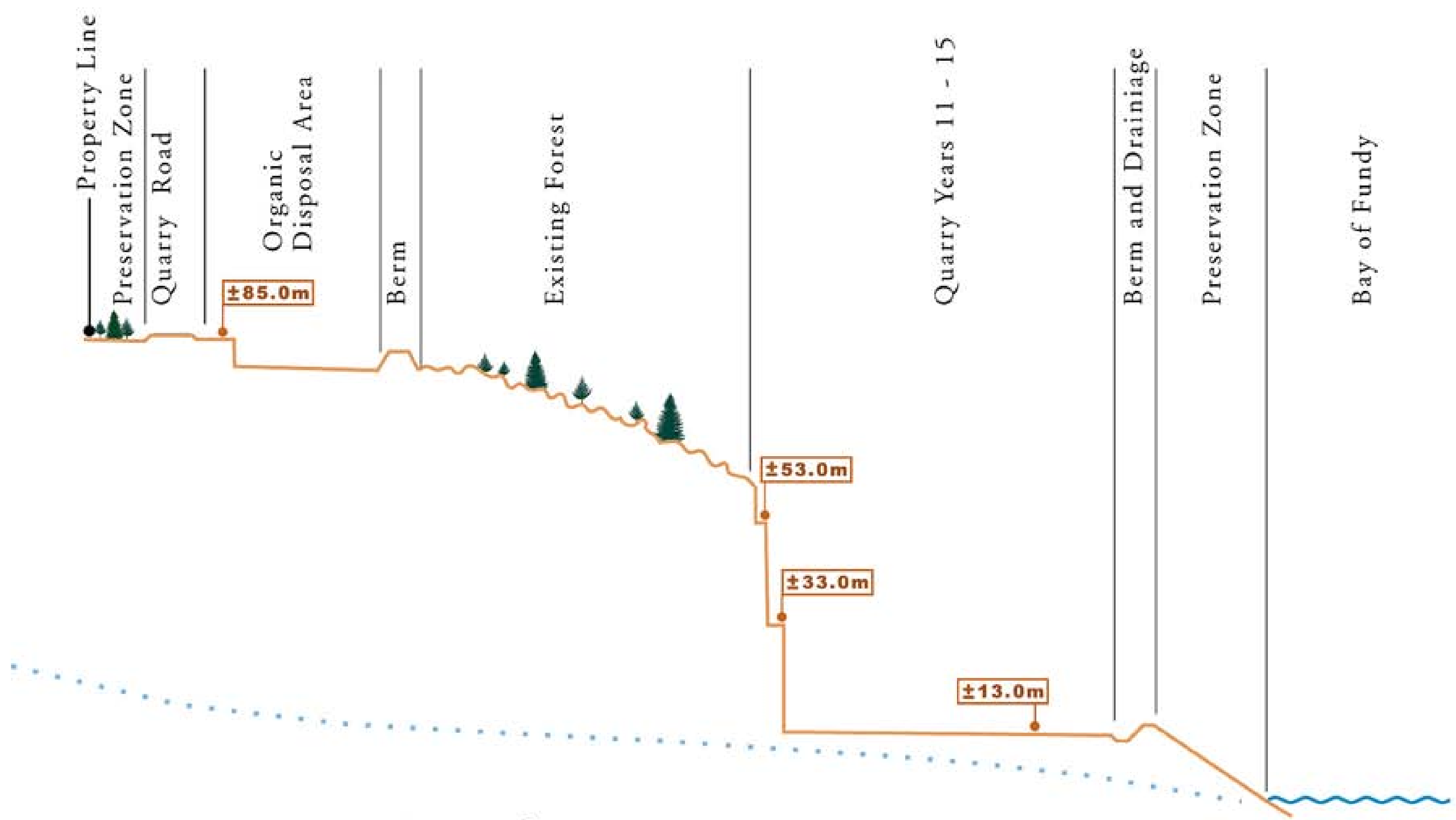
Figure IR8-2

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ② and ③
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 14)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-1 Sediment Disposal Section
OD-1 Organic Disposal Section
IR8-3 Section IR8 - 3
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 11 - 15
Plan OP 3-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Bay of Fundy
Magnetic North
Nord Magnetique
N
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section
Quarry Area 3 - Years 11 - 15
Section IR 8-3

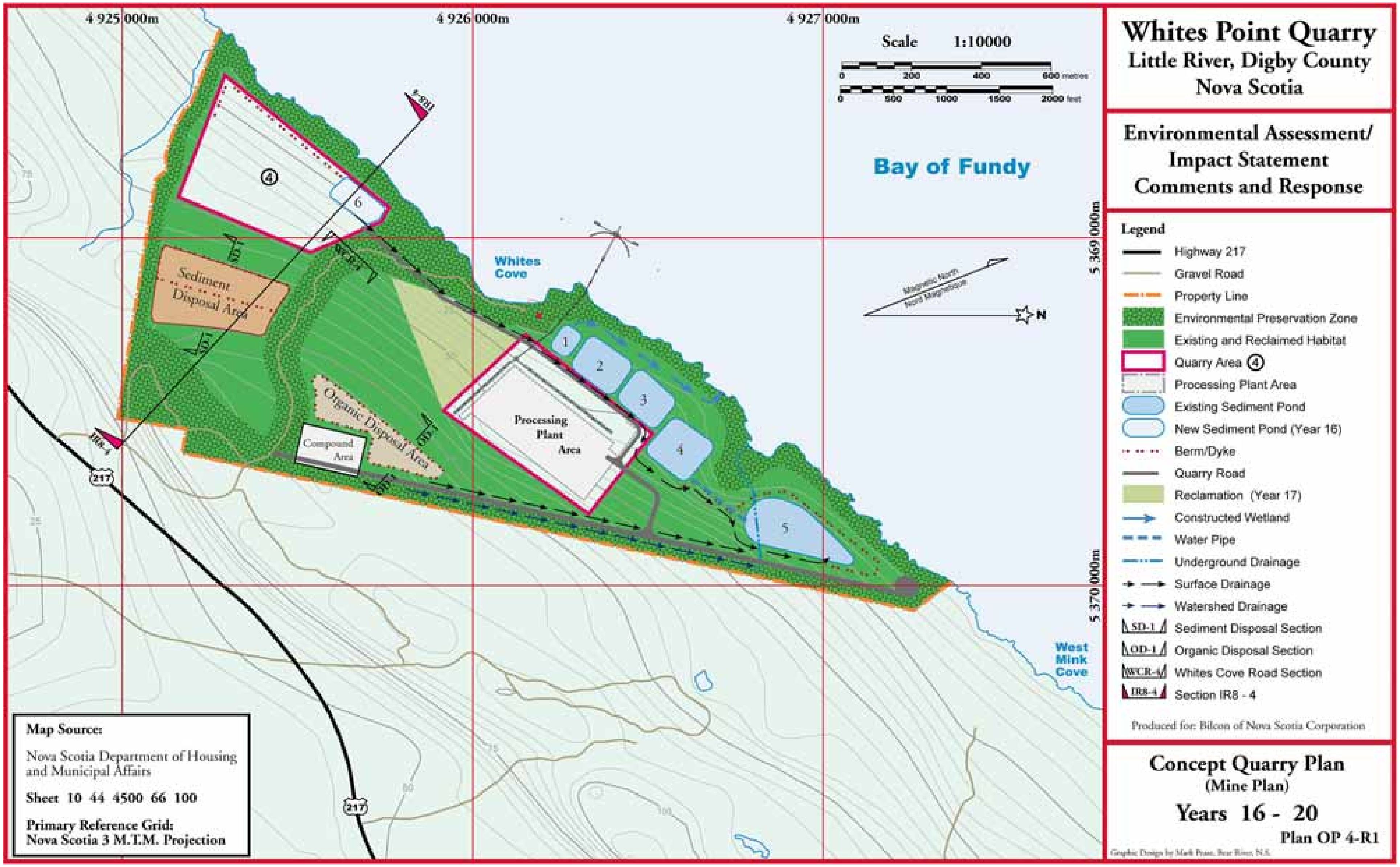
Legend
- Water Table
- ±00.0m Proposed Elevation

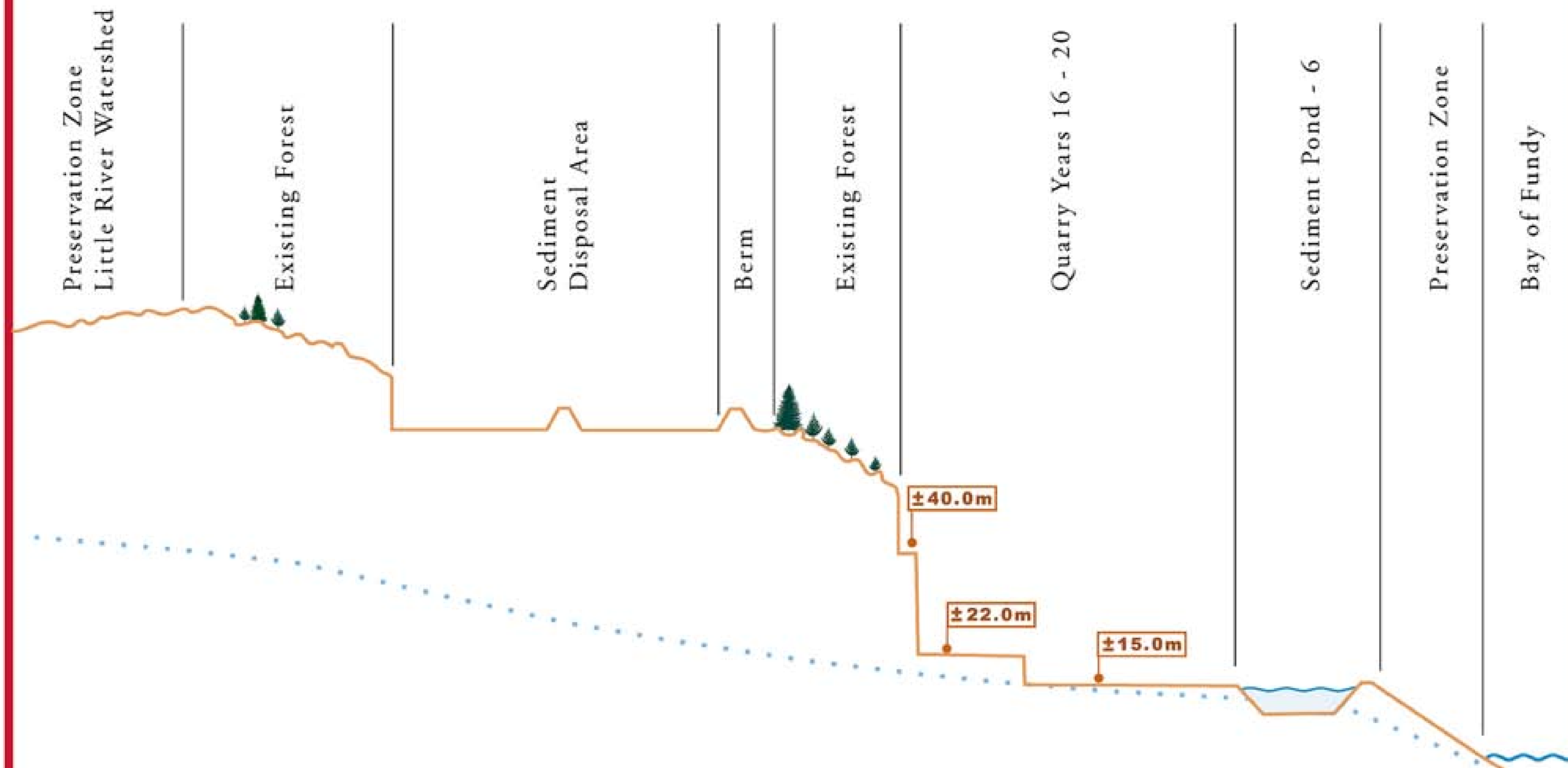
Scales:
1:3600 Horizontal
1:1200 Vertical

Figure IR8-3

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ④
Processing Plant Area
Existing Sediment Pond
New Sediment Pond (Year 16)
Berm/Dyke
Quarry Road
Reclamation (Year 17)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-1 Sediment Disposal Section
OD-1 Organic Disposal Section
WCR-4 Whites Cove Road Section
IR8-4 Section IR8 - 4
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 16 - 20
Plan OP 4-R1
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section
Quarry Area 4 - Years 11 - 15
Section IR 8-4

Legend

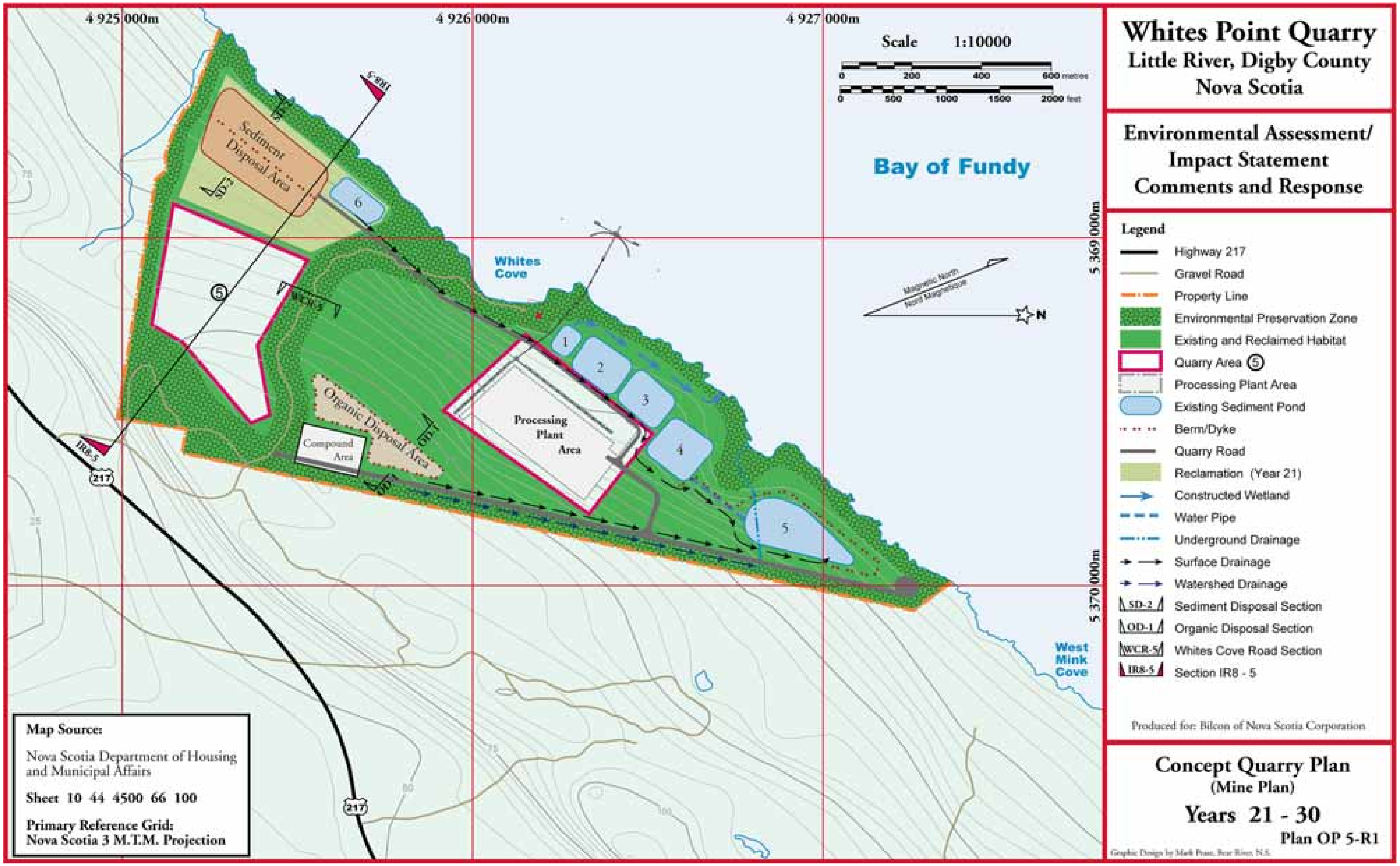
- Water Table
- ±00.0m Proposed Elevation

Scales:
1:3600 Horizontal
1:1200 Vertical

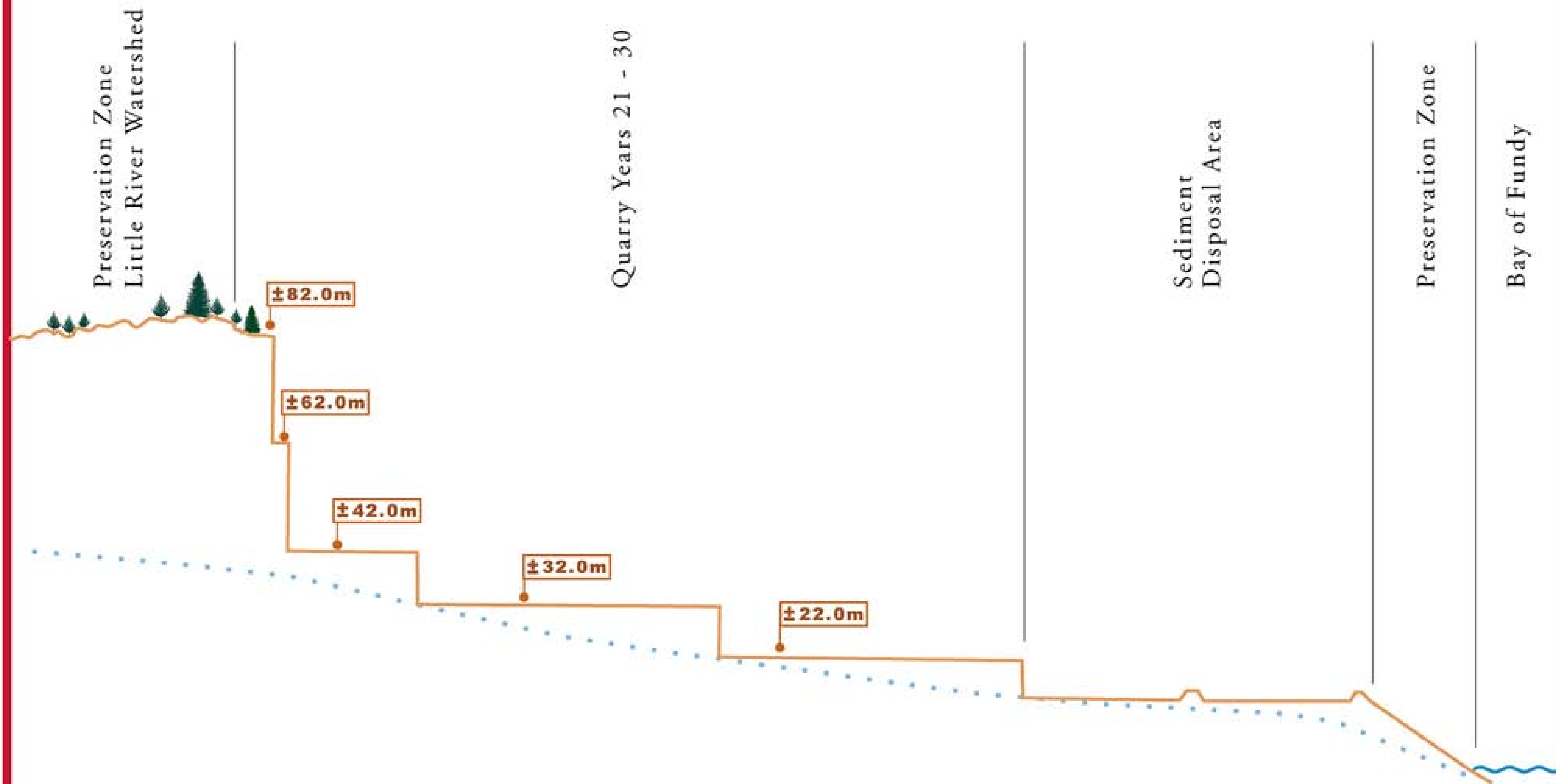
Figure IR8-4

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area 5
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 21)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-2 Sediment Disposal Section
OD-1 Organic Disposal Section
WCR-5 Whites Cove Road Section
IR8-5 Section IR8 - 5
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 21 - 30
Plan OP 5-R1
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Bay of Fundy
Whites Cove
West Mink Cove
Magnetic North
Nord Magnétique
N
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section
Quarry Area 5 - Years 21 - 30
Section IR 8-5

Legend

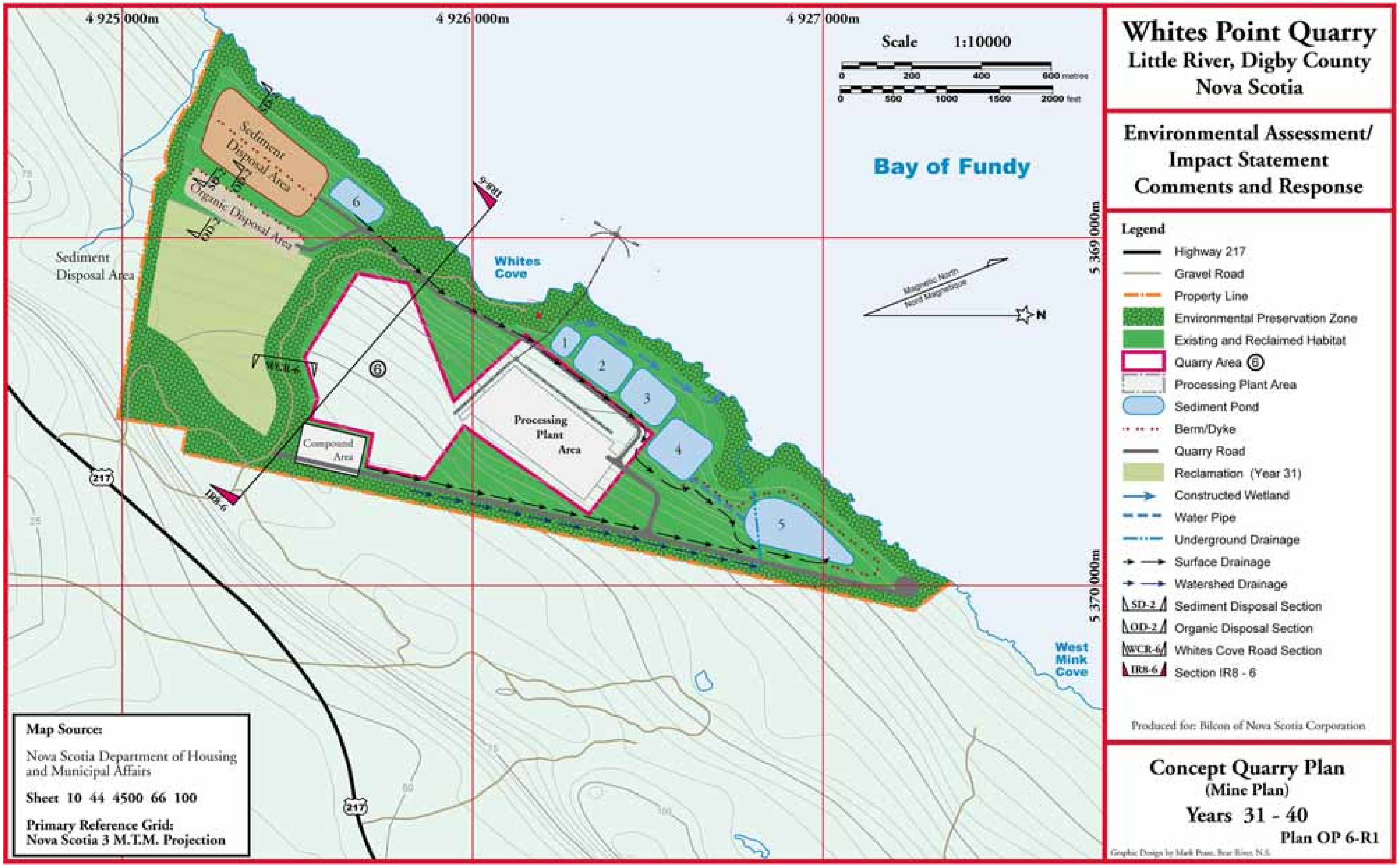
- · · · · Water Table
- 00.0m Proposed Elevation

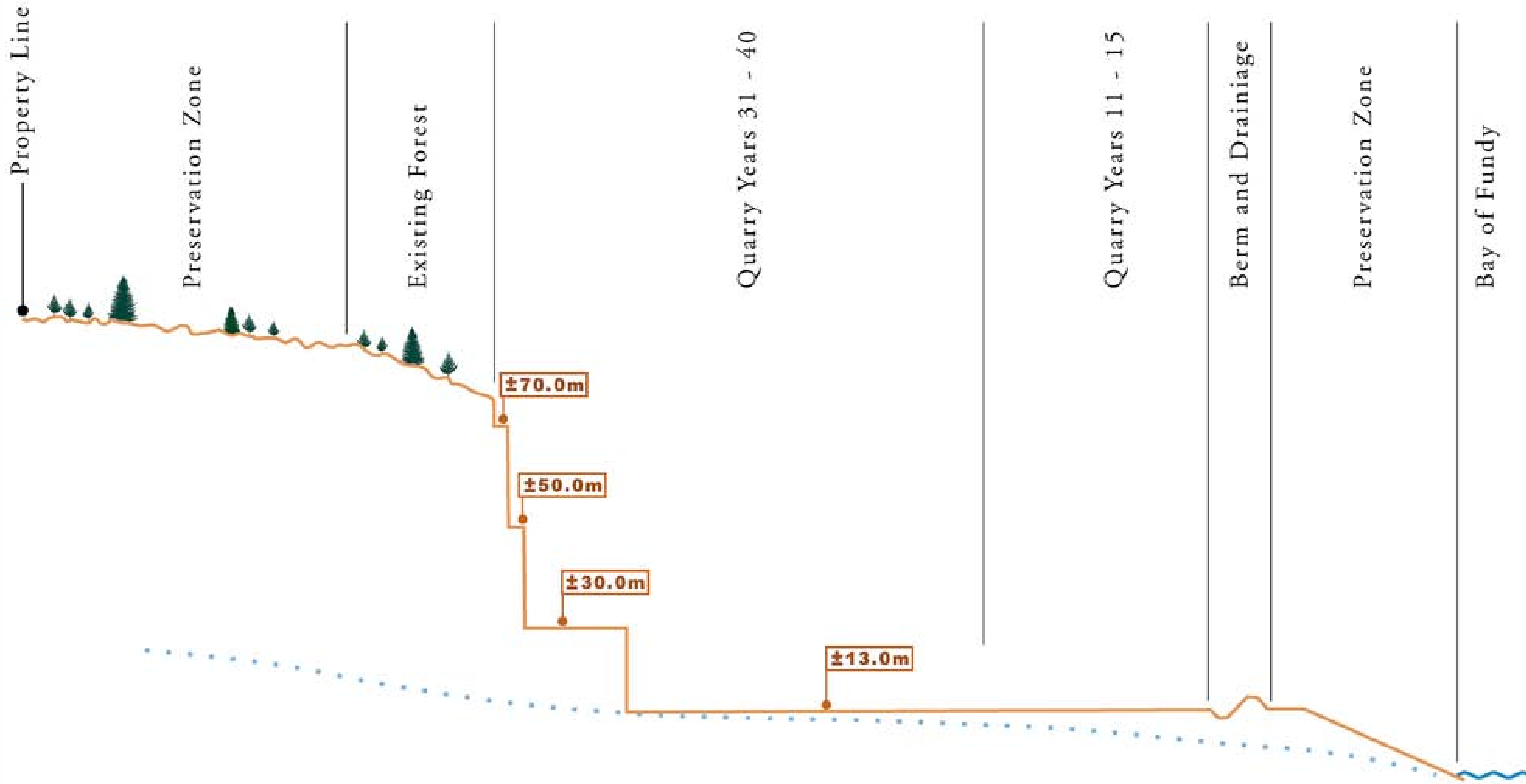
Scales:
1:3600 Horizontal
1:1200 Vertical

Figure IR8-5

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ⑥
Processing Plant Area
Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 31)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-2 Sediment Disposal Section
OD-2 Organic Disposal Section
WCR-6 Whites Cove Road Section
IR8-6 Section IR8 - 6
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 31 - 40
Plan OP 6-R1
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Processing Plant Area
Compound Area
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section

Quarry Area 6 - Years 31 - 40

Section IR 8-6

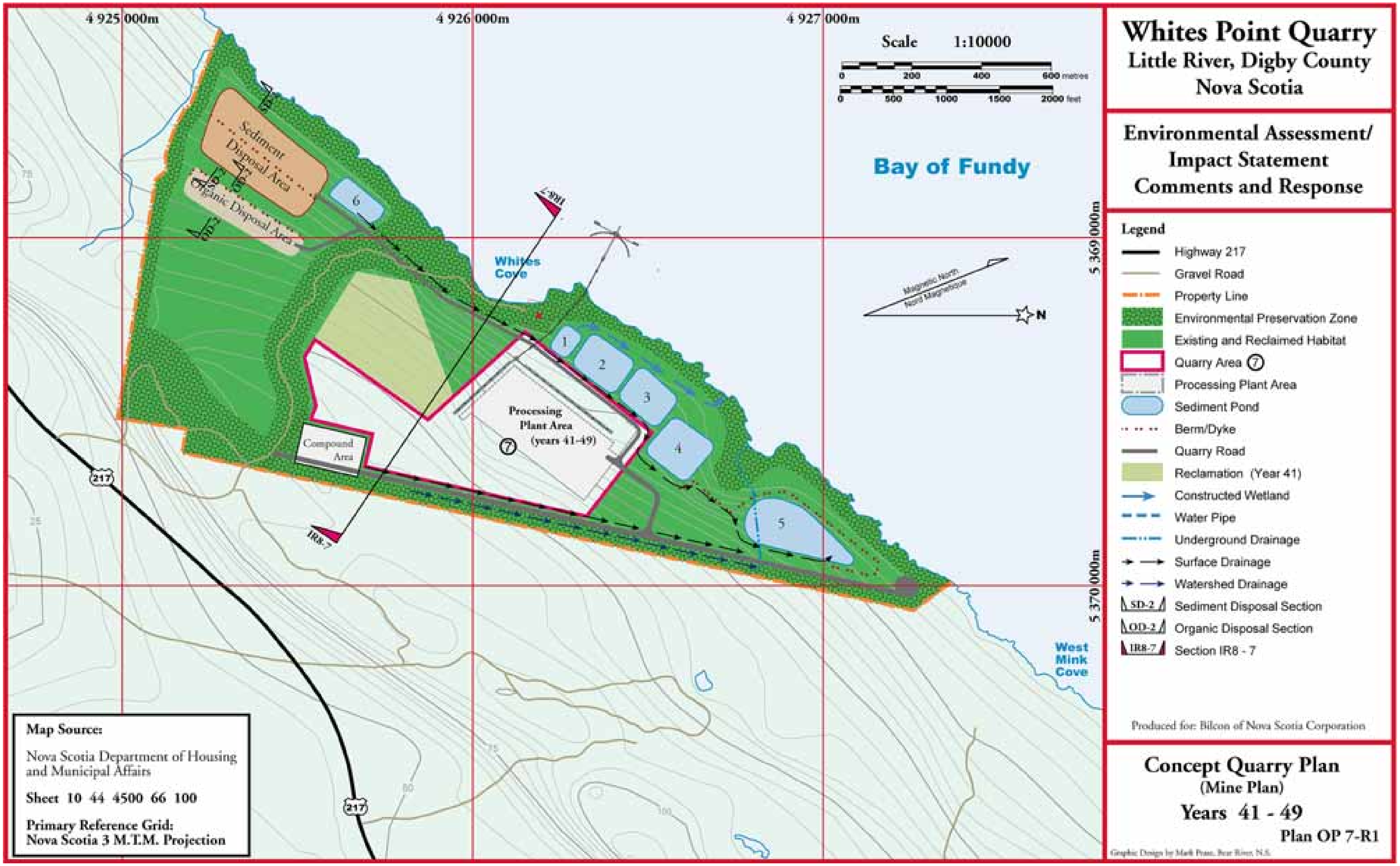
Legend	
· · · ·	Water Table
±00.0m	Proposed Elevation

Scales:
1:3600 Horizontal
1:1200 Vertical

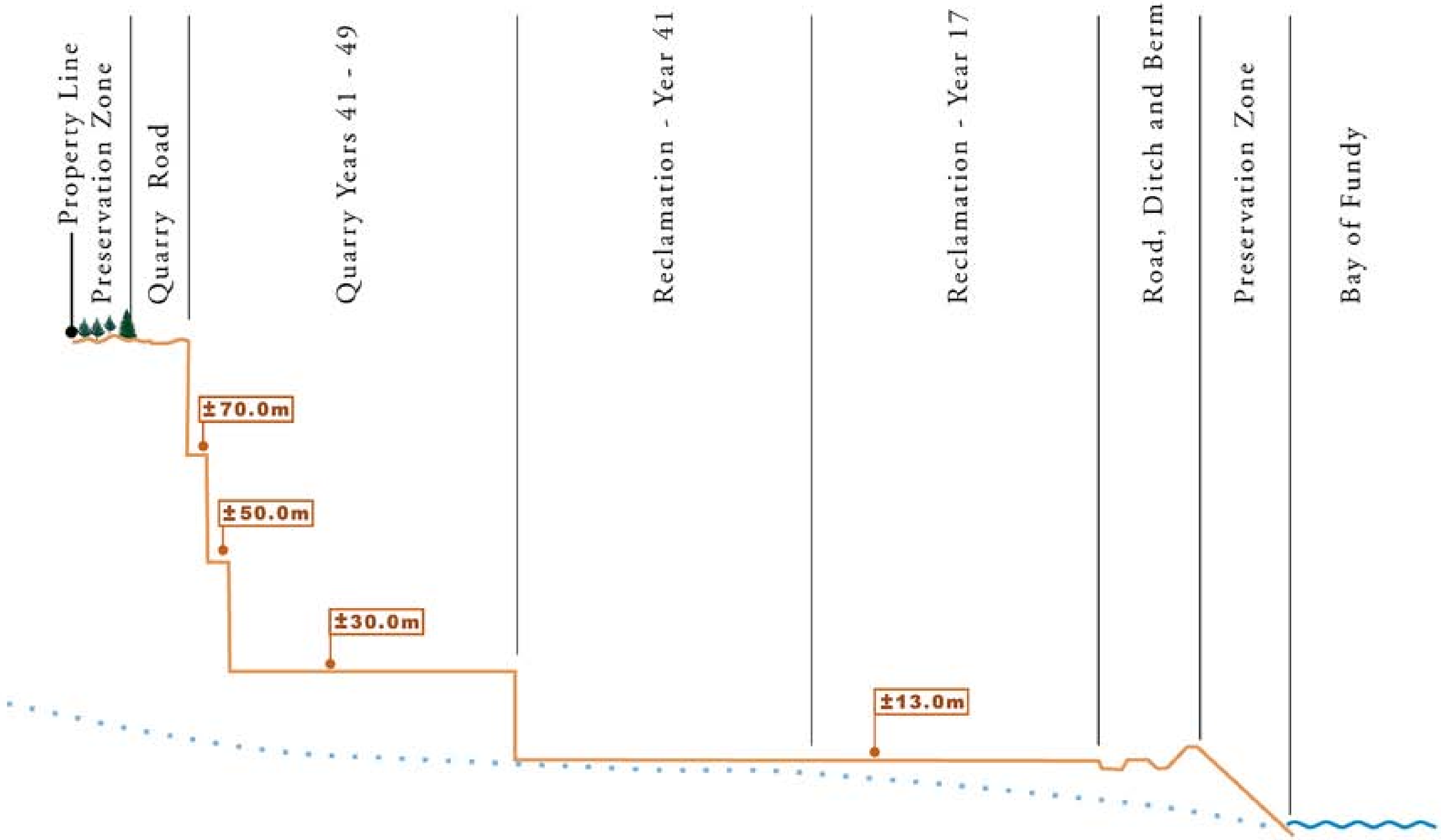
Figure IR8-6

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area 7
Processing Plant Area
Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 41)
Constructed Wetland
Water Pipe
Underground Drainage
Surface Drainage
Watershed Drainage
SD-2 Sediment Disposal Section
OD-2 Organic Disposal Section
IR8-7 Section IR8 - 7
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Mine Plan)
Years 41 - 49
Plan OP 7-R1
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area (years 41-49)
1
2
3
4
5
6
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Typical Section

Quarry Area 7 - Years 41 - 49

Section IR 8-7

Legend

Water Table

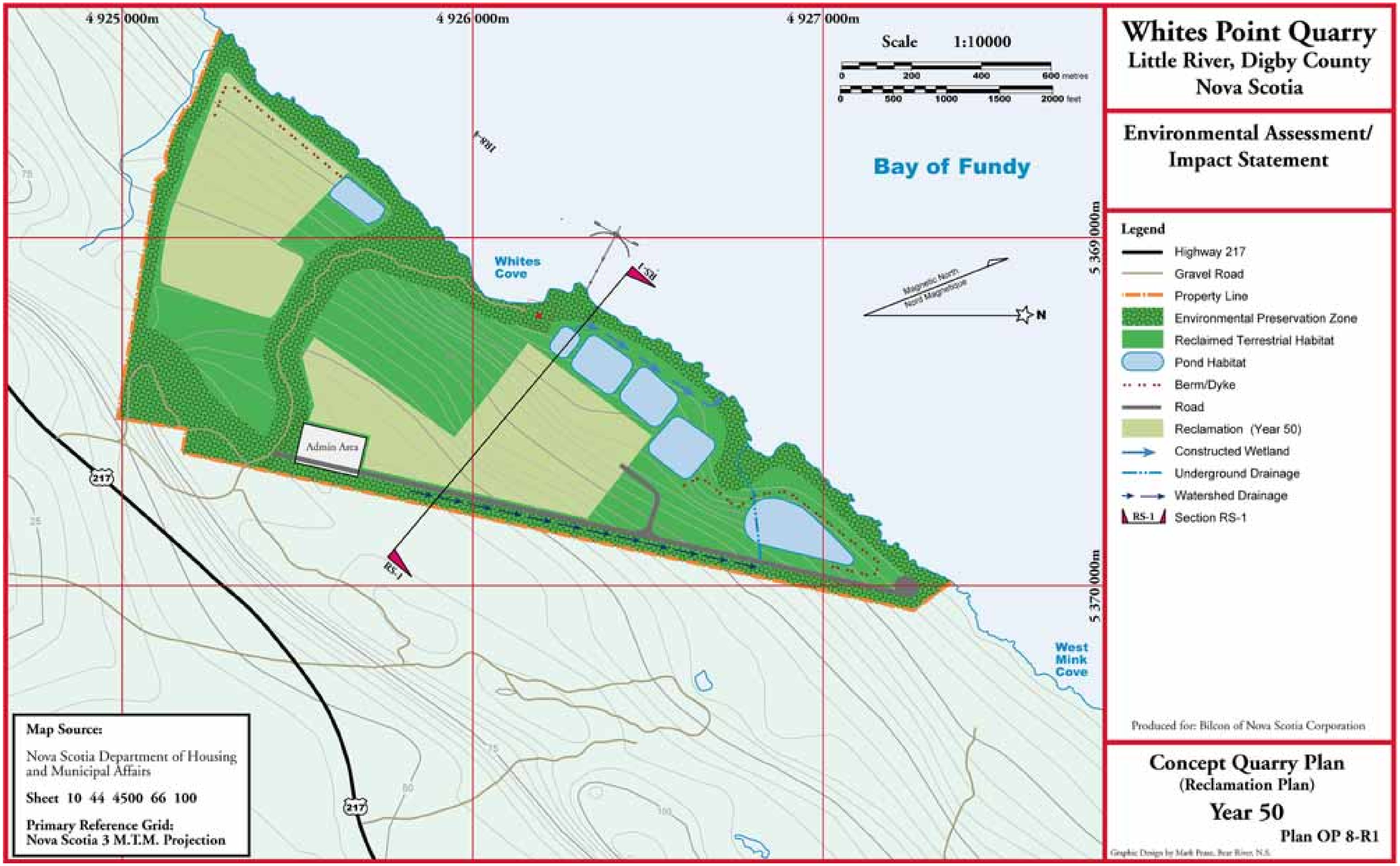
±00.0m Proposed Elevation

Scales:
1:3600 Horizontal
1:1200 Vertical

Figure IR8-7

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Reclaimed Terrestrial Habitat
Pond Habitat
Berm/Dyke
Road
Reclamation (Year 50)
Constructed Wetland
Underground Drainage
Watershed Drainage
Section RS-1
Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
(Reclamation Plan)
Year 50
Plan OP 8-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Bay of Fundy
Whites Cove
West Mink Cove
Magnetic North
Nord Magnétique
N
RS-1
Admin Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection

7.6 Cost and Workforce

Capital cost and workforce considerations for the Whites Point Quarry and Marine Terminal have been broken down into three distinct phases – construction, operation, and decommissioning/ reclamation.

Construction Phase

The construction cost of the Whites Point Quarry and Marine Terminal has been estimated at $33.1 million. The capital cost for the development of land infrastructure (roads, utilities, compound area facilities, environmental control structures, processing plant inclusive of operations equipment) has been estimated at $14.0 million with associated costs for marine infrastructure (conveyors, radial arm ship loader, mooring dolphins, and buoys) at $19.1 million. In addition, an allocation of $7.5 million has been made for the purchase of various pieces of mobile equipment. (loaders, trucks, excavators, bulldozers, crane, compressors, boats, and a drill rig) The total initial capital cost requirements of the project has been estimated at $40.6 million.

The anticipated construction employment impact, as it relates to the province of Nova Scotia as a whole, has been estimated at 225.4 person-years of employment. (A person- year of employment means one person is employed full-time for one year) This figure was derived from an analysis of expenditures utilizing the EcoTec Economic Impact Model and reflects an estimate of the total direct, indirect and induced impacts on employment. Approximately forty-five of these person years are attributable to Digby County specifically, and of these, 38.5 are considered direct employment impacts with 6.6 full-time equivalents created from spin-off employment. (Gardner Pinfold 2005, **Ref. Vol. VI, Tab 32)**.

A skilled and unskilled construction workforce will be required during the construction phase of the project. Marine and land based construction activities will be contracted to local or provincial contractors whenever possible. The work force will consist of workers skilled in concrete and steel fabrication, heavy equipment and crane operators, drillers and blasters, truck drivers, welders, electricians, conveyor system specialists, building trades, computer specialists, environmental technicians, and general labourers. Educational requirements will vary depending upon occupation, however, all trades people will be licensed in their particular trade as applicable.

Operation and Maintenance Phase

Annual operating expenditures at the Whites Point Quarry and Marine Terminal have been estimated to be in excess of $20.0 million. This estimate includes direct expenditures for wages, shipping costs, electricity, blasting and fuel and general operating expenditure considerations for debt service costs, repairs and maintenance, taxes, administrative salaries, insurance, environmental monitoring, reclamation, and other miscellaneous expenditures. These annual expenditure allocations are expected to remain relatively stable over the life of the project.

The total employment impact from operations (direct and spin-off), on an annual basis, has been estimated at 43.5 person-years of employment for Digby County with an additional 39.1 person-years attributable to the rest of Nova Scotia for a total impact of 82.6 person-years of employment.

Of the person-years of employment attributable to Digby County, 37.0 are considered full-time direct equivalents created from the operation of the quarry with an additional 6.5 full-time equivalents generated from spin-off activity directly resultant of the quarry. (Gardner Pinfold 2005 **Ref. Vol. VI, Tab 32**). The majority of direct employment impacts from the operation of the quarry would be felt predominately within neighbouring communities of the quarry site.

A skilled and unskilled work force will be required during the operational phase of the quarry over the 50-year life of the project. Skill requirements include a plant manager and operator, office clerk, heavy equipment operators, truck drivers, drillers, mechanics, electricians, welders, quality and environmental control technicians, fuel/greasers, and general labourers. The anticipated hourly wage rates to be paid vary from $13.75 to $20.00. The total annual budget estimate for direct wages and administrative salaries has been established at $1.16 million annually.

Training

The expected operation/technical efficiency of the quarry operation will require a team of skilled workers. In this regard, Bilcon of Nova Scotia Corporation is committed to employing local persons and providing training programs. This corporate position is intended to maintain a highly skilled and committed workforce. Specialized and professional training for equipment operators and maintenance personnel is planned to be provided by the primary equipment supplier on a continuing basis as technologies evolve. Appropriate educational backgrounds would be required for such occupations as the quality and environmental control technicians and plant managers/operators.

Decommissioning and Reclamation Phase

Decommissioning is planned to take place in the final year of operation, year 50, as shown on the Concept Quarry Plan – **Plan OP8 – R1.** Stationary equipment would be removed from the site by the quarry workforce. Final quarrying of the area occupied by the physical plant would be completed using mobile crushing and screening equipment. The compound area facilities, utilities, roads, environmental control structures (sediment ponds, constructed wetlands and environmental preservation zones) would remain in place. Also, to avoid disturbance in the marine environment and for potential use, the mooring dolphins, buoys, and conveyor support system would remain in place.

Reclamation of disturbed areas will be incremental over the life of the project as shown on the Concept Quarry Plans (mine plans) **-Plans OP1 - R1 through OP8 – R1.** Costs for reclamation are approximately $7,000.00 per hectare as provided in the operational cost estimates. Reclamation would be completed using quarry equipment and contracts with local landscapers. The final areas of reclamation would include the areas used for sediment and organic storage and the last area to be quarried.

7.7 Construction Phase

Infrastructure

The primary construction activities for the Whites Point Quarry and Marine Terminal consists of the physical plant area and marine terminal – see **Plan IR - 7 and Figures IR -7, 2 and 3;** the quarry compound area – see **Figure 4 – R1** and environmental control structures – see **Plans OP1 - R1 through OP8 – R1.** Land and marine construction will proceed simultaneously and take approximately one year to complete. The following sequence of construction activities is proposed.

7.7.1 Land

Access Road

An access road will be constructed from Highway #217 to the quarry property. Upgrading of the Whites Cove Road is being considered as well as a new access road on Bilcon property to the north of the Whites Cove Road. The new access road location would provide greater separation from existing residences. The access road would be paved and designed to accommodate tanker truck vehicles. The intersection of the access road and Highway #217 will be designed to meet the Nova Scotia Department of Transportation and Public Works standards. Limited cut and fill is expected during road construction if the new access road option is selected. Fill materials would be obtained from the quarry site. Vegetation will be cleared and chipped, and along with materials from grubbing, will be disposed of in the organic disposal area on the quarry site – see **Plan OP1 - R1.** Burning of brush during construction is not planned. Gradients on the access road would not exceed 10%. Necessary environmental controls would be put in place prior to road construction.

Utilities

Electrical energy would be provided from upgraded services on Highway #217 to the quarry compound area. The electrical services to the quarry site would follow the access road right-of-way. On-site distribution would be controlled from the quarry compound area. Other utilities would include an on-site sewage disposal system and domestic water supply. Sewage disposal and water well drilling will be done in accordance with the Nova Scotia Department of Environment and Labour guidelines. Solid waste disposal would be contracted to a private company.

Quarry Compound Area

A layout plan of this area is shown on **Figure 4 - R1.** The compound area encompasses approximately 2 hectares and would be surrounded with security fencing with gated road access. Construction in this area would include a pre-engineered maintenance shop approximately 60'x100' of 30' bay height and a lower office/lab and employee facility approximately 40'x40' with an eave height of 14'. The maintenance shop will be constructed on a reinforced concrete slab with adjacent "water stop" sealed curb walls to contain any accidental spillage of fuels or lubricant materials within the building. An electrical distribution centre, on-site sewage, domestic water well, vehicle and equipment parking and fuel storage tank will also be located within the compound area.

The fueling area at the storage tank will be erected on a reinforced concrete slab contained within two side curbs and with a sloping floor that is ramped from a lowpoint at the centre to a high point at the exit and entrance to the fuel station. This configuration will contain any spillage or surface drops within the slab. Release of any water from the fuel pad reservoir will be after filtration and processing is completed.

The majority of the compound surface will be paved. A 30 metre environmental preservation zone will buffer adjacent lands. No explosives will be stored on-site.

Quarry Roads

Construction of quarry roads from the compound area to the organic disposal area, processing plant area, Bay of Fundy shoreline, sediment retention ponds, and the marine terminal location are shown on **Plan OP1 - R1.** Subsequent extension of these roads are shown on **Plans OP4 - R1, OP5 - R1, and OP6 - R1.** Disposal of materials cleared and grubbed from this road construction will be placed in the berm/dyked organic disposal area also shown on **Plan OP1 - R1.** Fill material for road construction will be obtained on-site. The flow in any drainage ways encountered will be maintained during road construction with culverts, especially the drainage feeding the coastal bog. No wetlands were identified within the proposed road rights-of-way. Gradients on these roads will not generally exceed 10%. Necessary environmental controls will be put in place prior to road construction.

Processing Plant

The physical plant location for processing, stockpiling, and ship loading is shown on **Plan IR - 7 and Figure IR - 7.** The processing plant will be located at the 30 metre elevation and require approximately 12 hectares of land. Rock blasting will be required to create the platform. Drilling and blasting will be conducted in accordance with the Nova Scotia Department of Environment and Labour and the Department of Fisheries and Oceans guidelines. Rock removed from the processing site preparation will be temporarily stored in the northern portion of the quarry property as shown on **Plan OP1 - R1.** This rock may also be used for various land construction activities such as road base and other structural and environmental control structure activities.

Once the platform is established, the crushing and screening equipment and the high rate thickener tank will be installed. Crushing and screening equipment will be enclosed to control dust and noise. Also, the crusher feeds and discharges will be treated with an atomized dust suppression vapour that captures the airborne dust generated by the size reduction equipment. The manufactured sand product, the smallest particle product produced at the processing plant will be processed through a wet classification system, thus removing dust emissions.

On the lower 10 metre elevation level, the load out tunnels will be constructed and conveyors installed. Electrical power supply will be provided for the conveyor motors.

Environmental Controls

Once the roads are constructed to the area of the sediment retention ponds, these ponds will be constructed – see **Plan IR – 7 and Figure IR - 7.** The berms of these ponds will be the first areas to be reclaimed. Erosion control, visual enhancement and creation of wildlife habitat will be the intent. The sediment ponds will be in place before construction of the physical plant begins. Also, site preparation will be carried out and a berm/dyke will be constructed around the temporary rock storage area before rock is stockpiled. This berm/dyke will form the berm for a future sediment retention pond.

It should be noted that the coastal bog is in the environmental preservation zone in the area of the temporary rock storage and will not be disturbed. During this initial construction phase, berm/dykes will also be constructed around the organic disposal area and the sediment disposal area to contain sediment from runoff.

Constructed Wetland

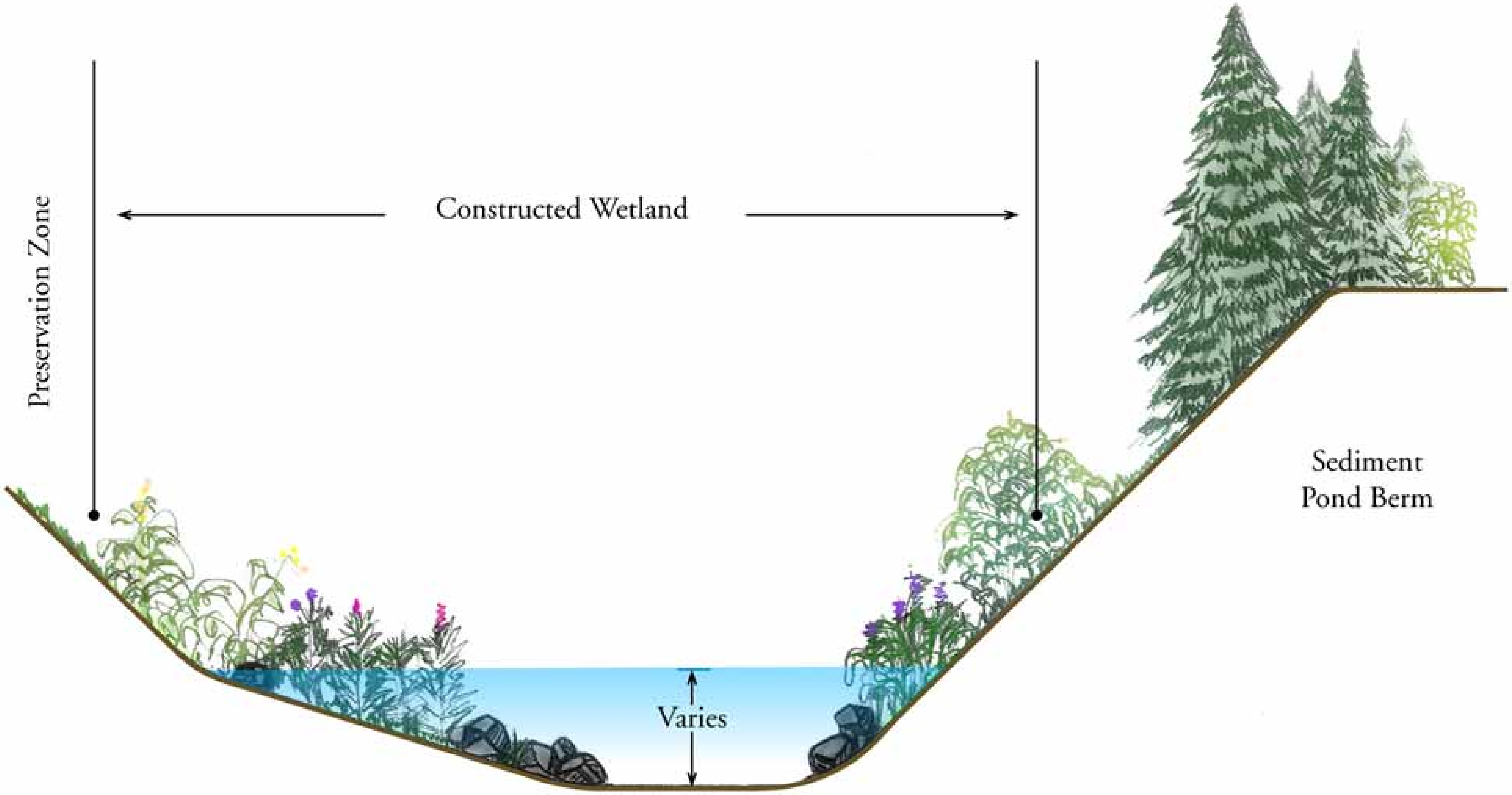
A constructed wetland is proposed as shown on **Plan IR – 7**. This wetland is designed as a further precautionary measure to the design capacity of the sediment retention ponds. This wetland will increase retention time for any suspended solids contained in water discharged from sediment pond 1 before it enters the Bay of Fundy. It will also provide over 500 metres of lineal aquatic habitat. Average capacity of the wetland depending on rainfall and discharge from sediment pond 1 is approximately 1000m^3. A discharge structure is proposed at the terminus of the wetland. This structure is located before the wetland reaches the existing coastal bog and will be used as a monitoring station for water discharged into the Bay of Fundy. A typical section of the constructed wetland is shown on **Figure CW – 1.** This wetland will not be connected to the naturally occurring coastal bog and the coastal bog is not intended to function for "effluent polishing".

As shown in **Section CW - 1**, the water depth will vary from a maximum depth of 1 metre. Width will also vary from 2 metres to 8 metres with side slopes also varying from steep (1.5 horizontal to 1 vertical) to more gentle (4 horizontal to 1 vertical) to provide varied aquatic plant habitat conditions.

Filter rock check dams are proposed within the wetland to slow water flow and allow any sediments to settle out before discharge. The overall design intent is a naturalistic appearance affording native plant and animal habitat thereby increasing biodiversity at a local scale. Native wetland plants, typical of the existing coastal bog, are proposed to be planted to supplement natural succession. Following is a typical plant list. Specific planting areas and detailed plans will be developed during the industrial permit phase of the project.

Constructed Wetland Plant List

Shadbush (*Amelancher sp.*)
Bog Aster (*Aster nemoralis*)
Coast Sedge (*Carex exilis*)
Canada Holly (*Ilex verticillata*)
Blue Flag (*Iris versicolor*)
Artic Rush (*Juncus articus*)
Bayberry (*Myrica pennsylvanica*)
Rhodora (*Rhododendron canadense*)
Marsh Fern (*Thelypteris palustris*)
Cranberry (*Vaccinium macrocarpon*)
Swamp-rose (*Rosa nitida*)



Typical Section Constructed Wetland

Whites Point Quarry

Section CW - 1

Scale: 1: 50

Figure CW-1

Produced for: Bilcon of Nova Scotia Corporation

Concept and Rendering by David Kern Sr., Granville Center, N.S.; Graphic Design by Mark Pease, Bear River, N.S.

Sediment Ponds

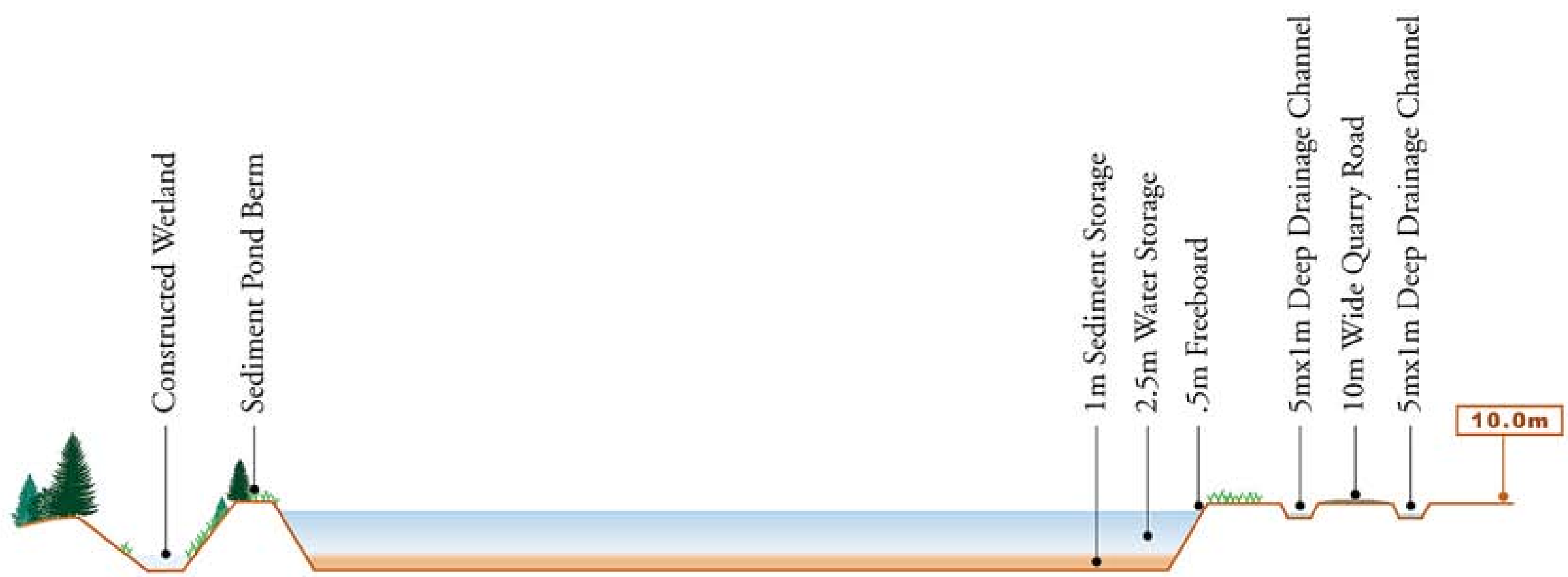
Six wash water/sediment ponds are proposed to be constructed. These ponds will function to collect runoff from rainfall for aggregate washing and dust control. The ponds will also function for sediment retention. The location and time frame for construction of the ponds is shown on **Plan OP1 - R1 through Plan OP7 – R1**. Approximately 10.6 hectares of pond surface area is planned. A typical section of a wash water/sediment pond is included – see **Figure SP – 2.**

As a precautionary measure, the 5 ponds located north of the Whites Cove Road adjacent to the processing plant are designed with a greater water storage capacity than a 100 year rainfall event. The closest weather station to provide rainfall intensity-duration frequency (IDF) data is Yarmouth and indicates the 100 year, 24 hour rainfall amount is 124.6mm. Assuming no abstraction losses (i.e. saturated conditions), a total runoff volume over the 143 hectare watershed north of the Whites Cove Road is approximately 178,200m^3. This in turn converts to an approximate 1.9 metre depth of storage required over the combined 9.6 hectare ponds. The proposed permanent water storage depth in the ponds averages 2.5 metres or 240,000m^3 total capacity. During production, water usage for dust control on roads, applied to shot rock before crushing, for dust suppression at the crushing plant, and dust control on the sediment disposal area is approximately 17,100,000 litres or 17,100m^3 per month. Control structures will be installed between ponds to regulate sufficient flow into pond 1 for pumping to the high rate thickener tank.

Sediment from these working areas of the quarry expected to enter the sediment ponds is estimated to be 10,300m^3 per year. The proposed sediment storage depth in the ponds is 1 metre or 96,000m^3 of sediment storage capacity. At the above rate of sediment deposition, the ponds would require clean-out approximately every nine years. The water, sediment and freeboard allocation for a typical wash water/sediment pond is shown on **Figure SP – 2.**

As quarrying south of the Whites Cove Road proceeds into quarry areas 4 and 5 after Year 15, a 1 hectare surface area sediment pond 6, 4 metres deep will be constructed. The total storage capacity of this pond will be approximately 40,000m^3. Sediment storage requirements are estimated to be 10,000m^3 for this 36 hectare watershed. Sediment pond 6 is also intended to provide a back-up water supply for rock processing and dust control. In this regard, runoff from this watershed flowing into pond 6 will be allowed to over flow and conveyed to sediment pond 5. Sediment pond 6 has not been designed to accommodate a 100 year storm event which would require a capacity of 45,000m^3. The water holding capacity of pond 6 is approximately 25,000m^3. Ponds 1 – 5 are designed with sufficient water capacity to accommodate the possibility of the over-flow from pond 6 if a 100 year rainfall event should occur. Over the 50 year life of the project, the risk of a 100 year storm is approximately 40%. Thus, sediment pond 6 will function to control sediment and as an integral part of the overall pond system for water supply.

The design of the berms for the sediment ponds will typically be subject to the same design considerations as the berms for the sediment and organic disposal areas set out on page 92.



Typical Section Sediment Pond

Whites Point Quarry

Section SP - 2

Scales:
1:1000 Horizontal
1: 500 Vertical

Figure SP-2

Produced for: Bilcon of Nova Scotia Corporation

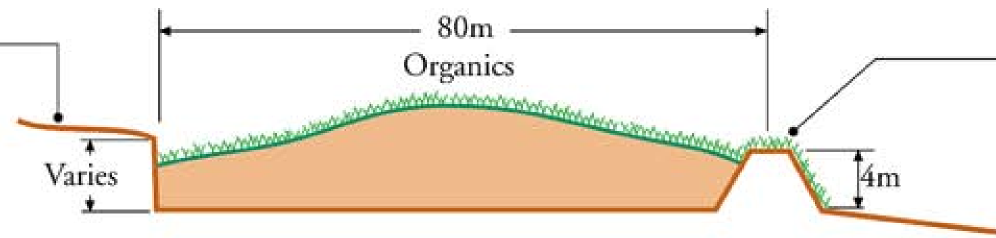
Concept and Rendering by Davis Kem Sr., Granvi

Sediment and Organic Disposal Areas

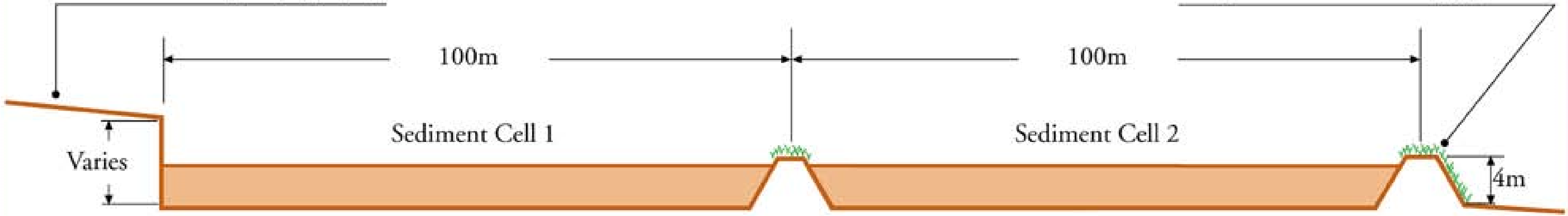
Recalculation of the amount of sediment and organic materials requiring longer term storage, less their periodic use for reclamation, indicated smaller area requirements than presented in the EIS. In this regard, sediment storage is planned to be contained in two 100 metres by 400 metres by 4 metre deep cells with a capacity of 140,000m³ each. Organic storage is planned to be contained in one 80 metre by 400 metre by 4 metre deep cell with a capacity of 112,000m³. The location of the sediment disposal area for years 1 to 20 and 21 to 49 of quarry operation are shown on **Plan OP1 – R1 and Plan OP5 – R1** respectively. The location of the organic disposal area for years 1 to 30 and 31 to 49 are shown on **Plan OP1 – R1 and Plan OP6 – R1** respectively. These disposal areas have also been relocated on the site to conform to areas of 0 to 10% slopes. Site preparation to accommodate the proposed disposal areas is shown on **Figure OD – 1 & SD – 1 and Figure OD – 2 & SD – 2.**

The organic disposal area will be created by cutting and constructing a berm to hold the organic material in the location shown for years 1 to 30. In years 31 to 49, the organic disposal area will be relocated to the quarry floor resulting from rock extraction from quarry area 4 with a constructed berm. Since the organic disposal areas are proposed to be located on a flat surface, the containment berm will function to prevent any movement of stockpiled material and act as a precautionary measure. Seeding of the organic disposal site will be conducted after excavation of material for site reclamation. This temporary cover crop will reduce potential wind and water erosion from the surface.

The sediment disposal area will be created by cutting and constructing two berms to hold the sediment material in the location shown for years 1 to 20. This disposal area would then be relocated for years 21 to 49 to the quarry floor resulting from rock extraction from quarry area 4. This area will be surrounded by cut faces with a constructed divider berm. Sediment material will be pumped as a slurry to cell 1 from the high rate thickener tank and from sediment pond clean-out. Since the sediment disposal area is proposed to be located on a flat surface, the containment berms will be designed to prevent any movement of the wet material. Filter fabric in the berms will allow the water to drain out of the sediment and be recycled. Both sediment cells have a total capacity of five years. As a result, cell 2 will generally act as a precautionary measure as sediment material for mixing with organics for land reclamation will periodically be removed from cell 1 first. The filling of cell 2 is unlikely due to the frequency of material use for reclamation over a five year period.



Section OD-1 - Organic Disposal Area
Years 1 - 30



Section SD-1 - Sediment Disposal Area
Years 1 - 20

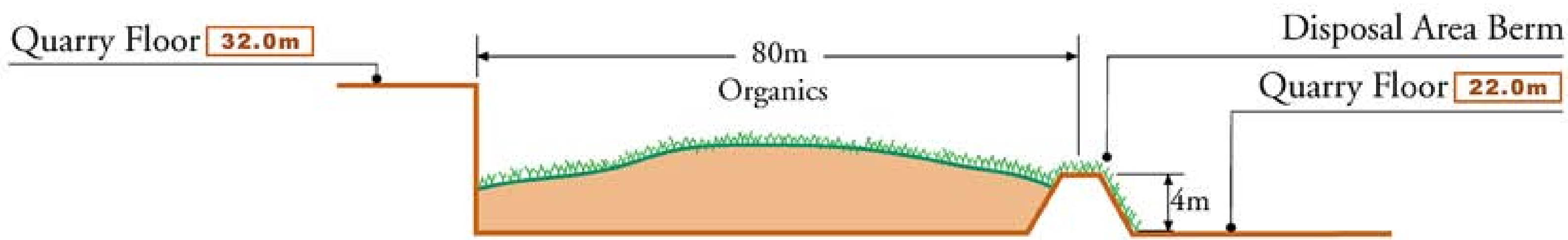
Whites Point Quarry
Sections OD-1 & SD-1

Scales:
1:1000 Horizontal
1: 500 Vertical

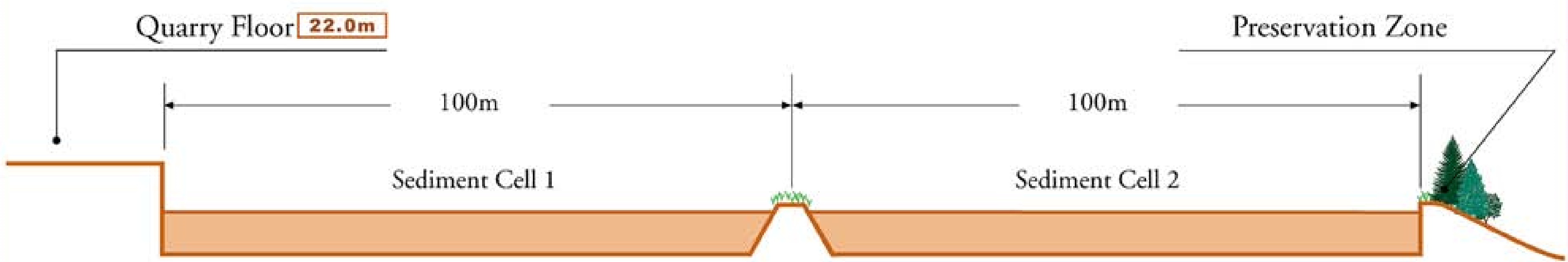
Figure OD-1 & SD-1

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.



Section OD-2 - Organic Disposal Area
Years 31 - 49



Section SD-2 - Sediment Disposal Area
Years 21 - 49

Whites Point Quarry
Sections OD-2 & SD-2

Scales:
1:1000 Horizontal
1: 500 Vertical

Figure OD-2 & SD-2

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.

It should be noted that the coastal bog is in the environmental preservation zone in the area of the temporary rock storage and will not be disturbed. During this initial construction phase, berm/ dykes will also be constructed around the organic disposal area and the sediment disposal area.

Runoff Collection Channels

The design of the runoff collction channels will include the following:

- geotechnical investigation along the proposed channels (similar to above, if required)
- piezometer installations along the proposed channels
- channel slope analysis (i.e. sediment transport considerations versus velocity/ erosion concerns)
- consideration of channel capacity
- flow velocity analysis for bed and bank protection requirements
- assessment of need for energy dissipation measures, e.g. rock check dams

Panel Comment

In view of the planned component relocations of the quarry operations, how can subsequent five-year plans be similar? Provide the five-year plans for subsequent periods.

Response:

Debris Cycle

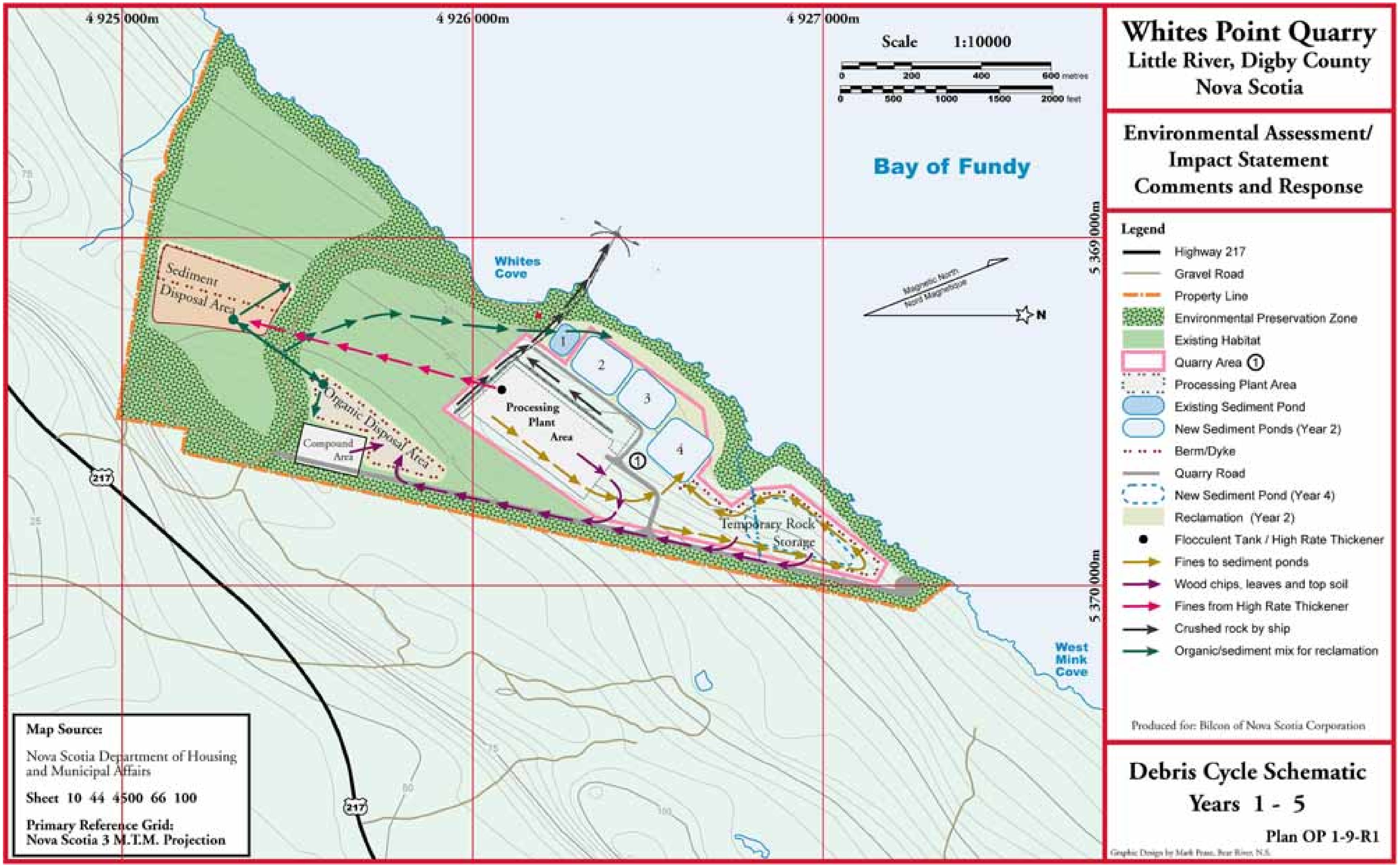
The debris remaining from the crushing process will initially be stored in designated areas and subsequently used in the reclamation process. **Plan OP1-9 – Debris Cycle Schematic** shows the track of debris for the initial 1-5 years of the quarry operation. Subsequent five year periods are shown in **Plans OP1-9-R1 through OP7-15-R1.**

Topsoil and chips from the clearing and grubbing process will be transported to the organic disposal area in the southeast corner of the site for temporary storage in years 1-30 and to the disposal area to the south side in years 30-50. These areas will be bermed to prevent material washing further down the slope.

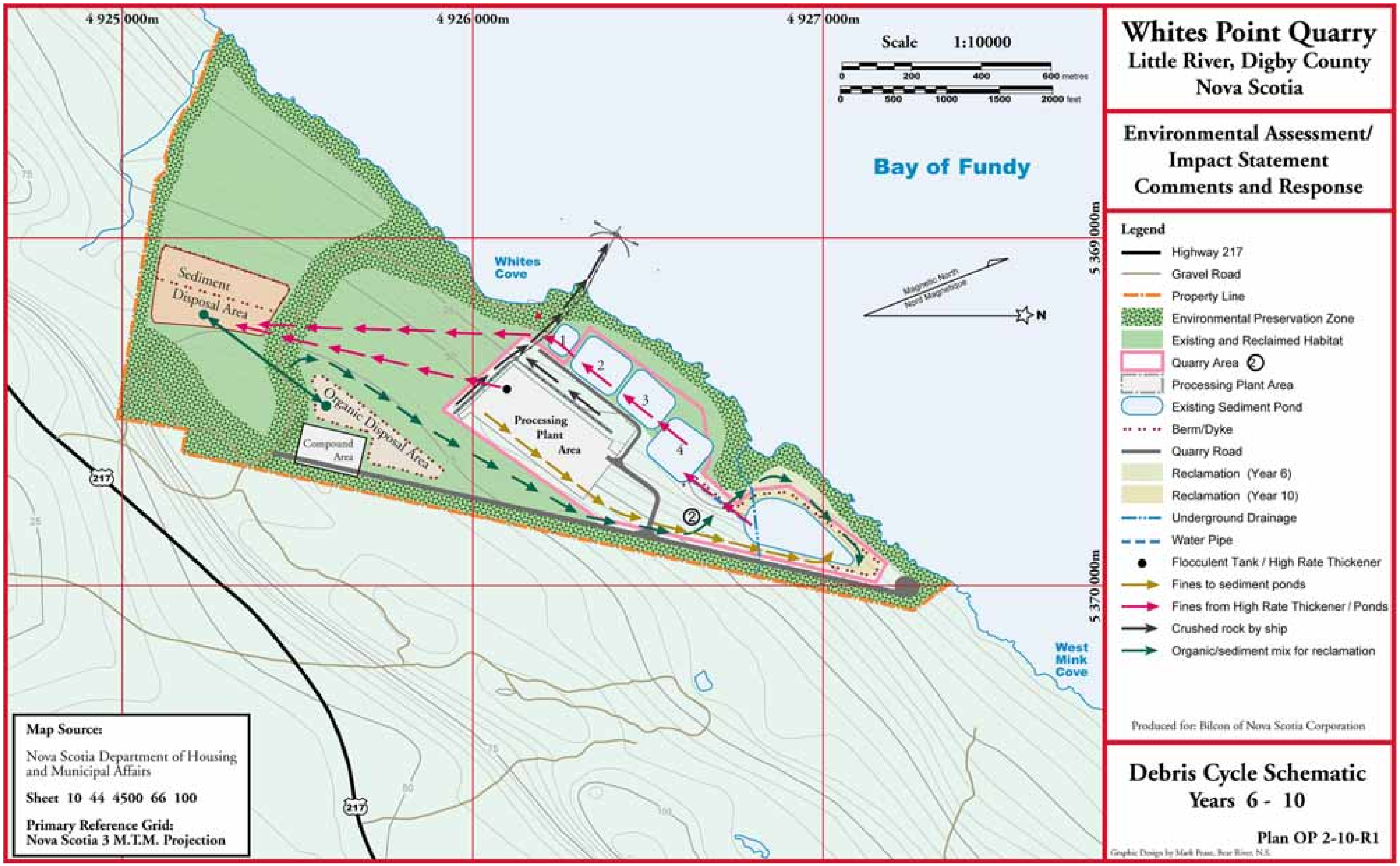
Fines from the exposed operations area will be collected in the settling ponds which will be periodically emptied and the fines transported to the sediment disposal area in the easterly area of the site for temporary storage.

Fines from the washing operation will be directed to the high rate thickener where, following dewatering, they will be pumped to the sediment disposal areas to the south side for temporary storage. These sediment disposal area will be bermed to prevent migration of the fines further downslope.

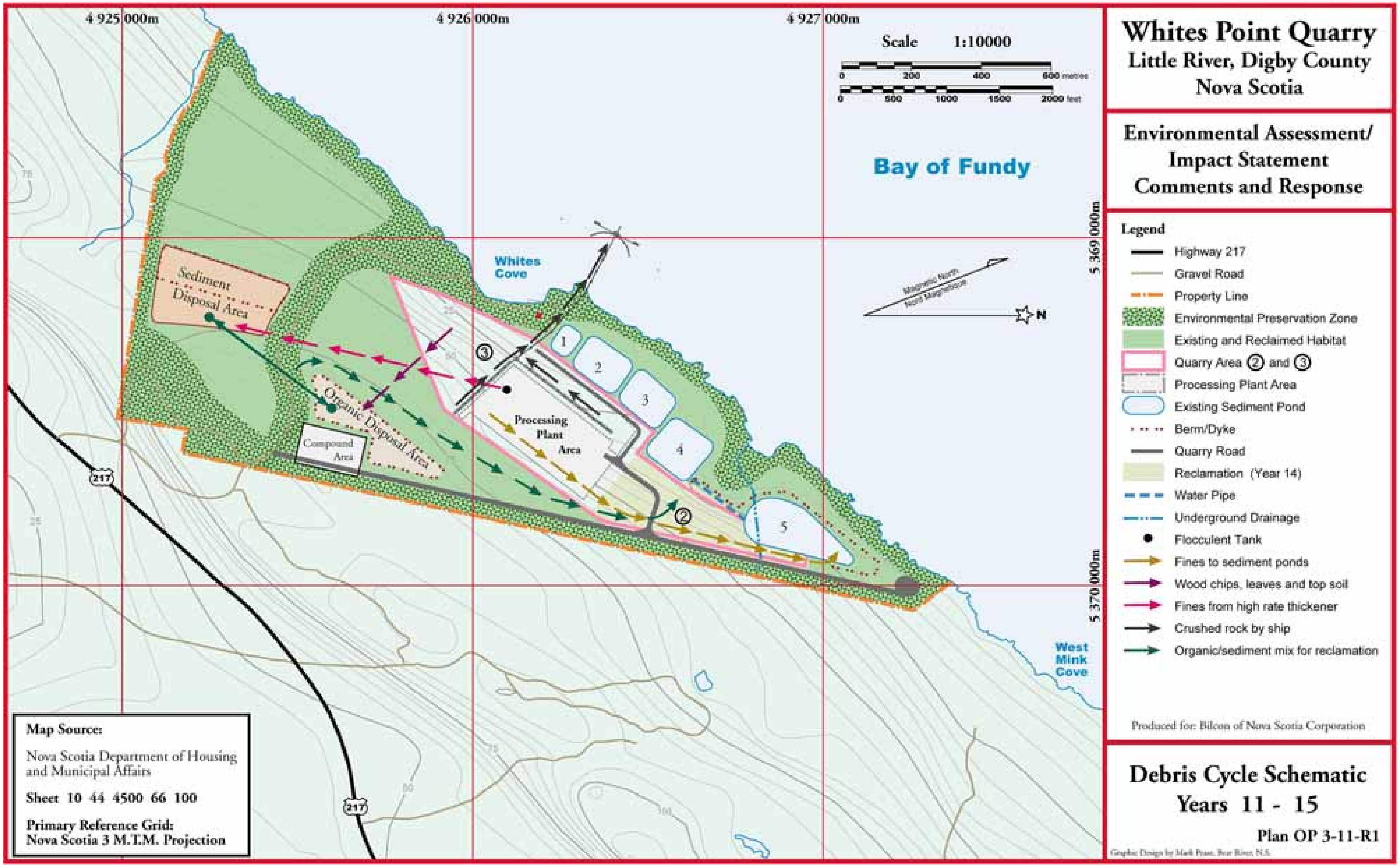
As material is required for reclamation, the organic material and the fine sediment will be mixed and spread for replanting following the addition of soil amendments. Crushed rock and grits will be loaded via the loading tunnel and the shiploader on a periodic basis for trans-shipment to New Jersey. No debris will be transported off-site since it will all be employed in the reclamation process which will be carried out incrementally throughout the life of the project.



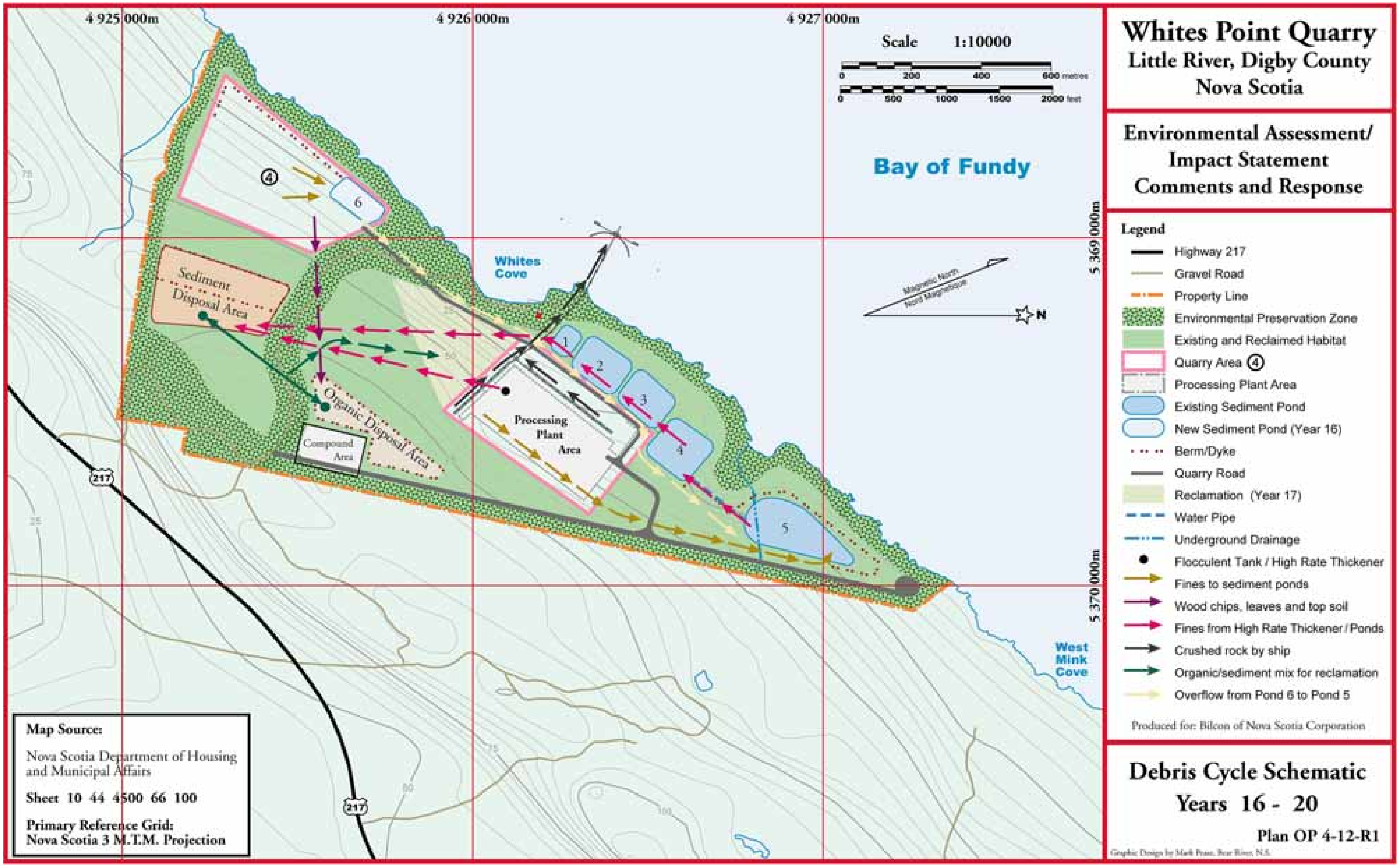
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing Habitat
Quarry Area ①
Processing Plant Area
Existing Sediment Pond
New Sediment Ponds (Year 2)
Berm/Dyke
Quarry Road
New Sediment Pond (Year 4)
Reclamation (Year 2)
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from High Rate Thickener
Crushed rock by ship
Organic/sediment mix for reclamation
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 1 - 5
Plan OP 1-9-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
Temporary Rock Storage
1
2
3
4
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



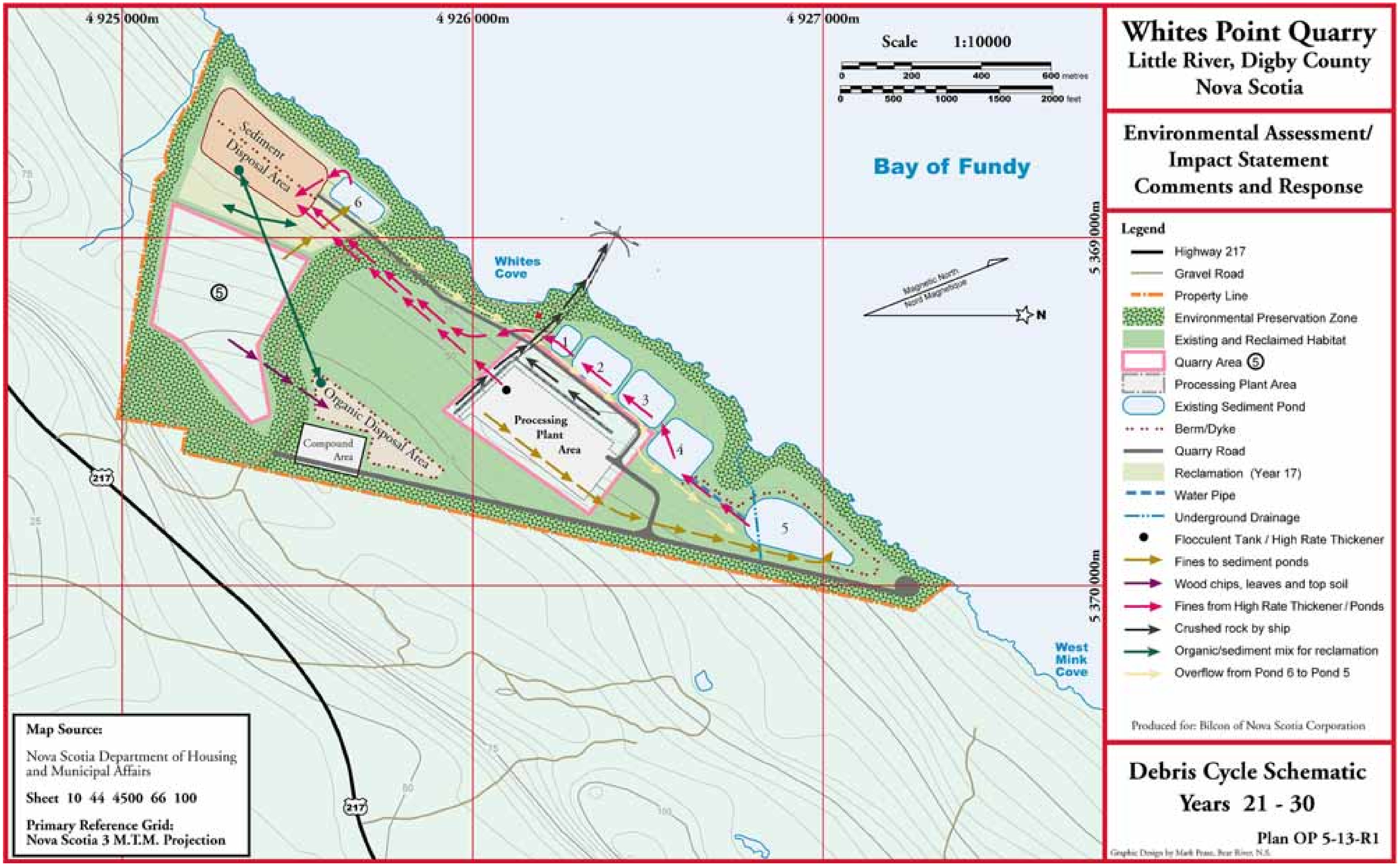
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 6)
Reclamation (Year 10)
Underground Drainage
Water Pipe
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Fines from High Rate Thickener / Ponds
Crushed rock by ship
Organic/sediment mix for reclamation
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 6 - 10
Plan OP 2-10-R1
Scale 1:10000
Bay of Fundy
Whites Cove
West Mink Cove
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection

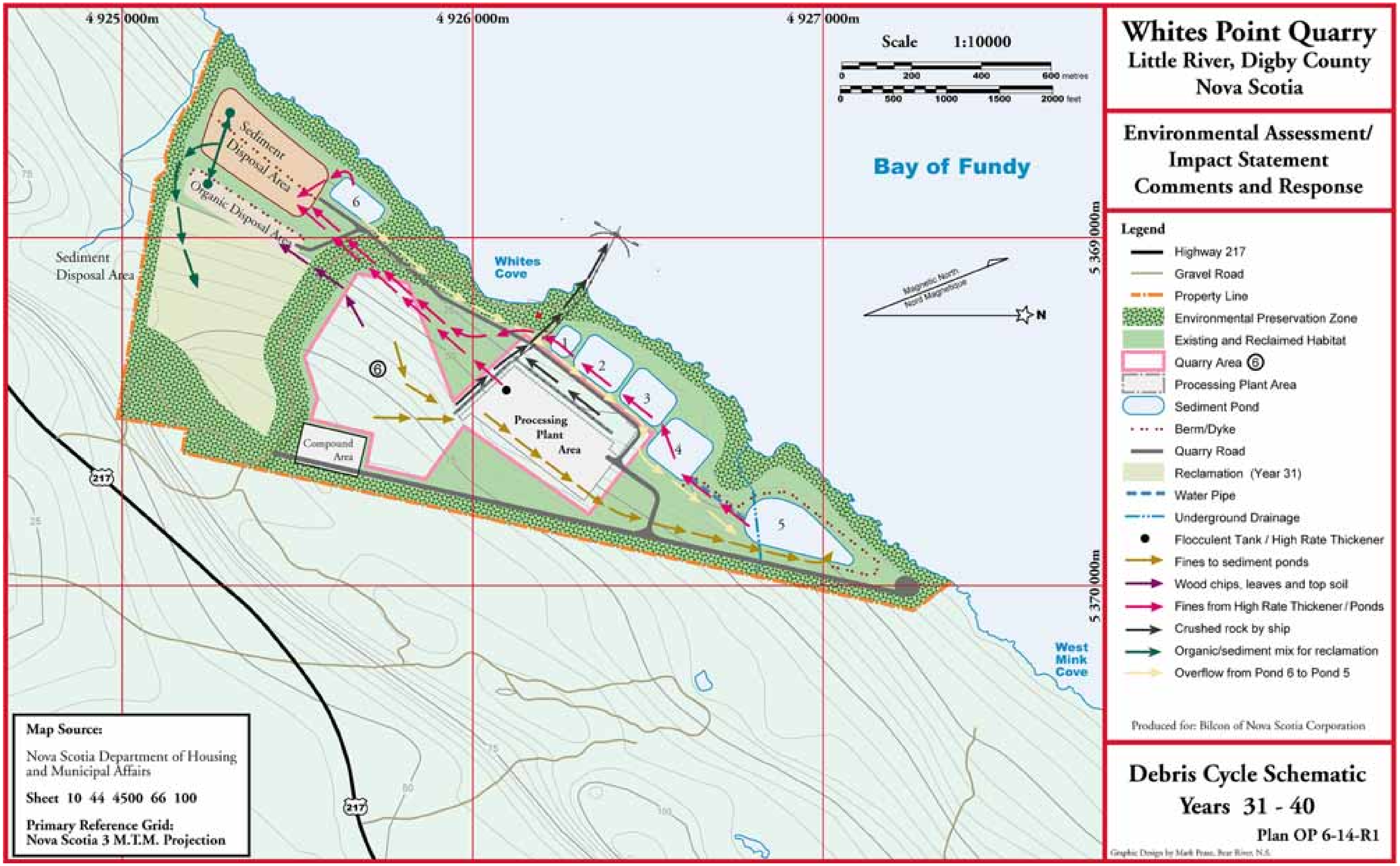


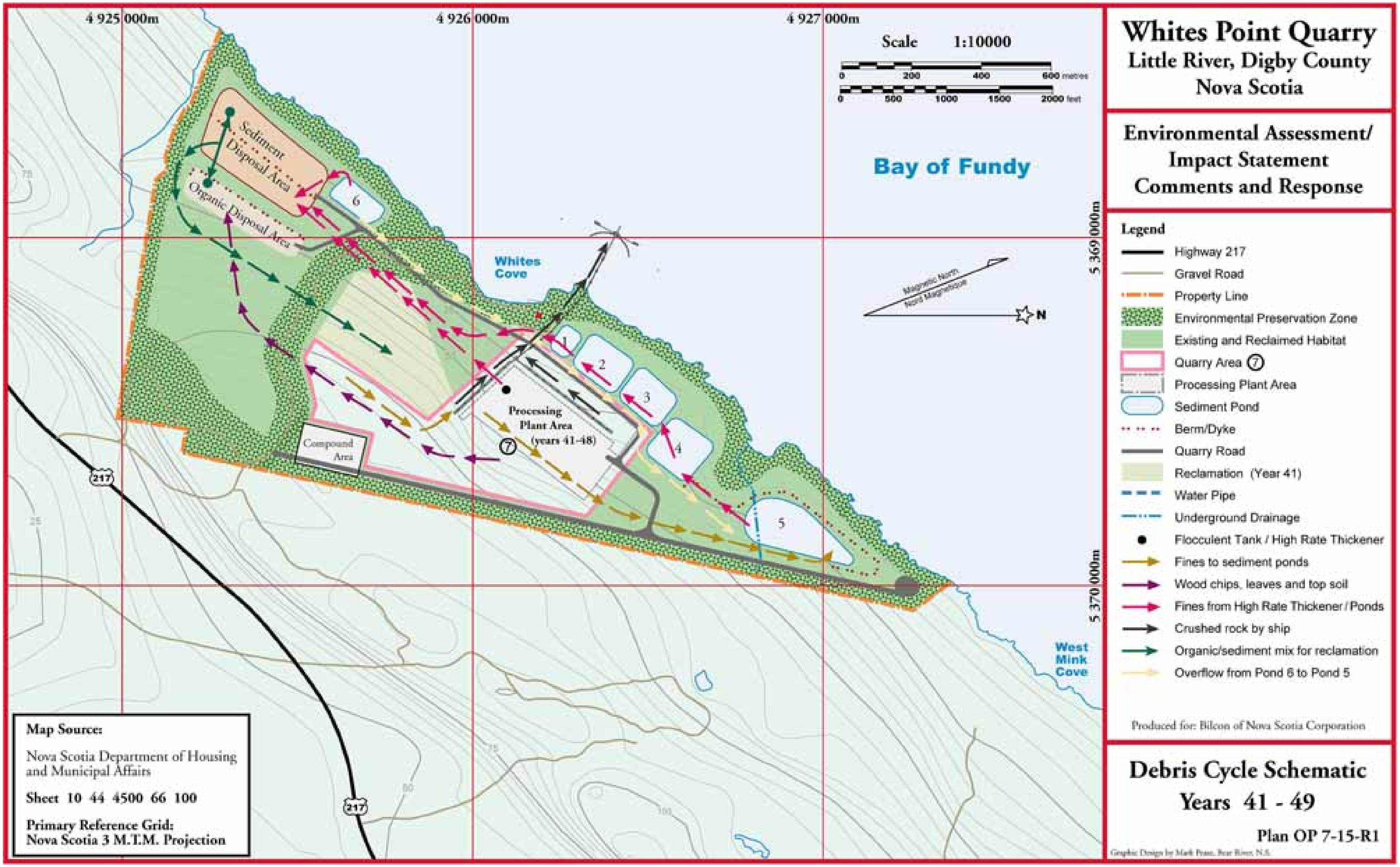
Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ② and ③
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 14)
Water Pipe
Underground Drainage
Flocculent Tank
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from high rate thickener
Crushed rock by ship
Organic/sediment mix for reclamation
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 11 - 15
Plan OP 3-11-R1
Scale 1:10000
Bay of Fundy
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection



Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ④
Processing Plant Area
Existing Sediment Pond
New Sediment Pond (Year 16)
Berm/Dyke
Quarry Road
Reclamation (Year 17)
Water Pipe
Underground Drainage
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from High Rate Thickener / Ponds
Crushed rock by ship
Organic/sediment mix for reclamation
Overflow from Pond 6 to Pond 5
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 16 - 20
Plan OP 4-12-R1
Graphic Design by Mark Pease, Bear River, N.S.
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
1
2
3
4
5
6
④
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area ⑤
Processing Plant Area
Existing Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 17)
Water Pipe
Underground Drainage
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from High Rate Thickener / Ponds
Crushed rock by ship
Organic/sediment mix for reclamation
Overflow from Pond 6 to Pond 5
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 21 - 30
Plan OP 5-13-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
Bay of Fundy
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Compound Area
Processing Plant Area
Magnetic North
Nord Magnétique
N
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area 6
Processing Plant Area
Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 31)
Water Pipe
Underground Drainage
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from High Rate Thickener / Ponds
Crushed rock by ship
Organic/sediment mix for reclamation
Overflow from Pond 6 to Pond 5
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 31 - 40
Plan OP 6-14-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Bay of Fundy
Magnetic North
Nord Magnetique
N
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Processing Plant Area
Compound Area
Sediment Disposal Area
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Highway 217
Gravel Road
Property Line
Environmental Preservation Zone
Existing and Reclaimed Habitat
Quarry Area 7
Processing Plant Area
Sediment Pond
Berm/Dyke
Quarry Road
Reclamation (Year 41)
Water Pipe
Underground Drainage
Flocculent Tank / High Rate Thickener
Fines to sediment ponds
Wood chips, leaves and top soil
Fines from High Rate Thickener / Ponds
Crushed rock by ship
Organic/sediment mix for reclamation
Overflow from Pond 6 to Pond 5
Produced for: Bilcon of Nova Scotia Corporation
Debris Cycle Schematic
Years 41 - 49
Plan OP 7-15-R1
Graphic Design by Mark Pease, Bear River, N.S.
Scale 1:10000
0 200 400 600 metres
0 500 1000 1500 2000 feet
Bay of Fundy
Magnetic North
Nord Magnétique
N
4 925 000m
4 926 000m
4 927 000m
5 369 000m
5 370 000m
Whites Cove
West Mink Cove
Sediment Disposal Area
Organic Disposal Area
Processing Plant Area (years 41-48)
7
Compound Area
1
2
3
4
5
6
217
Map Source:
Nova Scotia Department of Housing and Municipal Affairs
Sheet 10 44 4500 66 100
Primary Reference Grid:
Nova Scotia 3 M.T.M. Projection

Panel Comment

Plans OP-1 to OP-4 show the organic and sediment disposal areas for the first 20 years located on slopes that range possibly up to 25%. (Sediment retention structures are usually sited on level ground or in depressions.) Provide details on the berms, along with measures proposed to prevent down-slope movement of the sediments and berms by creep or flow. What mitigative and contingency plans are proposed in the case of berm failure during extreme precipitation events?

Response:

Berms

Reference to **Plans OP1-R1 to OP7-R1** shows a refinement of the organic and sediment disposal areas so that they are now placed on essentially level ground. These berms will require very specific designs for each location on the site. Please refer to Section 11 - Accidents and Malfunctions of Bilcon's responses to comments for more information.

Geotechnical specifications required for the design of a berm (approx. 4m high) would include the following:

- A complete geotechnical investigation of the existing soil (i.e. boreholes, test pits) would need to be carried out at each proposed general berm location, which would include items such as:
    - grain size analysis
    - consistency limits
    - water content
    - proctor testing for density
    - field testing for permeability
    - bedrock and groundwater elevations
    - shear strength analysis
    - consolidation potential
- base width and top width design considerations
- slope design and stability requirement
    - dependant on berm height requirements, material type, cover, etc.
    - analysis of sliding, sloughing or rotation failures
    - seepage analysis and drainage requirements, seepage filter

- material specifications:
    - consideration of type and quantity of native materials available on site
    - compaction requirements
    - permeability requirements for berms, seepage control
    - investigate the need for a synthetic liner, depending on available material on site
    - surface protection (i.e. rip-rap, vegetation)
- evaluation of potential for mass movements (i.e. landslides)
- settlement analysis

Panel Comment

The Proponent proposed de-watering methods to stabilize the sediment load on the sloping surface. It also proposes spraying water to suppress dust. Provide information how these apparently contradictory approaches would be compatible.

Response:

The sediment pumped from the high rate thickener will be distributed in layers in the sediment disposal areas. This material will drain naturally and within two to three weeks will be stable to the extent that it can be driven on. The surface of this material will dry quickly on hot, windy days and there will be a requirement for dust suppression by water spray.

7.7.2 Marine

Marine infrastructure will include the construction of mooring dolphins, a radial arm ship loader, conveyor supports, conveyors, and mooring buoys. A schematic plan and elevation are shown on **Figures 2 and 3.** A water lot lease of approximately 4 hectares is required for the marine construction and has been requested from the Nova Scotia Department of Natural Resources. Also, a registration has been filed with Transport Canada as required under the Navigable Waters Protection Act for the marine works. No blasting, dredging, or fill placement is anticipated in the marine environment.

Mooring Dolphins

Three rectangular, concrete capped mooring dolphins, approximately six metres wide by fifteen metres long are proposed. The construction technique for the pile supported dolphins will use conventional marine methods from a conventional floating or jack-up barges. The dolphins and piles will be designed to resist horizontal loads due to the berthing of vessels and environmental loads (wind, waves, etc.).

Temporary pile templates will be anchored to the bottom to support the steel pipe piles and dolphin caps. The proposed thirty-six inch diameter pipe piles would then be installed using conventional methods such as pile driving hammers and churn drills. Once seated into the bedrock, the inside of the pile would be churn drilled and cleaned out using a suction lift pressure jet or pump. Any contaminants would be stored for land disposal. After flushing the pile, an approximate four inch diameter core would be drilled into the bedrock for the pile anchor and grouted. The interior of the pile would then be filled with concrete using the tremie method. It should be noted that the majority of the work is inside the pile thereby reducing direct contact with the marine environment. Formwork for the concrete caps would then be installed, supported by the temporary pile template. Spill containment would be installed as part of the formwork and the caps would be poured. Also, depending on the final details, silt curtains and acoustic blankets may be required. For further details on marine noise and sediments refer to **paragraphs 9.1.7.1 and 9.2.1.5.**

Radial Arm Shiploader

Steel fabrication for the shiploader would be done off-site and delivered to the site by barge. Steel pipe piles would be anchored into the bedrock with concrete caps, similar to the dolphin construction, for the shiploader bridge support. The shiploader bridge would contain the mechanical components such as the electrical room, shuttling winch and shiploader drive. The main components of the shiploader are the quadrant shiploader boom with operators cab, the quadrant shiploader shuttle, and the quadrant shiploader suspended conveyor. Both the shuttle and boom are equipped with drip trays. Installation of the shiploader components is proposed to be done from a floating platform.

Lighting on the shiploader will be shielded to direct light downward on the conveyor during night loading. Navigational lighting will be provided as required by Transport Canada.

Shiploader at Sydney Steel

Conveyors

The loadout conveyor extending from onshore to the shiploader conveyor will be supported using the same technique of pipe piles with concrete caps. The conveyor trusses allow a 35 metres span between support structures thereby reducing the number of supports in the intertidal zone and nearshore waters. Installation of the pipe piles in the intertidal zone would be done at low tide from land. Depending upon final design, smaller diameter pipe piles may be appropriate for the conveyor supports. The loadout conveyor would be equipped with spill containment.

Mooring Buoys

Standard mooring buoys for the previously described panamax size vessel will be installed for bow and stern lines.

7.8 Operation and Maintenance Phase

Operation

The operational life of the quarry and marine terminal is expected to be 50 years based on the available basalt rock reserves on the site. Yearly production is estimated to be 2 million tons with weekly shipments of 40,000 tons. Concept quarry plans – **Plans OP1 – R1 through OP7 – R1** show the quarry operation in 5 and 10 year increments over the 50 year life of the project.

Quarrying and ship loading will be carried out for 44 weeks during the year with an 8 week maintenance period during the winter months. Proposed operating hours of the quarry will be from 0600 to 2200 hours. The workforce will consist of two shifts – twenty workers on the first shift and fourteen on the second for a total of 34 during normal production operations. Skill requirements for the workforce will include a plant manager and office clerk, quality control and environmental control technicians, plant operator, quarry face loader operator, quarry rock truck drivers, mobile equipment mechanic, electrician, fuel person, water truck driver, equipment operators, welders, rock driller and helper and labourers.

Administration and Maintenance

The quarry compound area will function as an operations headquarters with office space for administration and technical support staff (manager, office clerk, quality control and environmental technicians). The office will also house the electronic control centre. A maintenance shop will provide space for mobile equipment servicing and repairs as well as interior storage space for oils, greases, and coolants. This interior space will have spill control containment. A double walled fuel storage tank with an alarm system and surrounding spill containment will be located in the compound area. The fuel storage tank will be constructed according to the latest ULC – S601 or UL – 142 standards with ISO 9001 Quality Controls. This area will have security fencing and will be gated at its access point. Services such as parking, electrical control, domestic water supply, and an on-site sewage disposal system will also be located in the compound area – see **Figure 4 – R1.**

Stationary Equipment

The operation of the quarry will require stationary equipment to process and load the projected 2 million tons of aggregate products per year. A radial arm ship loader, jaw crusher with feeder and 150 ton rock box, rock crushers, screens, load-out tunnel, conveyors, sand processing equipment, waterlines and pumps, water clarification tank, dewatering screens for sand products. The primary energy for the stationary equipment will be electricity.

Mobile Equipment

The operation of the quarry will require mobile equipment for loading, transporting, servicing and environmental controls. The primary mobile equipment includes a face loader, off-road rock trucks, bulldozer, excavators and wheeled loaders, water trucks, crane, miscellaneous service trucks, work boat, barge and a drill rig. A mobile emergency generator will also be included. The primary energy for the mobile equipment will be diesel fuel.

Blasting

Blasting is planned every two weeks during production. The size and configuration of the blast holes and weight of explosives will vary depending upon production requirements, time of year, proximity to the Bay of Fundy and required set-backs from fish habitat, and proximity to adjacent residences. Blast geometry will also vary depending upon production and site location. All blast design will be done by certified blasters licensed in Nova Scotia. Pre-blast surveys will be conducted in accordance with the requirements set forth by the Nova Scotia Department of Environment and Labour. Blasting will not be conducted during periods of atmospheric inversion. Storage of explosives is not planned on the quarry site. For further details on blasting, refer to "Bilcon of Nova Scotia Corporation – Blasting Protocol" – see **Appendix 9**.

Process Description

Loading and transportation of the quarried rock will take place within the quarry site. Quarried rock will be loaded and transported to the physical plant area – see **Plan IR – 7 and Figure IR - 7**, in off-road trucks. The rock will be deposited into the dump hopper of the primary crusher at the north end of the process plant. A vibratory grizzly feeder then moves the rock at a controlled rate into the jaw of the primary crusher. This crusher will reduce the size of the rock and is housed, along with appurtenances, in an enclosure to provide sound and dust emission control. The crushed material will then travel by belt conveyor to the primary scalping screen for size separation. The material is then conveyed to surge piles according to size.

The larger rock (9"x3") that was segregated to the primary surge pile is automatically reclaimed through an "under pile" tunnel conveying system that meters the rock into a coarse material cone crusher. This crushed rock is deposited onto a belt conveyor and delivered to a double deck sizing screen. This screen will send oversized rock back to a secondary surge pile and any minus 1" product will be conveyed to a tertiary surge pile.

The plus 1" size material that was returned to the secondary surge pile is metered onto a belt conveyor within an "under pile" tunnel to be sent to a second crusher with a medium fineness crushing cavity and is then returned to the double deck sizing screen previously mentioned. It should be noted that the crushers and screens are enclosed in structures similar to the primary crusher. As the material size is reduced through this crushing/screening circuit, the 1"x 0" crushed rock is sent to a final tertiary surge pile to be metered into the product screening system

The product in the tertiary surge pile is then conveyed within an "under pile" tunnel/conveying system to a triple deck product screening station. This final screening will rinse the stone products as they are being screen-separated to size. The spray wash will remove dust and minus ¼" stone fractions and the slurry will be pumped to a classification and de-watering system. Concrete sand will be separated and the remaining water pumped to a flocculent tank. Here, the particulated solids will drop out of the water. The clarified water will then be recycled to the rinse screen process and the particulates (sediments) pumped to the dyked sediment disposal area. All site water is recycled and reused, all crushed products are utilized as product or during site reclamation, and noise and dust from the processing is controlled as close to the source as possible.

Ship Loading

The finished aggregate storage piles will have a reclaim tunnel below the piles with a conveyor system to carry aggregates to a second conveyor that will transport and discharge materials onto a movable ship loading stacking conveyor. Material conveyed over the shoreline and waters of the Bay of Fundy by the belt conveyor will be within long-span gallery trusses. These trusses will have a solid plate steel floor. As well as reducing the number of supports within the Bay, the solid steel gallery floor will provide personnel and equipment access to the conveyor for maintenance or repairs. All conveyors will be equipped with emergency stop switches, misalignment switches, and motion switches located on non-powered pulleys.

As mentioned previously, all conveyor systems are electrically powered. There are no oil or lubricant reservoirs required that could introduce petroleum products into the water below. A small amount of lubricant is required within the cast iron gear reducers, no more than several quarts per drive. The reducers are fitted with a drip pan to catch any minute amounts of lubricant. Inspection of seals in the reducers will be performed as part of routine maintenance procedures and replaced during down time as required.

Finally, the radial arm ship loader will then load the materials into the various holds of the bulk carrier. Use of a radial arm shiploader increases loading efficiency since the vessel will not have to move after mooring as would be the case with a stationary shiploader. This will allow the ship to be loaded in less than 10 hours under normal conditions. The frequency of ship loading is expected to be on a weekly basis.

Water Management

Washing of aggregate products is planned as an integral part of production. Wash water systems will be arranged in closed circuit. Surface water runoff will be collected and stored in sediment retention ponds. No deep wells are proposed for wash water supply. Make-up water for aggregate washing will be pumped from the sediment ponds to a flocculent tank, to remove particles, before being pumped to the production area. This water will then be collected, directed and recycled back to the high rate thickener tank.

For a detailed water budget for this process – see Strajt, David. MGI Limited. "Preliminary Results of Hydrologic Budget Analysis, Whites Point Quarry, Digby Neck, Nova Scotia" October 2005. **EIS Ref. Volume V, Tab 30 and Appendix 1**of the Revised Project Description**.**

The water budget was prepared for the projected fifty year life of the Whites Point quarry project and is based on the concept quarry plans **OP1 – R1 through OP7 – R1.** Available surface water supply for aggregate washing from the watershed north of the Whites Cove Road was calculated on a monthly basis. The water budget model maintained and operated by the Hydrometeorology Division of the AES, Environment Canada was used. This model is based on the Thornthwaite and Mather Water Balance Procedure. As a result and assuming a five per cent loss from the washing process, a net available water supply exists except for the months of August and September from years 5 through 40. The deficit during these two months is minimal and ranges from 8,000m^3 to 12,000m^3.

Water Budget

Following are the projected water budgets for plant processing, dust control etc. during construction and operational phases of the project. All quantities are expressed in litres and represent usage per month for the particular application.

Construction – December through March

Site - roads	380,000
Portable Crushing Plant	95,000
Shot Rock	98,400
	573,400

Construction – April through November

Site – roads	5,700,000
Portable Crushing Plant	285,000
Shot Rock	760,000
	6,745,000

Operation – December through March

Site – roads	3,800,000
Shot Rock	950,000
Crushing Plant	950,000
	5,700,000

Operation – April through November

Site – roads	11,400,000
Shot Rock	3,800,000
Crushing Plant and Conveyors	1,900,000
Sediment Disposal Area	114,000
Plant Process	24,000,000
	41,214,000

During operation in drought conditions, storage requirements in the sediment ponds rise to 226,000 m^3, which translates to an average storage depth of 2.35 metres per pond. Design storage depth for the sediment ponds with a maximum sediment load of 1 metre is 2.5 metres with a 0.5 metre freeboard. For further details on water budgets please see **Appendix 1** of the revised Project Description.

Waste Management

Incremental clearing and grubbing for quarry expansion will produce organic materials which will be stockpiled on-site. Also, sediment materials from the high rate thickener tank will be stockpiled on-site. These material disposal areas will be contained with dykes to control potential runoff. These materials (organics and sediments), will be mixed and recycled during the reclamation process. The location of these disposal areas are shown on the Quarry Concept Plans – **OP1 – R1 through OP7 – R1.** Sewage waste will be handled by an on-site disposal system, while solid waste will be collected by a private contractor and disposed of in an approved landfill. As mentioned previously, waste oil will be collected, stored, and disposed of by a licensed waste oil handler.

Ammonia from blasting with ammonium nitrate-fuel oil explosives is normally completely consumed during the blast event. Any residue, in the form of nitrates, will be directed by surface water runoff from the blast area to the sediment retention ponds. This will prevent any nitrates from directly entering the Bay of Fundy. Acid-generating rock does not exist on the site. For chemical analysis of the basalt rock – see **paragraph 9.1.2.1** and EIS **Appendix 4.**

Site Lighting

Permanent and mobile lighting will be required during operations at various locations including the processing plant, compound area, working face, ship loader and at the mooring facilities. The quantity and quality of illumination at the quarry is intended to be sufficient for the type of work being performed. Where it is reasonably practicable and considering the nature of the work, lighting required will conform to ANSI/IES – RP – 7 – 1991, "American National Standard Practice for Industrial Lighting" (*Occupational Health and safety Act* 2004). Navigational lighting requirements will be determined through coordination with the Navigable Waters Protection Program of Transport Canada.

Marine lighting will be as required for navigational purposes and safety by Transport Canada. Detailed lighting plans for the marine area will be developed during the detailed engineering and design phase of this component of project development.

On-land lighting plans will be developed considering the criteria proposed by the International Dark-Sky Association (IDA). Design criteria would include:

a. keeping artificial lighting to a minimum
b. reduction of "light trespass" on to neighbouring properties
c. selection of luminaries (lighting fixtures) that reduce glare
d. selection of luminaries that are designed to not pollute the night sky

Regarding night sky "glow", light fixtures bearing a seal of approval by the IDA would be given preference.

In general terms, on-land lighting will be metal halide type grouped to provide the levels recommended by the Illuminating Engineering Society of North America (IESNA). Fixtures will use a combination of lamps rated between 500 and 1500 watts. Each fixture will be provided with shields to prevent light spill beyond the area of illumination and to contain all lighting effects within the property line of the quarry. Fixtures will be selected with high-quality light reflectors and enclosures to provide the maximum degree of light control and light efficiency. Installation of fixtures will prevent lighting effects above the horizon. Using the above planning and design considerations, night sky light pollution will be practically eliminated. Since there will be minimal need for night lighting and minimal sources for reflected light at night, night sky glow will be minimal. More details on site lighting effects are presented in **paragraph 9.1.12** of the EIS.

Dangerous Goods

As mentioned previously, explosives will not be stored on-site. Explosives will be trucked to the quarry site on an as needed basis approximately once every two weeks during production blasting. Supply and trucking of explosives will be contracted to a licensed explosives provider. All explosives handling will be done by certified persons.

Diesel fuel will be stored on-site in a bulk tank. Delivery by tanker truck will be approximately once every two weeks during production. The double walled storage tank will be located within a security fenced area and within a spill containment area. Distribution of fuel from the bulk tank to the mobile equipment will be done with an approved fuel truck. All fuel transfers will use dry-break quick disconnect couplings.

Land Transportation

Quarried products will be transported by ship thereby eliminating heavy truck traffic on rural roads and through rural residential areas. Truck traffic from Highway 101, to Highway 217, to the quarry site will increase during the one year construction phase. Delivery of materials and equipment, and the construction workforce will increase traffic during the construction phase. Load size and weights will vary and adhere to restrictions by the Nova Scotia Department of Transportation and Public Works. For further details on land transportation refer to **paragraph 9.3.8**.

Land Transportation – Construction

Land transportation of equipment, materials and workforce is proposed for construction of land and intertidal facilities. Facilities for unloading equipment and materials would be located within the quarry site at the compound area and at the plant area. The estimated increase in truck traffic to deliver mobile and plant equipment and construction materials over the 18 month construction period, including a 20% contingency, is approximately 10 – 12 trucks per week.

Bilcon proposes the following mitigation measures to reduce heavy truck traffic on Highway #217 during the construction period. Heavy excavation equipment required for the operation of the quarry will be acquired for use before the construction period thereby reducing general contractors from having to float their own equipment from off-site to the site. Bilcon also intends to utilize site acquired/produced base materials and general construction aggregates in order to reduce the requirement for off-site resources. Further, Bilcon intends to establish an on-site concrete batch plant to reduce the number of heavy concrete trucks traveling along Highway 217. These mitigation measures are estimated to reduce truck traffic on Highway 217 by approximately 350 trucks during the 18-month construction period.

Quantification of various trucking requirements for the types of equipment and materials required, is broken down in response to the Panel's specific comment on **paragraph 9.3.8** of the EIS.

Marine Transportation

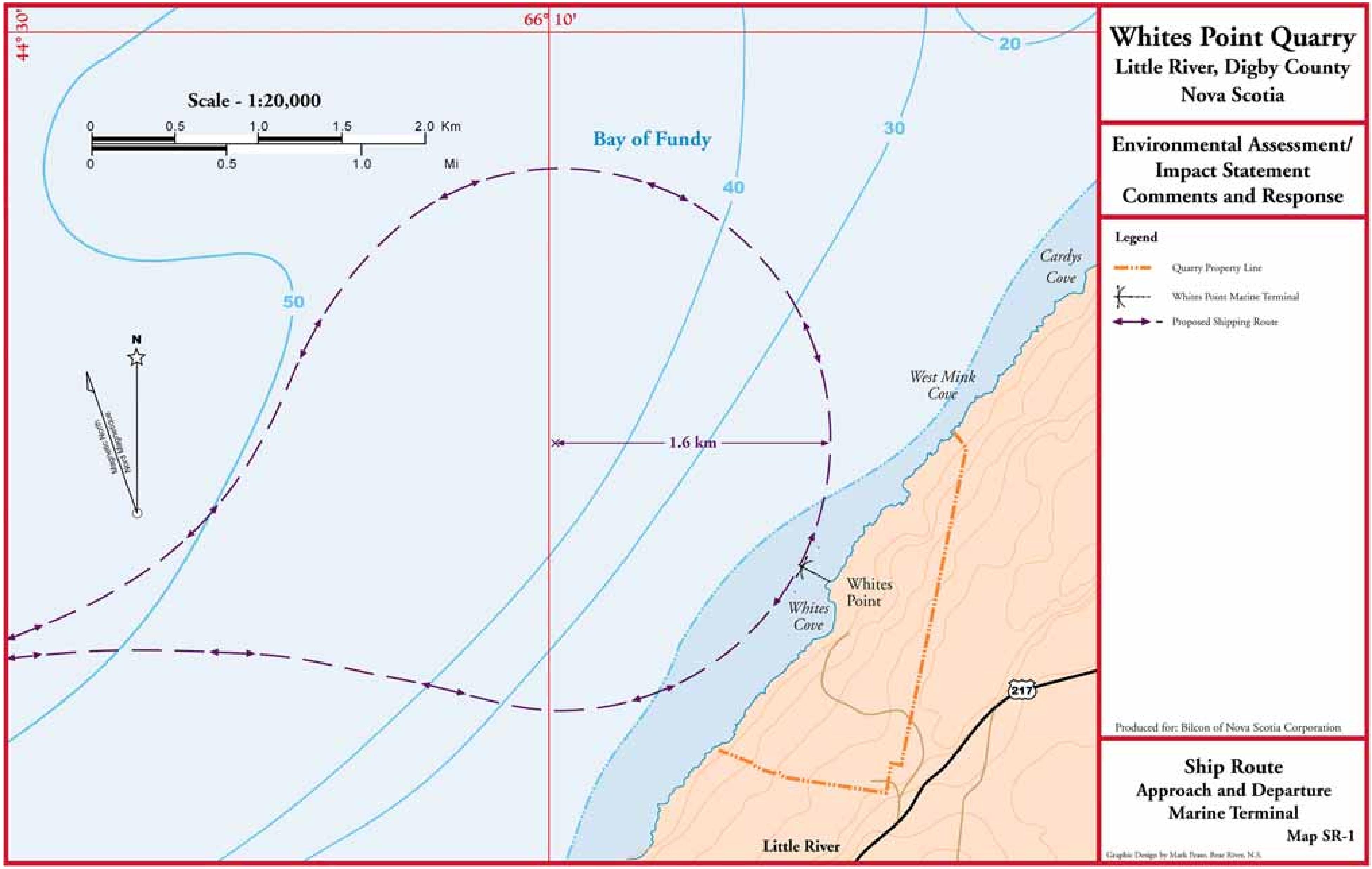
The Whites Point Marine Terminal will be designed to accommodate "Panamax" bulk carriers. The overall length of this type of vessel is approximately 225 metres, a molded breadth of approximately 32 metres, and a molded depth of approximately 19.5 metres. Dead weight is approximately 70,018 tons with a gross tonnage of 41,428. The proposed route of the vessel from the inbound shipping lane to the marine terminal and from the marine terminal to the outbound shipping lane is shown on **Map 4.**

Ship Route Approach and Departure at Marine Terminal

The proposed route of the ship when approaching and departing the marine terminal is shown on **Map SR – 1.** An approximate 1.6 km radius will be required to accommodate the bulk carries at the terminal. This radius will provide the option to approach the terminal from either direction, depending on the tide.

The frequency of call at the marine terminal will be on an average of once per week for a duration of an approximate 10 hour loading time. If severe weather is forecast, the ship's captain will determine an appropriate course of action.

Aggregates and sand products are the primary materials to be loaded from the Whites Point Marine Terminal. No off-loading of any materials is anticipated at this time nor will the marine terminal be used for any other purposes except for the Whites Point quarry. If an instance of severe weather develops in the Bay of Fundy, the Whites Point marine terminal could offer refuge for fishing boats or ships in the immediate area. Ship loading will be by conveyor with spill containment. For further details on marine transportation refer to **paragraph 9.3.8.**


Whites Point Quarry
Little River, Digby County
Nova Scotia
Environmental Assessment/
Impact Statement
Comments and Response
Legend
Quarry Property Line
Whites Point Marine Terminal
Proposed Shipping Route
Produced for: Bilcon of Nova Scotia Corporation
Ship Route
Approach and Departure
Marine Terminal
Map SR-1
Graphic Design by Mark Pease, Bear River, N.S.
44° 30'
66° 10'
Scale - 1:20,000
0
0.5
1.0
1.5
2.0 Km
0
0.5
1.0
Mi
N
Magnetic North
Nord Magnétique
Bay of Fundy
20
30
40
50
1.6 km
Cardys
Cove
West Mink
Cove
Whites
Point
Whites
Cove
Little River
217

Communications Plan

Bilcon recognizes that traditional users of nearshore waters and adjacent properties should be kept informed of the proposed new industrial use of the Whites Point site on a continuing basis. In this regard, blasting and shipping activities at the Whites Point Quarry and Marine Terminal will be made available to the public. People interested in the scheduling of these activities will be able to obtain the latest information by two means. Bilcon proposes to establish a toll free telephone service and to post information on their web page. Information would be updated daily and provide a schedule of activities.

Marine Transportation – Construction

Marine transportation of equipment, materials and workforce is proposed for construction of those facilities beyond the shoreline. No marine facilities for unloading equipment and materials during construction are proposed at the quarry site. Marine deliveries and services including components of the ship loader conveyor, stacker, trusses, pilings, electric motors, and concrete would be by barge. Approximately 15 barge loads are anticipated for delivery of items related to the construction of marine facilities. The delivery and construction barges will be anchored off shore adjacent to the site area of the proposed marine terminal. All construction beyond the shoreline will be conducted from barge platforms.

Ballast and Bilge Water

Management responsibility of ballast and bilge water lies with the shipping company to operate with reference to Transport Canada's regulations (Ballast Water Control and Management Regulations Section 657.1 *Canada Shipping Act* June 2006). For further details on ballast water management refer to **paragraph 9.2.14.**

Environmental Controls

Noise resulting from operation of the quarry and marine terminal will be controlled by attenuation (the distance between the source and receptor), vertical separation, environmental preservation zones, and design of stationary and mobile equipment. Noise from quarry operations, including blasting, will meet the guidelines set forth in Appendix D of the Nova Scotia Department of Environment and Labour's Pit and Quarry Guidelines. For further details on noise control refer to **paragraphs 9.1.9, 9.1.10, 9.1.11 and 9.2.15.**

Dust will be controlled whenever possible at the source. Examples of dust control measures include enclosed crushing and screening equipment, water sprays during aggregate screening and water sprays for dust control on roads. Dust control will meet the requirements of the Nova Scotia Department of Environment and Labour's guidelines for particulate emissions. For further details on dust control refer to **paragraph 9.1.8.**

The quarry operation is not visible from Highway #217 due to the vertical change in topography, horizontal separation and forested slopes. The Whites Cove Road, a public road, is practically inaccessible except by four-wheel drive vehicles, all terrain vehicles, or by foot. This road will have security fencing along both sides and an environmental preservation zone to buffer views of the quarry. Also, views from the coastline and Bay of Fundy will be buffered with an environmental preservation zone and/or berms planted with evergreen trees. For further details on aesthetic controls refer to **paragraph 9.3.6.**

Once the plant begins processing, water from the sediment ponds will be drawn to the high rate thickener tank where sediments will be removed. Periodically, sediments accumulated in the tank will be pumped to the sediment disposal area. The sediment disposal area encompasses an area of approximately 8 hectares while the organic disposal area encompasses approximately 3.2 hectares. Organic and sediment materials will periodically be reused as site reclamation materials.

Maintenance Activities

Quarry infrastructure is designed for the 50 year life of the project. Expansion of the production area is not anticipated at this time. However, if infrastructure or environmental technologies evolve, adaptive management procedures may be implemented. All repairs and maintenance activities would adhere to environmental regulations in place at that time. Since the marine terminal is to be constructed on bedrock and limited bottom sediments exist in the intertidal and nearshore area, no dredging or disposal of dredge materials is anticipated.

7.9 Modifications

Modifications to the basic quarry infrastructure or operating procedures are not anticipated in the near future. However, the life of the project is projected to be 50 years. Technological and scientific advancements are likely to occur during this time frame and may warrant changes and modifications. In this regard, an adaptive management process is recommended to ensure industry and regulatory authorities are involved in developing feasible and economically viable project modifications.

7.10 Decommissioning and Reclamation Phase

Decommissioning

The Decommissioning Phase will commence in year 50 of the Project life and will entail the removal of all processing equipment, conveyors and ship loaders. It is envisaged that some of the site infrastructure will remain in place (e.g., access road, electrical services) for future use. Portions of the marine infrastructure will also remain in place (conveyor support system, gallery trusses, mooring dolphins, buoys, navigational lighting).

All hazardous materials and storage tanks will be removed from the site and disposed of in compliance with regulatory requirements. The demolition of buildings and infrastructure will be conducted in a fashion that promotes the maximum recovery and recycling of materials and will apply provincial and municipal regulations and guidelines on waste management and separation.

The removal of storage materials and the demolition of the buildings, processing equipment and removal of infrastructure will be subject to environmental supervision and inspection for compliance with the decommissioning plan and regulatory standards.

To ensure public safety, the entire Project site will remain fenced to prevent public access. Should the after use concept involve public access, this and associated safety issues will be addressed during the development of the final decommissioning and reclamation plan.

Details of the site decommissioning and the associated site reclamation will be determined at the end of the Project life and described in a Decommissioning Plan. This plan will specify decommissioning objectives, approach, activities, and schedules and will be developed in consultation with the Provincial and municipal government, community and stakeholder groups.

In particular, objectives of the decommissioning plan will be to:

- Identify applicable municipal, provincial, and federal regulations and standards;
- Identify and consider objectives of local municipality and adjacent landowners;
- Define the decommissioning objective;
- Protect public health and safety;
- Specify the decommissioning works and activities in accordance with regulatory standards;
- Ensure the identification of site contamination and, if applicable, implementation of remediation works;
- Reduce or eliminate potential adverse environmental effects beyond decommissioning;
- Develop a material management strategy to maximize reuse/recycling options on and off-site or via a material processing facility, and to avoid/minimize disposal in approved landfills.

The decommissioning work will be conducted in full compliance with all the federal, provincial and municipal regulations and guidelines that apply at the time of the decommissioning. In order to support the site reclamation with respect to such aspects as habitat creation, re-vegetation and access, the decommissioning plan will be closely co-ordinated with the reclamation plan.

Following the removal of buildings, infrastructure and materials a qualified environmental expert will assess the quarry site with respect to contamination that may have occurred as a result of the production or decommissioning activities. Should any site contamination be identified, site remediation will be undertaken in order to meet all NSDEL standards for the intended after use. The site remediation, if required, will be supervised and documented by a qualified environmental expert.

Reclamation

The general objectives of the reclamation plan are to provide for immediate erosion control, watershed stabilization, and the re-establishment of wildlife habitat and aesthetics. Through preservation of existing, incremental re-creation of habitat, and establishment of new habitat types, it is expected that, upon completion of the reclamation, the overall ecological diversity of the site will exceed the current site conditions.

At this point, the reclamation plan establishes general principals such as the reclamation zones (e.g., preservation zone, environmental control zone, forest buffer) scheduling of the work, soil management, re-vegetation concept, and forest management on adjacent Bilcon lands. It is envisaged that the reclamation plan will be refined over time and with input from the local community, adjacent landowners, First Nations and local interest groups. In particular, Bilcon will solicit input on such issues as public access, habitat types, and approaches to habitat management. Further, Bilcon will obtain public input on the decommissioning and after use of the site. This could entail developments for recreational use or a strictly conservation oriented land use. If conservation becomes the primary objective, the reclamation plan will be detailed as to which habitat and plant communities should be promoted on the site.

Reclamation of the Whites Point Quarry lands is proposed to proceed incrementally over the 50 year life of the project. Approximately 2.4 hectares of quarry will be opened each year. Burning of brush is not planned during operation. All wood fibre will be chipped and composted in the organic disposal area along with other cleared and grubbed materials. The Concept Quarry Plans – **Plan OP1 – R1 through OP8 – R1**, identifies land uses in five and ten year increments. Reclamation would include site grading and drainage, soil preparation and planting. The priority area for reclamation would be lands along the coastline north of the Whites Cove Road and landward from the environmental preservation zone and environmental control/constructed wetland area. Reclamation of this coastal area first will increase the buffer area between the quarry and the marine environment providing more effective erosion control, noise attenuation, enhanced aesthetics, and wildlife habitat. This area would be fully reclaimed after approximately ten years.

As quarrying is completed inland from the coast, additional lands will be reclaimed on an incremental basis – see **Plans OP1 – R1 through OP8 – R1.**

The premise of the environmental reclamation program for the quarry is to maintain and increase a more ecologically diverse and productive quarry site, during and after completion of resource extraction. During project operation, maintaining sensitive habitats and creating habitat diversity is a primary objective. This is accomplished by maintaining an environmental preservation zone, especially along the sensitive coastline, and the creation of constructed wetlands, incremental planting to create various successional stages of vegetation for food and cover for wildlife, and the establishment of a more productive soil regime and forest.

The reclamation process begins after the environmental controls (sediment retention ponds, drainage channels, etc.) are in place. Merchantable timber will be harvested and residual woody plant material will then be chipped and stockpiled for composting. The remaining organic material and overburden will then be cleared and stockpiled in a dyked disposal area for future land reclamation use. Also, sediment retention ponds would be periodically cleaned out, sediments de-watered in a dyked disposal area along with processing sediments from the high rate thickener tank for reclamation use. Upon completion of quarrying in a given area, land reclamation would begin.

The area identified for reclamation would be rough graded and contoured for surface drainage. Stockpiled organics and sediments would be mixed and spread on the area to be reclaimed. Soil analysis indicates the existing soils require amendments. The pH is low and requires approximately 15 tons of agricultural limestone per hectare. As well, nitrogen, phosphorus, potassium, and calcium are also low. Appropriate amounts of these nutrients will be added for healthy and productive plant growth. Thus, lime and fertilizer would be incorporated into the soil. An erosion control mix of native grasses would then be seeded. This mix would contain grasses and legumes for nitrogen fixation.

Areas with suitable soil depth would be reforested with softwoods such as red and white spruce or balsam fir. Softwoods for shelter belts and commercial reforestation blocks would be included. Native hardwoods such as white birch, white ash, or red maple would also be included to maintain species diversity. Also, since no herbicides are proposed, natural regeneration would be allowed to occur. The series of benches adjacent to the east and south property line would be seeded and reforested in areas near the faces. Areas at the foot of the faces would be left for natural regeneration. A schematic section of the quarry after year 50 is shown on **Figure 5 – R1.**

The current reclamation proposal aims at the re-establishment of woody vegetation in form of mixed forest and shrub communities over most of the site. As a result of this proposed re-vegetation and the environmental site development (preservation zones, incremental clearing and grubbing, and incremental re-vegetation), the capacity of greenhouse gas uptake and storage will be maintained and likely enhanced. As mentioned above, other reclamation approaches would also be possible and may include the establishment of a mosaic of grassland, and dry and wet herbaceous and shrub communities on large portions of the site. Their potential for carbon dioxide absorption and carbon sequestration would be less than that of forest communities.

However, these habitats could promote plant communities and associated reptile, invertebrate and bird populations that are generally on the decline in Canada.

Reclamation of the quarry site begins with the soil. Even though the carbon dioxide uptake (absorption) will be interrupted during the clearing, grubbing, and quarrying, the soil and wood fibre removed will be stockpiled along with its stored carbon for future use on the site. This stored (sequestered) carbon will be recycled rather than being wasted by burning the wood fibre and organic matter, thus not contributing to the carbon dioxide in the air. The depth of soil is especially critical for successful reclamation in the short and long term. Existing soils are thin and rocky with limited depth for nutrient storage and anchorage for trees. A one to three metre depth of soil, depending on the proposed area to be reclaimed and the type of reclamation, is proposed. This aspect of the reclamation process will provide the basis for a more productive forest and a sustainable forest resource (Burger et al 1998). The more productive the forest resource is, the greater the capacity for carbon dioxide absorption and carbon sequestration.

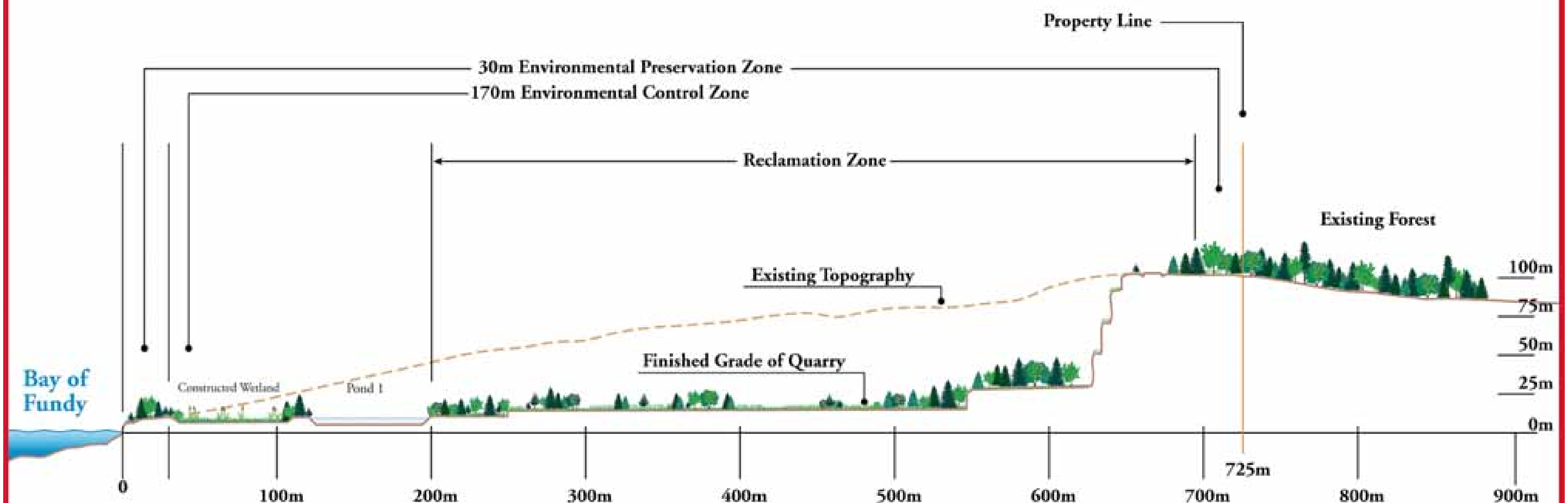
An ecological management of the existing older forest in the proposed 32 hectares of environmental preservation zone on the quarry site and management of the 130 hectares of Bilcon lands adjacent to the site is proposed. A Forest Management Plan (Berry, T. 2006) was recently prepared for adjacent lands and promotes ecological diversity, a healthy tree growth, and environmentally sensitive approaches to harvesting. By maintaining the forest resource in a healthy condition, approximately 5 tons of sequestered carbon per hectare and approximately 7.5 tons of carbon dioxide absorption per hectare per year (Wackemagel and Reese 1996) could be realized. Additionally, management techniques such as allowing trees to grow for longer periods between harvests, planting longer-lived tree species, and setting aside wider buffer zones around streams have all been shown to increase carbon storage in forests (Manion, M. 2004). These are some of the sustainable management practices proposed for the environmental preservation zone on the site and the buffer lands adjacent to the quarry site.

A young actively growing forest has the ability to take in larger amounts of carbon dioxide than the older forests (NRCan 2003). The re-vegetation proposed for the quarry site as part of the reclamation will create younger forests and maintain early to late successional stages over the 50 year life and decommissioning phase of the project. A fast-growing forest can absorb up to 25 tons of carbon dioxide per hectare of trees (Simpson, J.R. 1998). This is dependent upon many variables including climatic conditions, soil nutrients, species, etc.

As stated above, the intent of the current re-vegetation concept is to maintain the local plant biodiversity by establishing mixed forest and shrub communities over most of the site. Only small portions of the site would be used for the establishment of other habitat types such as wetlands, open water, and grassland. In the Forest Management Plan, the reforestation and subsequent management is planned to encourage and re-establish Acadian Forest species. This would be accomplished by leaving seed source trees standing for natural regeneration, seeding, and planting. A mix of softwoods and hardwoods are recommended for shorter term and longer term life spans. Depending on site conditions, plant species such as those listed below would be used.

Typical Tree and Shrub Species Suggested for Re-vegetation/Reforestation

Red Spruce (*Picea rubens*)
White Spruce (*Picea glauca*)
Black Spruce (*Picea mariana*)
Balsam Fir (*Abies balsamea*)
Red Maple (*Acer rubrum*)
White Birch (*Betula papyrifera*)
White Ash (*Fraxinus americana*)
Lowbush Blueberry (*Vaccinium angustifolium*)
Bunchberry (*Cornus canadensis)*
Bush Honeysuckle (*Diervilla lonicera*)



Whites Point Quarry Reclamation
Schematic Section RS-1: Year 50

Scale 1:2500

Figure 5-R1

Produced for: Bilcon of Nova Scotia Corporation

Graphic Design by Mark Pease, Bear River, N.S.

Bibliography

Berry, Tom. "*Forest Management Plan*" prepared for Bilcon of Nova Scotia Corporation, 2006.

Burger, James A., D.L. Kelting, C. Zipper. "*Maximizing the Value of Forests on Reclaimed Mine Land*". Virginia Polytechnic Institute and State University. Publication Number 460 – 138, September 1998.

Conestoga Rovers and Associates, *Whites Point Quarry Hydrologic Budget - Drought Conditions Analysis*, August 21, 2006

Conestoga Rovers and Associates, *Whites Point Quarry - Water Budget Details Summary*, November 17, 2006

Dickie, 1987, "*Potential Crushed Stone Deposits on Tidewater in Nova Scotia*", Nova Scotia Department of Mines and Energy IFR 87-027

International Dark-Sky Association http://www.darksky.org/.

Manion, M. "*Forest Carbon Sequestration*". Catalyst. Volume 3 – Number 2. 2004.

Mineral Valuation & Capital, Inc., Proprietary Database

Natural Resources Canada. "*Branching Out from the Canadian Forest Service*". Laurentian Forestry Centre. Number 4 – 2003.

Registry of Regulations, "*Occupational Safety General Regulations*". Occupational Health and Safety Act as amended. January 23, 2004.

Regueiro, 2002, "*Aggregate Extraction in Europe*", Third European Conference on Mineral Planning.

Simpson, J.R. "*Urban Forest Impacts on Regional Cooling and Heating Energy Use: Sacramento County Case Study*". Journal of Arboriculture 24(4): 201-214, 1998.

State of New South Wales, Department of Primary Industries – Forests. "*Forests, Timber, and the Greenhouse Effect*". 2005.

U.S. Bureau of Census, Population Division; Manufacturing and Construction Division

U.S. Geological Survey, **Mineral Industry Surveys**

Wackemagel and Reese. "***Our Ecological Footprint***". 1996.

APPENDIX 1

WHITES POINT QUARRY EIS - WATER BUDGET DETAILS SUMMARY

CONESTOGA-ROVERS
& ASSOCIATES

31 Gloster Court
Dartmouth, Nova Scotia, Canada B3B 1X9
Telephone: 902.468.1248 Facsimile: 902.468.2207
www.CRAworld.com

November 17, 2006 Reference No. 821191D

Mr. Paul Buxton, P. Eng.
Bilcon of Nova Scotia
305 Highway #303, Suite #3
Digby, Nova Scotia
B0V 1A0

Dear Mr. Buxton:

Re: Whites Point Quarry EIS – Water Budget Details Summary

Conestoga-Rovers and Associates (CRA) has completed its additional assessment of water budget details related to the Whites Point Quarry project, in support of Bilcon of Nova Scotia's (Bilcon) Environmental Impact Statement (EIS) information summary. Below is a summary of the previous and additional water budget considerations analyzed in response to the Joint Review Panel (JRP) requests.

Background

The original water budget completed in October 2005 examined average climatic conditions over the 35 year period from 1963 – 1997. The analysis considered average monthly water supply and compared it process demands estimated by Bilcon. The analysis indicated that approximately 22,000 m^3 of storage would be required to satisfy the process demand under average conditions. The five sediment ponds proposed in the quarry plans would provide approximately 9.6 ha of pond area, which would equate to approximately 0.23 m of depth required in each pond for storage purposes.

A subsequent analysis considered storage requirements under drought conditions, by examining the driest year on record in the 35 year data set. The analysis showed that storage requirements needed to satisfy process demand under these conditions rose to as much as 119,000 m^3, or an equivalent of approximately 1.25 m of storage depth required in each pond.

Construction and Operation Water Demands

A further refinement to the analyses considers additional construction and operation water demands, not accounted for earlier. These demands include site dust control provided by a water truck, water applied to the shot rock before crushing, water to be used for dust suppression at the crushing plant, and water to be used at the sediment disposal area. These additional demands range from approximately 5,800 m^3 per month from December through March to 17,000 m^3 per month from April through November during quarry operation. Tables

1 and 2 summarize the demand estimates provided by Bilcon for both construction and operation, respectively.

Construction Demand

Construction water demands were examined considering both average and drought conditions. Based on the Quarry Concept Plans provided by Bilcon, site conditions existing during the first 1-2 years of operation were used in the water budget model. During this period, only the first four of five sediment ponds proposed would be in operation (approximate pond surface area of 6.3 ha).

Figure 1 and Table 3 present the summary results for average climatic conditions, and Figure 2 and Table 4 show results for drought conditions. As indicated, construction demands would be satisfied each month for average conditions. Under drought conditions, as much as 28,000 m^3 of storage would be required to satisfy demand. This would require an average storage depth in each of the four ponds of approximately 0.44 m.

Operation Demand

The additional operational demands were examined for both average and drought conditions. Table 5 presents the results for average climatic conditions and Table 6 presents the results for drought conditions. Under average conditions, as much as 82,000 m^3 of storage would be required to satisfy demand during drier months. This equates to an average storage depth required in each of the five sediment ponds of approximately 0.9 m. During drought conditions, storage requirements rise to as much as 226,000 m^3, or an approximate average storage depth of 2.35 m per pond required.

Sediment Pond Sizing

Preliminary volumetric sizing requirements were investigated for the proposed sediment ponds identified in the quarry plans. The Nova Scotia Department of Environment and Labour (NSDEL) Sediment and Erosion Control Handbook gives a minimum sizing requirement of 190 m^3/ha of disturbed area. This number reflects sizing for temporary sediment ponds, but provides a lower limit estimate of size requirements. Typical urban stormwater pond sizing requirements fall around a maximum of 250 m^3/ha for water quality storage requirements (Ontario Ministry of the Environment Stormwater Management Planning and Design Manual, 2003). This is for urban settings however, and the sediment loadings from the quarry operations will be much higher. Typical pond sizing for mining applications falls in the range of 500 - 600 m^3/ha, of which approximately 140 m^3/ha should be reserved for sediment storage (Pennsylvania Department of Environmental Protection (PDEP), Engineering Manual for Mining Operations, 1999). Given the 143 ha catchment area draining to the sediment ponds (north of Whites Cove Rd.), this would suggest a total pond volume requirement of approximately 86,000 m^3, with a maximum sediment storage capacity of approximately 20,000 m^3. For the proposed pond area of 9.6 ha, this equates to an approximate pond depth of 0.9 m and sediment storage depth of 0.2 m for each pond.

Bilcon is proposing to construct each pond at a maximum depth of 4 m, consisting of a maximum of 1 m for sediment storage, 2.5 m for water storage and a 0.5 m freeboard allowance. This would provide a total pond volume of 336,000 m^3, with a sediment storage capacity of 96,000 m^3, not including the freeboard allowance. This equates to a sizing criteria of approximately 2,350 m^3/ha, with sediment storage allowance of 670 m^3/ha. Bilcon estimates a sediment loading rate of 10,300 m^3/year and proposes to schedule sediment pond cleaning every 9 years. At this rate, maximum average sediment depth in each pond would reach approximately 1.0 m, although sediment deposition will vary depending on final pond layout and configuration. Sediment removal may need to be more frequent in the first one or two ponds in series, and a sediment forebay could be incorporated into the first pond to trap larger particles and facilitate maintenance.

Given the information above, and the demand storage estimates, the preliminary pond sizing proposed by Bilcon should be sufficient to provide for adequate treatment, sediment storage and surface water supply purposes. Pond design and configuration details would need to be finalized during the industrial approvals stage to ensure proper pond function and treatment characteristics, including a particle settling analysis to ensure sufficient residence times.

Flood Capacity

In addition to storage considerations, a check of pond capacity for flood conditions was made. Typically in Nova Scotia, stormwater ponds are designed to handle the 100-yr storm event. Storm data was obtained from the Meteorological Service of Canada (MSC) in the form of rainfall intensity-duration frequency (IDF) information for the Yarmouth Airport climate station (MSC ID# 8206500), which is the closest station to the quarry site for which IDF data exists. The station is considered representative for storm conditions for the region in which the quarry will be located. The 25 year data record indicated that the 100-yr, 24-hr duration storm event would yield 124.6 mm of rainfall. As a first cut conservative estimate, we can assume no abstraction losses (i.e. saturated conditions), which gives a total runoff volume for the 143 ha north catchment area of approximately 178,200 m^3. This would require a depth of approximately 1.9 m for each of the 5 operating ponds for flood storage. During construction, with only 4 ponds in operation, a flood storage depth of approximately 2.85 m would be required to contain the flood volume.

Given the proposed pond design, sufficient capacity would exist to contain the 100-yr flood volume, assuming the ponds were or could be drawn down to sufficient levels to accommodate the flood flows. Note that the 100-yr flood is defined as having a magnitude that would be exceeded once, on the average, every 100 years. However, the risk that at least one 100-yr flood would occur over a 100 year time period is approximately 63%. Over a 50 year time period the risk is approximately 40%, and over a 5 year time period approximately 5%.

South Drainage Catchment

The majority of the quarry operations will take place to the north of Whites Cove Rd. and the water budget analyses have been focused on this area. It was assumed that drainage from the catchment to the south would not drain across the road and provide input to the sediment ponds. Quarrying is proposed in the south catchment after year 15. A 1 ha sediment pond has been proposed to handle runoff from the catchment area, however the pond is not intended to be used for normal water supply purposes.

The contributing drainage area of the south catchment has been estimated at 36 ha, based on the 1:10,000 topographic mapping. For a proposed 3.5 m deep 1 ha pond, total storage volume would be 35,000 m^3 with a sediment storage allowance of 10,000 m^3. This translates to a pond sizing of 970 m^3/ha with sediment storage of 275 m^3/ha. This should be sufficient, based on the PDEP guidance. However, flood volume generated from the 100-yr storm would be a maximum of approximately 45,000 m^3, requiring a storage depth of 4.5 m. Thus additional capacity would be required to contain the 100-yr storm. Assuming worst case conditions of the pond full with sediment (to 1 m depth), leaves 2.5 m for flood storage or 25,000 m^3. If the remaining 20,000 m^3 was diverted to the ponds to the north, an additional storage depth of 0.21 m would be required in the 5 north ponds, raising total flood storage requirements in those ponds to approximately 2.1 m. This is still within the minimum 2.5 m of depth available in each of these ponds, without consideration of the 0.5 m freeboard allowance.

The water budget analysis was applied to the south catchment area for both average and drought conditions, to determine additional supply quantities available if required (i.e. backup). Summary results are presented in Tables 7 and 8 for average and drought conditions, respectively. As indicated in the tables, additional monthly supply of approximately 4,000 m^3 to 40,000 m^3 is available on average, and from 0 to 25,000 m^3 per month is available under drought conditions.

We trust that this meets your requirements at this time. Please do not hesitate to contact the undersigned should you have any questions or require additional information.

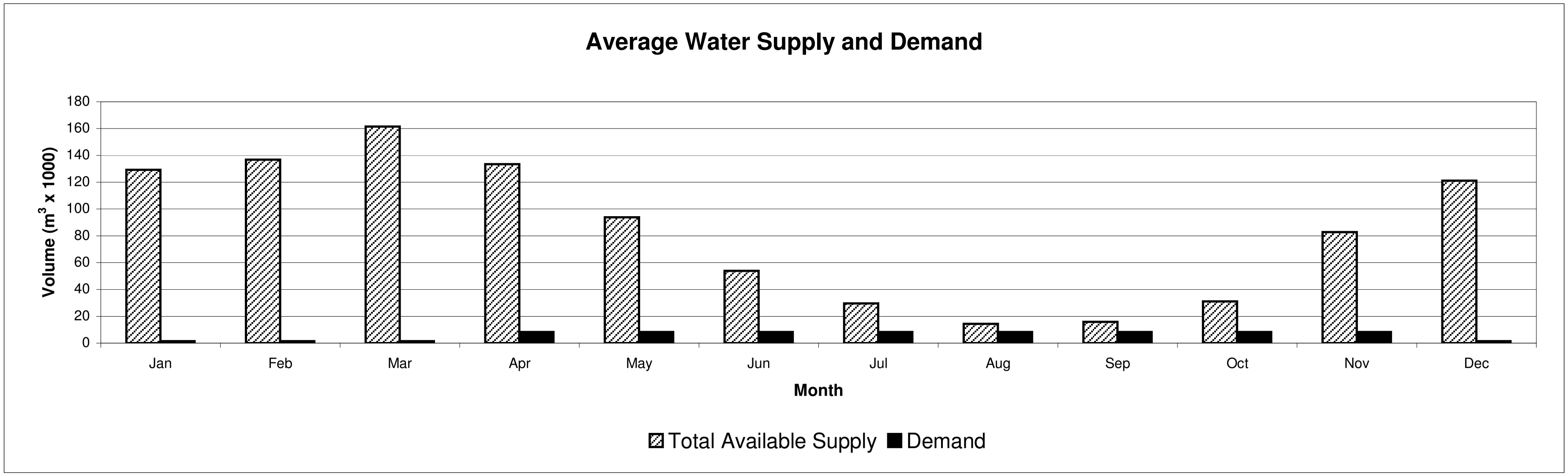
Yours truly,

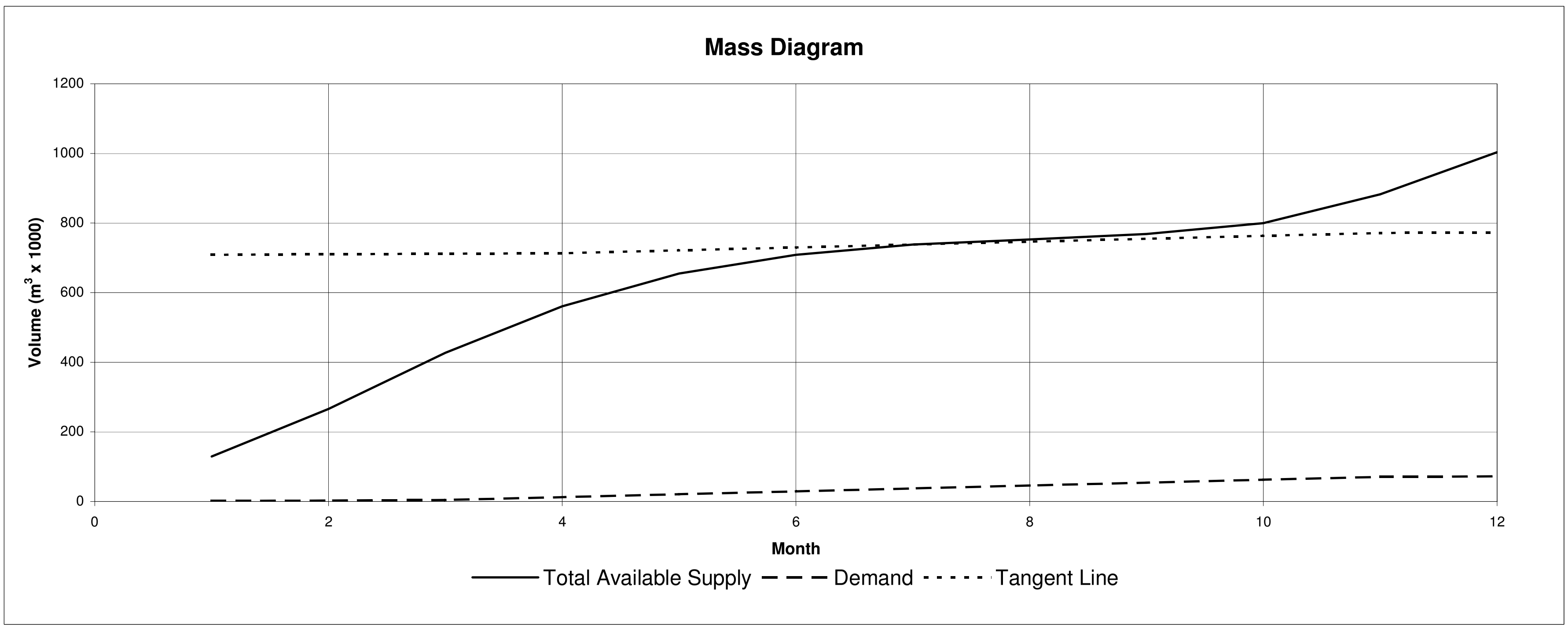
CONESTOGA-ROVERS & ASSOCIATES

David F. Strajt, M. Eng.
Project Manager

DS/mb/3
Encl.

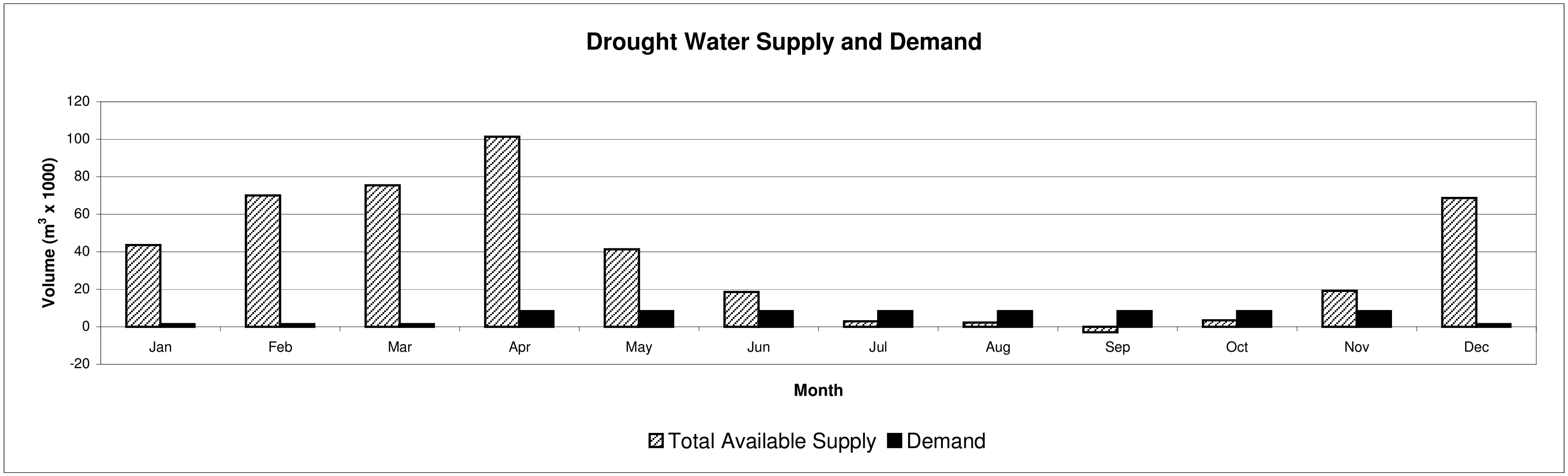
Figure 1
Whites Point Quarry Hydrologic Budget
Construction Water Budget Estimates - Average Conditions

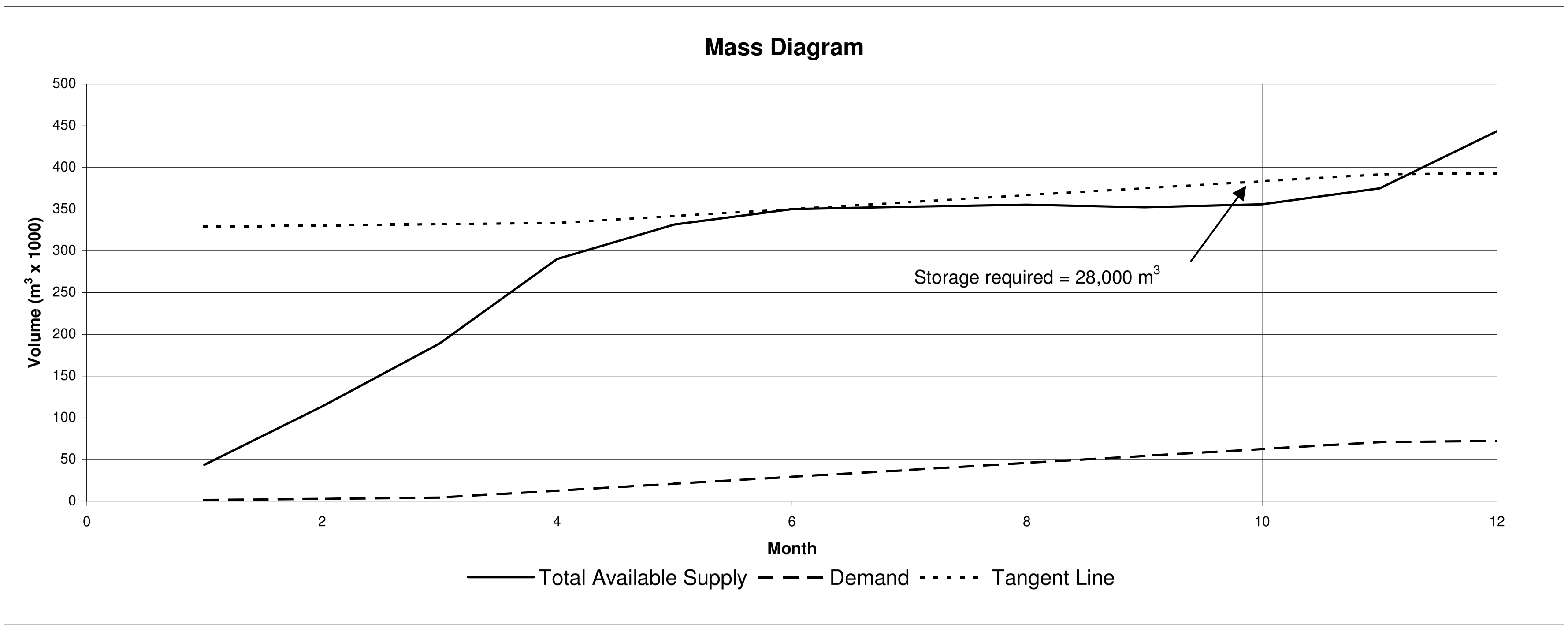




CRA (821191) - November, 2006

Figure 2
Whites Point Quarry Hydrologic Budget
Construction Water Budget Estimates - Drought Conditions





CRA (821191) - November, 2006

Table 1
Water Demands - Construction

	Dust Control	Shot Rock	Dust - Plant	Total
Jan	379	114	946	1,438
Feb	379	114	946	1,438
Mar	379	114	946	1,438
Apr	5,678	757	1,893	8,328
May	5,678	757	1,893	8,328
Jun	5,678	757	1,893	8,328
Jul	5,678	757	1,893	8,328
Aug	5,678	757	1,893	8,328
Sep	5,678	757	1,893	8,328
Oct	5,678	757	1,893	8,328
Nov	5,678	757	1,893	8,328
Dec	379	114	946	1,438
Total	46,939	6,511	18,927	72,377

Table 2
Water Demands - Operation

	Process (Make-up)	Dust Control	Shot Rock	Dust - Plant	Sediment Disposal	Total
Jan	24,003	3,785	946	946	114	29,795
Feb	21,821	3,785	946	946	114	27,613
Mar	24,003	3,785	946	946	114	29,795
Apr	23,458	11,356	3,785	1,893	114	40,606
May	24,003	11,356	3,785	1,893	114	41,151
Jun	23,458	11,356	3,785	1,893	114	40,606
Jul	24,003	11,356	3,785	1,893	114	41,151
Aug	24,003	11,356	3,785	1,893	114	41,151
Sep	23,458	11,356	3,785	1,893	114	40,606
Oct	24,003	11,356	3,785	1,893	114	41,151
Nov	23,458	11,356	3,785	1,893	114	40,606
Dec	24,003	3,785	946	946	114	29,795
Total	283,676	105,992	34,069	18,927	1,363	444,026

Table 3
Whites Point Quarry Hydrologic Budget
Detailed Summary Table
Construction Water Budget Estimates - Average Conditions

Month	Quarry and Watershed Areas			Pond Areas					Total Available		
	Water Surplus[1] (mm)	Surface Runoff[2] (mm)	Runoff Volume (m^3 x 1000)	Input[3] (mm)	Evaporation (mm)	Seepage Loss (mm)	Net Input (mm)	Volume (m^3 x 1000)	Water Supply (m^3 x 1000)	Demand[4] (m^3 x 1000)	Net Surplus (m^3 x 1000)
Jan	95	88	126	100	0	48	52	3.3	129	1.4	128
Feb	98	93	133	102	0	43	59	3.7	137	1.4	135
Mar	125	109	156	135	0	48	88	5.5	161	1.4	160
Apr	73	91	130	103	0	46	56	3.5	133	8.3	125
May	44	68	96	103	96	48	-40	-2.5	94	8.3	86
Jun	13	41	58	92	108	46	-62	-3.9	54	8.3	46
Jul	8	24	35	86	121	48	-83	-5.2	30	8.3	21
Aug	2	13	19	80	105	48	-73	-4.6	14	8.3	6
Sep	11	12	17	99	75	46	-23	-1.4	16	8.3	8
Oct	31	21	31	102	47	48	8	0.5	31	8.3	23
Nov	87	54	78	130	0	46	84	5.2	83	8.3	74
Dec	109	82	117	119	0	48	71	4.4	121	1.4	120
Total	**698**	**698**	**995**	**1250**	**552**	**561**	**137**	**9**	**1004**	**72**	**931**

Storage Required: 0
Equivalent Average Pond Storage Depth (m): 0

Notes: 1) Sum of water surpluses from varying land-use areas within contibuting drainage area (north catchment - 143 ha).
2) Runoff calculated as 50% of surplus for current month plus 50% of runoff from previous month.
3) Pond input is the sum of rainfall and snowmelt over pond areas (ponds 1, 2, 3 & 4 - 6.3 ha).
4) Comprised of general site dust control, dust suppression on portable crushing plant, and wet down of shot rock.

Table 4
Whites Point Quarry Hydrologic Budget
Detailed Summary Table
Construction Water Budget Estimates - Drought Conditions

Month	Quarry and Watershed Areas			Pond Areas					Total Available		
	Water Surplus[1] (mm)	Surface Runoff[2] (mm)	Runoff Volume (m^3 x 1000)	Input[3] (mm)	Evaporation (mm)	Seepage Loss (mm)	Net Input (mm)	Volume (m^3 x 1000)	Water Supply (m^3 x 1000)	Demand[4] (m^3 x 1000)	Net Surplus (m^3 x 1000)
Jan	18	32	45	19	0	48	-29	-1.8	44	1.4	42
Feb	64	48	69	66	0	43	22	1.4	70	1.4	69
Mar	57	52	75	61	0	48	13	0.8	75	1.4	74
Apr	85	69	98	104	0	46	58	3.6	101	8.3	93
May	0	34	49	24	96	48	-120	-7.5	41	8.3	33
Jun	0	17	24	60	108	46	-95	-5.9	19	8.3	10
Jul	0	9	12	20	121	48	-149	-9.3	3	8.3	-5
Aug	0	4	6	92	105	48	-61	-3.8	2	8.3	-6
Sep	0	2	3	25	75	46	-96	-6.0	-3	8.3	-11
Oct	4	3	4	84	47	48	-10	-0.6	3	8.3	-5
Nov	19	11	16	99	0	46	52	3.3	19	8.3	11
Dec	80	46	65	107	0	48	59	3.7	69	1.4	67
Total	**327**	**327**	**466**	**758**	**552**	**561**	**-355**	**-22**	**444**	**72**	**371**

Storage Required: 28
Equivalent Average Pond Storage Depth (m): 0.44

Notes: 1) Sum of water surpluses from varying land-use areas within contibuting drainage area (north catchment - 143 ha).
2) Runoff calculated as 50% of surplus for current month plus 50% of runoff from previous month.
3) Pond input is the sum of rainfall and snowmelt over pond areas (ponds 1, 2, 3 & 4 - 6.3 ha).
4) Comprised of general site dust control, dust suppression on portable crushing plant, and wet down of shot rock.

Table 5
Whites Point Quarry Hydrologic Budget
Summary Results - Operation (Average Conditions)

Month	Net Water Surplus[1] (m^3 x 1000)							
	Year 0	**Year 5**	**Year 10**	**Year 15**	**Year 20**	**Year 30**	**Year 40**	**Year 50**
Jan	125	101	101	101	100	100	101	129
Feb	133	111	111	111	111	111	111	138
Mar	156	135	135	135	134	134	135	164
Apr	130	95	95	95	95	95	95	135
May	96	51	51	51	51	51	51	92
Jun	57	11	11	11	11	11	11	52
Jul	34	*-14*	*-14*	*-14*	*-14*	*-14*	*-14*	27
Aug	18	*-29*	*-29*	*-29*	*-29*	*-29*	*-29*	11
Sep	16	*-26*	*-26*	*-26*	*-26*	*-26*	*-25*	13
Oct	27	*-10*	*-11*	*-11*	*-12*	*-12*	*-9*	27
Nov	74	44	44	44	42	42	45	80
Dec	115	93	93	93	92	92	94	121
Total	**982**	**562**	**561**	**559**	**555**	**555**	**565**	**990**
Storage Required (m^3 x 1000)	**N/A**	**79**	**80**	**81**	**82**	**82**	**78**	**N/A**

Notes: 1) Represents available surplus water after all losses have been considered and demand satisfied.
Negative values represent a water deficit.

Table 6
Whites Point Quarry Hydrologic Budget
Summary Results - Operation (Drought Conditions)

Month	Net Water Surplus[1] (m^3 x 1000)							
	Year 0	**Year 5**	**Year 10**	**Year 15**	**Year 20**	**Year 30**	**Year 40**	**Year 50**
Jan	43	12	12	12	11	11	13	38
Feb	68	43	43	43	42	42	43	69
Mar	74	46	46	46	46	46	46	75
Apr	98	63	63	63	62	62	63	103
May	48	*-4*	*-4*	*-4*	*-4*	*-4*	*-4*	37
Jun	24	*-25*	*-25*	*-25*	*-25*	*-25*	*-25*	15
Jul	11	*-43*	*-43*	*-43*	*-43*	*-43*	*-43*	*-2*
Aug	6	*-41*	*-41*	*-41*	*-41*	*-41*	*-41*	0
Sep	2	*-47*	*-47*	*-47*	*-47*	*-47*	*-47*	*-6*
Oct	2	*-38*	*-38*	*-39*	*-39*	*-39*	*-38*	1
Nov	6	*-21*	*-22*	*-23*	*-26*	*-26*	*-19*	8
Dec	60	40	39	39	36	36	40	62
Total	**440**	**-16**	**-18**	**-21**	**-29**	**-29**	**-13**	**399**
Storage Required (m^3 x 1000)	**N/A**	**219**	**221**	**222**	**226**	**226**	**217**	**N/A**

Notes: 1) Represents available surplus water after all losses have been considered and demand satisfied.
Negative values represent a water deficit.

Table 7
Whites Point Quarry Hydrologic Budget
Summary Results - South Catchment (Average Conditions)

Month	Net Water Surplus[1] (m³ x 1000)			
	Year 20	**Year 30**	**Year 40**	**Year 50**
Jan	32	32	31	32
Feb	34	34	33	33
Mar	40	40	39	39
Apr	33	33	33	33
May	23	23	23	23
Jun	14	14	14	14
Jul	8	8	8	8
Aug	4	4	4	4
Sep	4	4	4	4
Oct	9	9	7	6
Nov	21	21	19	19
Dec	30	30	29	29
Total	**252**	**252**	**244**	**244**
Storage Required (m^3 x 1000)	**N/A**	**N/A**	**N/A**	**N/A**

Notes:

1) Represents available surplus water after all losses have been considered and demand satisfied.
Negative values represent a water deficit.

Table 8
Whites Point Quarry Hydrologic Budget
Summary Results - South Catchment (Drought Conditions)

Month	Net Water Surplus[1] (m^3 x 1000)			
	Year 20	**Year 30**	**Year 40**	**Year 50**
Jan	12	12	11	11
Feb	18	18	17	17
Mar	19	19	19	19
Apr	25	25	25	25
May	11	11	11	11
Jun	5	5	5	5
Jul	2	2	2	2
Aug	1	1	1	1
Sep	0	0	0	0
Oct	2	1	0	0
Nov	7	7	2	1
Dec	19	19	16	17
Total	**120**	**119**	**107**	**107**
Storage Required (m^3 x 1000)	**N/A**	**N/A**	**N/A**	**N/A**

Notes:

1) Represents available surplus water after all losses have been considered and demand satisfied. Negative values represent a water deficit.

APPENDIX 2

MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET

Date-Issued: 10/11/2005
MSDS Ref. No: 11015-005
Date-Revised: 10/11/2005
Revision No: New MSDS

CALLAWAY A-4230

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: CALLAWAY A-4230
CHEMICAL FAMILY: Polyacrylamide Copolymer

MANUFACTURER

Kemira Chemicals, Inc.
Suite 200
245 TownPark Drive
Kennesaw, GA 30144
Product Stewardship: 800-347-1542

24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (US Transportation) : (800) 424 - 9300
Emergency Phone : (770) 422 - 1250

2. COMPOSITION / INFORMATION ON INGREDIENTS

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: White, granular solid

IMMEDIATE CONCERNS: This material is not a significant, immediate concern for emergency response personnel unless spilled material becomes wet. Wet material will cause surfaces to become extremely slippery. It presents little or no unusual hazard if involved in a fire.

POTENTIAL HEALTH EFFECTS

EYES: Slightly irritating but does not injure eye tissue.

SKIN: Low order of toxicity. Prolonged or repeated contact may irritate and cause dermatitis.

INGESTION: Low order of toxicity. May cause gastrointestinal irritation and nausea.

INHALATION: Dust may be irritating to eyes and respiratory tract.

CANCER STATEMENT: This product (or any component at a concentration of 0.1% or greater) is not listed by the NTP, IARC, OSHA or EPA as a carcinogen.

4. FIRST AID MEASURES

EYES: Flush eyes with large amounts of water until irritation subsides. If irritation persists, get medical attention.

SKIN: Wash with large amounts of water; use soap if available. If irritation persists, seek medical attention.

INGESTION: First aid is normally not required. If symptoms develop, get prompt medical attention.

INHALATION: First aid is normally not required. If symptoms develop, get prompt medical attention.

5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: None

FLAMMABLE LIMITS: Not Applicable

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, foam or water spray.

HAZARDOUS COMBUSTION PRODUCTS: No unusual

OTHER CONSIDERATIONS: Contact with water may form a gel which is extremely slippery and difficult to clean up.

FIRE FIGHTING PROCEDURES: Use water to cool fire-exposed surfaces and to protect personnel. Isolate "fuel" supply from fire. Use foam, dry chemical, or water spray to extinguish fire.

FIRE FIGHTING EQUIPMENT: As in any fire, wear self-contained breathing apparatus pressure-demand, (MSHA/NIOSH approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

ENVIRONMENTAL PRECAUTIONS

WATER SPILL: Prevent additional discharge of material, if possible to do so without hazard. This material is water soluble/dispersable and may not be recoverable. If possible, contain and recover floating material.

LAND SPILL: Prevent additional discharge of material, if possible to do so without hazard. For small spills implement cleanup procedures; for large spills implement cleanup procedures and, if in public area, advise authorities.

GENERAL PROCEDURES: Spilled product should be scooped up as much as possible and the remaining solid material swept up. Washing the area with water should only be attempted after most of the polymer has been removed.

RELEASE NOTES: Recycle or dispose of recovered material in accordance with all federal, state, and local regulations.

COMMENTS: Contact with water may form a gel which is extremely slippery and difficult to clean up.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Keep container closed. Both open and handle containers with care. Store in a cool, well ventilated place away from incompatible materials.

STORAGE TEMPERATURE: (86°F) maximum

STORAGE PRESSURE: Atmospheric

SHELF LIFE: At least six months in unopened containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Ventilation should be provided to control worker exposures and prevent health risk; and as necessary to reduce, prevent and control particulate exposure.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Safety glasses with side shields.

SKIN: Where contact may occur, wear chemical resistant gloves, and long sleeves.

RESPIRATORY: Where concentrations in air may exceed the limits given in this section or Section 2 and engineering, work practice or other means of exposure reduction are not adequate, NIOSH/MSHA approved respirators may be necessary to prevent overexposure by inhalation.

OTHER USE PRECAUTIONS: An eyewash station is recommended in area of use.

COMMENTS: ACGIH TWA-TLV for "particulates not otherwise classified"/nuisance dust: Inhalable particulate: 10 mg/m3 Respirable particuate: 3 mg/m3 OSHA TWA-PEL for "particulates not otherwise regulated"/inert dust: Total dust: 15 mg/m3 Respirable fraction: 5 mg/m3

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Solid
ODOR: Slight mild odor

VAPOR PRESSURE: Not Applicable
VAPOR DENSITY: Not Applicable
BOILING POINT: Not Applicable
FREEZING POINT: Not Applicable
SOLUBILITY IN WATER: Soluble
EVAPORATION RATE: Not Applicable
DENSITY: ~50 lbs/ft3 at (77°F)
VISCOSITY: ~660cP (0.25% in DI water)
MOLECULAR FORMULA: Mixture

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Heat over 50 degrees C (122 F) and moisture/water.

HAZARDOUS DECOMPOSITION PRODUCTS: None

INCOMPATIBLE MATERIALS: Strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

ACUTE
ORAL LD_{50}: >5000 mg/kg (rat)

SENSITIZATION: Testing on guinea pigs (skin): non-sensitizing

12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: Fish: 96-Hour, Danio rerio: LC50 = >100 mg/L (OECD 203) Daphnia: 48-Hour, Daphnia magna: EC50 = >100 mg/l (OECD 201) Freshwater algae: 72-Hour, Scenedesmus subspicatus: IC50 = >100 mg/L (OECD 202)

CHEMICAL FATE INFORMATION: This product in not readily biodegradable. This product does not bioaccumulate.

13. DISPOSAL CONSIDERATIONS

EMPTY CONTAINER: "Empty" containers retain product residue and can be dangerous. Empty containers should be completely emptied, and properly disposed of.

RCRA/EPA WASTE INFORMATION: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

GENERAL COMMENTS: Ensure compliance with local, state, and Federal regulations in disposing of this container, residual contents, or rinsing.

14. TRANSPORT INFORMATION

15. REGULATORY INFORMATION

UNITED STATES
SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: This product is not a hazardous chemical under 29 CFR 1910.1200, and therefore is not covered by SARA Section 311/312.

FIRE: NO **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** NO **CHRONIC:** NO

313 REPORTABLE INGREDIENTS: This product does not contain Section 313 Reportable Ingredients.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

CERCLA REGULATORY: If this product is accidentally spilled, it is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). We recommend you contact local authorities to determine if there may be other local reporting requirements.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA STATUS: All components of this product are listed on the TSCA Inventory or are exempt from TSCA Inventory requirements .

RCRA STATUS: Discarded product, as sold, would not be considered a RCRA Hazardous Waste.

CANADA

CANADA INGREDIENT DISCLOSURE LIST: This product, or its components, are listed on or are exempt from the Canadian Domestic Substance List (DSL).

16. OTHER INFORMATION

PREPARED BY: HS&E GROUP

REVISION SUMMARY New MSDS

HMIS RATING

HEALTH:		1
FLAMMABILITY:		1
PHYSICAL HAZARD:		0
PERSONAL PROTECTION:		

HMIS RATINGS NOTES: This information is for people trained in Key the National Paint & Coatings Association's 4 = Severe (NPCA) Hazardous Materials Identification 3 = Serious System (HMIS). 2 = Moderate 1 = Slight 0 = Minimal

MANUFACTURER DISCLAIMER: NOTICE: We believe that the information contained on this Material Safety Data Sheet is accurate. The suggested procedures are based on experience as of the date of publication. They are not necessarily either all-inclusive or fully adequate in every circumstance. Also, these suggestions should not be confused with or followed in violation of applicable laws, regulation, rules or insurance requirements. NO WARRANTY IS MADE, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

List of Submissions

WP 1431 Panel

Information Request - IR-6
Information Request - IR-7
Information Request - IR-8

WP 1452 Panel

7.0 Project Description - Specific Comments

Comments from the Responsible Authorities and Regulatory Agencies

WP 1498	Nova Scotia Department of Environment and Labour
WP 1525	Natural Resources Canada
WP 1541	Fisheries and Oceans Canada
WP 1542	Health Canada
WP 1630	Environment Canada
WP 1652	Nova Scotia Department of Transportation and Public Works

Comments from Interest Groups

WP 1405	Town of Annapolis Royal
WP 1625	Partnership for Sustainable Development
WP 1626	Canadian Parks and Wilderness Society - Nova Scotia Chapter
WP 1636	Ecology Action Centre
WP 1637	Sierra Club of Canada- Atlantic Canada Chapter

WP 1431 Joint Review Panel

Issue

It is frequently stated that 2,000,000 of aggregate will be shipped out at the rate of 40,000 tons per week yet production will occur only 44 weeks a year. This suggests the rate will be 45,000 tons per week.

Information Request - IR-6
Confirm the rate of shipment per week and the annual total.

Response:

The design annual production and shipment of all aggregates is 2,000,000 tons. As noted elsewhere, it will not be possible to arrange a dedicated ship in the early years of the operation so that the shipments per week will vary. The 44 weeks per year for the production of aggregates is based on severe weather conditions preventing economic operation of the plant, particularly with respect to the wash operation. The capacity of the production line will be 48,000 tons per week, thus allowing flexibility in shipments to provide the required 2,000,000 tons.

Information Request - IR-7

Explain whether the 20 m elevation refers to a distance from the base up or if it is recessed. Provide an elevation drawing (side view) showing the relative elevation of each of the components shown in the Quarry Infrastructure Plan on page 17 of Chapter 7. Provide the depth of the sediment ponds.

Response:

Please refer to Project Description

Information Request - IR-8

Regarding the Concept Quarry Plans (Years 1-50) beginning with page 21 in Chapter 7, provide elevations for the active quarry area at each stage (i.e., show the expected elevation of the quarry floor).

Response:

Please refer to Project Description

WP 1452 Joint Review Panel

7.0 Project Description

Comment

The Province currently owns Whites Cove Road. If the Proponent does not acquire ownership of that road, the entire operational scheme of the Project, the mining plan, hydrology and site drainage will be affected. The Proponent is instructed to resolve the road ownership issue or propose plans, Project components, mitigation and effect assessments for both options.

Response:

Please refer to Project Description

Comment

The level of detail for most Project components described in the EIS is not adequate for the Panel to properly understand the Project and assess its potential effects or to judge the effectiveness of the proposed mitigation measures. Discrepancies in the various documents and maps make it difficult for the Panel to confirm where activities will occur.

Response:

Please refer to Project Description

Comment

The Panel requires a level of detail at this stage of Project planning that could be described as pre-engineering (as opposed to the conceptual information presented in the current EIS documents). More precise quantitative, pre-engineering design details that include schematics and/or diagrams, where appropriate, are required for the following Project components, at a minimum. (Some specific requirements related to the Project description are reinforced or expanded on later in this information request.)

Response:

Please refer to Project Description

Comment

Describe the zone of influence of the marine area expected to be affected by the maneuvering requirements of the ship during varying sea and wind conditions.

Response:

Please refer to Project Description

Comment

Identify factors that may alter the rate of removal of aggregate materials from the site. For instance, the EIS suggests the bulk carriers may range up to 70,000 tons capacity. Could this reduce the number of ship trips required per year? Could enhanced demand by Clayton increase the rate of aggregate extraction?

Response:

Bilcon anticipates employing Panamax-size vessels initially. The carrying capacity is approximately 45,000 tons. However, initial investigations into the use of bulk carriers with up to 70,000 tons capacity have been carried out with the specific intent to reduce the number of ship trips per year. At the present time, there is a general world-wide shortage of bulk carriers due to increased demand for raw material in Asian countries, particularly China. There is currently an approximate three-year waiting list for the construction of new vessels so that in the initial years of the quarry, Bilcon will have to employ what is currently available on the market. It should also be noted that while the Whites Point terminal has been designed to accommodate vessels carrying up to 70,000 tons of aggregate, the unloading ports presently contemplated are restricted due to water depths. Bilcon's parent company, Clayton Concrete Sand and Gravel, is currently investigating alternate sites on the eastern seaboard which would permit the unloading of large vessels. At the present time, Clayton does not anticipate a future demand in excess of two million metric tons a year from the White Point site.

Comment

In some parts of the EIS, the Proponent indicates that it expects it will have a dedicated ship while in other parts it says it will not. Clarify.

Response:

As noted above, there is currently a worldwide shortage of bulk carriers. Initial discussions with potential carriers indicates that with a three-year waiting time for new vessels, a dedicated vessel for Whites Point is not a possibility in the immediate future. Bilcon has also investigated the construction of a vessel for its own specific use but, again, due to waiting time, this is not a possibility in the immediate future.

Comment

Clarify the communications plan that will be used to apprise fishers, whale watchers, or others of Project activities such as blasting or ship loading.

Response:

Please refer to Project Description

Comment

Provide a detailed decommissioning plan.

Response:

Please refer to Project Description

Comment
The lease the Proponent has on the property extends for 90 years, while the Project plan calls for 50 years. Clarify the intended use of the property for the years remaining on the lease.

Response:

There is sufficient rock on the Whites Point site to enable two million metric tons to be extracted for a fifty-year period. However, Bilcon deemed it prudent to enter into a lease arrangement for a ninety-year period. At the present time, Bilcon has no specific plan for the property between the 50 – 90 years, other than to ensure that the reclamation plan is fully functional.

Comment
Facility and Component Locations

The quarry infrastructure plans (Figure 1) for the EIS and the Fish Habitat Compensation Plan of September 2005 (Appendix 17) differ in how they illustrate critical components. Examples include the footprint of the physical plant, orientation of the loading tunnel, the direction of flow in drainage channels, and the use of the "Phase l Reclamation area".

Resolve discrepancies in the drawings to indicate which of these infrastructure plans represents the final proposed design of the Project.

Response:

Please refer to Project Description

Comment

Access Road

If the current access road remains public property, the Proponent proposes to fence it off, enclosing it within a 30m environmental preservation zone. After ten years of quarrying activities, the road will exist on an isolated ridge that traverses the site, almost 90m above the quarry floor on either side.

Provide contingency plans of the effects of such a ridged on facility locations, quarry operations, surface drainage, and site reclamation. Consider the stability of this ridge and safety issues arising for the workforce and the public.

Response:

Please refer to Project Description

WP 1498 Nova Scotia Department of Environment and Labour

Comments from the Environmental Monitoring and Compliance Division
Yarmouth District Office
Bruce Arthur - Acting District Manager
Scott Lister – Hydrogeologist
Comment

1. Chapter 6.1 discusses that a permit (approval) was issued by NSDEL for a quarry of less than four hectares in size. However, what is not mentioned is that this approval is no longer valid. Chapter 6.5.5 then discusses the various permits and approvals required for the project. The only approval discussed as required by NSDEL is a water extraction approval. However, the proponent will also be required to obtain an Industrial Approval pursuant to 13(f) of the Activities Designation Regulations. This Industrial Approval would also include the bulk solids handling loadout facility pursuant to 16(2)(h) of those regulations. In addition the proponent would be required to obtain an approval for either an on-site sewage disposal system or for a sewage treatment and disposal (outfall) facility

---

Response:

Bilcon is aware of the requirement for an Industrial Approval. Preliminary discussions were held with NSDEL in 2006 with respect to an application for an Industrial Approval and it was agreed that the application would follow the Environmental Assessment Process. Bilcon also recognizes the requirement to obtain a permit for either an on-site sewage disposal system or for sewage treatment and disposal (out-fall) facility.

Comment

2.Chapter 7.1 discusses investigation of alternate quarry sites in the Atlantic Provinces and Nova Scotia. What sites were investigated? Why were no sites in the Eastern United States such as New York and New Jersey included?

Response:

Permitted crushed stone reserves are being depleted in New Jersey. Many quarries will be depleted within 20 years, or less. No new quarries have been approved in New Jersey since at least 1970. Because the quarries are located miles away in the northern part of the State and because highway congestion, tolls, and fuel costs are rising, the cost of transporting stone to southern New Jersey via truck has increased dramatically and often exceeds the f.o.b. price per ton. As a result, Clayton began evaluating alternativequarry sites and potentially more cost-effective modes of transporting crushed stone to its facilities, as a way to reduce its stone costs and find a long-term, captive, dependable supply of stone.

New quarry sites are not available in New Jersey or southern New York because of issues such as land availability and cost, stone quality, land use, etc. Even if a suitable site were available in this region, the cost of transporting stone from the site to CLAYTON'S southern New Jersey facilities would likely be prohibitive. As a result CLAYTON began investigating potential offshore sources of stone.

Comment

3. Chapter 7.3 discusses that there are 5 residences within 500 m of the active quarry area and 19 within 500 - 1000 m. NSDEL Pit and Quarry guidelines specify a separation distance of 800 m from off-site structure or residence that can be reduced providing the owners issues a signed waiver. There is no discussion regarding the company's ability to obtain necessary waivers that would allow project approval by NSDEL.

Response:

Bilcon recognizes that the NSDEL Pit and Quarry Guidelines which specify a separation distance of 800 m from the foundation or base of a structure located off-site with respect to blasting activities. This separation distance is measured from the working face and point of blasting to the foundation or base of the structure and can be reduced with written consent from all individuals owning structures within 800 m.

Bilcon has acquired property adjacent to the Quarry site, as it has become available, and several setback agreements have been negotiated. Bilcon is continuing to discuss various land issues and will increase this activity following the Environmental Assessment Process.

It is recognized that, at the present time, Bilcon's ability to develop the entire site is constrained. However, there is sufficient product available on site even after recognizing a separation distance of 800 m to warrant the Proponent proceeding with the project.

Comment

4. Chapter 7.7.1 discusses utilities and states that "electrical energy would be provided from upgraded services on Highway 217 to the quarry compound area." What is meant by "upgraded services on Highway 217? How much electrical energy is the project expecting to use on an annual basis? Is the present grid capable of providing this energy or will this main line on Highway 217 need to be increased in capacity? If upgrade is required what will be negative or positive effects on area residents? Who would be responsible for constructing and financing the upgrades?

Response:

Bilcon has identified a power requirement to feed approximately 7,000 horse power of electric motors. NSPI has identified a requirement for line work and sub-station upgrades to supply this demand. Bilcon also recognizes the requirement to provide flicker control to minimize flicker on the NSPI electrical system. Bilcon is responsible for financing the upgrades which would be carried out by NSPI. Bilcon is of the opinion that the upgrading of the line from Digby to Whites Point will have a positive affect on the power supply for area residents.

Comment

5. Chapter 7.7.1 also discusses utilization of an on-site sewage disposal system. While it may be possible to design a suitable on-site system it may be more probable that a sewage treatment plant, designed to Atlantic Canada Standards and requiring a certified operator will be required.

Response:

Bilcon recognizes that a sewage treatment plant designed to Atlantic Canada Standards and requiring a certified operator may be required rather than an on-site sewage disposal system. Bilcon will engage a QP1 to design an appropriate system and obtain a permit from NSDEL.

Response:
Please refer to Project Description

Comments from the Environmental and Natural Areas Management Division
Water and Wastewater Branch
Darrell Taylor - Environmental Analyst

Comment

9.It is stated in the EIS that water supply to meet process water needs will be provided from surface water runoff taken from the sedimentation ponds. It is also mentioned that this water supply would be in deficit during August and September in quantities of 8,000 m3 to 12,000m3, from years 5 through 40 of operation (Chapter 7, section 7.8, page 47, paragraph 2). Additional water supply needed to cover this deficit for process requirements should be identified.

Response:
Please refer to Project Description

Comment

10. Mitigation measures proposed for reducing the migration of silt off site could include a number of measures proposed in the Erosion and Sedimentation Control Handbook for Construction Sites. This should be used as a guide and referenced.

Response:

Noted

Pollution Prevention Branch
Melanie Haggart – Planner
The areas of responsibility and interest of the Pollution Prevention Branch include the following:

- contaminated sites
- hazardous substances
- environmental emergencies
- pesticides
- pollution prevention.

Comment

1. Overall the proponent's plan appears to have anticipated and designed adequate mitigative measures to address most potential concerns related to areas within the P2 mandate.

Response:

Noted

Comment

2. Satisfactory commitments are made on page 40 of Chapter 7, to construct the maintenance shop and fuelling area on reinforced concrete slabs designed to contain spillage. Satisfactory commitments to maintenance shop fuel storage plans are provided on page 44. However, details are needed on the system proposed to remove any petroleum or other contaminants from water from the 'fuel pad reservoir' mentioned on page 40.

Response:

It should be noted that the fuel storage area will be roofed and that a specific gravity-type fuel water separator will be installed.

Comment

3. The proponent should provide more details on procedures for refuelling mobile equipment including where equipment will be sited during refuelling (eg on pads or other impermeable surfaces), emergency spill procedures, spill containment and cleanup equipment to be kept on site.

Response:

Fuelling of equipment will be in situ. All fuelling will be conducted with spill-proof, Wiggins type connectors. Re: details of emergency spill procedures, spill containment, and clean up equipment to be kept on site, note that all employees will receive training in emergency spill procedures and spill containment. While refuelling of mobile equipment is insitu, it would be carried out at specific sites and at each of these sites, there will be a 55 gallon drum containing an Emergency Spill Kit. The contents of the Kit are as follows:

- 50 pads (17" x 19")
- 12 socks (3" x 4')
- 8 pillows (18" x 18")
- 2 pairs of goggles
- 5 disposal bags
- 1 Emergency Response Guidebook
- 1 box nitrile gloves
- 2 tyvek suits for the employees

The Maintenance Compound will have a Spill Containment Kit containing the following:

- 6 clean securable 55 gallon drums for contaminated material
- ground tarps to preserve clean soil
- 4 oil/debris containment booms
- 4 oil-absorbent booms
- 100 oil-absorbent pads
- refuse bags
- an oil skimmer and pump
- speedi dry.

Comment

4.The proponent should state where the emergency generator (described on page 44 as part of the stationary equipment) will be sited. The proponent should identify whether it will have a dedicated fuel storage tank associated with it. If so, plans should be provided on how the proponent will contain potential spillage from this tank.

Response:

The emergency generator will be mobile (A Pritchard Brown Sound Attenuating Weatherproof Genset Enclosure Specification No. 2130)

The fuelling tank is installed beneath the floor and is a "primary containment above ground tank for flammable and combustible liquids" in accordance with UL standard # 142, and mounted within a combined rupture basin/floor/under-frame. The interstitial space between the tank and basin will be electronically monitored to indicate a rupture condition. Refer to # 3 above for Spill Procedures.

Comment

5.The proponent should provide more information on what flocculents and/or other additives will be used for water treatment, how they will be stored, and on potential impacts and mitigative measures (if potential impacts are identified) for spills of flocculents or additives. Also more information is needed on whether there will be any contaminants (eg from specific flocculents) present in the flocculated sediment to be used for site reclamation which could leach out or inhibit vegetation growth and if so, how will this issue be addressed.

Response:

The flocculent which will be used is a Polyacrylamide Copolymer for which the Material Safety Data Sheet is attached. in Appendix 2. This material has a low order of toxicity and is not a significant, immediate concern for emergency response personnel unless spill material becomes wet. Flocculent will be stored in the maintenance building.

Wet material will cause surfaces to become extremely slippery. It presents little or nounusual hazard if involved in a fire. This product is not readily biodegradable and does notbioaccumulate. There is no evidence that the residual amounts of this substance present in the sediment inhibit vegetation growth. The Ecotoxilogical information is contained in Section 12 of the MSDS.

Comment

6. More information is needed on the dykes mentioned on page 47 of Chapter 7, which are proposed to contain sediment stockpile areas. The proponent should identify whether these areas are expected to contain water. If so, mitigative measures should be identified to ensure they do not fail or overflow during periods of unusually heavy precipitation.

Response:

Further information on the dykes to contain sediment stock pile areas is contained in the response to the Panel under Section 7.0 – Project Description.

Comment

7. There is no information provided on ship refuelling or storage of fuel for ships at the site. It should be made a condition of the release from the EA that no ship fuel will be stored or dispensed on the site.

Response:

Ships will not be refuelling at the Whites Point Terminal and there will be no storage of fuel for ships at the site.

WP 1525 Natural Resources Canada

Comment 5: Decommissioning, Vol. V, 7.10

The report states that portions of the marine infrastructure, such as the conveyor support system, gallery trusses and floor, mooring dolphins and buoys will remain. It is likely that the mooring dolphins and buoys can be used by the local community after the project; however, it is doubtful that the conveyor support system (pipe piles) and the gallery trusses and floor can be used for other purposes. Other federal authorities may have concerns that leaving marine infrastructure in place may affect navigation and/or tourism in the region, so clarification is needed.

Response:

As noted in the response to the Panel under "Decommissioning Plan", the plan would be developed in consultation with the federal, provincial and municipal governments, the community and stakeholder groups. If the mooring dolphins and buoys can be used by the community, then the conveyor support pipe piles will also be required for an access way to the dolphins. In any event, the marine infrastructure left in place would have to meet the requirements of the regulatory agency responsible at that time to ensure that navigation and tourism are not negatively affected.

WP 1541 Fisheries and Oceans Canada

EIS Volume IV – Chapter 6

Comment

Page 50 – The proponent should indicate who issues the Water Lot Lease?

Response:

The Nova Scotia Department of Natural Resources would be responsible for issues concerning the Water Lot Lease.

Comment

Volume V – Reference Document 30
The report indicates that the project will require additional water for August and September. The proponent should indicate where they will obtain the water shortfall.

Response:

Please refer to Project Description

WP 1542 Health Canada

Noise and Vibration (Table ECM-2, Section 9.1.9, Section 9.1.11, Reference Document #31, Noise and Air Quality Study at Whites Point Quarry)
Comment

4. Plain Language Summary – section 1, second paragraph – This clause indicates there will be two shifts, please clarify if this means operation will occur during the night.

Response:

No operations will be conducted at night. The two shifts will be from 6:00 AM to 2:00 PM and from 2:00 PM to 10:00 PM.

Comment

11. Section 9.1.11.2, Noise and Vibration, Ship Loading – Please clarify if ship loading operations will occur at night.

Response:

It is possible that loading operations will be conducted at night although Bilcon will make every effort to reduce the number of night loadings.

Comments Related to Reference Document #31 – Jacques Whitford Environment Limited. 2005. Noise and Air Quality Study at Whites Point Quarry. Project No. NSD19591

Comment

3.Section 2.11, Construction – How many months will the construction last?

Response:

The length of the construction period will be highly dependent upon the time of the year that the industrial permit is issued. The construction of the marine terminal will take place during the summer months to take advantage of calmer seas – other construction operations will be much less weather dependent. It is reasonable to assume that the construction period will be in the order of 18 months.

Comment

4. Please verify that there will be no night time (i.e. 10 p.m. to 7 a.m.) construction

Response:

There will be no night time i.e. 10:00 PM to 6:00 AM construction.

Comment

6. Section 2.12 Operation – Please indicate if there will be operation at night.

Response:

There will be no operation at night - i.e. 10:00 PM to 6:00 AM

WP 1630 Environment Canada

Item #3 Taking a Long-Term View
Information Request

Explain how the proposed decommissioning plans, and infrastructure that remains on the site, would support future land uses and strengthen local and regional capacities and opportunities to achieve a sustainable future.

Response:

It is anticipated that all processing equipment, conveyors and shiploaders will be removed from the site while some of the site infrastructure will remain in place, e.g. access road, electrical services and portions of the marine infrastructure. The site itself will slope to the Bay of Fundy and assets such as the sediment ponds will be left in place.

It is difficult to predict what the opportunities for development will be 50 years hence, but it is reasonable to assume that the demand will still exist for waterfront and waterview cottages. The site would certainly lend itself to such a development, particularly with a small craft marina. Sympathetic development using the bare land condominium concept, for example, would preserve the integrity of the site as natural habitat and the condominium corporation would maintain it.

Alternatively, if the demand were there, the land would lend itself to the creation of a waterfront resort complex with a small craft marina. Both of these activities would create a demand for goods and services and a resort development would also create job opportunities.

Another option would be for a community based organization to acquire the site to create a park for recreational and tourist use.

Information Request

Discuss the variations in significance and temporal scale of impacts that could result from the future land use scenarios and the potential conflicts between development options and reclamation objectives.

Response:

As noted in the response above, it is pure speculation to predict future opportunities for the Whites Point Site 50 years hence. What can be said is that the decommissioning plan and the reclamation plan lend themselves to projects involving cottage development, resort development or park development. No conflicts are seen with the reclamation objectives provided that sympathetic development is carried out.

Item #7 Confirming the Structural Integrity of Coastal Structures
Information Request

Present an analysis of the impact of extreme climatic events on the structural integrity of the marine terminal and loading operations that includes a consideration of the following information:

- *Extreme winds and waves from extratropical winter storms and the less frequent tropical cyclones;*
- *Up-to-date wind and wave data from the AES40 database and climate summaries;*
- *An analysis of extreme monthly wave heights;*
- *An analysis of data on deep wave and wind conditions available from the US National Data Buoy Centre;*
- *Nearshore wave conditions based on transformation of offshore wave conditions if necessary; and,*
- *Storm surge height that could be expected in an extreme storm event.*

Response:

Introduction

The reviewers of the EIS for Environment Canada have requested additional information confirming the structural integrity of coastal structures. The request includes presentation of an analysis of the impact of extreme climatic events on the structural integrity of the marine terminal and loading operations.

The scope and requirement for the requested information is clear however it is noted that the contractual course of design development would have the requested analyses done by the engineering team undertaking the design of the maritime structures. It is also important to realize that the statutory responsibility for the design is with the engineering team and the scope of the responsibility routinely includes the analyses outlined by the reviewers and subsequently development of load cases and structural design. Realizing that design and construction contracts for the facility will not be awarded until the project receives approvals from environmental authorities, the specific analyses requested are not deliverable at this time.

What we are able to offer is a commentary on the design process for maritime structures noting that most of the information requested by the EIS reviewers can be delivered during the design phase of this project.

Commentary on Analysis of the Marine Environment and Design

The design and scale of fixed coastal structures are in most instances determined by the site specific physical environment. In this regard, coastal sites are generally unique and need to be studied and assessed specifically, particularly for green field sites where there is no previous experience with the maritime environment, marine shipping activity or operations. Whites Point will require thorough study of the maritime environment both offshore and on the coast to adequately define the magnitude of physical parameters including winds, waves, currents and ice that will induce loads on fixed structures proposed at the site. Other aspects of the marine environment such as fog, snow and temperature will be quantified for purposes of assessing the impact on operations or structural loads in the case of snow and temperature.

Definition of the marine environment for design of fixed coastal structures at Whites Point will follow a programme of study that will proceed roughly as follows:

Data Assembly and Review

The data necessary to support various analyses will be assembled and assessed, including:

- Bathymetric data. A site specific hydrographic survey was carried out for this project. These data would be merged with digitized data for the Bay of Fundy to provide a regional bathymetric database as input to subsequent wave modelling.
- Review of the proposed terminal layout.
- Water level records for the Bay of Fundy with particular attention to extreme storms such as the Atlantic storm of January 21-22, 2002 that may have produced record or near record water levels.
- Ice cover
- Hindcast and recorded wave data with particular reference to Environment Canada’s AES40 database.
- Oceanographic currents. Data from any available measurement and numerical models of currents will be acquired and analyzed. As tidal currents are of relatively high velocity in the Bay of Fundy, with the potential to significantly modify the incident wave conditions, analyses of available current data will be carried out to assess the range of possible current velocities and directions at the site.
- Wind is an important input to the wave model used to simulate the growth and propagation of waves within the Bay of Fundy. Various wind data sources, including both recorded and hindcast model data, will be acquired and compared. An appropriate dataset will be selected for subsequent use.

Offshore Wave Climate Development

The proposed project site at Whites Point on Digby Neck may be broadly subject to two different types of wave conditions:

- waves generated by the relatively short fetches within the Bay of Fundy, and
- waves generated in the North Atlantic Ocean that can propagate into the Bay of Fundy from a south-southwesterly direction.

Although the opening through which these Atlantic waves can approach is relatively narrow, they are of long period and may excite moored vessels into motion. In order to best represent the wave conditions at the project site, both types of waves will be considered.

For North Atlantic wave conditions, reference will be made to the AES40 database. To simulate wave growth within the Bay of Fundy itself, a second generation (2G) spectral wave model WAVAD (Resio, 1981, 1987) developed by Dr. Don Resio of the U.S. Army Corps of Engineers (USAE), will be utilized. This model has been extensively tested and verified at a range of sites throughout the world.

Inputs to the WAVAD model will consist of a regular grid defining the shoreline and bathymetry of the Bay of Fundy and Gulf of Maine, as well as a temporally varying wind field defined at the grid points. Given the relatively small size of the Bay of Fundy, the WAVAD model will be driven by historical hourly wind data from a single meteorological station. In order to properly combine the effects of the Atlantic Ocean and Bay of Fundy waves, an Atlantic Ocean wave data set will be used to derive a suitable boundary condition for the WAVAD model in the vicinity of the mouth of the Bay of Fundy. Thus, the WAVAD model will represent both local wave growth as well as wave energy propagating in from the Atlantic Ocean. Reference will be made to weather and wave observations from moored buoys in the approaches to the Bay of Fundy as required for verification of model results.

Output from the WAVAD model includes the spectral wave energy densities at all grid locations, from which standard parameters such as significant wave heights (Hs), peak wave period (Tp), peak wave direction and wave directional spreading are derived. The net outcome of this task is a definition of wave climate offshore of the site in deep water. At least a 20-year period will be modeled, with data produced at hourly intervals.

Nearshore Wave Transformation

Following definition of the offshore, deep water wave climate, the hourly hindcast will be transformed to the shallower water at the berth and marine structure locations using the nearshore wave transformation model, STWAVE. Developed by the U.S. Army Corps of Engineers, STWAVE simulates depth-induced wave refraction and shoaling, current-induced refraction and shoaling, depth and steepness-induced wave breaking, wave generation, and wave-wave interaction and white capping that redistribute and dissipate energy in a growing wave field. It is a robust model that has been widely applied.

The wave transformation modeling will be carried out at both low and high tide, in order to assess the potential effects of water level on the site wave characteristics. Results from the STWAVE model will be extracted at the berth site and the locations of other marine structures located shoreward.

Operational Wave Climate at the Berth

Using the model results, a long term (20 year) wave climate will be developed at the berth locations. Statistical analyses will be performed on the wave climate.

Extreme Wave Analysis

Design wave conditions will be developed for the berth and marine structure locations through statistical extreme value analyses of the wave climate. This will provide estimates of wave heights by probability of occurrence (return period). Due to the potential for currents to modify waves, some specialized numerical simulations will also be conducted using the STWAVE model.

Extreme Water Level Assessment

Extreme water levels will be assessed with reference to:
- record high and record low water levels in the tidal records
- storm surge estimation and
- survey of the upper foreshore for any physical evidence of past record high water levels such as debris deposition or wave erosion

It is noted that the design of the cargo loading system will require an elevation of about 10 metres above higher high water and structure decks will be located just below the cargo loading system. The structures and cargo loading systems for the type of operation proposed for Whites Point are typically high enough to be unaffected by extreme high water levels.

Reporting

Technical reports will be prepared summarizing study methodologies and major findings. The study findings will be a key input into the load case development for structural design.

Development of Marine Environmental Load Cases

With reference to the above analyses, factored and combined marine environmental load cases will be developed for the structural design. Extreme values usually define the governing load cases for fixed maritime structure design.

Maritime Fixed Structure Design

Structural design will proceed pursuant to standard design codes and practices for the construction materials used. The scope of structural design will include strength design for static and dynamic loads. Analysis and design for fatigue is within the scope of design. In addition, the design process will include an assessment of seabed to scour at the foundations of the structures. In the case of steel structures, coatings and corrosion prevention will be within the scope of the design.

Conclusions

The methodology outlined here is a fairly routine procedure for design of fixed maritime structures in the coastal zone. The analytical skills and computer software to undertake the analyses of the physical marine environment are somewhat specialized so it is anticipated that a specialist subconsultant will work for the engineering team. Numerical models used will be verified against measured data so the results can be used with confidence. Standard codes for design and practice will be used to develop structure designs that will perform safely and reliably in the coastal environment of Whites Point.

Item # 8 Calculating the Water Supply

Information Request

Discuss variability in water supply due to climate change considerations taking into account the available guidance.

Response:

Water supply is by precipitation only and no subsurface supply will be used. For precipitation predictions refer to *Variability and Extremes in Statistically Downscaled Climate Change Projections at greenwood, Nova Scotia by Michael Pancura and Gary Lines - Meteorological Service of Canada, Atlantic Region Science Report Series 2005-10, October 2005,* which predicts:

For precipitation:

1 Precipitation is projected to increase by about 10%
2 Positive annual precipitation anomalies (excesses) are projected in 20 of the 30 years by the 2080's, a 100% increase over historical values; while negative annual anomalies (deficits) are projected in 7 of the 30 years, a decrease of 50% over historical values.

3 The number (frequency) of days with no precipitation will increase by 253 days/ tri-decade or about 84 days/year; ergo more precipitation is projected to fall on fewer days
4 Precipitation intensity is projected to increase; i.e. the number of days with light precipitation (<2mm) will decrease, while days with moderate (2-25mm) to heavy (>25mm) precipitation will increase.
5 The frequency of occurrence of the extreme 'maximum annual 5-day total precipitation amount' is projected to increase. Under this scenario, the 100 year return period event (115mm) in the base climate period 1961-90 is projected to recur once every 10 years by the 2050's, a reduction in the return period by a factor of about 10.

If these predictions are borne out by experience the existing design parameters will comfortably handle the changes provided an adaptive management approach is undertaken. This would be particularly applicable if the change in frequency of occurrence of the extreme and "maximum 5 day total precipitation amount" increases.

Information Request

Demonstrate that storage design and water budgeting have accounted for drought years, along with other factors such as breaches and malfunctions, and identify alternative water sources if there is a deficit.

Response:

Please refer to the Water Budget in the Project Description and please refer to 2nd submission – 11.0 Accidents and Malfunctions for breaches and malfunctions.

Item #9 Designing the Sediment Retention Ponds
Information Request

Identify and fully describe the climactic factors, including extreme events, applied to the design of the sediment retention ponds and the accompanying rationale for sizing of the ponds.

Response:

Please refer to the Water Budget in the Project Description

Item #22 Identifying Responsibility for Post Operational Issues
Information Request

Identify provisions for ensuring emergency equipment, environmental control structures and seeded areas are not damaged by ATVs after operations cease.

Response:

As noted in the decommissioning plan, the entire site would be fenced during decommissioning, primarily for safety considerations but also to ensure that the reclamation process is not compromised by inappropriate use. Regular inspections of the fencing will be carried out to ensure that safety is not compromised and sensitive reclamation areas are not being damaged.

Comment

Identify plans and responsibility for monitoring and maintaining the integrity of the decommissioned facilities.

Response:

Please see Decommissioning Plan in Section 7.10

WP 1652 Nova Scotia Department of Transportation and Public Works

Comment

Whites Cove Road (hereinafter referred to as the "Road") is a publicly listed but unmaintained gravel road (Class K).

Response:

Noted

Comment

The existing entrance to the Road where it intersects Highway 217 has been checked for Commercial Stopping Sight Distance (SSD) and it meets the requirements of TPW at that point. However, as the width of the right of way (ROW) on the Road is believed to be only 33 feet wide, it may be difficult for tractor trailers to exit Hwy 217 onto the Road safely. Discussions must take place between the proponent and TPW via the local Area Manager, with respect to upgrades to the Road as well as the intersection of the Road and Hwy 217, before any upgrades take place. Should additional ROW be required to properly design the Road this would normally be at the cost of the proponent.

Response:

Noted – Bilcon will consult with TPW should any upgrades of the Whites Cove Road be contemplated. Bilcon has acquired the land to the north of the Whites Cove Road so that should additional ROW be required for design considerations, it is in place.

Comment

Should upgrades or changes to the Road be necessary, "Access to Property" and "Breaking Soil" permits are required from TPW. Any changes to the present Road must be done according to TPW standards or as directed by TPW. Changes to the Road which result in environmental or other problems will be the responsibility of the proponent.

Response:

Noted

Comment

An upgraded Road will only be maintained if the Road is brought up to maintainable appropriate government standards and the maintenance standards would be as per the normal priorities for the area.

Response:

Bilcon has noted in the EIS that a paved access road will be constructed to the quarry property to reduce dust in the local area. The Whites Cove Road or an alternate access road will be built to the appropriate government standards and paved.

Comment

Gated access on a public road is not standard government policy. Gated access to a private road constructed and maintained by the proponent is at the discretion of the proponent.

Response:

The Whites Cove Road would not be gated at any location along the road since it is a public road. Access would be restricted only during a blasting operation. Should a new access road be developed on private property, it would be gated.

Comment

Due to siltation problems along the present Road, any construction which aggravates sediment and erosion control issues on this Road especially on the down grade near the shore of the Bay of Fundy should be first addressed with the local Area Manager and must meet the requirements of the Department of Environment and Labour and Federal Department of Fisheries and Ocean officials.

Response:

Bilcon is very well aware of the siltation issue on the down grade portion of the Whites Cove Road near the Bay of Fundy shoreline and has assisted TPW in trying to solve this issue. Unless Bilcon acquires the Whites Cove Road from the quarry property line to the Bay of Fundy shore, Bilcon will conduct no operations of any kind on the Whites Cove Road.

Interest Groups

WP 1405 Town of Annapolis Royal – Mayor John Kinsella

Comment

…The operation will run 24 hours a day, for 46 weeks of the year.

Response:

The quarry will operate from 6:00 AM to 2:00 PM and from 2:00 PM to 10:00 PM for approximately 44 weeks per year. Please refer to EIS Chapter 7.0 and the Project Description.

WP 1625 Partnership for Sustainable Development

Deficiency Statement 26

…the overall site plans for the 50-year project (illustrated in Plans OP1-8) use a rather elementary two dimensional method. These plans are missing the illustration of the most important component of a quarry: an isometric view of the "benches" showing the dimensions of the bench and the blast geometry in each of the seven stages of quarry operations.

Response:

Additional details of the quarry have been provided in response to the Panel's request. Please refer to the Project Description.

Deficiency Statement 27

The EIS fails to provide detailed engineering work concerning the design of the quarry. Absent from the EIS are details on the design of the intermediate and ultimate highwalls (slope angle), bench and bench width. Design information is required to ensure the safety of the highwalls. This may require a geotechnical investigation to provide the needed data.

The EIS identifies that Whites Cove Road, a public right of way, will be maintained through the Project site. Quarry activities will be undertaken on both sides of the road. No design work is provided on how the safety of the access road will be maintained. Additional information is required, particularly concerning the slopes on both sides of the road, in order to ensure safety to the public both during and after the operation.

Response:

Detailed engineering work is not required for an Environmental Assessment and hence, has not been provided. Greater detail will be provided to NSDEL during the Industrial Permit phase. Further detail, however, has been provided with respect to the Whites Cove Road and can be found in the Panel's request for information under 7.0 – Project Description.

Deficiency Statement 28

The EIS fails to provide adequate detail on the methods proposed for the construction of the marine terminal, as required by the Guidelines. No diagrams or plans are provided, nor is any reference provided on the effectiveness of 'conventional marine methods', in terms of environmental protection.

The EIS fails to quantify the horizontal and lateral stresses that the mooring dolphins may experience under both normal and adverse conditions. The EIS does not incorporate the local effects of waves, wind, swell action and forces originating from a docked ship on the marine facility. No assessment is made of whether the proposed design is suitable for the location and sufficiently strong enough for the proposed life span of the Project. No information is provided on the fendering systems to be employed between the ship and marine terminal

In order to rectify these deficiencies, the Proponent should provide additional information on the design of the marine facilities, their strength and suitability for the location, and construction methods to be employed.

Response:

As with 27 above, detail engineering design is not required for an environmental assessment.

Deficiency Statement 29

7.9 – Modification - An example of the lack of appropriate mining plans is illustrated by the outline of the quarry boundary shown in Figure 5 of the EIS Chapter 7.9. The height of each of the four benches is approximately 22.5 m, which is about 3 times the height of the bench that is inferred from the proposed Shot 1 (of the blasting plan of 2002, examined in detail later at Deficiency Number 31.). The EIS does not include the design of the benches and geometry of the progressive blasts, which will permit to achieve the boundary of Figure 5 and the planned production of aggregate, in conformance with the provincial and federal guidelines for observing the environmental constraints. No information is provided regarding the standard blasting plan to be used during the 49 years of quarry operations.

Response:

The blasting protocol included in the EIS is simply a protocol to indicate the procedures for blasting. Every blast conducted on the project, whether for construction or operations, will be specifically designed and hence there is no standard blasting plan which would be used during the 49 years of quarry operations. Again, this is a request for detailed design or detailed operating procedures which is not appropriate at the environmental assessment stage.

Deficiency Statement 30

…The arrival, mooring, docking, loading and departure of the marine vessels represent an important component of the Project, where large pieces of equipment are being utilized and subject to the weather. The severity of impact arising from an accident during this phase of the Project has the potential to be significant.

The EIS provides relatively little information on this critical project phase. The EIS is deficient in addressing:

the number and training of staff available for docking and departure. radio communications to be used between the ship and marine terminal who will monitor local weather conditions and determine whether it is safe for the ship to dock and remain docked.

The EIS identifies that "standard mooring buoys for the previously described panamax size vessel will be installed for the bow and stern lines." No description is provided on how these buoys designed, anchored and utilized. The EIS does not identify if a small boat (or boats) will be available to tow and connect mooring lines to the buoys and whether additional shore-based docking facilities will be required for these.

The EIS states that 'For docking purposes, ship operators do not consider this location to be significantly different that other locations such as Atlantic Minerals, Port au Port, NL, and Belledune, NB. Tug assisted docking will not normally be required." No information, analysis or reference is provided to substantiate the statement that the White's Point location is comparable with other ports. The EIS provides no further information as to when and under what conditions tug assisted docking would be required, and the implications of this.

Response:

The request for information in this statement covers detailed design and detailed operational planning neither of which is appropriate at this stage of the project.

Deficiency Statement 31

EIS Guidelines
7.8 – Operation and Maintenance Phase - "Explain the lifespan of the Project, and annual and maximum production rates. Describe all drilling and blasting ..."
EIS

7.8 – Operation and Maintenance Phase – The EIS gives a short description of blasting, including the statement: "the size and configuration of the blast holes and weight of explosives will vary…." The blasting protocol, for which the reader is referred to Appendix 9, also does not illustrate the bench or blast geometry. The comments of DFO on the blasting protocol (included in Appendix 9) make reference to the "proposed initial blast sequence" given in the Blasting Plan for the 3.9-hectare quarry of Nova Stone Exporters Inc., dated November 18, 2002. The 2002 plan and subsequent revisions to it are not included in Appendix 9, but are to be found in Public Registry Document # 1389 (to which no reference is made in the EIS).

For the purpose of this submission, we performed our own calculations for defining the amount of the ANFO explosive to be used per "shot" and the resulting tonnage of the blasted rock. These calculations are provided in the Appendix J, Annex 1 to this Report.

The following conclusions emerge from Annex 1.
The Blasting Protocol of Bilcon of NS of May 2005 states that "The frequency of blasting during quarry start-up will be once per week (52 blasts per year) and once every two weeks (26 blasts per year) during full production". However, the blast from the 56 holes of "Shot 1" will produce 10,640 tons, requiring 188 blasts per year for producing 2 million tons of aggregate.

The blasting design per shot shown in the EIS and other referenced documents cannot be used for meeting the goals of the proposed quarry. In our opinion, the blast design for meeting the "once every two weeks" frequency needs to be prepared and submitted by the Proponent for review by the Panel and an independent expert. The public can then spend its efforts (in a more productive way) to examine the blast design for its environmental impacts.

Response:

As noted previously, the Blasting Protocol and the proposed initial blasting were not intended to represent standard blasting design for the life of the quarry. There will be a specific blasting design for every blast conducted during construction and operation of the facility.

Deficiency Statement 33

7.10 - Decommissioning and Reclamation Phase - The EIS states that 6 acres of quarry will be opened each year, reclamation will begin after year 5, and that full reclamation will be completed one year after quarry operations cease. Based on The Concept Quarry Plans, there appears to be a substantial amount of reclamation to be completed from year 50-51. There does not appear to be a contingency plan if this timeline is not met – no discussion of a reclamation bond if reclamation is left uncompleted or efforts "fail" to achieve goals – plants/trees do not grow, erosion and sedimentation become a problem, the visual appearance is not compatible with the surrounding area, etc. The EIS fails to meet the requirements of section 7.10 of the EIS Guidelines because, although schematic diagrams of the reclamation process are provided, a detailed written plan including the timing and nature of site clean-up and rehabilitation activities is not included.

Response:

Bilcon anticipates that a reclamation bond will be required to be posted prior to any activity on the quarry site. This bond will provide surety that the reclamation plan approved by the regulatory authority will be carried out in its entirety.

EIS Deficiency 34

The EIS identifies that upon decommissioning, the south and east walls of the quarry will consist of a series of steps, each approximately 20 m in height. Stone steps of this height pose a risk in terms of falling rock and the hazard of individuals falling. The design proposed is unsafe and requires amendment. This could take the form of permanent barrier (fence) at the top of the slope and/or decreasing the angle of the slope to remove the vertical step faces.

Response:

See "Decommissioning Plan" under the response to the Panel " *To ensure public safety, the entire project site will remain enfenced to prevent public access*"

EIS Deficiency 35

While it is identified that the property is in private ownership, the EIS does not provide information on provisions for the fiscal and legal responsibility of decommissioned site, as required by the Guidelines. No information is provided on the source of funds to ensure the integrity of the site, including safety equipment (e.g. navigational lighting on marine terminal, fencing), nor how liability for the property will be addressed. The Proponent should revise the EIS to address these deficiencies.

Response:

Responsibility for decommissioning the site lies with Bilcon as set out in the Decommissioning Plan – see response to the Panel. Responsibility for ensuring the integrity of the site from the perspective of safety and for the effectiveness of the reclamation plan lies with Bilcon for a 40 year period following decommissioning. If Bilcon has not taken title to the land portion of the site over the 90 year period of the lease, responsibility for the site will then devolve to the owner of the property. With respect to the marine facilities, if Bilcon has entered into an agreement with a community group for the operation of the facility, then responsibility for its maintenance and operation will lie with the community group. If no agreement has been entered into with a community group, or developer, then the marine facility will be removed as part of the decommissioning plan. Bilcon will provide the necessary funding to carry out its obligations.

EIS Deficiency 36

The EIS identifies that a variety of site infrastructure, including the marine terminal mooring dolphins and buoys, will remain at the site after decommissioning. It is noted that navigational lighting will remain on the marine terminal. It is very difficult to propose at this stage a financial and legal structure to ensure that the marine terminal does not pose an on-going hazard beyond the end of the Project. The plan to leave the marine terminal is therefore questionable. A method for removing all the piles should be developed and described by the Proponent, or the marine terminal should be redesigned to allow an environmentally acceptable demolition and removal.

Response:

Bilcon has stated that the marine terminal will remain after decommissioning. It is entirely possible that 50 years hence, there will be a demand for a recreational facility and Bilcon is willing to work with a future group to create a recreational facility at Whites Point. This would be particularly true if the reclaimed quarry site were to be developed into a tourism venture.

If there is no demand for future use of the terminal, Bilcon will dismantle the terminal in consultation with the appropriate regulatory agencies.

WP 1626 Canadian Parks and Wilderness Society – NS Chapter

Comment

….More information must be provided on the decommissioning of the marine terminal. If much of this structure will remain in the water, what is the rationale for this? What might the effects and results be as this structure eventually degrades and breaks down? This is not adequately described...

Response:

Please see Decommissioning Plan in the Project Description.

Comment

…More information must also be provided on the appropriateness of the proposed marine terminal structure for the area. The pipe pile design will decrease impacts on the nearshore bottom habitat, but will this structure be able to withstand the force of high winds, high waves, ice, storms, and other possible weather and marine events in the Bay of Fundy over time? Will repairs or modifications likely be necessary during the life of the Project, and if so, what are the projected impacts of this?...

Response:

The marine structure will be designed to withstand high winds, wave action and storm surges. Neither repairs nor modifications of a substantive nature are anticipated during the 50 year life period of the quarry operation. Please see response to Environment Canada's Iten #7 in this submission.

WP 1636 Ecology Action Centre

Comment

…The impacts of climate change will also increase the chance that storm events will cause on-site sediment ponds at the proposed quarry site to overflow. The run off from overflowing sediment ponds could cause increased sedimentation and eutrophication in adjacent coastal waters….

Response:

Please refer to the Project Description and typical cross sections.

WP 1637 Sierra Club of Canada – Atlantic Canada Chapter

…one should be able to assume that the guidelines' requirement that the proponent provide "specific and sufficient detail" in describing the project would result in an EIS specific and detailed enough to allow for the verification of the accuracy of all assertions made regarding all aspects of the quarry operation...

...and therefore, the description of quarry components should be far more detailed. Additionally, we assume that the "vessel" in "marine transportation (e.g. routes, vessel size and type, frequency, duration of berthing, contingency plans for storms or extreme conditions" refers to the bulk carriers that would transport quarried aggregate to market…

Response:
Please see additional details provided in response to the Panel's request for more detail or clarification.