

TABLE 6.23 Environmental Effects Assessment Matrix: Atmospheric Environment

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects				
			Magnitude	Geographic Extent	Duration/ Frequency	Reversibility	Ecological/Socio-economic Context
<p>KEY Magnitude: 1 = Low: Within normal variability of baseline conditions. 2 = Moderate: A positive or negative change that may be measurable but is within standard objectives. 3 = High: Changes that result in persistent or regular exceedances of standard objectives, or which contribute to such exceedances</p> <p>Geographic Extent: 1 = Environmental effects restricted to Project footprint. 2 = Environmental effects extend beyond the Project footprint but remain with Assessment Area. 3 = Environmental effects extend beyond Assessment Area.</p> <p>Duration: 1 = Short term: Effects are measurable for <1 year. 2 = Medium term: Effects are measurable for 1 to 5 years. 3 = Long term: Effects are measurable for >5 years.</p>		<p>Frequency: 1 = Occurs once. 2 = Occurs rarely and at sporadic intervals. 3 = Occurs on a regular basis and at regular intervals. 4 = Continuous.</p> <p>Reversibility: R = Reversible. I = Irreversible.</p> <p>Ecological/Socio-economic Context: 1 = Area is relatively pristine or not adversely affected by human activity. 2 = Evidence of existing negative environmental effects (e.g., existing stream crossings).</p> <p>Prediction Confidence: Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation L Low level of confidence M Moderate level of confidence H High level of confidence</p>					

6.6 Land Use

Land Use has been selected as a VEC to assess the interaction between the Project and current and proposed land uses, including occupation and public and private use of the lands within and adjacent to the Project. Specifically, it includes consideration of zoning, development plans, existing recreational activities, and residential, commercial and industrial structures and activities. Development patterns and land use play an important role in shaping the character and quality of life, economic vitality, and the socio-economic well-being of a community. The potential environmental effects of the Project on land use are a particular concern to the public, stakeholders and individuals that own properties in the area adjacent or in close proximity to the Project. This VEC is also closely related to the Atmospheric Resources VEC (Section 6.5) as well as viewshed and traffic studies that were undertaken for this environmental assessment.

In this assessment, the potential change to existing land uses (Section 4.13) were examined for possible Project-related changes to the physical environment. The assessment considers Project-related noise, air quality and visual effects as they might affect the use or enjoyment of the surrounding

properties. The Project may also result in reduced access to and use of land for recreational activities (e.g., trail walking) as well as changes to traffic patterns.

Designated land use, as expressed through municipal zoning regulations, is an important consideration in this evaluation (i.e., Project compatibility with on site and surrounding land uses and zoning). The Project is permitted under the current designated land use and zoning. The current designation and zone was established during the most recent Municipal Planning Strategy (MPS) review and was subject to extensive public participation and approval by the Cape Breton Regional Municipal Council. Development of the land for use by the Project represents an increase in the current use-value obtained from the land to the benefit of the people of Sydney and the CBRM.

6.6.1 Environmental Assessment Boundaries

Spatial and Temporal

Determinations of the spatial and temporal boundaries of the Project have been developed considering potential interactions with land use. Spatial boundaries for the evaluation are based primarily on the location of the Project and Project infrastructure and components. This area also includes zones of potential influence from the Project on Land Use with regard to visual aesthetics and noise and dust emissions. These boundaries are referred to as the Assessment Area for this VEC.

The temporal boundaries have been developed in considered of the time period during which land use will be affected. This will include the construction period and through the operational life of the Project. Other temporal considerations with respect to land use include those times of year and time of day when use and enjoyment of lands may be more or less affected by aspects of the Project (e.g., noise, visibility).

Administrative and Technical

The Project is located in the CBRM and the CBRM MPS is the policy document that describes plans for future development within the City. The CBRM Land Use By-Law (LUB) is the legal instrument that implements the MPS that translates the more general concepts and policies of the Plan into specific development prohibitions and permit requirements. The MPS and LUB have been prepared in accordance with the *Municipal Government Act (MGA)*, which is the provincial legislation identifying municipal powers and authority in regulating land use.

The assessment of the potential interactions between the Project and Land Use relies on existing available information and data. In addition, information was obtained through interviews with key stakeholders, as well as site visits and secondary data and document review. The quality and extent of the available information determined the technical boundaries.

6.6.2 Residual Environmental Effects Evaluation Criteria

For Land Use, a significant adverse residual environment effect is one where the proposed use of land for the Project and related facilities is not compatible with adjacent land use activities as designated through a regulatory land use process, and/or the proposed use of the land will create a change or disruption that widely restricts or degrades present land uses to a point where the activities cannot continue at current levels and for which the environmental effects are not mitigated or compensated.

6.6.3 Potential Interactions, Issues and Concerns

The Project is located on private lands controlled or managed by the proponent. Given the size and scope of the Project, the visibility of the facilities, and location of facilities with respect to surrounding land uses, the Project has potential to interact and affect existing uses during all phases of the Project.

The site is designated and zoned Sydport Industrial Park (SIP), which enables the proposed industrial use. The land use designation and zoning was approved by the CBRM Council and the Minister of Service Nova Scotia and Municipal Affairs in 2004. The proposed Designation and Zone were subject to a variety of public consultation sessions conducted by CBRM, in accordance with the MGA. The development is in accord with the proposed land uses enabled in the MPS and LUB.

Notwithstanding this zoning, the Project will interact with existing land use in a number of ways. The Project site will occupy land and will result in changes to informal land use. Construction and Operation environmental effects may extend to adjacent lands areas physically influenced by Project activities, such as changes in traffic patterns, noise levels and the visual environment. Generally, the Project will complement the substantial industrial activity and development in the immediate area of the proposed site; however, other uses could be adversely affected.

A Change in land use is the potential environmental effect that has been selected for evaluation with respect to the Land Use VEC. The potential environmental effects on Land Use are identified in Table 6.24.

TABLE 6.24 Potential Interactions, Issues and Concerns for Land Use

Project Activities and Physical Works	Potential Environmental Effects
	Change in Land Use
Construction and Commissioning	
Dredge and Dewatering	1
Vessel Transportation	2
Construction of confined disposal facility	2
Site Preparation (clearing and grubbing, grading)	2
Construction of land components (including road, rail, buildings)	2
Operation	
Marine Vessel Traffic	2
Loading and Unloading Vessels/Trains	2
Site Stormwater and wastewater Management	1
Equipment and Materials Storage	1
Maintenance/Repairs to Terminal	1
Note - Project-Environment Effects were ranked as follows: 0 No interaction. No substantive interaction contemplated. 1 Interaction will occur. However, based on past experience and professional judgment, the interaction would not result in a significant environmental effect, even without mitigation, or the interaction would clearly not be significant due to application of codified practices 2 Interaction may, even with codified mitigation, result in a potentially significant environmental effect and/or is important to regulatory and/or public interest. Potential environmental effects are considered further and in more detail in the EIA.	

Table 6.25 provides the measurable parameters that will be used for the assessment of the environmental effect of Change in Land Use, and the rationale for the selection of the measurable parameters.



TABLE 6.25 Measureable Parameters for Land Use

Environmental Effects	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Land Use	Area of land use change (ha) due to the Project	Used to provide a measure on the direct environmental effect of the Change in Land Use on current use of the land
	Number of adjacent properties affected by emissions and noise	Used to provide an indication of the extent of the environmental effects on the use and enjoyment of properties. Results of the Atmospheric Environment assessment are referenced, along with established noise and emission guidelines
	Total land area with view of Project facilities	Used to provide measure of the environmental effects on the visual environment
	Reduction in transportation level of service for area travelers	Used to provide an indicator of potential changes in traffic flow and patterns

Construction and Commissioning

The Dredge and Dewatering activities occurring during construction and commissioning are anticipated to have minimal interactions with land use have been rated as “1” in Table 6.24. The only anticipated interactions are the increased noise emissions that may be generated during dredging; as noted in the Atmospheric Environment VEC (Section 6.5), mitigation measures and monitoring will be undertaken during Project Operation to ensure that effects from noise and dust on nearby sensitive receptors are not significant. In general, these nuisance effects on land use are predicted to be low in magnitude, and restricted to sites within or only immediately adjacent to the Project site. Consequently, the potential environmental effects on Land Use of the Dredge and Dewatering during construction are rated not significant, and are not assessed further in the EA.

During Vessel Transportation, Site Preparation and Construction, potential nuisances occurring from activities on the site, such as traffic, noise, dust and visual effects will increase, potentially affecting the use and enjoyment of surrounding residential properties. These potential effects have been rated as “2”, and are discussed further in Section 6.6.4 and Appendix I.

Operation

Equipment and Materials Storage, Maintenance/Repairs to Terminal will have limited interaction with existing land use in the Project area and have been rated as “1” in Table 6.24. The noted activities will occur within the proposed Project footprint. These lands are already designated for use as an industrial park, and the LUB provides direction in the regulation of these activities. Maintenance/Repairs to Terminal would also be a normal, anticipated use based on the site zoning and would be limited to the Project footprint. The LUB permits outdoor storage, and therefore any equipment and material storage would be foreseen under the LUB, and also within the range of normal activities that would be anticipated to occur on the site. Given the zoning anticipates these uses, which are localized and occur within the Project footprint, they are rated not significant, and are not assessed further in the EA.

It is anticipated that Wastewater Management will have minimal interactions with land use and have been rated as “1” in Table 6.24. Wastewater from Project activities will be treated as is required by Nova Scotia Environment according to the normal provincial standards. The site design for the Project will also incorporate engineering best practices in Storm Water Management, and will also be subject to Engineering and Planning approval through the standard CBRM Development Permit Processes.



Given these uses will be managed according to the normal provincial and municipal regulatory standards; they are rated not significant, and are not assessed further in the EA.

During Operation of the Project, potential nuisances occurring from Marine Vessel Traffic, Loading and Unloading Vessels/Trains, such as traffic, noise, dust and visual effects will increase, potentially affecting the use and enjoyment of surrounding residential properties and have been rated as “2” in Table 6.24. These are discussed further in Section 6.6.4.

6.6.4 Analysis, Mitigation and Residual Environmental Effects Prediction

During Vessel Transportation, Site Preparation and Construction, as well as marine vessel traffic, loading and unloading vessels/trains during operation, potential nuisances occurring from activities on the site, such as traffic, noise, dust and visual effects will increase, potentially affecting the use and enjoyment of surrounding residential properties. Some long term changes to land use will occur during the construction phase (e.g., land creation, restricted access); however, the permanent changes in land use will be addressed in the context of Project operations.

6.6.4.1 Construction and Commissioning

During Site Preparation and Construction, potential nuisances such as noise, dust and visual effects will increase, potentially affecting the use and enjoyment of surrounding residential properties. The facilities will be positioned to avoid conflict with existing land uses as much as possible; for example, the terminal footprint will be located as far away from Hospital Road as possible, and only emergency access to the site will be permitted from this road. However, in some cases interaction may be unavoidable, particularly for residential areas in very close proximity to the site. Some of these environmental effects will be mitigated through standard construction Best Management Practices such as screening, buffering, and site construction control measures.

Construction traffic occurring along main access roads will also interact with Land Use; however, standard traffic management controls and construction procedures will assist in mitigating these interactions. Traffic within the area immediate to the Sydport Industrial Park is expected to increase, however this increase is expected to be limited and able to be accommodated within existing road capacity. Any other interactions with existing residential areas will be minimized through traffic control and public notification. It is anticipated that standard Best Practice Traffic Management Procedures (i.e., public notification of activities, traffic control) will mitigate any potential environmental effects.

Vessel transportation will be visible from various properties within the area during construction. The proposed industrial use is enabled under the LUB. The visual landscape in the area currently incorporates many port-related industrial and marine-based activities and structures and this type of activity is already part of the visual landscape. The potential environmental effects associated with visual intrusion of marine-based infrastructure associated with construction and commissioning are expected to be limited by physical distance and natural topography. It is anticipated that visual impacts will be limited to sites within close visual range of the Project. Changes to the visual environment and potential mitigation are discussed further in the next Section 6.6.4.2 Visual Environment.



6.6.4.2 Operation

Project operation will result in a change in informal land use. Further the Marine Vessels and Loading will result in changes to the physical Land Use environment. Nuisances such as dust and noise emissions will increase, potentially affecting the use and enjoyment of surrounding residential properties.

Changes to Land Use

The Project use is in accord with the envisioned and intended use designated and zoned under the MPS and LUB. The current designation and zone were established during the most recent MPS review and was subject to extensive public participation and approval by the CBRM Council. A large portion of lands in closest proximity to the Project are currently underutilized industrial lands, complementing the location of the proposed use. Development of the land for use by the Project represents an increase in the current use-value obtained from the land to the benefit of the people of Sydney and the CBRM.

Communication with adjacent land owners indicates there is very little informal land use activity on the site (C. Sheppard, per. comm., 2008). Although there is evidence of an informal trail onsite, use of the site is limited to a small number of individuals. Any informal recreational activities will be restricted from the Project area; however these activities will be available along other stretches of shoreline in the area. Given the topography and the minimal presence of these activities in the Project area, it is anticipated that standard practices (*i.e.*, public notification of activities and signage) will mitigate any potential environmental effects.

Traffic

Operation of the Project will result in interaction between road transportation and Land Use. It is anticipated that there will be an increase in traffic associated with activity on the Project Site. The increases are expected to be limited, and it is anticipated the existing road capacity will accommodate the change. As requested by local residents, the Project has been designed so that Project-based traffic will not use the Hospital Road for normal access (other than for emergencies), and further, that Project traffic will be directed into the Sydport Industrial Park at the first available access (Gulf Drive), so that as little traffic as possible moves along Point Edward Highway.

CBCL Limited conducted a traffic impact study for the proposed Project. Results indicate the proposed Sydport container terminal will add additional vehicular traffic to local roadways and intersections. When Phase 2 is complete or rather the terminal is fully developed, some traffic movements are expected to experience volumes two to four times higher than what they are now in 2008. However, traffic volumes at the study intersections are currently quite low relative to their capacities. Traffic movements are currently operating at less than 20% capacity during peak hours, with the exception of the westbound approach to Point Edward Highway from Westmount Road, which is less than 30%.

Following the completion of Phase 2 of the container terminal in 2012, all movements are expected to operate at less than 40% capacity, with the exception of the westbound Westmount Road and Gulf Crescent approaches during the PM peak at 46% and 48% capacity, respectively. This means that there will be at least 50% reserve capacity available for all movements after the terminal is operational. Also, average vehicle delay will be less than 22 seconds after Phase 2 is complete. No intersection or roadway improvements are required or recommended.



The existing railroad through the study area will be put back into service to haul freight to and from the container terminal, blocking both Point Edward Highway and Rudderham Road whenever a train arrives at the site or departs. Given the available track length and terminal location it is expected that the maximum train lengths that could transit from the terminal, across the existing at grade intersections would range between 915 and 1830 meters with delays estimated at approximately 2.3 to 4 minutes respectively. The resulting queues are not a significant concern provided the following recommendations are implemented:

- install improved advance warning signage and lighting at the rail crossing approaches;
- install flashing warning lights and gates at both crossings that meet or exceed current standards;
- limit the number of train crossings during periods of peak traffic demand; and
- minimize the amount time that roadways are blocked during train crossings.

From the perspective of traffic impacts on the roadway infrastructure, construction of the container terminal may proceed as planned. This recommendation is appropriate based upon the predicted minimal impacts that are expected and reinforced given the conservative assumptions used in the study.

Noise and Dust

Use and enjoyment of adjacent properties may be affected by Project-related noise and dust. As noted in the Atmospheric VEC (Section 6.5), mitigation measures and monitoring will be undertaken during Project operation to ensure that effects from noise and dust on nearby sensitive receptors are not significant. In general, these nuisance effects on land use are predicted to be low in magnitude, and restricted to sites within or only immediately adjacent to the Project site.

Visual Environment

Operation of the Project will result in changes to the visual environment. The viewshed analysis (Appendix I) indicates that the Project will be visible from a variety of communities, as shown on Figure I-1, Appendix I. The total amount of land with a view of some or all of the Project components is estimated to be about 14,230 ha. This figure is an over-estimate of the visibility of the Project, however, because it was not possible to take the environmental effect of other existing structures (*e.g.*, buildings) into account. Overall, the cranes and vessel traffic are expected to be visible from various vantage points.

To further assess the visual environment, key vantage points were identified, and site visits were conducted to determine visual impacts from the Project. The vantage points represented either areas of importance (recreational areas) or residential areas of significance with views of the proposed Project site. Key viewpoints and photo simulations resulting from the site visits can be found in Appendix I.

Although the viewshed study Figure I-1, Appendix I shows that the Project will be visible from a large portion of the lands within Sydney, Westmount, Sydney Mines, Whitney Pier, and North Sydney, the assessment of the key vantage points showed that the visual change at each vantage point would be varied. In most instances the distance between the vantage point and the proposed Project minimizes the visual impacts of the facilities. In other instances, existing buildings mask the views of the proposed



infrastructure. The most important visual screen of the Project to mitigate potential effects is the natural topography of the land. In most instances the existing topography masks the view of the Project facilities. From many of the vantage points in surrounding communities the only visible portion of the facilities are the tops of the fully extended cranes. Therefore, it is anticipated that visual impacts will be limited to sites within close visual range of the Project.

The increased visual activity that may result from new marine vessel traffic in the harbor is also consistent with the existing visual conditions. Although vessel transportation will be visible from various properties within the area, given that the visual landscape in the area already incorporates many port-related industrial and marine-based activities and structures, the potential environmental effects associated with visual intrusion of associated marine-based infrastructure is not expected to be substantive.

To mitigate the adverse visual interaction with properties in close proximity to the site, best practices in site design can be applied. For example, the Project can be laid out in such a manner that buffers are established to increase the setback between the Project and adjacent residential properties. To assist with screening the Project, trees, berms or fences can be incorporated in key locations to limit the visual impacts of Project activities. It is important to note that the impacts of visual changes are often subjective in nature; some individuals may enjoy a view with increased port-related activity, while others may not. Therefore, it is important to discuss any proposed mitigation measures with those residents directly affected.

6.6.5 Follow-up and Monitoring

Follow up and monitoring for land use interactions will consist of the following activities:

- Detailed site planning to include consideration of traffic management and buffering of residential properties.
- As noted for Atmospheric Environment (Section 6.5) a program will be in place to monitor noise and dust on a complaint-driven basis with remedial action taken to correct any significant problems.

6.6.6 Summary of Residual Environmental Effects Prediction

Project Construction and Operation will result in a number of environmental effects which are outlined below:

- Land uses occurring within the Project footprint will be changed from vacant to industrial, and public access to the Proponent's property will be controlled and restricted. Any informal recreational use of these lands will cease.
- The enjoyment and use of residential properties on adjacent lands may be affected by increased nuisance-related environmental effects including noise and dust emissions.
- The Project will alter the visual landscape, potentially affecting the views from key residential and recreational areas.

Nuisance environmental effects on adjacent residential and industrial land uses are predicted to be low in magnitude, and restricted to sites within or only immediately adjacent to the Project site. The residual environmental effect as a result of the change in the visual environment is anticipated to be low in magnitude. Within the context of the Sydney Harbor, the industrial landscape has become a part of

the visual fabric. Although the Project does represent a change to the visual aesthetics of the area, other land use activities can continue largely unaffected.

The proposed Project uses and activities are in keeping with the intent of the MPS and the LUB. The need for increased industrial activity in the region is clearly noted in the MPS, and the Sydport site was designated Sydport Industrial Park to encourage Port-related industrial activity on the site. Development of the land for use by the Project represents an increase in the current use-value obtained from the land to the benefit of the people of Sydney and the CBRM and thus constitutes an important beneficial effect on Land Use.

In summary, with the proposed mitigation and environmental protection measures, the adverse residual environmental effect of Change in Land Use on the Land Use VEC is not likely to be significant. Construction and Operation of the Project is expected to result in an increase in the current use-value obtained from the land use in Sydney. Residual environmental effects on Land Use are summarized in Table 6.26.

TABLE 6.26 Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects					
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-economic Context	Prediction Confidence
CONSTRUCTION AND COMMISSIONING								
Vessel Transportation	<ul style="list-style-type: none"> ▪ Visual presence of vessels (A) 	<ul style="list-style-type: none"> ▪ No mitigation recommended. 	1	2	1/3	R	2	H
Construction of confined disposal facility	<ul style="list-style-type: none"> ▪ Noise from pile driving and equipment operations ▪ Dust emissions (A) 	<ul style="list-style-type: none"> ▪ Monitoring and response to any exceedance of NSE Guidelines (e.g., scheduling to avoid sensitive times) ▪ Dust control measures 	1	2	1/3	I	2	H

TABLE 6.26 Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects					
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-economic Context	Prediction Confidence
Site Preparation (clearing and grubbing, grading)	<ul style="list-style-type: none"> ▪ Physical Change in Land Use (P) ▪ Noise and dust emissions from construction equipment and site preparation (A) ▪ Increased traffic resulting from construction (A) 	<ul style="list-style-type: none"> ▪ Monitoring and response to any exceedance of NSE Guidelines (e.g., scheduling to avoid sensitive times) ▪ Dust control measures ▪ Traffic control measures ▪ Site access control measures 	1/2	2	1/3	I	2	H
Construction of land components (including road, rail, buildings)	<ul style="list-style-type: none"> ▪ Noise and emissions from construction equipment (A) ▪ Increased traffic resulting from construction (A) 	<ul style="list-style-type: none"> ▪ Monitoring and response to any exceedance of NSE Guidelines (e.g., scheduling to avoid sensitive times) ▪ Traffic control measures ▪ Site access control measures 	1/2	2	1/3	I	2	H
OPERATION								
Marine Vessel Traffic	<ul style="list-style-type: none"> ▪ Visual presence of vessels (A) 	<ul style="list-style-type: none"> • Site design measures such as buffering and Screening for nearby residences 	1	2	3/3	R	2	H
Loading and Unloading Vessels/Trains	<ul style="list-style-type: none"> ▪ Physical Change in Land Use (P) ▪ Noise and emissions from hotelling of the vessels and operation of the cranes and rail cars (A) 	<ul style="list-style-type: none"> ▪ Monitoring and response to any exceedance of NSE Guidelines (e.g., scheduling to avoid sensitive times) ▪ Noise reduction measures 	1	2	3/3	I	2	H

TABLE 6.26 Environmental Effects Assessment Matrix: Land Use

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects					
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-economic Context	Prediction Confidence
<p>KEY</p> <p>Magnitude: 1 = Low: Land use activities of specific user groups, residences or neighbourhoods are disrupted, but can continue. 2 = Moderate: Land use activities of specific user groups, residences or neighbourhoods are disrupted and cannot continue. 3 = High: Land use activities of a broad number of user groups, residences or neighbourhoods are disrupted and cannot continue.</p> <p>Geographic Extent: 1 = Site-Specific: Environmental effects restricted to Project footprint. 2 = Local: Environmental effects extend beyond the Project footprint but remain within Assessment area 3 = Regional: Environmental effects extend beyond Assessments Area.</p> <p>Duration: 1 = Short term: Effects are measurable for <1 year. 2 = Medium term: Effects are measurable for 1 to 5 years. 3 = Long term: Effects are measurable for >5 years.</p>		<p>Frequency: 1 = Occurs once. 2 = Occurs rarely and at sporadic intervals. 3 = Occurs on a regular basis and at regular intervals. 4 = Continuous.</p> <p>Reversibility: R = Reversible. I = Irreversible.</p> <p>Ecological/Socio-economic Context: 1 = Area is relatively pristine or not adversely affected by human activity. 2 = Evidence of existing negative environmental effects (e.g., existing stream crossings).</p> <p>Prediction Confidence: Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation L Low level of confidence M Moderate level of confidence H High level of confidence</p>						

6.7 Commercial Fisheries

Commercial Fisheries is a VEC in consideration of the potential environmental effects of Project-related activities on commercial fish species and commercial fishing operations in Sydney Harbour. Despite its long history of heavy industrial activity, Sydney Harbour still supports an active commercial fishery which provides a livelihood for a number of Cape Breton residents. In addition to the regulatory requirements protecting fisheries under the *Fisheries Act*, Commercial Fisheries was selected as a VEC due to the importance of fishing to the regional economy and as a socio-cultural activity among maritime communities. The fisheries considered for this assessment include all finfish and shellfish harvested commercially within Sydney Harbour, with a particular focus on lobster and rock crab, the two dominant fisheries in terms of landings and landed value. The assessment of Commercial Fisheries is closely linked to the assessment of Project-related environmental effects on Benthic Habitat Communities and Sediment Quality (Section 6.1) (including primary effects on lobster and rock crab biology), and Marine Fish and Water Quality (Section 6.2). A description of the existing conditions for Commercial Fisheries is provided in Section 4.12. At present there are no commercial aquaculture operations in Sydney Harbour and therefore no assessment of the environmental effects of the Project on aquaculture is provided in this report.

6.7.1 Environmental Assessment Boundaries

Spatial and Temporal Boundaries

The general spatial boundary for the assessment of Commercial Fisheries encompasses all of Sydney Harbour, which will be referred to as the Assessment Area. In particular, this includes the dredge channel in the Seaward Arm of Sydney Harbour, as well as the CDF and marine terminal, the potential secondary CDF in the South Arm, and any other locations in Sydney Harbour where the Project may interact with commercial fishing activities. Commercial fishing activities undertaken outside of Sydney Harbour are not considered to be within the spatial boundaries of the assessment. While it is recognized that there are ecological links between Sydney Harbour and the rest of Sydney Bight (e.g., affected planktonic forms of commercial species originating in the harbour may be ordinarily carried out of the harbour by currents to populate other areas of suitable habitat), it is reasonable to focus this assessment on areas of greatest potential for direct Project interaction with the fishery (*i.e.*, in the harbour).

The temporal boundaries for the assessment of Commercial Fisheries include the Construction and Operation phases of the Project. Commercial Fisheries in Sydney Harbour are generally limited to certain specified fishing seasons defined by DFO. Start and end dates of the fishing seasons for the commercial species in Sydney Harbour are summarized in Table 4.15 in Section 4.12. Dredging is anticipated to take two to three months to complete and is tentatively scheduled to occur outside of the key commercial lobster fishing season. This dredging schedule is subject to the availability of the TSHD, and in the unanticipated event that the dredge is not available at the scheduled time; a contingency dredging plan will be developed.

Administrative and Technical Boundaries

The commercial fisheries considered in this assessment are located within NAFO fishing division 4Vn and Lobster Fishing Area (LFA) 27 (Figure 4.3). These fisheries management units and assigned fishing licenses and seasons define the administrative boundaries, and DFO assumes responsibility for the management of fish stocks in these areas.

Information available on the status and abundance of commercial fish and shellfish stocks often varies between fisheries and between regions due to differences in the research or catch information that is collected. DFO catch data, research survey data, and published literature were the primary sources for all information related to commercial fisheries. In instances where DFO could not provide adequate information on fishing activities in Sydney harbour, anecdotal evidence was used, based on consultations with fishing associations and from the preliminary results of a study being undertaken during the summer and fall of 2008 on the ecosystem services provided to Cape Breton fishers from Sydney Harbour (Hatcher *et al.* 2008). The lack of consistent, detailed information on commercial fishing activities and the inherent limitations of using anecdotal information therefore represent technical boundaries for this assessment. A further technical limitation is that the commercial fishery landings statistics outlined in Table 4.14 (see Section 4.12) are based on the port where the fish are landed, and do not indicate the geographical region where these fish were caught. As such, it is not clear what share of these landings were actually captured in Sydney Harbour. This is particularly a limitation when assessing any changes to landings and landed value that occur as a result of the Project.

6.7.2 Residual Environmental Effects Evaluation Criteria

A significant adverse residual environmental effect on Commercial Fisheries is defined as an unmitigated or non-compensated net financial loss to Commercial Fisheries as a result of the Project. It is understood that a net financial loss must be discernable outside the range of normal inter-annual variation in landings experienced by fishers for a variety of non-Project related reasons.

6.7.3 Potential Interactions, Issues and Concerns

Based on the regulatory requirements and the issues raised by the public and key stakeholders, the environmental effect selected for the assessment of Commercial Fisheries is a Change in Commercial Fishery Income.

Fishers in Sydney Harbour have expressed concerns about how the Project may affect their livelihood due to changes in lobster and crab populations, loss of gear from increased vessel collisions, and loss of access to traditional fishing areas due to increased vessel traffic (C. Dicks, pers. comm., 2008). This environmental effect relates to the interaction between Project activities (including dredging, marine vessel traffic, and placement of marine infrastructure) with existing commercial fishing activities in Sydney Harbour. A change in commercial fishery income could result from changes in the abundance of target species due to direct mortality, destruction of habitat, a long-term change in habitat use, or from the loss of gear or access to fishing grounds.

The potential interactions between Project-related activities during each phase of the Project and potential environmental effects to Commercial Fisheries are shown in Table 6.27.

TABLE 6.27 Potential Interactions, Issues and Concerns for Commercial Fisheries

Project Activities and Physical Works	Potential Environmental Effects
	Change in Commercial Fisheries Income
CONSTRUCTION AND COMMISSIONING	
Dredge and Dewatering	2
Vessel Transportation	1
Construction of confined disposal facility	2
Site Preparation	1
Construction of land components	0
OPERATION	
Marine Vessel Traffic	2
Loading and Unloading Vessels/Trains	0
Site stormwater and wastewater Management	0
Equipment and Materials Storage	0
Maintenance/Repairs to Terminal	0
Note: Project-Environment Effects were ranked as follows: 0 No interaction. No substantive interaction contemplated. 1 Interaction will occur. However, based on past experience and professional judgment, the interaction would not result in a significant environmental effect, even without mitigation, or the interaction would clearly not be significant due to application of codified practices 2 Interaction may, even with codified mitigation, result in a potentially significant environmental effect and/or is important to regulatory and/or public interest. Potential environmental effects are considered further and in more detail in the EIA.	

Table 6.28 provides the measurable parameters that will be used for the environmental effects assessment, and the rationale for the selection of the measurable parameters.

TABLE 6.28 Measurable Parameters for Commercial Fisheries

Environmental Effects	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Commercial Fishery Income	Change in available fishing area	The purpose of this measurable parameter is to determine if access to fishing grounds in Sydney Harbour will be temporarily limited or permanently lost as a result of Project activities.
	Direct mortality of target species	The purpose of this measurable parameter is to determine the amount of commercial species mortality that may result from Project-related activities such as dredging and placement of marine infrastructure.
	Fishing gear loss	The purpose of this measurable parameter is to determine if fishers will face an increased risk of gear loss from Project-related vessels navigating in Sydney Harbour and if so, to what extent is the risk higher than under normal harbour conditions

6.7.3.1 Construction and Commissioning

Project activities associated with the Construction of Land-Based Components will not have any significant interactions with Commercial Fisheries and has been rated “0” in Table 6.30. The environmental effects of this phase of the Project on Commercial Fisheries are therefore rated not significant. There is no further consideration of this aspect of the Project in the assessment.

During the Construction phase of the Project, a number of marine vessels will be used for the delivery of construction materials and equipment and the placement of marine infrastructure. Increased Vessel Transportation during the Construction phase of the Project could temporarily restrict access to fishing grounds or cause damage to fishing gear, and therefore this phase of the Project has been rated “1” in Table 6.30. In an effort to prevent such adverse interactions, the Proponent will ensure good communication and dialogue with commercial fishers about vessel movements during construction. Construction-related vessels will be relatively small in size and will not be present in large numbers, which will further reduce the risk of gear loss or of restricting access to fishing grounds. Construction of the CDFs and terminal will occur in the fishery closure area in the South Arm, further reducing the likelihood of conflicts with fishing activities. The environmental effects of Vessel Transportation during the Construction phase are therefore rated not significant and there is no further consideration of this aspect of the Project in the assessment.

Site Preparation activities could potentially interact with Commercial Fisheries if sediments or other materials run-off the site into Sydney Harbour during clearing, grubbing, and grading activities while soils are not fully stabilized. This potential effect will be mitigated by the placement of erosion and sediment controls as part of a Storm Water Management Plan (see Section 2.0) prior to the beginning of site preparation activities. The environmental effects of Site Preparation are therefore rated not significant and will not be considered further in the assessment.

Dredging and Dewatering activities and Construction of the CDFs will interact directly with Commercial Fisheries and could potentially result in adverse environmental effects. These phases of the Project have been rated as “2” in Table 6.30 and are considered further in the assessment and are discussed in Section 6.7.4.



6.7.3.2 Operation

Activities associated with the Loading and Unloading of Vessels, Storage of Equipment and Materials, Maintenance and Repairs to the Terminal, and Site Stormwater and Wastewater Management will not have any interaction with commercial fishing activities and have been rated “0” in Table 6.30. The environmental effects of these phases of the Project are therefore rated not significant. There is no further consideration of these aspects of the Project in this assessment.

Marine Vessel Transportation could interact with Commercial Fisheries potentially resulting in adverse environmental effects. This phase of the Project has been rated as “2” in Table 6.30 and is considered further in the assessment and is discussed in Section 6.7.4.

6.7.4 Analysis, Mitigation and Residual Environmental Effects Prediction

Dredging and Dewatering, Construction of the Confined Disposal Facility, and Marine Vessel Traffic during Operation have been rated as “2” due to their potentially adverse environmental effects to Commercial Fisheries. Each of these Project components is discussed in the following sections, along with an assessment of their potential environmental effects. The section includes a discussion of mitigative measures which will be put in place to limit residual environmental effects.

6.7.4.1 Construction and Commissioning

Dredging of the proposed navigation channel represents the most important interaction between the Project and Commercial Fisheries. By its very nature, dredging and the removal of dredged materials from the channel will disturb fish and fish habitat. Dredging activities will also result in the dispersal of re-suspended sediments and contaminants which could have adverse environmental effects on commercial fish species and their habitat. Infilling of marine habitats required to construct the CDF will also have intrinsic effects on marine species potentially including commercially fished species. As a result of these potential environmental effects, the dredging process and infilling of the marine environment to create the CDFs and marine terminal will constitute a habitat alteration, disruption or destruction (HADD) under the *Fisheries Act*.

Under the Policy on the Management of Fish Habitat (DFO 1986), DFO-Habitat Protection and Sustainable Development (DFO-HPSD) employs a no-net loss guiding principle to habitat conservation in its decision to authorize the alteration of fish habitat under section 35(2) of the *Fisheries Act*. To compensate for the direct loss of benthic habitat, including loss of habitat for the commercially important rock crab and lobster, the proponent will be directed to create new habitat (or improve existing habitat) by DFO-HPSD. The type and area of habitat to be created will be detailed in a Habitat Compensation Agreement signed by both the proponent and DFO before DFO will authorize the alteration of habitats. The specifications of the HADD compensation program will depend on the type of habitat compensation to be employed and the assessed ecological value of existing habitat at the dredge and infill sites. The preferred location for the creation of new habitats is within the ecological boundary of the HADD (e.g., within Sydney Harbour) although this may not be possible or practical. The proposed HADD compensation plan is outlined in Section 6.1.4.1.

The potential environmental effects to lobster and rock crab resulting from dredging of the navigational channel have been assessed in Section 6.1 on Benthic Habitat Communities and Sediment Quality and

were rated not significant. While there is expected to be some direct mortality of individual lobster and crab during the dredging (potentially mitigated by a pre-dredge fish and relocation efforts), there will be no long-term effects on lobster and rock crab populations. The seabed in the dredge channel is expected to return to its original condition within 2 to 3 years, allowing benthic flora and fauna to recolonize the area with no permanent or long-term residual effects. Any residual environmental effects will be compensated for by the Proponent through the HADD process. The environmental effects of dredging on the bait fishery (herring and mackerel) will be similar to the effects on other marine finfish, which have been assessed in Section 6.2 on Marine Fish and Water Quality and were rated not significant. While there may be some temporary disruption to the quality and use of habitat by marine fish resulting from vessel noise and sediment re-suspension, these effects will be short in duration and conditions will return to background levels in a matter of hours or days.

Dredging is currently scheduled to take place outside of the commercial lobster season to coincide with the expected availability of the TSHD in the region; this will eliminate direct interactions with lobster fishing activities. In the unanticipated event that the TSHD is not available at the scheduled time, a contingency dredging plan will be developed to ensure that the revised dredging schedule does not result in significant interactions with commercial lobster fishers. This plan will include a communication program to notify lobster fishers of the anticipated dredging locations and schedule and to discuss other mitigation options. Directed mitigation may include the capture and relocation of lobster and rock crab prior to the dredge, or the rescheduling of the lobster season to allow fishers to land a large share of the lobsters present in the navigational channel prior to dredging; both of these mitigation activities would require DFO approval. Although the mortality of target species and disruptions to their habitat resulting from dredging will not have any long-term effects on the health of these species populations, in the short term these disruptions could result in reduced abundance or availability of some commercial species, particularly lobster and rock crab. Compensation by the Proponent through the HADD process will mitigate the effects on the availability of commercial species.

Dewatering of the dredge spoils will take place in the South Arm near the CDF and is not expected to have any effect on commercial fisheries activities. Measures will be taken to avoid producing pockets of fine sediments during reclamation. Perimeter bunds will be constructed around the reclamation area to prevent the mixture of soil and water from flowing outside the reclamation site boundaries. Water boxes will be used and designed specifically to maximize the settling of soil particles into the reclamation area in order to reduce the release of suspended solids (see Section 2.0 for description of dewatering process).

Construction of the CDFs (terminal and secondary facility) could potentially result in direct mortality of fish and shellfish at the location of the disposal facility, and will result in permanent loss of fish habitat, including habitat for species such as rock crab and lobster that may migrate out of the South Arm into other parts of the Harbour over the course of the year. Some rock crab fishers in Sydney Harbour place traps as close to the South Arm fishery closure boundary as possible in an effort to land such migrating species (L. Penny, pers. comm., 2008). As with the capital dredging activities, this component of the Project will be classified as a HADD under the *Fisheries Act*. In accordance with DFO-HPSD guiding policy on the Management of Fish Habitat (DFO, 1986), the Proponent will be required to compensate for the loss of fish and fish habitat at the location of the disposal facility. Opportunities for habitat compensation will be investigated during final terminal design and could include addition of riprap in areas that could be productive for benthic plant and animal species. These



potential effects are further mitigated by the fact that commercial fishing has not been permitted in the South Arm of Sydney Harbour for over 20 years due to concerns over contaminant levels found in fish tissues (Lee 2002).

In summary, Dredging of the proposed navigation channel and Construction of the CDF will result in direct mortality of some targeted commercial species, and alteration and changes to use of habitat by target species. Mitigative efforts have been outlined which will limit the extent and magnitude of these environmental effects. Stipulations under the *Fisheries Act* will also ensure that adequate habitat compensation is provided by the Proponent to account for the mortality of commercial species and the alterations to their habitat prior to providing authorization for the Project. The residual environmental effects of Dredging and Dewatering and Construction of the Confined Disposal Facility are therefore rated not significant.

6.7.4.2 Operation

Environmental effects to Commercial Fisheries that result from dredging and infilling activities during the Construction phase will be ongoing during the Operation phase, in particular those resulting from infilling, which will be permanent. These environmental effects and the appropriate mitigation and compensation plans have been addressed in the Construction phase discussion (Section 6.7.4.1)

Once the Terminal is operational, it is expected that a greater number of vessels will be navigating in Sydney Harbour, moving from the mouth of the harbour to the Terminal in the South Arm via the newly dredged channel in the centre of the Seaward Arm (see Section 4.11 for a description of increased vessel traffic). The increased number of vessels is of concern to commercial fishers since the movements of these vessels in the harbour could result in increased losses of lobster and crab traps, temporary restrictions on access to fishing grounds, and changes to fishing vessel steaming routes.

By Phase 2 of the Project, the expected increase in vessel traffic will be in the order of two to four vessels per week beyond current operating conditions in Sydney Harbour. This does not represent a large increase in vessel traffic and the movement of these vessels will be safely and effectively managed by the harbour authorities (see Section 4.11 for a description of vessel traffic and traffic management protocols). Project-related vessels will be using the dredged channel to navigate in Sydney Harbour. There is already considerable vessel traffic in this area and fishers do not currently set traps in the area where the channel will be dredged as there is a risk of gear loss if these vessels run over lobster and crab traps (Hatcher *et al.* 2008). Rock crab fishers are known to set traps as close to the navigational channel as possible (Hatcher *et al.* 2008); however, these fishers do so knowing the risk of gear loss, and this will continue to be the case once the Project is operational. The increase in vessel traffic therefore will not result in an increase in gear loss for commercial fishermen, nor will it result in restricted access to fishing areas, as the dredge channel is currently only fished at the margins. Similarly, the increase in vessel traffic should not affect fishing vessel steaming times, since fishing vessels have the ability to navigate outside of the dredge channel due to their small draft, whereas Project-related vessels, such as the post-panamax vessels, will be limited to navigating within the dredge channel. The small number of additional vessels arriving each week will also limit the number of occasions when fishing vessels could interact with Project-related vessels.

The safe and effective management of the increased vessel traffic in Sydney Harbour will also be assisted by several mitigation measures, including:

- Project vessels to comply with all applicable legislation, codes and standards of practice for shipping;
- establishment of practices and procedures for marine terminal operations as defined in a Marine Terminal Manual;
- the hiring of additional Harbour Pilots by the Atlantic Pilotage Authority, if so determined to be required by that organization; and
- an increase in the capacity of the tug boat fleet, if so determined to be required by the harbour authorities.

In consideration of the limited interactions that are expected between Project-related vessels and commercial fishing vessels and the proposed mitigation, the increase in vessel traffic should not result in a change to commercial fishing income. The environmental effects of this phase of the Project are rated not significant.

6.7.5 Follow-up and Monitoring

Authorization under Section 35(2) of the *Fisheries Act* will provide compensation for marine habitat lost as a result of capital dredging and infilling. The approved compensation program may have monitoring requirements.

6.7.6 Summary of Residual Environmental Effects Prediction

Residual environmental effects of the Project on Commercial Fisheries in Sydney Harbour are summarized in Table 6.29.

TABLE 6.29 Environmental Effects Assessment Matrix: Commercial Fisheries

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects					
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-economic Context	Prediction Confidence
CONSTRUCTION AND COMMISSIONING								
Dredge and Dewatering	<ul style="list-style-type: none"> ▪ Mortality of commercial target species (A) ▪ Change to commercial species habitat or habitat use (A) 	<ul style="list-style-type: none"> ▪ HADD Authorization for capital dredging at a compensation ratio to be determined by DFO-HPSD. ▪ Intensive fishing and relocation program immediately prior to dredging (subject to DFO approval) ▪ Extension to commercial fishing season in dredge and in-fill areas (subject to DFO approval) ▪ Use of state-of-art dredging technology (suction dredging rather than bucket dredging) ▪ Preferred schedule for Dredging to be conducted outside of the key commercial fishing seasons (lobster and rock crab) if coincident with availability of TSHD. ▪ Dredging contingency plan (<i>i.e.</i>, communication program with lobster fishers) if TSHD is not available at currently scheduled time ▪ Placement of perimeter bunds and water boxes to limit suspended solids levels during dewatering 	1	2	2/1	R	2	H



TABLE 6.29 Environmental Effects Assessment Matrix: Commercial Fisheries

Project Activity	Potential Environmental Effect Positive (P) or Adverse (A)	Mitigation	Evaluation Criteria for Assessing Residual Environmental Effects					
			Magnitude	Geographic Extent	Duration/Frequency	Reversibility	Ecological/Socio-economic Context	Prediction Confidence
Construction of confined disposal facilities (infilling)	<ul style="list-style-type: none"> Mortality of commercial target species (A) Change to commercial species habitat or habitat use(A) 	<ul style="list-style-type: none"> HADD Authorization for infill of terminal and secondary CDFs at a compensation ratio to be determined by DFO-HPSD. 	1	2	3/1	I	2	H
OPERATION								
Marine Vessel Traffic	<ul style="list-style-type: none"> Restriction of access to fishing grounds (A) Damage of commercial fishing gear (A) Change in fishing vessel steaming routes (A) 	<ul style="list-style-type: none"> Pilotage Port Practices and Procedures Notices to mariners/shipping Normal practice of seafarers 	1	2	1/3	R	2	H
KEY Magnitude: 1 = Low: 10% or less change in net income of commercial fishermen operating within the Assessment Area 2 = Moderate: From 10-50% change in net income of commercial fishermen operating within the Assessment Area 3 = High: Greater than 50% change in net income of commercial fishermen operating within the Assessment Area Geographic Extent: 1 = Environmental effects restricted to Project footprint. 2 = Environmental effects extend beyond the Project footprint but remain within Sydney Harbour. Environmental effects extend beyond Sydney Harbour			Duration: 1 = Short term: Effects are measurable for <1 year. 2 = Medium term: Effects are measurable for 1 to 5 years. 3 = Long term: Effects are measurable for >5 years. Frequency: 1 = Occurs once. 2 = Occurs rarely and at sporadic intervals. 3 = Occurs on a regular basis and at regular intervals. 4 = Continuous.			Reversibility: R = Reversible. I = Irreversible Ecological/Socio-economic Context: 1 = Area is relatively pristine or not adversely affected by human activity. 2= Evidence of existing negative environmental Prediction Confidence: Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation L Low level of confidence M Moderate level of confidence H High level of confidence		

6.8 Archaeological and Heritage Resources

Archaeological and heritage resources are those tangible remains of past human activity, whether on or below the surface of land or water, which include portable and non portable objects such as structures, features, and artifacts. An archaeological structure is a built standing object such as an abandoned house whereas an archaeological feature is defined as a fixed object such as a house foundation, cemetery, hearth, shipwreck, or mine shaft. Artifacts are portable remnants of human activity such as stone tools, china, nails, and clothing. In Nova Scotia, archaeological resources are the property of the

