

# Port of Sheet Harbour

Consulting Services for  
Master Plan

March 2020



**EASTPOINT**

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## I EXECUTIVE SUMMARY

Attention: Virginia Bonn, Nova Scotia Business Inc.

**Reference: Consulting Services for a Master Planning Exercise for the Port of Sheet Harbour.**

The purpose of this report is to provide the Port of Sheet Harbour (POSH) with guidance that will help answer the following question:

*“How can the Port of Sheet Harbour (1) improve facilities for companies who currently operate at the site, (2) accommodate new opportunities as they arise, and (3) allow for expansion of the site if a surplus of activity arises?”*

This report will address this three-part question by doing an analysis of the following key areas of interest:

- A. Property ownership, land acquisitions, and trades
- B. Current & future opportunities
- C. Movement of materials (on-shore)
- D. Ship loading/unloading

Through this *Master Plan*, the key areas of interest for the POSH will be prioritized into actionable items that can be completed as they are needed or as they make economic sense, as the POSH management deal with arising opportunities.

This study represents a culmination of EastPoint’s acquired knowledge of the Port from our involvement with a variety of projects from 1999 to present. Over the years, EastPoint has had person to person conversations with existing operators, landowners of the adjacent lands, port management, and companies and individuals who represent companies that are interested or could become interested in making use of the POSH.

Our hope is that this document serves as a Go-Forward Plan which can be executed with flexibility, both from a time and development perspective. The changes and additions contemplated in this plan for the POSH are in excess of \$80M CAD (2020), and many of the upgrades can be accomplished in unison or incrementally over the coming years as they are needed or as they are financially supported. POSH management can use this Master Plan to guide decision making when offering land agreements, negotiating the potential use cases of the Port, and attracting new business.

Sincerely,

EastPoint

## 2 EXISTING STATE OF THE PORT OF SHEET HARBOUR

EastPoint was retained by Nova Scotia Business Inc. to conduct a Master Planning Study outlining the Port of Sheet Harbour’s (POSH) current capacity, and potential upgrades, to receive, store and stage new products and material handling opportunities.

POSH is an industrial port located within the Halifax Regional Municipality (HRM). It is a 10 m + deep, ice free port, sheltered from extreme weather. The port is located on the eastern shore of Nova Scotia and is 115 km from downtown Halifax. Being close to a major port city allows for recruitment from an experienced, robust, work force, giving POSH an advantage over many of its competitors in the region. The port is also on the Great Northern Circle Route between Europe and North America.

Table 1 – Distance to Places of Interest

| From                  | To          | Distance (Nautical Miles) |
|-----------------------|-------------|---------------------------|
| Port of Sheet Harbour | Scotland    | 2400                      |
|                       | Denmark     | 2900                      |
|                       | Boston, MA  | 400                       |
|                       | Norfolk, VA | 800                       |

The port facility was last upgraded in 1987, where it increased significantly in size, efficiency and usability. The port in its current state can handle vessels with a length up to 214 meters and has 4.8 ha (12 acres) of quayside storage that is Maritime Security (MARSEC) approved. Water access to the site is by way of a 152 m long wharf with a 10 m draft. The quay is bordered by Northern Fibre, R.J. MacIsaac Construction Ltd. and Tuskent Mining properties. There is an additional 14 ha (35 acres) of storage available 400 m inland from the quay. Existing accessways to traverse from quayside to the upper yard are sloped between 2% and 10%.

The port has been used for special cargo requirements in the past, for both onshore and offshore projects and is roughly a 60 to 80-minute drive to the Halifax Stanfield International Airport (HSIA).



Figure 1 - POSH Quayside



## 2.1 Properties, Ownership, Land Acquisitions, and Trades

POSH is divided into 7 different property ordinates, owned by four different entities. The surrounding land is owned by Tuskent Mining Inc. (8). The Province of Nova Scotia (Province) owns the majority of the site including the quayside (1), a small area at the site entrance (2) and a large laydown area at the back of the site (3). Those areas owned by the Province are managed by the Halifax Port Authority (HPA). The remaining owners are Northern Fibre Terminal Inc. (4, 5), R.J. Maclsaac Construction Ltd. (6), and North East Boat Building Limited (7).



Figure 2 - Property Map Ownership

## 2.2 Current & Future Opportunities

### 2.2.1 Northern Fibre Terminal Inc.

Northern Fibre Terminal Inc. is the property owner who runs the company Great Northern Timber (GNT). GNT is currently active at the POSH and operates a wood chip production and export business. The operation currently occupies a significant portion of the site (Figure 2, Area 4 & 5) and makes use of the quay (Figure 2, Area 1) by a conveyer system which is semi-permanently placed on the wharf. An active tenant on the site is a valuable resource for the POSH and should be encouraged and supported in its initiatives for growth by the POSH. Presently, GNT has six (6) vessel calls per year and is working toward increasing their loadout to twenty (20) vessel calls per year with a new pellet export operation.

It is important to note that expansion of one operation should be possible without serious impedance on future opportunities. For this reason, this Master Plan will outline rough site orientation changes and load out infrastructure that will support the growth of GNT while improving the entire POSH's ability to accommodate additional operations and opportunities for activity.

### 2.2.2 R.J. Maclsaac Construction Limited

R.J. Maclsaac Construction Limited is currently occupying property and has a facility on the site (Figure 2, Area 6). It is important to note that this property has approximately 1.5 Acres of valuable land that is not being used nor is it prepared for any operations. The 1.5 acres are bound by Area 4, Area 1 and the paved roadway to the quay. It will be a strategic action of this Master Plan to acquire this parcel of land from R.J. Maclsaac Construction Limited and ensure that they still have adequate access to the wharf for their purposes.

### 2.2.3 High Capacity, Deep Water Quay

The most valuable asset at the POSH is the presence of a well-maintained high capacity quayside with 10m+ of water depth along side. One of the primary focuses of this Master Plan will be to optimize the use of this asset by suggesting site modifications and expansions that position the quay to be used by a variety of different industrial operations and leaving it free of encumbrances during normal operating conditions.

EastPoint reviewed the record drawings of the POSH facility dated 1998. The record drawings illustrate the original construction of the wharf including details of the concrete caissons, backfilling, lower yard preparation, and electrical works. Borehole data provided in the documents indicates that bedrock was 5-

7 meters below the original grades prior to the lower yard being constructed. Common fills were used to level and grade the lower yard area above the bedrock line and the surface of the yard was finished with nearly half metre of compacted granular. At the face of the wharf, the caissons were infilled with rock. It is presumed that the yard would have been constructed using proper construction techniques including engineering oversight, adequate compaction equipment and materials testing. If the presumption is correct, the POSH would have a high bearing capacity on its lower laydown area (Figure 2, Area 1) and could accommodate significant loads both at the quayside and on the site. This storage capacity would be further improved by the acquisition of the parcel of land owned by R.J. MacIsaac Limited.

#### **2.2.4 Future Opportunities**

In recent years the POSH has been recognized by several industries for being both capable of accepting large and heavy loads, and also available where many similar ports are burdened with continued operations which would not accommodate new operations.

As an illustrative example, one of such industries is the offshore wind energy industry. The offshore wind industry is in early stages of growth within the North American market. As a proven technology in Europe, it is set to make a breakthrough in the U.S. The hurdles of new regulations, legislative bodies and laws can be challenging for a budding technology.

The anticipated offshore wind farm transportation process starts in Europe, at facilities producing wind turbine and related components. Wind farm developments have been pegged along the northeastern U.S. seaboard. The parcels approved for lease are located off the coasts of Massachusetts, New Jersey, Rhode Island & New York. Transporting components directly from manufacturing sites, or erecting yards in Europe, to the U.S. northeastern seaboard is not economical.

A more efficient approach is to transport components to a landing site; reducing the risk of direct oversea trips and circumventing costly logistic delays associated with time sensitive construction schedules and limited availability of transportation vessels. For effective execution of such wind farm developments, an intermediate laydown area is required. Due to the limitations of the Jones Act, it is favorable for a laydown site to be available in Canada, as opposed to the U.S., offering an opportunity for the POSH as a great solution for European offshore wind farm contractors.

Other opportunities for the POSH are raw material loading and export operations. The lands surrounding the POSH are rich with resources for mining and export activities much like the wood chip and pellet operation currently functioning at the POSH.

This Master Plan will include guidance on port expansion and providing infrastructure that will encourage organizations to stockpile raw materials and load vessels for export while maintaining the use and availability of the high capacity quay.

## 2.3 Movement of Materials

At the time this Master Plan is being written, the POSH has an as-needed style of road networks on the site and this is enough to support the existing operations. In Figure 3, the darker grey access roads are public & paved while the others are private & unpaved. The Master Plan will outline a list of sequential roadway realignments, widenings, and paving that are all focused on improving existing conditions and allowing for future expansion.

Material movement on the site is impeded by sprawling operations and by severe grade changes which make the movement of heavy products difficult. The Master Plan endeavors to provide solutions which will improve the material movement on the site.



Figure 3 - Site Access Roads

### 2.3.1 Northern Fibre Terminal Inc. (GNT)

GNT currently uses the paved access road to the site entrance to deliver raw material to the site for processing in its operation. The Master Plan will show no measurable difference to GNT deliveries of raw materials to the site.



Figure 4 - GNT Operational Area

An important change to the way materials move on the site will be to facilitate the flow of material from the upper yard (area furthest from the water's edge) to the lower yard where all vessel loading operations will occur. Specifically, in the case of GNT and their current operation, the Master Plan will suggest property realignments and land swaps to improve GNT's operations and ability to expand while also positioning the province in such a way that they can expand the use of the port efficiently.



### 2.3.2 R.J. Maclsaac Construction LTD.

R.J. Maclsaac Construction accesses their site by driving the northern paved road and then entering their property. As previously noted, the northern portion of their property has strategic value to the province and to the movement and storage of heavy and high value products.

The Master Plan suggests changes to the access roads and the property alignments that will improve access to the R.J. Maclsaac Construction site and their access to the wharf to benefit their operations.



Figure 5 - R.J. Maclsaac Construction Operational Area

### 2.3.3 Future Opportunities

Currently many of the potential opportunities at the POSH are centered around making use of the upper laydown area because of its approximately 30 acres of flat area (at the southern part of the property). While this is a large and flat parcel of land, it is difficult to transport items to and from the quayside because of narrow and winding access roads and because of the significant elevation change between the upper laydown area and sea level. The blue and green dotted arrows in Figure 6 outline the existing path to the area.

The Master Plan will focus on improving access to the upper laydown area by way of land acquisition, realignment and access road widening. The key design guidelines direct the POSH management to develop access road that minimize grades as much as possible to increase the variety of items that can be transported to the upper laydown area.

## 2.4 Ship Loading/Unloading

Presently there is one heavy lift quayside that is 152 m in length, has a minimum pier side draft of 10 m and is enough to support the current activity on the site. The port can accommodate vessels up to 230 m in total length along side. Presently, GNT is loading vessels from the main quay via a conveyer system which, although small, is occupying a significant portion of the wharf and high value laydown area. All vessel loading of any kind happens from this quayside which represents a potential bottleneck in the event there are multiple operations vying for the berth in the future.



Figure 6 - Existing Route(s) to Upper Laydown Area

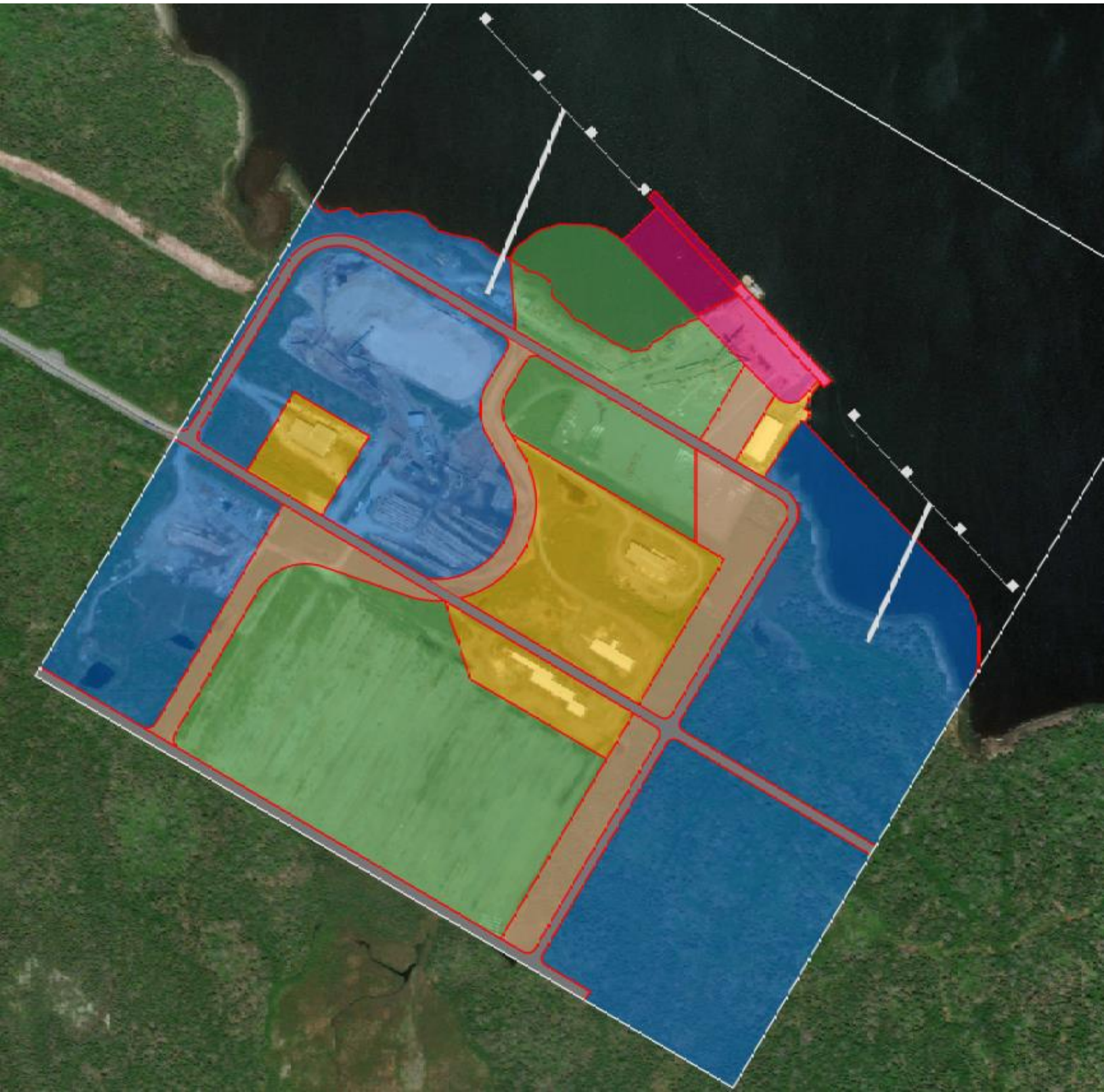


Figure 7 - Future State Layout



### 3 FUTURE STATE LAYOUT

The “Future State Layout” (Figure 7) represents the boundaries and expansions contemplated by this Master Plan Study. Achieving this layout in the short-term would be a costly endeavor and would not provide much benefit or return on investment for the Province, the POSH, or the companies currently operating on the site.

However, it is a useful exercise to envision the future of the site and plan out the incremental steps to be executed over years and decades, that all work together to create a functional space because it has a framework in place that allows management to act with a vision of the future.

The Future State Layout, at its core, is operating on the fundamental principal of material movement. To ensure long term flexibility, changes and expansions are considered from only high-level material delineation. At the POSH, all of the areas will be designated for either:

- (A) Bulk Material, or
- (B) Break Bulk Material/Specialty Product

Figure 8 indicates the areas designated for Bulk Material handling and those designated for Break Bulk and Speciality Products. It can be seen from the figure that the Break Bulk and Speciality Products will make use of the center of the site to facilitate material movement by heavy machinery (Cranes, SMPT’s, etc.). Bulk Material Movement will be kept to the outside of the site layout to prevent encroachment on valuable laydown area adjacent to the wharf and to provide those operations with simplified vessel loading structures that will not impede the wharf. These loading structures can be seen in Figure 7.



Figure 8 - Material Area Designations

### 3.1 Properties, Ownership, Land Acquisitions, and Trades

In order to achieve the *Future State Layout*, there are a number of property boundaries that need to be changed and renegotiated for the common good of site and the potential expansion abilities. Figure 9 shows the existing properties with the changes overlaid, including the highlighting of future infill areas. As with the infrastructure upgrades proposed in the Future State Layout, the property boundaries will only need to be purchased, changed, and infilled on an as needed basis as dictated by actual and potential economic activities presented to the POSH.



Figure 9 - Property Boundary Changes



### **3.1.1 Property Change (A) – GNT/NSBI Land Swap**

Property Change A would see GNT and NSBI swap parcels of land. The primary intent of this transaction is to provide GNT with continuous access to their two parcels of land so that GNT can freely move their product from the upper (southeast) property down to the water for vessel loading. The secondary intent is to secure the land at the center of the property so that it can be re-designated as a ‘right-of-way’. This re-designation should improve the current and future abilities to move break bulk and speciality products from the wharf to the upper laydown area without infringing on existing operations.

### **3.1.2 Property Change (B) – R.J. Maclsaac Construction Limited Acquisition**

The parcel of land labelled “B” in Figure 9 is owned by R.J. Maclsaac Construction Limited (R.J. Maclsaac) and approximately 2 acres. This land is not presently being used by R.J. Maclsaac, but it is very strategic because it is acting as a plug, preventing the ease of break bulk material flow from the wharf to the upper laydown areas. In addition to providing a conduit to the upper laydown area, this parcel of land can also add approximately 1 acre of high value laydown area at a low elevation which would be desirable to many specialized products.

### **3.1.3 Property Change (C) – Tusket Mining Land Acquisition**

The parcel of land labelled “C” in Figure 9 is currently owned by the Tusket Mining (which is the operating group for the German, Knaff Group). The intent of this purchase is to provide the POSH with a much-needed access road with a minimized grade for moving very large products (300-3000 tonnes). The proposed acquisition is approximately 400 m wide and runs the entire depth of the existing POSH property. The proposed access road for heavy lifting operations is proposed to be 40 m width however, the remainder of the property acquisition would be strategic for the future expansion of the site and designated for bulk material handling. In total, the recommended acquisition would be approximately 50 acres of land.

### **3.1.4 Property Change (D) – West of Wharf Infilling**

The parcel of land labelled “D” in Figure 9 is currently water at an average depth of 4 m to the west of the wharf. Infilling this parcel of land requires no negotiation with other owners but will require approvals from the Department of Environment/Department of Fisheries and Oceans (DFO) and will be an expensive endeavor. Performing the infill would create over 5 acres of new high value land at a low elevation. This infill should be performed when there is an economic opportunity proposing to use the new acreage.

### **3.1.5 Property Change (E) – East of Wharf Infilling**

The parcel of land labelled “E” in Figure 9 is currently water at an average depth of 3 m to the west of the wharf. Infilling this parcel of land would require no negotiation with other owners provided that this infill is performed after *Property Change C*. It will require approvals from the Department of Environment/DFO and will be an expensive endeavor. Performing the infill would create over 6.5 acres of new high value land at low elevation. This infill should be performed when a new bulk material operation is proposing to occupy the designated parcel of land and the existing bulk handling area is fully utilized.

### 3.2 Current and Future Opportunities

This section will detail how the *Future State Layout* will address the existing operations on the site and the future operations.

#### 3.2.1 Current - GNT Future State Layout

In Figure 10 the *Future State Layout* has the GNT bulk material handling operation shifted completely off the existing wharf face and is making use of newly installed mooring dolphins and conveyer systems. The access to the site for bulk handling operations on the west side of the POSH property is still ideally located and some additional property has been designated for the purposes of moving bulk material from the upper yard space to the base of the ship loading system.



Figure 10 - West Bulk Material Handling

### 3.2.2 Current – R.J. MacIsaac Construction and Other Operators



Figure 11 - Central Bulk Material & Manufacturing Area

Figure 11 shows the improved road networks and material movement access roads that any operation which occupies the buildings and land in the center of the POSH property will benefit from. The planned central access road through the interior of the site will provide businesses with unfettered access to the wharf and loadout opportunities.

### 3.2.3 Future – Bulk Material Handling – East side of POSH



Figure 12 - East Bulk Material Handling

In conversation with adjacent landowners, there is potential for one or more bulk material handling operations to the east of the POSH. For the same reason that the western bulk material operation is forced to the west side, so too should the eastern operations. Figure 12 shows the expanded area, infilled and with mooring dolphins and conveyors installed. The mooring dolphins would be aligned such that they can be used in a flexible manner with the existing quay. An access road and right of way would be designated prior to any activity on the site to facilitate further expansion if necessary.



### 3.2.4 Future – Break Bulk and Special Cargo Storage

There are two areas which can be immediately designated for ‘break bulk and special cargo’. One area is approximately 5 acres at the same elevation as the wharf and the other is over 25 acres in the upper laydown area which is at a much higher elevation. The *Future State Layout* has made improvements to both areas by increasing the size of the smaller area and improving the access to the larger area.



Figure 13 - Break Bulk and Special Cargo Storage

### 3.2.5 Future – Break Bulk and Special Cargo Infilled Area

To maximize the usefulness of the high capacity wharf, the *Future State Layout* recommends an infill area to the west side of the wharf and pier which can be coupled with an additional 150 m extension to the pier if needed. The proposed west bulk material mooring dolphins should be strategically positioned to allow for this pier extension project as they are likely to be installed first, based on current economic opportunities at the POSH.

The infilling would create a usable area of approx. 8 acres of laydown space at the same elevation as the wharf as well as providing a platform for continued expansion for up to a 150 m extension of the concrete caissons.



Figure 14 - Break Bulk and Special Cargo Storage - Infill



### 3.3 Movement of Materials

The Movement of materials is the primary function of the POSH and so the focus of the Future State Layout was to maximize access to the various areas around the site and provide guidance for removing bottlenecks in vessel loading and unloading.

#### 3.3.1 Passenger Vehicle Right of Way

The *Future State Layout* has areas which should be designated as right-of-way for passenger vehicles but only need to be constructed when the need arises. The intent of this designation is to prevent material operations from infringing on the right-of-way's making future expansion difficult. The contemplated passenger vehicle rights-of-way are indicated in Figure 15.



Figure 15 - Passenger Vehicle Right of Way

#### 3.3.2 Large Material Right of Way

In addition to passenger vehicle movement on the site, the POSH will want to ensure that large cargo which may need to be stored on the site, and easily moved from the wharf to other areas without disrupting other operations on the site. The Large Material right-of-ways are indicated in Figure 16.



Figure 16 - Large Material Right of Way

### 3.3.3 Ship Loading and Unloading



Figure 17 - Ship Loading and Unloading

Figure 17 above illustrates the possible *Future State Layout* for shipping loading and unloading. The Master Plan contemplates the addition of mooring dolphins and conveyors to serving the Bulk Material operations that presently exist on the site and those bulk opportunities that exist in the marketplace. For the unloading and loading of break bulk and special cargo, the Master Plan recommends freeing the quayside of any permanent or semi-permanent structures like conveyors, buildings or otherwise to allow for improved work flow for those break bulk operations. Also contemplated is a wharf extension to the north west of the existing pier. This extension is facilitated by the placement of the mooring dolphin which will be constructed in such an orientation as to not impede with the POSH's ability to expand the pier when opportunity arises.

#### 4 EXPECTED UPGRADE COSTS

The contemplated upgrade costs for this project are expressed in 2020 Canadian Dollars. The reader should understand fully that these prices are conceptual rough order of magnitude (ROM) pricing.

In Figure 18, a numbering system has been assigned to highlight the features which can be procured to through traditional engineering and construction methods. Some of the features of this Master Plan will require the Province to negotiate with various landowners and it will not be possible to put estimated costs to those items.



Figure 18 - Infrastructure Upgrade Features

| No. | Feature                                                                          | Units                  | ROM Cost Estimates | Est. Time to Initiate Design/Construction |
|-----|----------------------------------------------------------------------------------|------------------------|--------------------|-------------------------------------------|
| 1   | Grading and preparing parcel to match adjacent laydown area                      | 1.24 Acres             | \$ 400,000         | Immediate                                 |
| 2   | Infilling to produce 6.5 acres of similar elevation land south east of wharf     | 150,000 m <sup>3</sup> | \$ 4,500,000       | 12 months permitting                      |
| 3   | Infilling to produce 5 acres of similar elevation land north west of wharf       | 100,000 m <sup>3</sup> | \$ 3,000,000       | 12 months permitting                      |
| 4   | Wharf extension to provide secondary berthing pier for heavy lift operations     | 150 m                  | \$ 50,000,000      | 12 months permitting                      |
| 5   | Wide array of mooring dolphins, support piers, conveyors, and catwalk north west | 250 m                  | \$ 9,000,000       | 8 months permitting                       |
| 6   | Wide array of mooring dolphins, support piers, conveyors, and catwalk south east | 175 m                  | \$ 8,500,000       | 8 months permitting                       |
| 7   | 40 m wide unpaved access road to supply heavy loads to and from the upper area   | 550 m                  | \$ 900,000         | Immediate                                 |
| 8   | 25 m wide unpaved access road to supply heavy loads to and from the upper area   | 750 m                  | \$ 750,000         | Immediate                                 |
| 9   | Passenger Vehicle Paved Roadways                                                 | 2,250 m                | \$ 900,000         | Immediate                                 |

## 5 FINAL THOUGHTS

The Port of Sheet Harbour is a prime location within Nova Scotia to support a variety of activities related to export shipping and off-shore infrastructure projects. The infrastructure upgrades contemplated in this Master Planning exercise are intended to act as a guide for the Province of Nova Scotia and the management of this Port. Having a firm grasp of the possible configurations of the site will allow management to make land acquisitions, trades and upgrades to the site with good comfort that those upgrades will not impede the future abilities of the site.

Each of the infrastructure upgrade features suggested can be undertaken independently of on another which should provide the port management with ample flexibility to expand the ports infrastructure as it is needed