

VOLUME V
CHAPTERS 7 & 8

WHITES POINT QUARRY & MARINE TERMINAL

**ENVIRONMENTAL
IMPACT
STATEMENT**



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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 – see **Figures 1 and 4**.

Land based infrastructure and activities will include the quarrying of approximately 300 acres of the 380 acre 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 27 acres and is located 30 m above sea level. Other land based infrastructure includes quarry roads, a compound area comprising approximately 5 acres, and dyked organic and sediment disposal areas comprising approximately 30 acres each. All land development and activities will take place within the 380 acre site.

An integral aspect of the land based development is an environmental preservation zone, approximately 30 m 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. 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 10 acre water lot lease and extend approximately 200 m into the Bay of Fundy. Water depth at the mooring dolphins would be approximately 16 m 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. Diesel fuel will be used for mobile equipment such as loaders and trucks. Ammonium nitrate-fuel oil based explosives will be used for blasting. Water for aggregate washing will be obtained from storage of surface water runoff and recycled after the washing process. Waste oil from the mobile equipment will be recycled and used as fuel for heating the compound area buildings.

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

The following sections 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 proponents 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. 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.

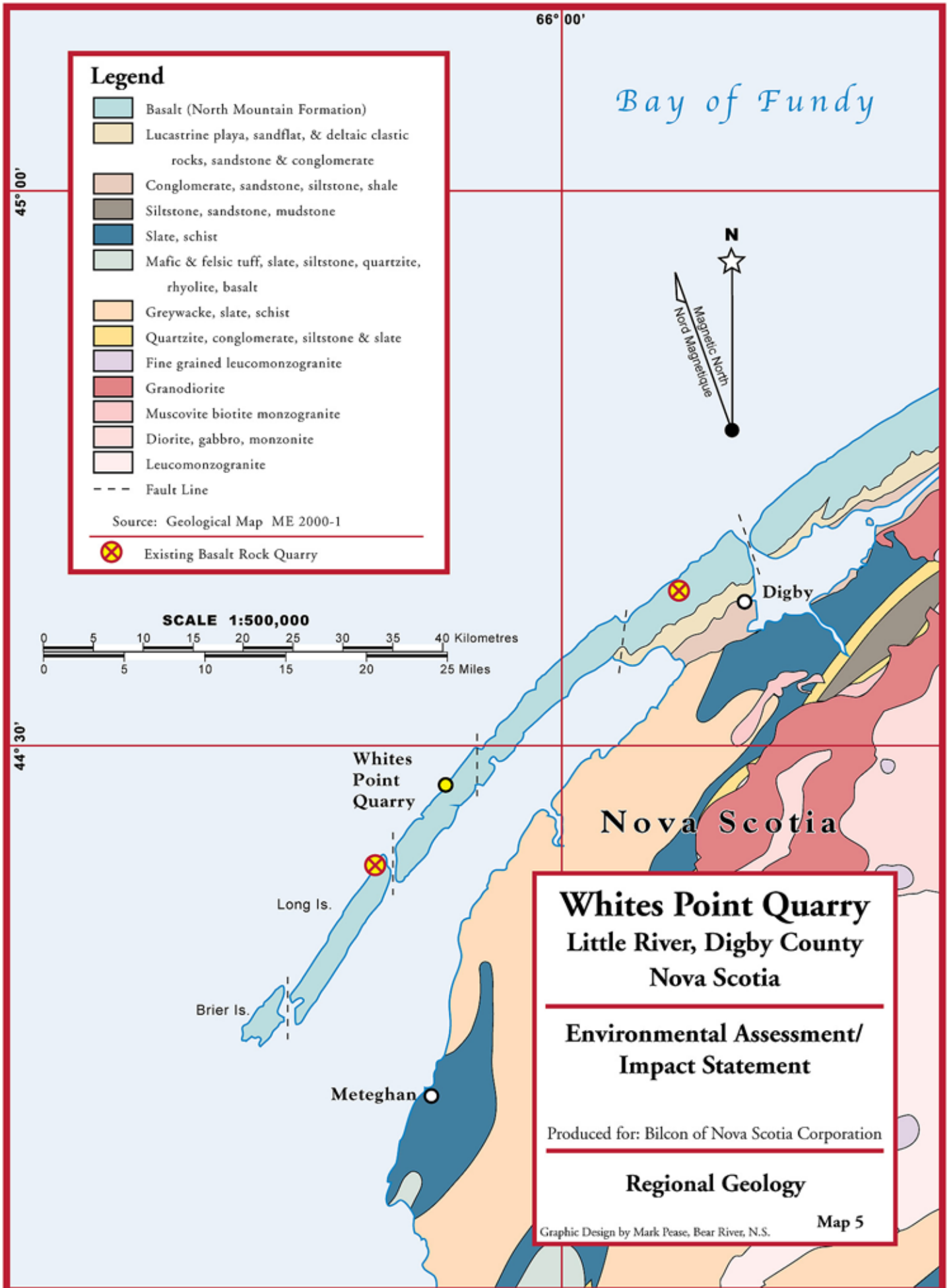
The “do nothing” alternative will not result in a viable economic diversification opportunity for the Digby Neck and region. Past land use of the proposed Whites Point quarry site has included historic use as a pit, farming, boat haul-up, unmanaged forest lands, and recently clear cutting. These past 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 rather than trucking through rural communities.
- 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 m land elevation, which limits the potential for sediment production.
- Minimal nearshore sediment deposits exist, especially within the area of the proposed 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, 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, 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.

Any quarry site located in this region could present environmental and socio-economic ramifications. During the following detailed environmental assessment/impact analysis, the Whites Point site 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.

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 380 acres with approximately 300 acres 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 tonnes 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, these 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. Also, used oil from mobile quarry equipment is proposed to provide fuel for heating the quarry shop and office buildings. 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 current (2056) 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 over the 50 year life of the project.

Land based components of the quarry infrastructure will be located above the 10 m contour elevation and above the coastal flood plain. No significant streams or rivers exist on the site, thus no freshwater flood plains 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 10 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 products per week and approximately 2 million tons per year over a 50 year project life. Construction is expected to begin in 2006. 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 **Figures 1, 2, 3, and 4**. This infrastructure is proposed for construction during 2007 – 2008. Construction and operation plans of the quarry in five and ten year increments are outlined on **Plans OP 1-8**. 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 ships to be loaded with quarry products. 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 OP 1-8**) are presented at the same scale (1:10 000) as many subsequent physical, biological, and human resource plans. This is a rather elementary, two dimensional method which facilitates “overlying” 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.

Designated inbound/outbound shipping lanes in the Bay of Fundy, along with the proposed ship route to and from the marine terminal are shown on **Map 4**.

Existing land use adjacent to the project is generally rural residential with limited commercial and industrial uses in the village of Little River. Buildings by type within 4 km of the quarry property are shown on **Maps 3 A, 3B, 3C, 3D, 3E**. Businesses and services for the community of Digby Neck are identified on **Maps 6A and 6B**.

Whites Point Quarry
Little River, Digby County
Nova Scotia

**Environmental Assessment/
Impact Statement**

- Legend**
- Environmental Preservation Zone
 - Existing Contour Lines
 - Drainage Channel
 - Constructed Wetland
 - Reforestation - Wildlife Plantings
 - Grass - Legumes
 - Private Land

Produced for: Bilcon of Nova Scotia Corporation

**Quarry Infrastructure
Plan**



Figure 1
Graphic Design by Mark Fyfe, Ben Burt, N.S.



Whites Point Quarry
 Little River, Digby County
 Nova Scotia

**Environmental Assessment/
 Impact Statement**

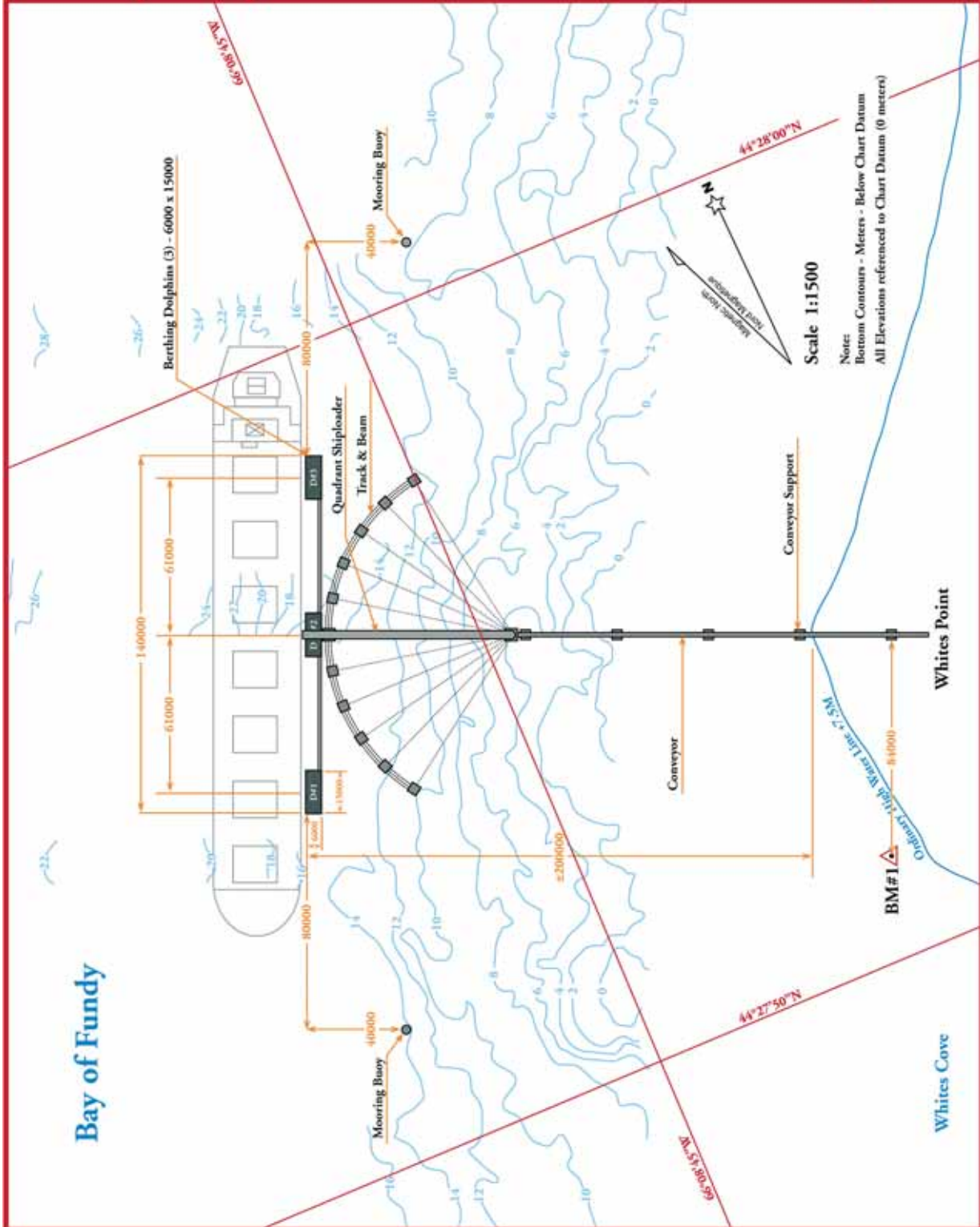
Legend

-  BenchMark # 1, Elevation 9.5M
 44°27'85"N 66°08'66"W
-  D#1, D#2, D#3, - Berthing Dolphins

Produced for: Bilicon of Nova Scotia Corporation

**Marine Terminal
 Plan**
 Figure 2

Graphic Design by Mark Proulx, Burr Evans, N.S.



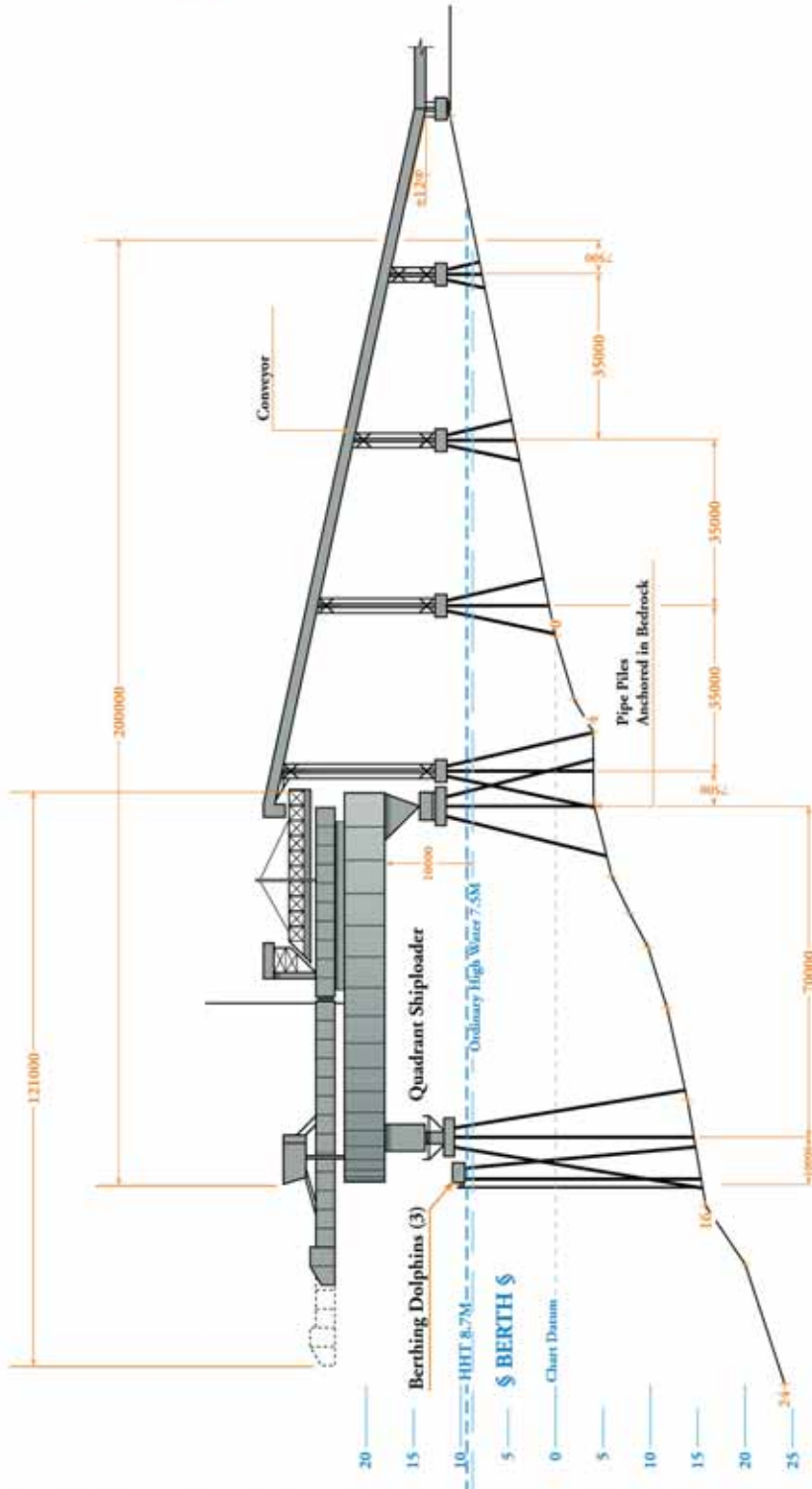
Whites Point Quarry
 Little River, Digby County
 Nova Scotia

**Environmental Assessment/
 Impact Statement**

Produced for: Bilsons of Nova Scotia Corporation

**Marine Terminal
 Elevation**
 Figure 3

Graphic Design by Mark Proulx, Blue Horizons, N.S.









Horizontal Scale 1:1000

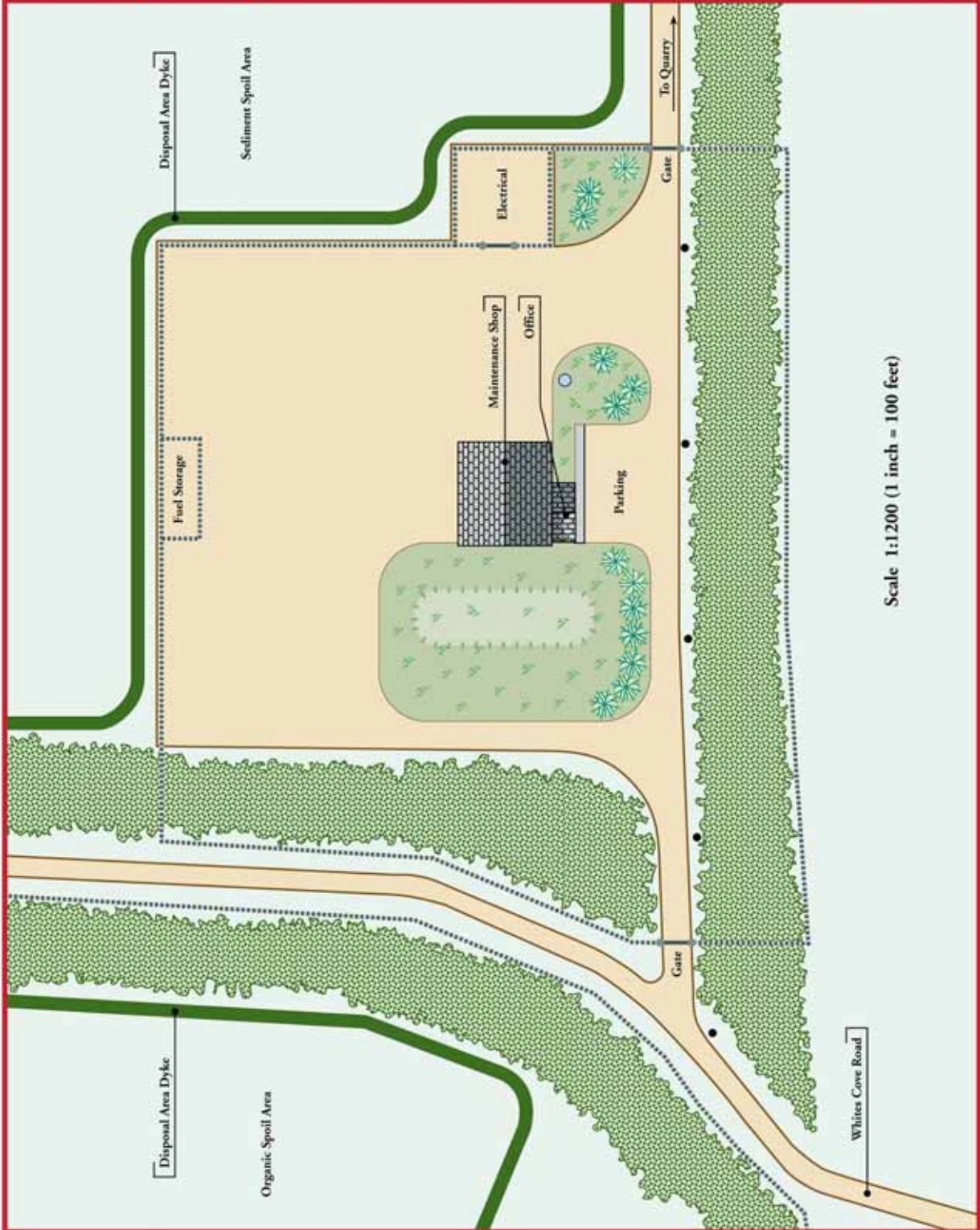
Vertical Scale 1:500

Note:
 All Elevations referenced to Chart Datum (0 meters)

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



Scale 1:1200 (1 inch = 100 feet)

Produced for: Bilcon of Nova Scotia Corporation

**Quarry Compound
 Plan**

Figure 4

Graphic Design by Mark Press, Blue River, N.S.

Whites Point Quarry
 Little River, Digby County
 Nova Scotia

**Environmental Assessment/
 Impact Statement**

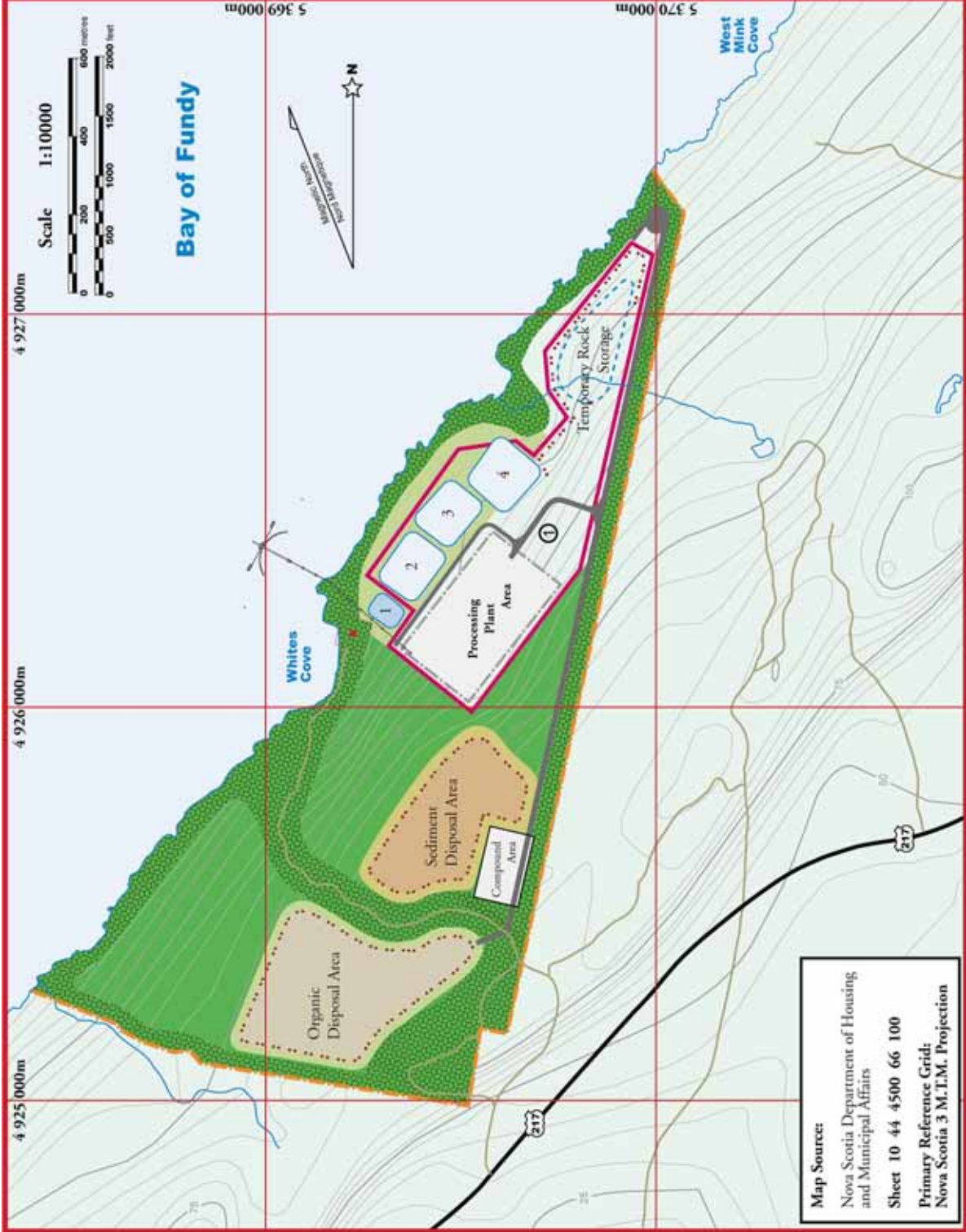
- Legend**
- Highway 217
 - Gravel Road
 - Property Line
 - Environmental Preservation Zone
 - Existing Habitat
 - Quarry Area ①
 - Processing Plant Area
 - Existing Sediment Pond
 - New Sediment Ponds (Year 2)
 - Berm/Dyke
 - Quarry Road
 - New Sediment Pond (Year 4)
 - Reclamation (Year 2)
 - Reclamation (Year 4)

Produced for: Bilcon of Nova Scotia Corporation

Concept Quarry Plan
Years 1 - 5

Plan OP 1

Graphic Design by Math Press, Bear River, N.S.



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**

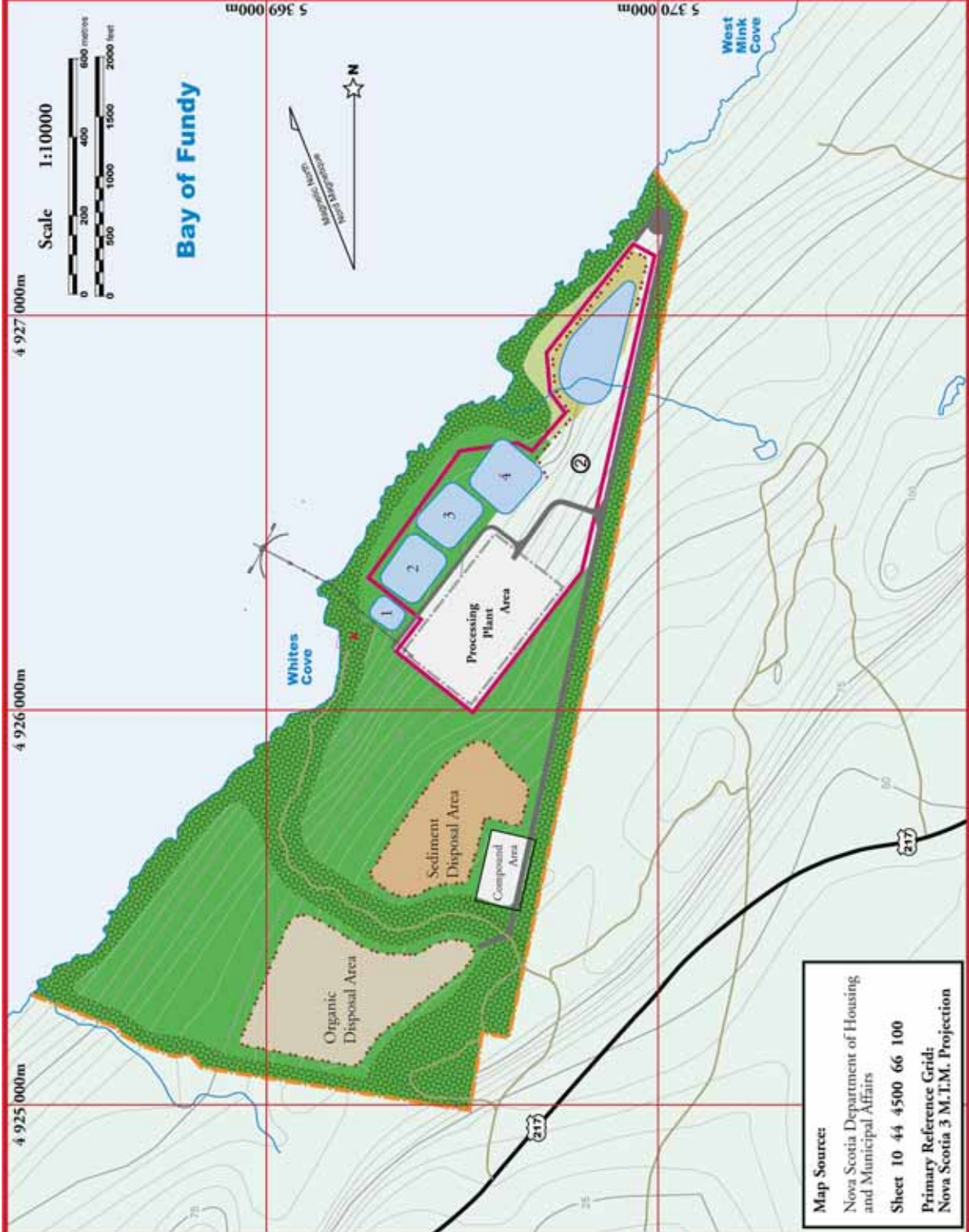
- Legend**
- Highway 217
 - Gravel Road
 - Property Line
 - Environmental Preservation Zone
 - Existing and Reclaimed Habitat
 - Quarry Area ②
 - Processing Plant Area
 - Existing Sediment Pond
 - Berm/Dyke
 - Quarry Road
 - Reclamation (Year 6)
 - Reclamation (Year 10)

Produced for Bilcon of Nova Scotia Corporation

Concept Quarry Plan
 Years 6 - 10

Plan OP 2

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



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

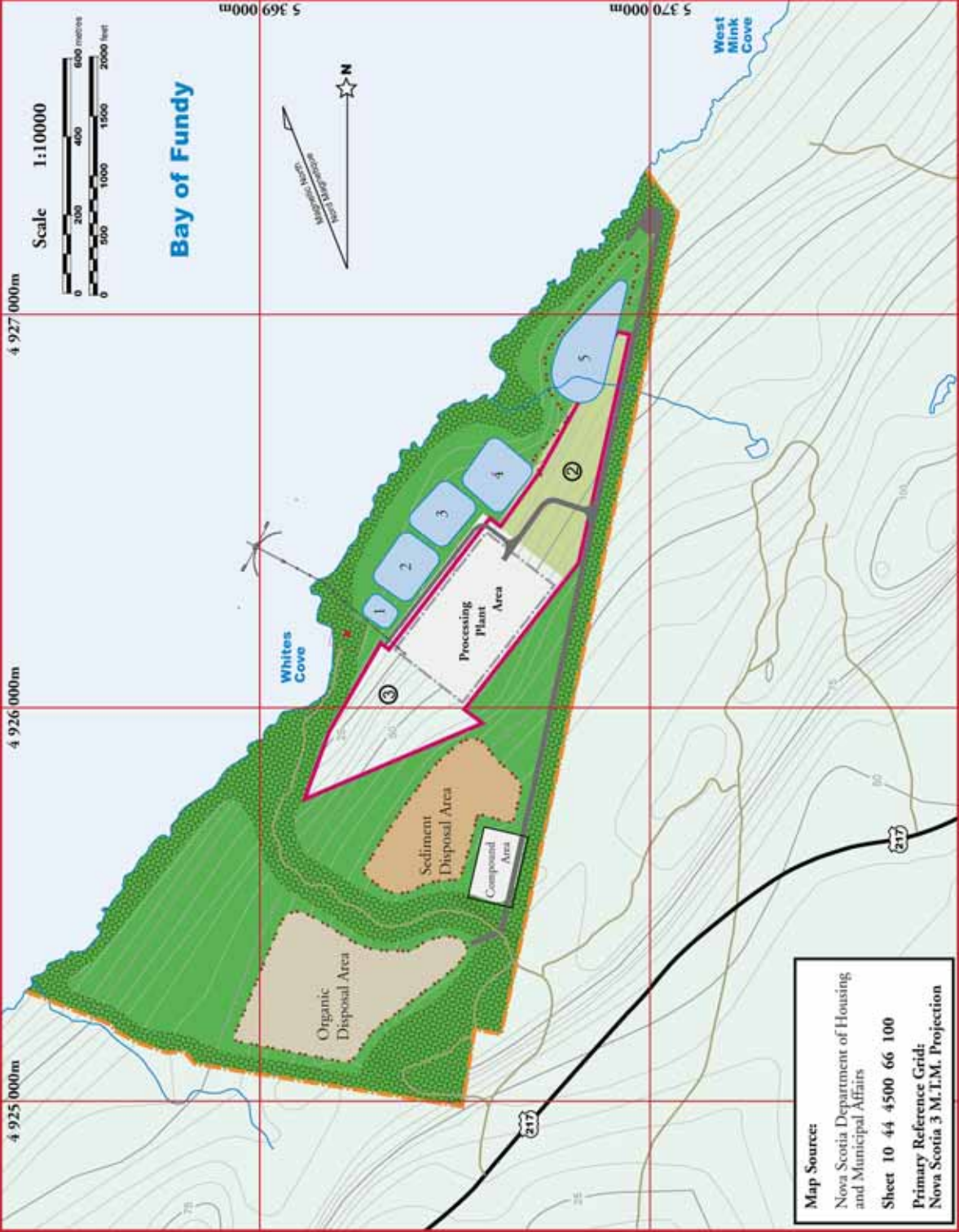
Whites Point Quarry
 Little River, Digby County
 Nova Scotia

**Environmental Assessment/
 Impact Statement**

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)

Produced for: Bilcon of Nova Scotia Corporation
Concept Quarry Plan
Years 11 - 15
 Plan OP 3



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

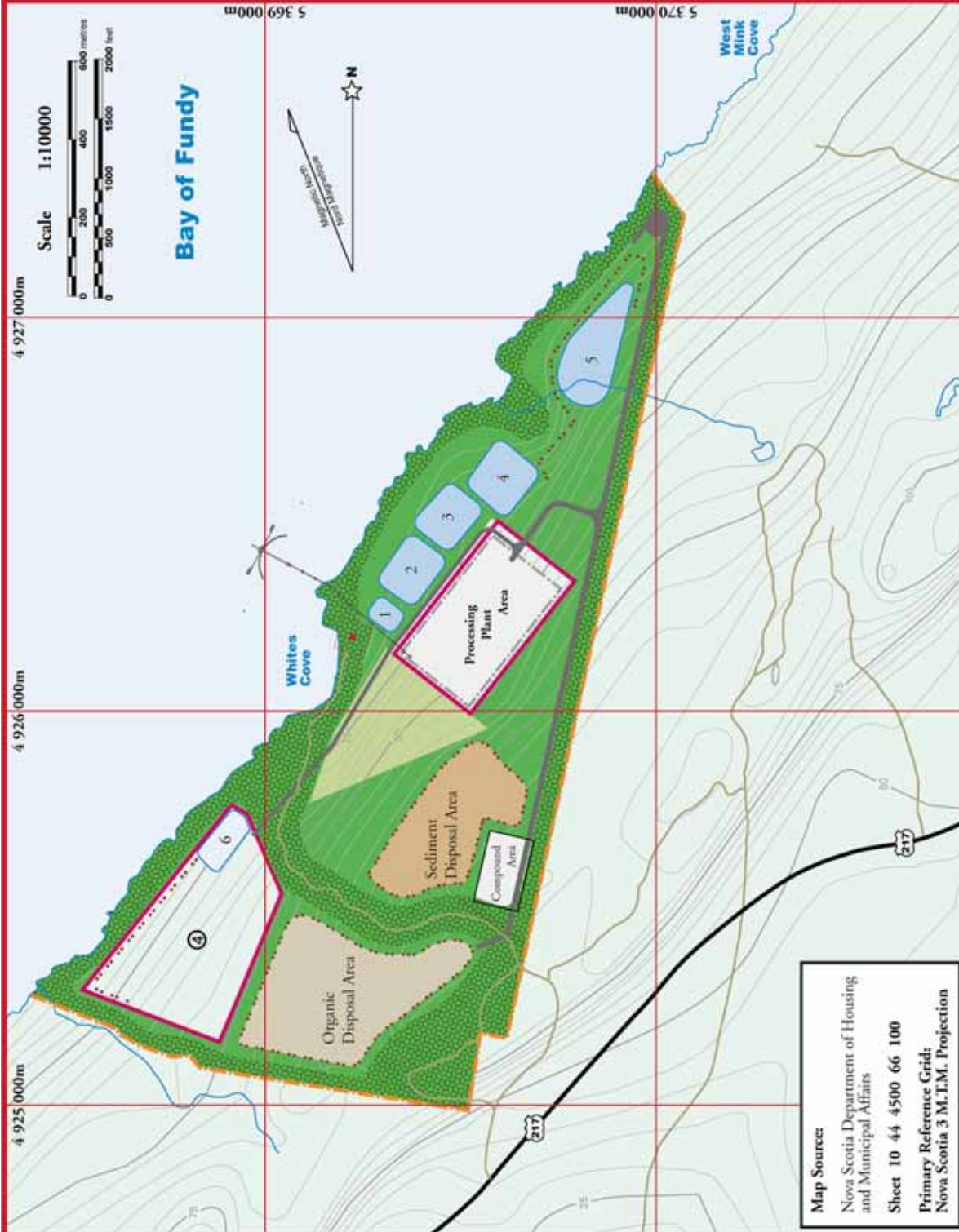
**Environmental Assessment/
 Impact Statement**

- 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)

Produced for: Billion of Nova Scotia Corporation

Concept Quarry Plan
 Years 16 - 20
 Plan OP 4

Graphic Design by: Hald, Proulx, Brier, Blain, N.S.C.



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**

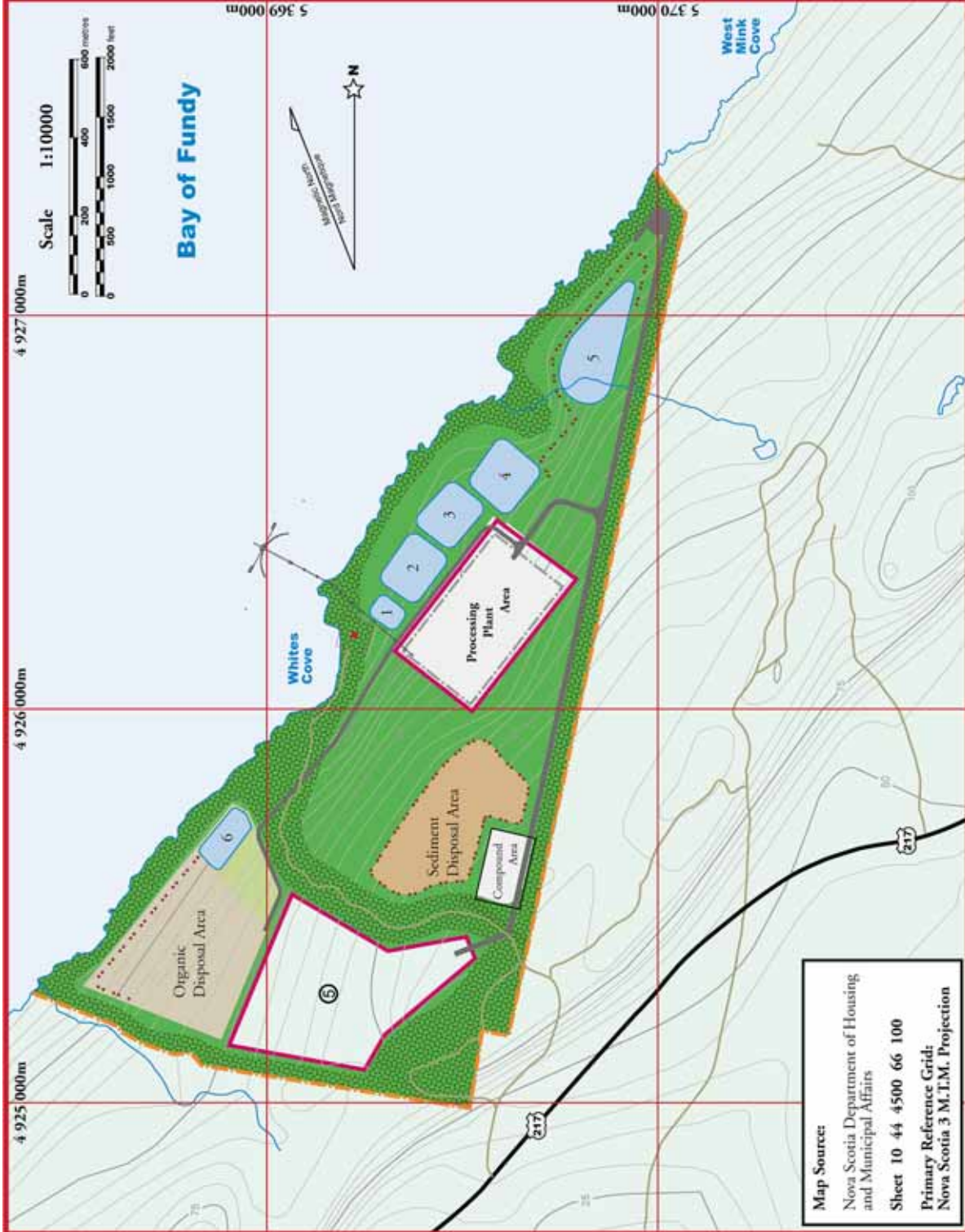
- Legend**
- Highway 217
 - Gravel Road
 - Property Line
 - Environmental Preservation Zone
 - Existing and Reclaimed Habitat
 - Quarry Area ⑤
 - Processing Plant Area
 - Existing Sediment Pond
 - Berm/Dyke
 - Quarry Road
 - Reclamation (Year 21)

Produced for: Bilcon of Nova Scotia Corporation

Concept Quarry Plan
Years 21 - 30

Plan OP 5

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



Map Sources:
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**

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)

Produced for Bilsons of Nova Scotia Corporation

Concept Quarry Plan
 Years 31 - 40

Plan OP 6

Graphic Design for Mark Press, Bear River, N.S.



Map Sources:
 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**

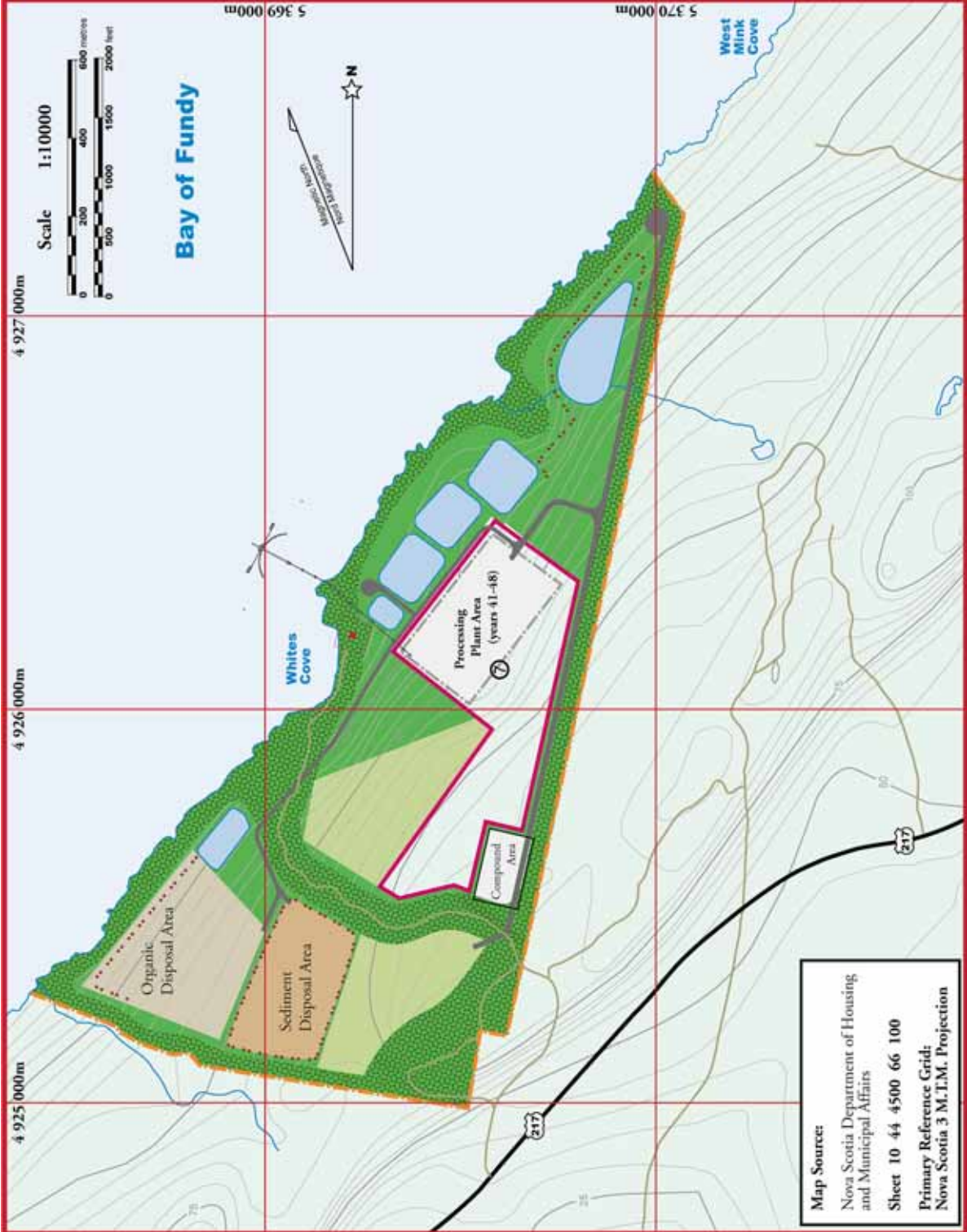
- Legend**
- Highway 217
 - Gravel Road
 - Property Line
 - Environmental Preservation Zone
 - Existing and Reclaimed Habitat
 - Quarry Area ⑦
 - Processing Plant Area
 - Sediment Pond
 - Berm/Dyke
 - Quarry Road
 - Reclamation (Year 41)

Produced for: Billion of Nova Scotia Corporation

Concept Quarry Plan
Years 41 - 49

Plan OP 7

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



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**

Legend

- Highway 217
- Gravel Road
- Property Line
- Environmental Preservation Zone
- Reclaimed Terrestrial Habitat
- Pond Habitat
- Berm/Dyke
- Road
- Reclamation (Year 50)

Produced for: Bilcon of Nova Scotia Corporation

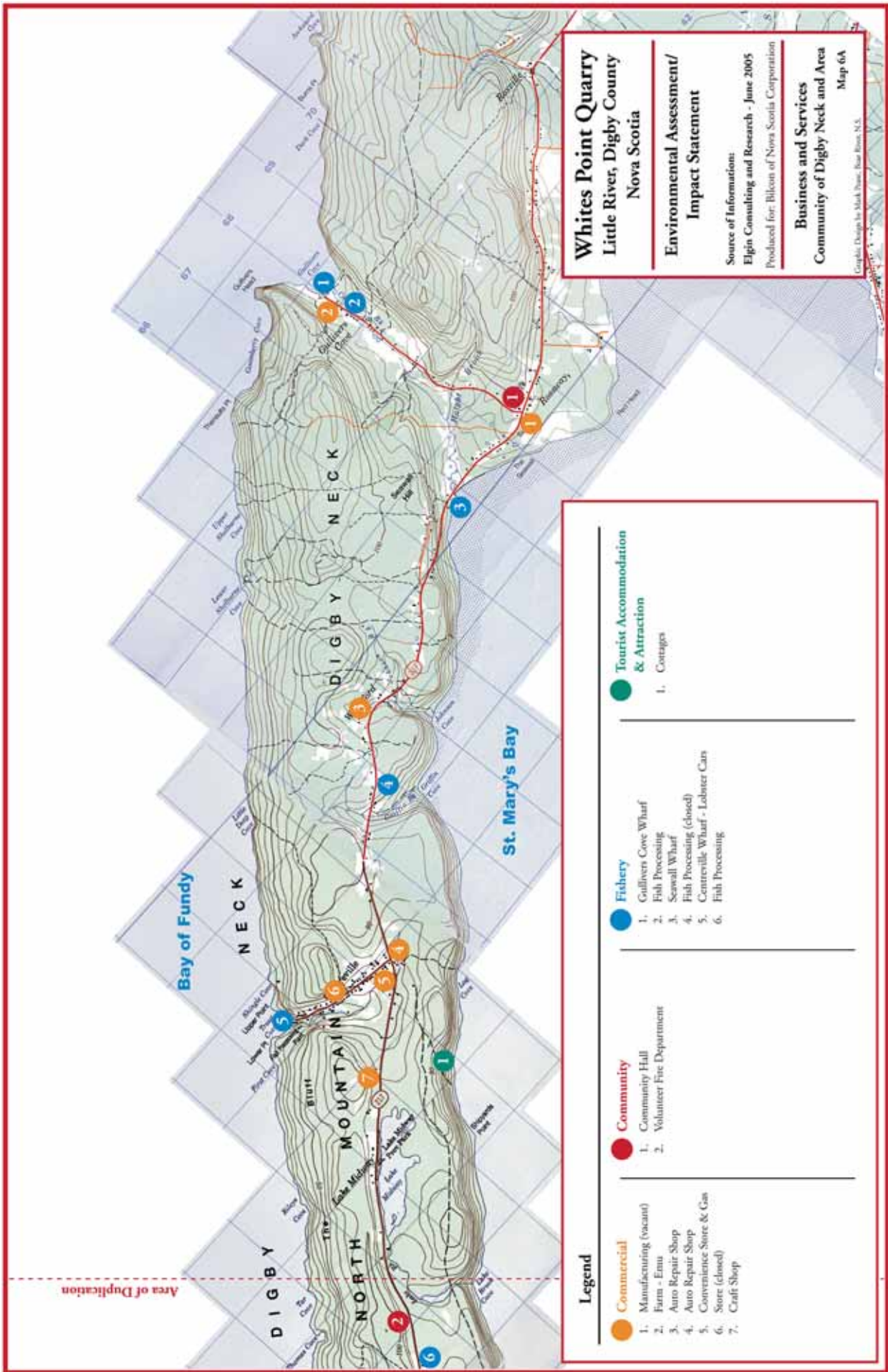
Concept Quarry Plan
Year 50

Plan OP 8

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



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**

Source of Information:
Elgin Consulting and Research - June 2005
Produced for: Hilcom of Nova Scotia Corporation

**Business and Services
Community of Digby Neck and Area**
Map 68B

Graphic Design by Mark Fraser, Peter Bliven, S.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 (Trenton)
 - 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. Trenton Harbour
 - 20. Trenton 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

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 security.

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. Also, 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. 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 four hectare quarry within the proposed Whites Point quarry site. Presently, there are no known regional-scale management plans in place for Digby Neck or Digby County.

Major physical components of the quarry are shown on **Figures 1, 2, 3, and 4. Plans OP 1-8** 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 m from the active quarry area (the area of rock extraction). A total of 5 residences are located within 500 m of the active quarry area and 19 within 500 – 1000 m.

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 15 acre/feet of organic material for each ten acres cleared. Also, sediments from the aggregate washing process will produce approximately 45 acre/feet 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

The Proponent does not have title to lands within the footprint of the project. The 380 acre parcel of land is leased from the title holders (see Appendix 25) for a period of 90 years.

The owners of the land and the Proponent 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 380 acre parcel of land leased by the Proponent 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, the Proponent 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.

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 the Proponent to prevent sediment from entering the Bay from the road structure.

Existing Rights-of-Way

The only existing right-of-way on the 380 acre 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 380 acre 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 the Proponent 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 380 acre land area are shown on **Plans OP 1 – 8** 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 **Figures 1,2,3 and 4**. Marine and land construction would proceed simultaneously. The marine terminal will require an approximate ten acre water lot, the physical quarry plant area approximately twenty-seven acres, and the compound area approximately five acres.

Sediment retention ponds (2,3,4) are on approximately fifteen acres, a dyked organic disposal area on approximately thirty acres, and a temporary rock storage area on approximately fifteen acres will be a first order of construction. The location of these areas is shown on **Plan OP – 1**.

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 twenty acres, site preparation for quarry area 1 on approximately thirty acres, processing and shipment of stockpiled rock, construction of sediment retention pond (5) on approximately ten acres, 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 **Plan OP – 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 thirty acres would be done. The location of these areas is shown on **Plan OP – 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 thirty acres of land. The location of these areas is shown on **Plan OP – 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 forty-five acres of land would be completed. The location of these areas is shown on **Plan OP – 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 forty acres of land would also be completed. The location of these areas is shown on **Plan OP – 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 fifty acres of land would be completed. The location of these areas is shown on **Plan OP – 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 thirty acres 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 OP – 7**.

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 **Plan OP - 8**.

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 \$12.50 to \$20.00. The total annual budget estimate for direct wages and administrative salaries has been established at \$1.16 million annually.

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 OP-8**. 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. 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 -**Plans OP 1-8**. 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 **Figures 1, 2, and 3**; the quarry compound area – see **Figure 4** and environmental control structures – see **Plans OP 1-8**. 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. 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 OP-1**. 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**. The compound area encompasses approximately 5 acres 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 m 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 OP-1**. Subsequent extension of these roads are shown on **Plans OP-4, 5, and 6**. Disposal of materials cleared and grubbed from this road construction will be placed in the berm/dyked organic disposal area also shown on **Plan OP-1**. 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 **Figure 1**. The processing plant will be located at the 30 m elevation and require approximately 27 acres 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 OP-1**. 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 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 m 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 OP-1**. 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.

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 ten acres 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 m wide by fifteen m long are proposed. The construction technique for the pile supported dolphins will use conventional marine methods from a conventional floating barge. 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 m 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 OP 1 – 8** – 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. Heating systems for the office and shop will be fueled by recycling waste oil from the mobile equipment. 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**.

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, and an emergency generator will be required. 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. 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 **Figure 1**, 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 1/4" 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.

Shiplading

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, mis-alignment 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 shiplader increases loading efficiency since the vessel will not have to move after mooring as would be the case with a stationary shiplader. This will allow the ship to be loaded in less than 10 hours under normal conditions. The frequency of shiplading 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 sediment ponds. 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. **Ref. Volume V, Tab 30.**

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 **OP – 1-8**. 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 8,000m³ to 12,000m³.

Waste Management

Incremental clearing and grubbing for quarry expansion will produce organic materials which will be stockpiled on-site. Also, sediment materials from the flocculent 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 – **OP – 1-8**. 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 recycled as a heating fuel.

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 Appendix 4.

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**.

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 m, a molded

breadth of approximately 32 m, and a molded depth of approximately 19.5 m. Dead weight is approximately 70,018 tonnes 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**. 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**.

Ballast and Bilge Water

Management responsibility of ballast and bilge water lies with the shipping company to operate with reference to Transport Canada's guidelines and regulations. For further details on ballast water management refer to **paragraph 9.2.1.4**.

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 flocculent tank where sediments will be removed. Periodically, sediments accumulated in the flocculent tank will be pumped to the sediment disposal area. The sediment disposal area encompasses a maximum of approximately 25 acres while the organic disposal area encompasses approximately 35 acres. 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

As mentioned previously, in year 50, Bilcon of Nova Scotia will begin closure of the quarry. This process is expected to take one year. All processing equipment, conveyors and ship loader will be removed from the site. Infrastructure such as the quarry compound area, electrical services, and roads will remain in place for future use. Portions of the marine infrastructure, such as the conveyor support system, gallery trusses and floor, mooring dolphins and buoys will also remain. Navigational lighting will remain. No underwater demolition is proposed. The environmental control structures such as the sediment retention ponds and constructed wetlands will be left in place as wildlife habitat. Any portions of core holes remaining after rock extraction in the quarry area will be appropriately filled.

All of the quarry property is in private ownership. Upon completion of quarrying as a land use, certain infrastructure, as mentioned above, could remain in place. The created land – see **Figure 5**, could be easily developed for a higher economic land use. Land uses such as a resort, residential or eco-tourism development could be considered at that time based on market demand.

Reclamation

Reclamation of the Whites Point Quarry lands is proposed to proceed incrementally over the 50 year life of the project. Approximately six acres 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 OP 1 - 8**, 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 OP 1 - 8**.

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 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**.

