

TO: Vancouver Fraser Port Authority

FROM: Seaspan ULC

DATE: November 19, 2020

SUBJECT: Seaspan ULC-Outfitting Pier Extension Project
PER No. 20-034



Prepared for:
Seaspan Vancouver Shipyards.
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1.0 GENERAL SUBMISSION REQUIREMENTS

Seaspan Vancouver Shipyards (VSY) And Seaspan ULC. To Prepare the Following Vancouver Fraser Port Authority (VFPA) Category C Project and Environmental Review (Per) Application for The Seaspan Outfitting Pier Extension Project (The Project).

The Project Application Is Comprised of The Following Components and Required Information Consistent with The VFPA Per (No. 20-034) Checklist (Appendix A) Dated April 23, 2020, Including:

- **GENERAL SUBMISSION REQUIREMENTS**
 - Application Form (Appendix A)
 - Application Fee
 - Documentation Deposit
 - Contact List
- **PROJECT DESCRIPTION REQUIREMENTS**
 - General Scope
 - Operations
 - Construction and/or Demolition
 - Marine Construction and Staging Plan
- **DRAWING REQUIREMENTS**
 - Location plan (Appendix B)
 - Site plan (Appendix C)
 - Site Photographs (Appendix D)
 - Lot grading and utilities (Appendix E)
 - Construction Fire Safety Plan (Appendix F)
 - Marine structures (Appendix E)
- **REQUIRED STUDIES AND REPORTS**
 - Hazardous materials reuse, removal, recycling and disposal plan (Appendix G)
 - Geotechnical report (Appendix H)
 - Biophysical survey report (Appendix I)
 - Dredging studies (Appendix J)
 - Marine traffic study
 - Archaeological overview assessment (Appendix K)
 - Construction environmental management plan (Appendix L)
 - Fisheries and Oceans Canada Request for Review Application (Appendix M)
- **CONSULTATION REQUIREMENTS**
 - Indigenous group communication
 - Stakeholders
 - Community
 - Draft construction communications plan (Appendix N)
 - North Shore Waterfront Liaison Committee Draft Materials (Appendix O)

Seaspan Vancouver Shipyards Outfitting Pier Extension

1.1 APPLICATION FORM

A signed and completed Category C application form is included with this Application submission (Appendix A).

1.2 APPLICATION FEE

The application fee of \$13,125 is provided by Seaspan VSY with this application.

1.3 DOCUMENTATION DEPOSIT

The documentation deposit of \$10,000 is provided by Seaspan VSY with this application.

1.4 CONTACT LIST

The contacts below are the leads for the Project.

Table 1 Key Project Personnel

| Title | Name | Address | Phone |
|---------------------------------------|----------------|--|--------------|
| Project and Environmental Review Lead | Lisa McCuaig | Vancouver Fraser Port Authority 100 The Pointe, 999 Canada Place Vancouver, BC V6C 3T4 | 604-665-9527 |
| Manager, Special Projects | George Geatros | Seaspan ULC, 10 Pemberton Avenue, North Vancouver, BC, V7P2R1 | 604-990-1847 |
| Environmental Manager, Seaspan ULC | Daryl Lawes | Seaspan ULC, 10 Pemberton Avenue, North Vancouver, BC, V7P2R1 | 604-984-1067 |
| Environmental Manager | Mark Johannes | Stantec 500-4730 Kingsway, Burnaby BC V5H 0C6 | 604-418-1095 |
| Design Manager | Chuck Rosner | Stantec 500-4730 Kingsway, Burnaby BC V5H 0C6 | 604-235-1877 |

2.0 PROJECT DESCRIPTION REQUIREMENTS

2.1 GENERAL SCOPE

Construction of a new outfitting pier will be a major investment in the Vancouver Shipyards (Seaspan) and the Canadian shipbuilding industry by making local shipbuilding operations more efficient and improving upon delivery dates of newbuilds which have been awarded as part of the National Shipbuilding Strategy (NSS).

Seaspan is under contract with the Canadian federal government through the National Shipbuilding Strategy Program to construct and launch several non-combat vessels for Fisheries and Oceans Canada (DFO) - Canadian Coast Guard (CGG) and non-combat support ships for the Royal Canadian Navy (RCN). The National Shipbuilding Strategy is a long-term commitment to Canada's shipbuilding industry that is intended to rejuvenate Canada's marine industry, support Canadian technological innovation and bring jobs and prosperity to several communities across the country.

Seaspan's new ship-builds include the following:

- For the DFO-CGG, three (3) Offshore Fisheries Science Vessels (OFSV)
- For the DFO-CGG, one (1) Offshore Oceanographic Science Vessel with an estimated delivery date of late 2021 to early 2022
- For the RCN, two (2) Joint Support Ships (JSS) with an estimated delivery date of late 2022 to early 2023
- For the DFO-CGG, one (1) Polar Icebreaker with a delivery date pending advancement on other projects (this vessel has been tendered by the Government of Canada and is now only a potential newbuild)
- 16 Multi-purpose vessels to support a variety of missions, including "light icebreaking, environmental response and offshore search and rescue.

The above new vessels are currently being constructed at Seaspan's Vancouver shipyards facility including the fabrication and assembly of the main ship components and blocks. Based on current practice, once the vessels are ready to be floated, they are typically launched and towed to Seaspan's Victoria Shipyards where the vessels undergo final outfitting and commissioning before initial sea trials. Space at the Victoria facility is limited, and when the vessels are outfitted there, they are done so without assistance or oversight from the primary naval architects/engineers and trade workers located in North Vancouver.

The outfitting pier constructed at Seaspan's Vancouver Shipyard's would support a more efficient ship building process, reduce costs and improve delivery schedules of newbuilds.

2.1.1 PROJECT DESCRIPTION

Seaspan proposes to construct a new outfitting pier located within the Vancouver Shipyards site in North Vancouver (Figure 1 & Appendix B) to accommodate new vessel construction (largest vessel length overall > 175 m). The Project includes the removal of the existing outfitting pier; a timber structure approximately 155 m in length and 10 m in width (originally constructed in 1966 and extended in 1974) and replacing it with a new outfitting pier constructed with steel pile and a concrete deck approximately 272 m in length and 19.2 m in width (Figure 2 & Appendix C, Appendix D: Photo 1). The new pier will have a deck elevation of EL. + 7.3 m CD, 2.3 m above higher high-water large tide mark (EL. + 5.0 m CD) (Appendix E).

Components of Seaspan's new outfitting pier include:

1. Demolition of the existing timber outfitting pier, 155 m in length and 10 m in width (shading 1,550 m²) including:
 - removal of 590 wood creosote treated piles and 4 steel piles (pile footprint 28.9 m² + 0.52 m² [total 29.4 m²]) and supporting timber pile caps
 - removal of existing timber pier surface, stringers and decking trestle
 - removal and repurposing of the existing floating walkways from opposing sides of the existing outfitting pier (combined footprint of shading 589 m²)
 - removal and reuse of 9 existing floating steel camels (shading), reduced from removal of 17 existing floats
 - removal of 8 multi-timber pile dolphins securing the existing floating steel camels, reduced from 18 multi-timber pile dolphins and 6 steel pipe piles
2. Construction of a new outfitting pier above the water surface with an area of approximately 272 m in length and 19.2 m in width (shading footprint 5,222 m²) including:
 - Installation of 126 X 1.1 m diameter vertical piles supporting pile caps and piers for total footprint in-water of 119.7 m²
 - Installation of 19 concrete pile caps (including the abutment) at bents from the shoreline to the outer mooring dolphin
 - Installation of concrete or composite spans between bents
 - Installation concrete cast in place deck slabs
 - Installation of ancillary deck infrastructure including rail mounted traveling portal crane, fenders and mooring bollards
 - Installation of a mooring dolphin consisting of 4 X 1.2 m diameter steel piles (area 4.8 m²) connected to the new outfitting pier via a dolphin catwalk

The area surrounding the pier will be again dredged within the basin (Figure 3 & Figure 5) to accommodate changes in bathymetry in the basin associated with sediment transport and Seaspan transportation and tug vessel activities. The dredge depths will be completed consistent with past dredge programs in the basin to ensure appropriate water depths for vessel being constructed and outfitted at the new pier. Dredging will be conducted under the Interim Code of Practice for Routine Maintenance Dredging within the Seaspan Basin.

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Dredging is presently funded within Seaspan operations and planned to be completed during 2021 only as a first phase dredge program in area of 21,146 m² around the new pier, dredged to EL. -8.8 m CD to accommodate construction and completion at the new outfitting pier of the shallow draft JSS vessels.

Existing routine dredging and disturbance of the seafloor areas in the shipyard basin occurs periodically throughout Seaspan's history and use of the basin from 1968 to present, including basin dredging in 1968-69, 1975, 1989-1993, 2013 with the latest dredging occurring between 2016 to 2018. As noted in the Section 4.3, Biophysical Survey Report, the basin has been surveyed in 2018 and 2020 and observations of limited species diversity and low density (Appendix D: Photo 7 & Appendix I) support an understanding of ongoing activity and disturbance of the seafloor in the basin.

Dredging will be subject to a separate Notification to DFO and dredge works will be conducted under requirements of the Code of Practice, including isolated dredge works completed during the Burrard Inlet least risk fisheries window. Disposal at sea, for a portion of the dredge material, is being applied for through Environment and Climate Change Canada (ECCC) based on sediment sampling within the shipyard basin (Appendix J). Contaminated surface sediment has been identified in the northwestern portion of the dredge area. The specific contaminated dredge management unit will be fully defined in consultation and review by ECCC and will be appropriately disposed in an upland licensed landfill facility under BC's Contaminated Site Regulations. Past dredging has identified some historic presence of contaminated materials classified as Industry Landfill, not hazardous waste.

Habitat offsetting is being planned for an area within the Seaspan basin to restore the habitats at the existing western inlet area (the inlet area is within Seaspan water lot, adjacent to Fibreco). The western inlet is tidal and provides an outlet for existing culvert outfalls (Appendix D, Photo 8, 9, 10). The inlet has an accumulation of wood waste dust discharged and blown into the area over time from the adjacent Fibreco terminal to the west.

Habitat restoration / offsetting of the inlet habitats will focus initially on restoring approximately 1,650 m² of habitat area and would include placement of intertidal reefs near the inlets' narrow mouth. Seaspan has developed habitat restoration concepts for the larger area of the western inlet, but these are not defined within this application, consistent with mitigation of in-water activities and the new outfitting pier footprint (pile and shading).

Seaspan Vancouver Shipyards Outfitting Pier Extension



Figure 1 Seaspan Vancouver Shipyards Outfitting Pier Extension Location Map

Seaspan Vancouver Shipyards Outfitting Pier Extension

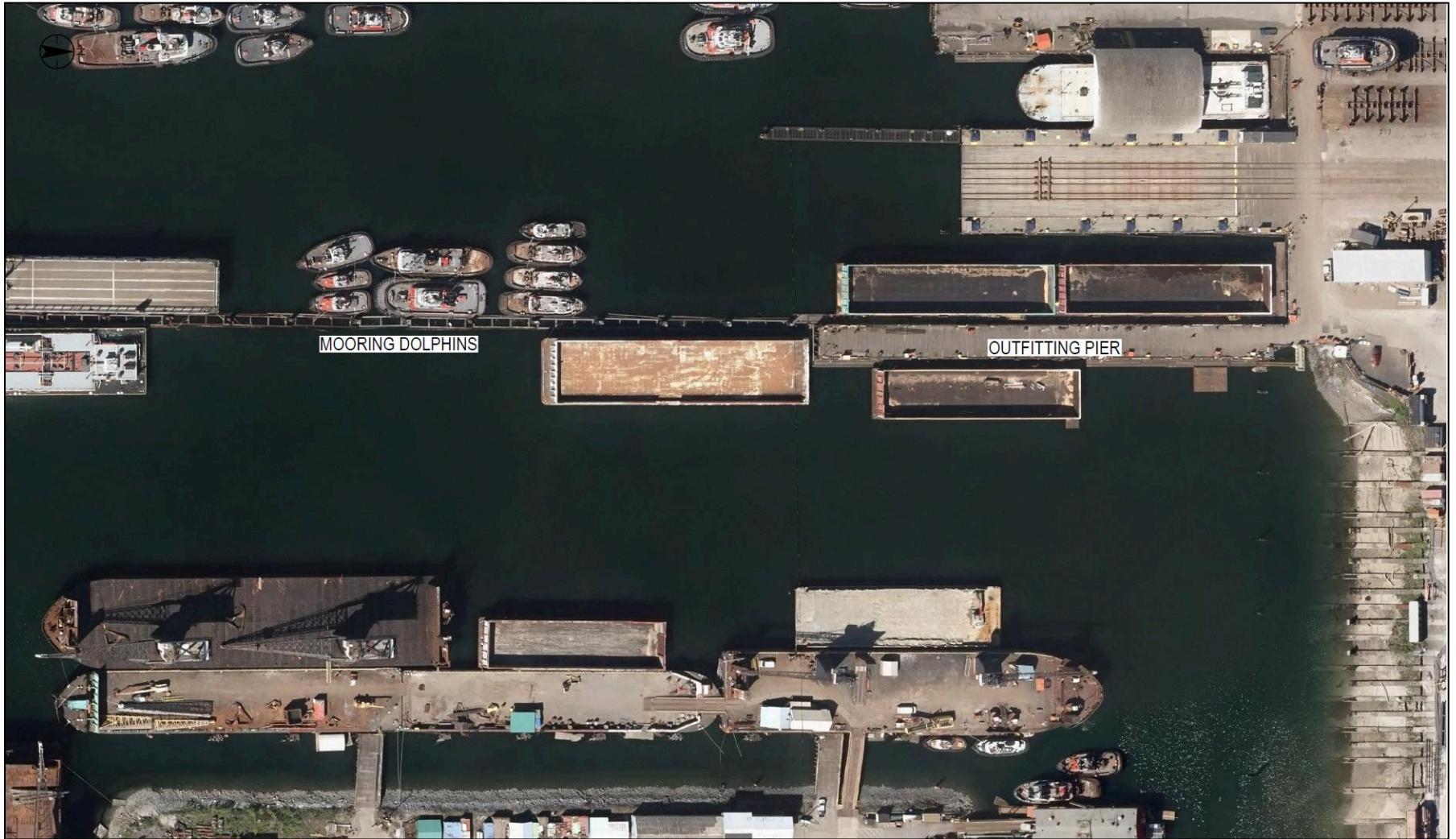


Figure 2 Seaspan Vancouver Shipyard Existing Outfitting Pier Site Plan

Seaspan Vancouver Shipyards Outfitting Pier Extension

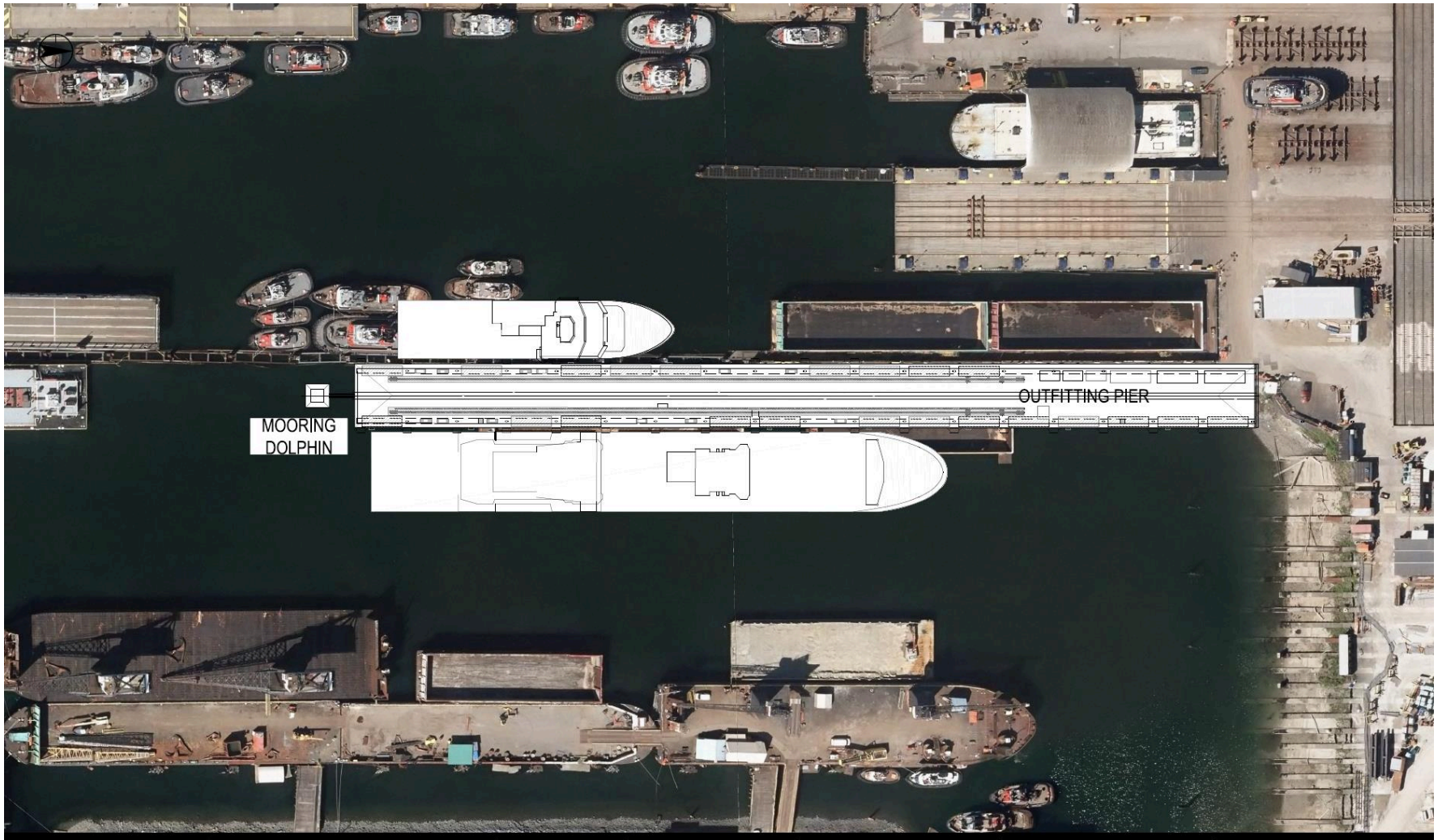


Figure 3 Seaspan Vancouver Shipyard Proposed Outfitting Pier Site Plan

Seaspan Vancouver Shipyards Outfitting Pier Extension

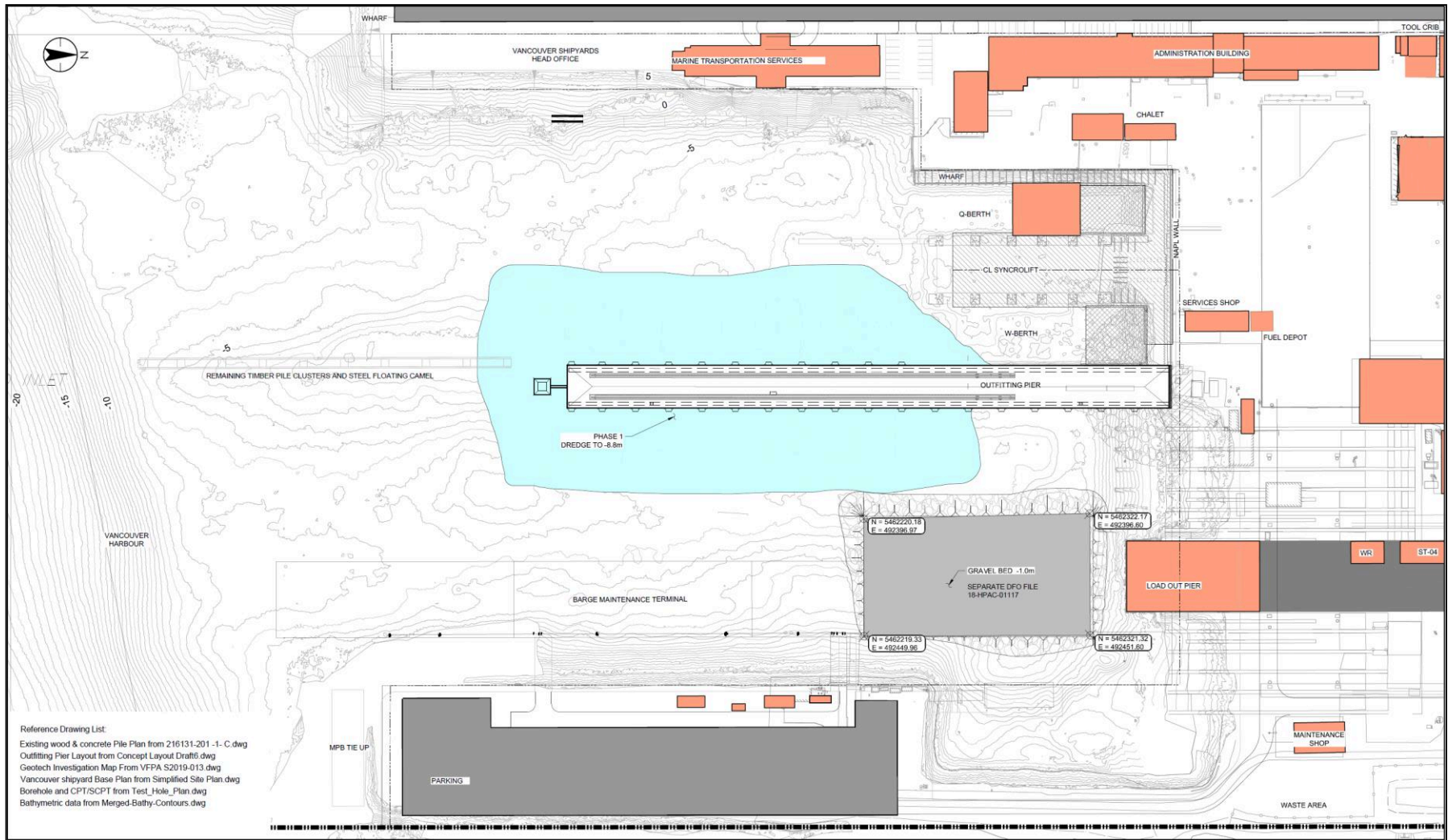


Figure 4 Seaspan Vancouver Shipyard Outfitting Pier Extension Dredge

2.1.2 PROJECT SETTING

The Project is located in District of North Vancouver on VFPA owned Schedule A water lots which are operated under tenancy by Seaspan ULC (Figure 1). The Site land use is designated by the VFPA as “Port Terminal” in the Port Metro Vancouver Land Use Plan (VFPA 2014). The Seaspan upland shipyard is owned by Seaspan outside federal lands within the District of North Vancouver.

The nearest sensitive receptors in the District and City of North Vancouver include:

- Bodwell High School located at 955 Harbourside Dr, City of North Vancouver, 0.4 km east
- Northgate Community Elementary School located at t 1295 Sowden St, District of North Vancouver, 1 km northwest
- Westview Elementary School, located at 641 17th Street West, District of North Vancouver, approximately 1.5 km northeast
- Kings Mill Walk Park, City of North Vancouver, located 0.4 km east, and MacKay Creek Marsh Park, District of North Vancouver located 0.7 km north of the Project site.

2.1.3 POTENTIAL EFFECTS OF THE PROJECT

Project-related effects have been discussed with the VFPA for demolition, construction and operational phases. Demolition and construction-related effects will result from the use of construction equipment and construction activities that may temporarily increase air emissions, dust, noise and lighting within the Project area of the Seaspan basin.

No additional impacts to the community or local businesses are anticipated as a result of the construction or operation of the Project.

Environmental controls and mitigation measures used to avoid, and limit construction-related effects are outlined in the Project’s CEMP (Appendix L).

2.1.4 COMPLETED STUDIES AND PLANS

Studies and plans completed in support of the Project are included as appendices as listed in Table 2 below.

Table 2 Completed Studies and Plans

| Appendix | Section | Study or Plan |
|----------|---------------------|---|
| A | | PER Application Submission Requirements |
| B | 2.1.1, Figure 1 | Location Plan |
| C | 2.1.1, Figure 2 & 3 | Site Plan |
| D | | Site Photographs |
| E | | Permitting Design Drawings |
| F | | Construction Fire Safety Plan |

Seaspan Vancouver Shipyards Outfitting Pier Extension

| | | |
|---|-------------|---|
| G | | Hazardous materials reuse, removal, recycling and disposal plan |
| H | | Geotechnical Report |
| I | | Biophysical Survey Report – Dive Survey |
| J | | Dredge Pocket Sediment Characterization Report, Sample Analysis Plan |
| - | Section 4.5 | Marine Traffic Study |
| K | | Archeological Overview Assessment |
| L | | Construction Environmental Management Plan |
| M | | DFO Request for Review Application: Updated Designs Details, Attachments, and Request for Review Form |
| - | Section 5.1 | Indigenous Communication |
| N | | Draft Communications Plan |
| O | | Draft North Shore Waterfront Liaison Committee (NSWLC) Materials |

2.2 OPERATIONS

Normal working hours of approximately 0700–1700 Monday through Saturday will be followed for this Project, with no work on Sundays or statutory holidays. A construction schedule will be provided once a construction contractor has been retained. Proposed capacities and throughput including vehicular, truck and marine vessel traffic and parking requirements are not expected to change. Proposed capacities including vehicular, truck and marine vessel traffic and parking requirements are not expected to change.

Access points, roads and parking areas are provided on the general site plan (Figure 5) and design drawings (Appendix E).

Seaspan Vancouver Shipyards Outfitting Pier Extension

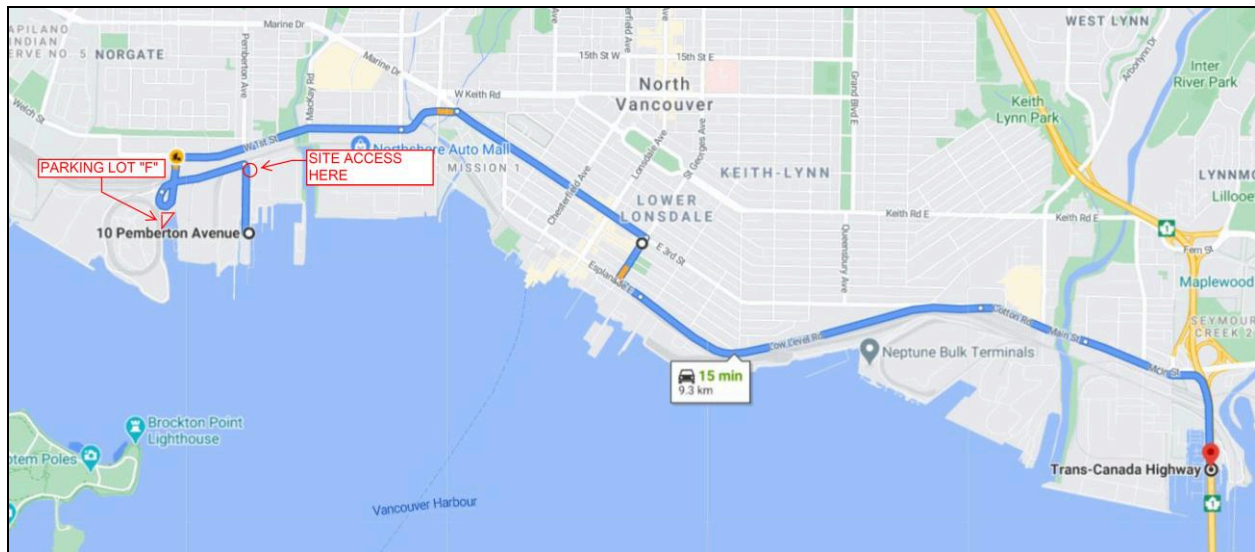


Figure 5 General Seaspan Shipyards Access Points, Roads and Parking Areas.

2.3 CONSTRUCTION

The anticipated construction schedule for the Project is as follows:

- Preliminary design to be completed by the end of November 2020 (Appendix E)
- Bathymetric survey has been completed in July 2020
- Additional geotechnical investigation and sediment sampling is anticipated to be completed in December 2020
- Construction from March 1, 2021 to August 30, 2022

As discussed with the VFPA, additional construction details will be determined upon the tendering of the Project with a construction contractor. Specific activities are included below and are subject to changes by Seaspan VSY or the contractor.

2.3.1 MARINE CONSTRUCTION AND STAGING PLAN

Outfitting pier construction will include in-water and over-water construction activities within the existing Vancouver shipyards site. It is expected that marine equipment (barges, clamshell, pile drivers, tugs, cranes, drill rig, excavators, loaders, vibratory and impact hammer, air compressor and welder etc.).

In-water demolition and construction activities will be isolated and monitored to ensure the protection of local environmental resources. The isolated work areas will constrain activities during the construction period within the shipyard basin (Figure 2, & Appendix A, B, and E). The construction works however do not impact local marine traffic or adjacent port tenants. The Seaspan basin is enclosed on three sides and only open to Burrard Inlet to the south and construction activities can be isolated to avoid and limit impacts to areas outside the Seaspan basin (Figure 1).

Seaspan Vancouver Shipyards Outfitting Pier Extension

The construction sequence would include:

1. Demolition of the existing timber outfitting pier in an isolated work area through removal of the pier deck infrastructure (155 m X 10 m) and existing deck slabs, removal of pier caps, stringers, removal of 590 wood creosote treated piles and 4 steel piles through vibro-extraction (where possible). An existing outfall discharge pipe will be protected and reconnected to the newly constructed outfitting pier. Wooden piles which break during initial extraction will be removed with a clamshell. Additional debris will be removed from around the old pier area. Removal of existing vessel tie-up floats and timber/steel dolphins.

The demolition scope is summarized in the following steps:

- a. Remove steel floating section of outer pier/camels. Cut into manageable size pieces for recycling or disposal
- b. Remove multi-timber pile (creosote) dolphins using a vibratory hammer on a barge mounted crane as a preferred method. Where not possible, cut off piles at the seabed
- c. Remove any fenders and fender/mooring piles on outer section of pier
- d. Remove any temporary buildings/offices along main timber section of pier
- e. Remove any ladders, lifesavers, movable gangways, curbs, guardrail, handrail, loose items, garbage or any other items on the existing timber pier deck
- f. Remove platform and gangway near abutment
- g. Remove any services running along/underneath the timber pier
- h. Remove pier timber decking
- i. Remove timber deck beams
- j. Remove timber pile caps / headstocks
- k. Remove timber piles completely using a vibratory hammer as a preferred method. Where not possible, cut off piles at seabed
- l. Remove abutment bulkhead wall. A slope of 2H: 1V with aggregate and riprap reinforcing will be required to stabilize the embankment once the bulkhead wall is removed
- m. Remove existing rip rap around abutment and store salvageable riprap in a stockpile on the side launch ramp
- n. Remove rocks, old steel beams and other debris around abutment

Seaspan Vancouver Shipyards Outfitting Pier Extension

- o. Remove any temporary buildings/offices/washrooms and loose items at or near the abutment
 - p. Demolish asphalt approach road near abutment
 - q. Dispose/recycle all items/materials removed, as directed by Seaspan
2. Dredging of a pocket to El. - 8.8 m CD using an environmental clamshell dredge conducted under the DFO Interim code of practice: Routine maintenance dredging.

Dredging operations would normally commence soon after the demolition and site preparation stages are complete. However due to the fisheries window, dredging in Burrard Inlet can only begin by August 16, 2021. In order to maintain schedule, pier construction will need to start prior to the commencement of dredging operations. The pier construction would start at the abutment and progress along the pier length. Dredging is far enough from shore that construction on the pier can commence prior to dredging without interference. Once dredging is initiated, it can start closer to shore and progress outwards to allow the dredging activity to stay ahead of the advancing pier construction. After dredging is complete, the construction of the outfitting pier and the mooring dolphin can occur somewhat independently and simultaneously to expedite schedule.

3. Construction of the Outfitting pier will include installation of:
- a. 126 steel vertical and batter piles to support the new pier structure using a vibratory hammer (final set may be required by impact hammer)
 - b. concrete pile support bents and concrete pile caps
 - c. concrete cast in place deck slab and ancillary deck infrastructure, utilities and fittings
 - d. mooring dolphin and access catwalk

Although each construction activity for the outfitting pier can occur sequentially, to expedite the schedule it is more likely that multiple activities will be conducted simultaneously by multiple crews and equipment at different work fronts along the pier. For example, a pile installation crew can progress along the length of the pier starting at the abutment and in advance of a second crew which follows and installs fender support panels and pile caps, followed by a third crew installing concrete girders, etc. This type of construction method is very efficient and lends itself directly to cantitravel construction.

Cantitravel construction involves the use of a custom fabricated cantitravel bridge unit which supports a crane and accommodates multiple work fronts as it advances along the length of the pier supported solely on the pier's pile foundations. The cantitravel unit

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allows installation of all major structural elements in sequence as it installs each piled bent and advances to install the next.

Although a cantitravel unit would be well suited to this type of construction, the pier can just as easily be constructed using spud barges, jack-up barges, barge derricks, and other floating construction plants.

Noting that several of the following activities will likely overlap, the basic sequence of construction tasks required to complete the outfitting pier is as follows:

- a. Mobilize materials and equipment
- b. Complete demolition as per above demolition sequence
- c. Install piles to required depth starting at abutment end of pier including field splicing piles if required.
- d. Begin dredging operations when the dredging window commences
- e. Continue to install piles during and after dredging advancing along the length of pier
- f. Install shear rings in piles
- g. Install reinforced concrete pile plugs in tops of piles.
- h. Erect precast concrete fender support panels on those bents with fenders.
- i. Place formwork around piles for first stage concrete pour of pile caps
- j. Erect precast crane beams, deck girders and utilidor girders
- k. Set bollard anchor bolts in pile cap closure pour
- l. Perform second stage concrete closure pour of pile caps with block-outs for utilidors
- m. Perform third stage deck pour to suit expansion and construction joints
- n. Perform fourth stage pour for bull rail curb.
- o. Install crane storm pins and hold-downs
- p. Install fenders and bollards, ladders, and other deck furniture
- q. Install crane rails, crane stops, and asphalt fill in rail trench
- r. Install covers on utilidors and drainage system
- s. Install utilities, electrical conduit/cables, deck electrical kiosks and crane power pit components.

The Mooring Dolphin will be constructed from the bottom up where each element is erected in sequence one on top of the other as follows:

- a. Drive piles to required depth
- b. Place and field weld modular steel pile cap to tops of piles

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- c. Install prefabricated deck
- d. Install bollards, bull rails, and other deck furniture
- e. Install catwalk after both mooring dolphin and outfitting pier decks are completed.

3.0 DRAWING REQUIREMENTS

The 60% design drawing package for the Outfitting Pier Extension is provided in the Appendix E and drawings listed below. The first phase of the Outfitting Pier Extension project, to be constructed in the next five years, will only include the demolition of the existing wooden pier and construction of the new 272 m pier with dredge area (drawing sheet page 6 and 7) to a depth of -8.8 m CD.

DRAWING No. Sheet Description by Appendix E page number.

1. 115619249-001 DRAWING INDEX
2. 115619249-101 SITE DEMOLITION PLAN
3. 115619249-102 SITE DRILLING LOCATION
4. 115619249-103 SITE GENERAL ARRANGEMENT
5. 115619249-104 GENERAL ARRANGEMENT - CROSS SECTION
6. 115619249-105 DREDGE PLAN
7. 115619249-108 DREDGE CROSS SECTIONS
8. 115619249-201 PILING - GENERAL ARRANGEMENT
9. 115619249-202 PILE POINT TABLE COORDINATES
10. 115619249-203 STEEL PILE SCHEDULE
11. 115619249-204 STEEL PILING DETAILS - SHEET 1
12. 115619249-205 STEEL PILING DETAILS - SHEET 2
13. 115619249-301 GENERAL ARRANGEMENT - PIER ELEVATION
14. 115619249-302 GENERAL ARRANGEMENT - PIER DECK PLAN
15. 115619249-303 PILECAP PLAN
16. 115619249-304 PILECAP DETAILS - PILECAP TYPE A
17. 115619249-305 PILECAP DETAILS - PILECAP TYPE B
18. 115619249-306 PRECAST UNITS PLAN
19. 115619249-307 PIER PRECAST UNITS - CROSS SECTIONS AND DETAILS
20. 115619249-308 UTILITY TRENCH - SERVICE DETAILS

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21. 115619249-309 UTILITY TRENCH DETAILS
22. 115619249-310 PIER SLAB DETAILS
23. 115619249-312 PIER ABUTMENT GENERAL ARRANGMENT
24. 115619249-313 ABUTMENT PILECAP DETAILS - PILECAP TYPE C
25. 115619249-401 MOORING GENERAL ARRANGEMENT - PLANS FOR OPERATIONAL CONDITIONS
26. 115619249-402 MOORING DOLPIN - STEEL PILE DETAILS
27. 115619249-404 OUTFITTING PIER - FENDER LAYOUT ELEVATION
28. 115619249-501 GENERAL ARRANGEMENT VESSEL MOORING - PLAN FOR OPERATIONAL CONDITIONS
29. 115619249-504 TYPICAL PIER SECTION - WITH PROG IB AND JSS - AT LOW TIDE
30. 115619249-505 TYPICAL PIER SECTION - WITH PROG IB AND JSS - AT HIGH TIDE

3.1 LOCATION PLAN

The Location Plan is shown on Figure 1 and is provided in Appendix B.

3.2 SITE PLAN

The Site Plan is shown in Figures 2 and 3 and is provided in Appendix C.

3.3 LOT GRADING AND UTILITIES

The elevations and utilities for the new outfitting pier are presented in Appendix E (drawing pages 20 and 21 respectively).

3.4 CONSTRUCTION FIRE SAFETY PLAN

The draft construction fire safety plan is provided in Appendix F and will be updated as the design process is completed, and the construction contractor is selected. The Seaspan shipyard site utilities, fire hydrants, and emergency access routes is presented in Figure 6.

Seaspan Vancouver Shipyards Outfitting Pier Extension

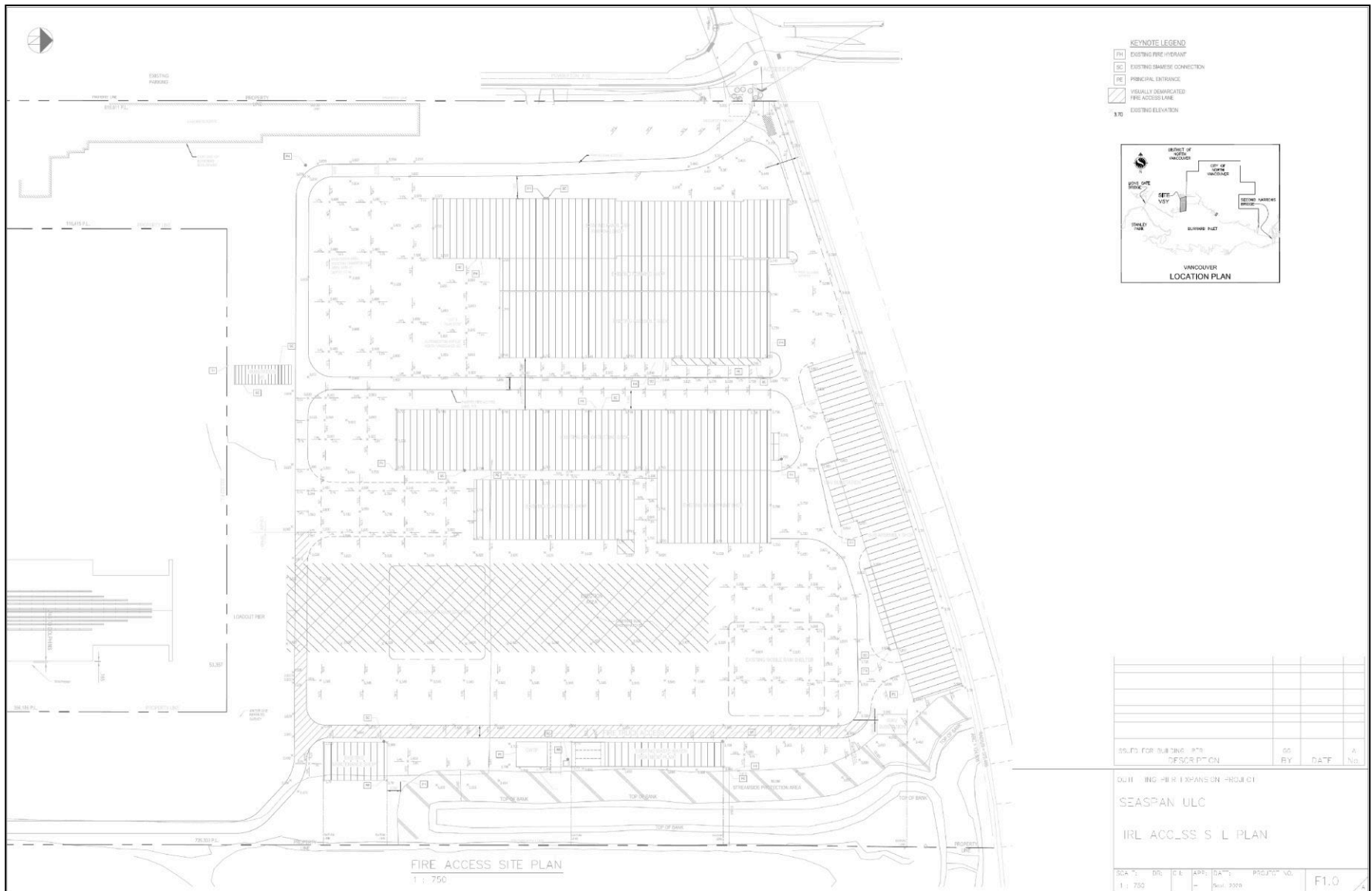


Figure 6 Site Utilities, Fire Hydrants, and Emergency Access Routes

3.5 MARINE STRUCTURES

The marine structures planned for demolition and construction are shown in Appendix E and are outlined in Section 3.0 above.

4.0 REQUIRED STUDIES AND REPORTS

4.1 HAZARDOUS MATERIALS REPORT FOR DEMOLITIONS

The pre-demolition hazardous building materials assessment report is provided in Appendix G.

4.2 GEOTECHNICAL REPORT

The preliminary geotechnical design report is provided in Appendix H.

4.3 BIOPHYSICAL SURVEY REPORT

The outfitting pier biophysical subtidal SCUBA survey results report is provided in Appendix I.

4.4 DREDGING STUDIES

The sediment sampling analysis plan and sediment characterization report is provided in Appendix J.

4.5 MARINE TRAFFIC STUDY

There is no public marine use or navigation within the Seaspan Shipyard basin other than Seaspan operations and therefore, no potential interference with navigation under the Canadian *Navigable Waters Act* due to the outfitting pier expansion project. Some considerations and activities associated to the outfitting pier usage during construction and operation are indicated below.

4.5.1 VESSELS

The vessels scheduled to be fabricated and assembled at the proposed outfitting pier range from a length overall of 173.7 m to 69.5 m (MPA assumed length overall). Details about the design vessels are presented in Table 3 and Figure 7.

Table 3 Design Vessels Main Characteristics

| Description | | | |
|-------------------|---------------------------------------|---------------------|------------------------|
| Vessel Name | OOSV | JSS | Polar |
| | Offshore Oceanographic Science Vessel | Joint Support Ships | Polar Class Icebreaker |
| Length Overall, m | 87.93 | 173.7 | 149.3 |

Seaspan Vancouver Shipyards Outfitting Pier Extension

| | | | |
|---|-------|-------------|-----------------------|
| Length Between Perpendiculars, m | 78.96 | 162.0 | 135.6 |
| Beam, m | 17.6 | 24.0 | 28.0 (25.3 at launch) |
| Loaded Displacement, tonnes | 5,050 | 21,597 | 23,700 |
| Lightship Displacement, tonnes | 3,425 | 11,133 | 15,481 – 17,360 |
| Max Draft, m | 6.2 | 8.0 | 10.5 |
| Design Draft, m | 6.2 | 7.4 | 10.5 |
| Lightship Draft (m) | 4.8 | 5.1 | 7.8 |
| Moulded Depth, m (at centre upper deck centre) | 9.25 | 14.6 / 17.6 | 16.5 |
| Freeboard ABL (freeboard deck)/(weather deck) | 9.25 | 14.6 / 17.6 | 16.5 |
| Loaded Freeboard (Normal), m | 3.05 | 10.2 | 6.0 |
| Loaded Freeboard (Minimum), m | 3.05 | 9.6 | 6.0 |

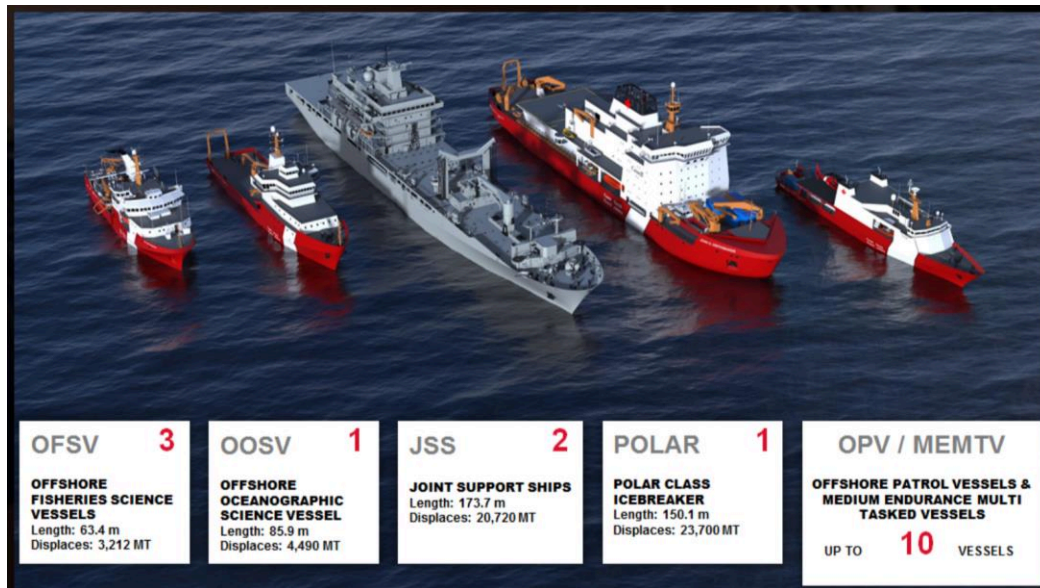


Figure 7 Illustration of Planned Vessels

4.5.2 ANTICIPATED TRAFFIC

The traffic during construction is expected to be limited to the area adjacent to the outfitting pier. The details of equipment will depend on the methodology adopted and the selected contractor. The main activities anticipated during construction consist of the demolition of the existing pier, dredging the berth pockets and new piles installation. The demolition of the existing pier, a timber pile and timber deck structure of approximately 155 m long x 15 m wide, and portions of

Seaspan Vancouver Shipyards Outfitting Pier Extension

the floating steel camel structure secured by timber pile cluster dolphins along its length is expected to be removed using a vibratory hammer in a barge.

The installation of the piles for the outfitting pier will start after the demolition is complete. The pile installation may use cantitravel construction method, which does not increase the marine traffic, as it involves the use of a custom fabricated cantitravel bridge unit progressing from shore. Alternatively, the pier can be constructed using spud barges, jack-up barges, barge derricks, and other floating construction plants, which will increase the marine traffic locally.

Dredging will start when the dredging window commences. Clamshell dredges are expected to conduct the work, to minimize environmental impacts, using barges or dump scows to collect the sediments. The sediment will be further disposed at sea or off-site at an approved facility.

During operations it is expected minimum vessel traffic as only a small number of vessels are to be fitted out at the berth and launched from the outfitting pier. It is understood all vessels will be fabricated at the shipbuilding assembly yard approximately 190 m to the east of the new outfitting pier. The partially complete vessels will be transported from the yard to the loadout pier. A floating drydock will be positioned in front of the loadout pier and grounded on a new gravel bed (barge cribbing), vessels will then be moved onto the grounded drydock. As the drydock is refloated it shall be towed away from the gravel bed and the vessels can be launched at a suitable location and then towed over to the outfitting pier. The proximity of the assembly yard and the outfitting pier is a benefit as it is only a short distance for these vessels to be towed over and berthed against the outfitting pier. This short and sheltered berthing route results in easy berthing conditions that only warrants the use of a lower berthing velocity. Seaspan's extensive knowledge of the local marine conditions and operations inside Burrard Inlet also plays an important role finding best windows to launch the vessels, minimizing potential impacts to the nearby traffic.

4.5.3 VESSEL MOORING

The mooring plan for the outfitting pier was determined considering operational and extreme conditions and the two largest vessels expected at the pier (JSS and Polar vessels). The mooring study was conducted using Optimoor, an industry standard software. During operational conditions, the vessels are expected to have a general line arrangement using 10 lines (2 head, 2 forward breast, 1 forward spring, 1 aft spring, 2 aft breast and 2 stern lines). Four additional lines (1 head, 1 forward breast, 1 aft breast and 1 stern lines) should be added during extreme conditions (total of 14 lines). Figure 8 shows the use mooring line arrangement during outfitting pier operational conditions.

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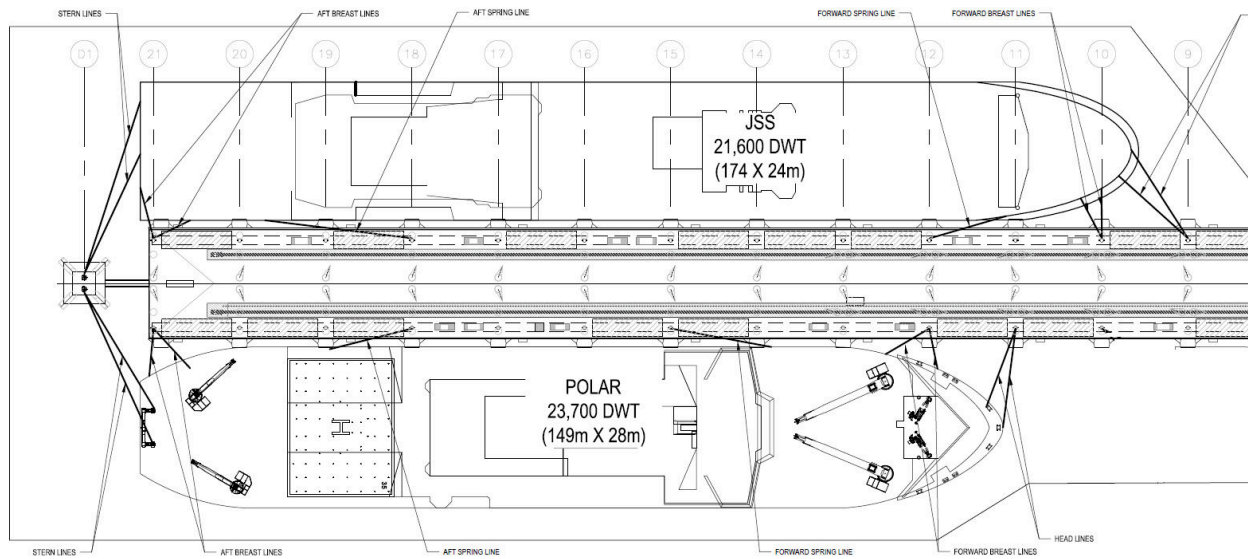


Figure 8 General Mooring Plan During Operational Conditions

There are several mooring buoys in the area that are used for temporary mooring of barges (Figure 9). One of these is owned and operated by Seaspan and the others are owned by the Council of Marine Carriers and can be rented for short periods of time. The closest buoy is approximately 500 m from the proposed outfitting pier extension location.

Seaspan is the primary user of the mooring buoy and does not have concerns about the Outfitting pier expansion interfering with navigation. No traditional or current marine use by Indigenous groups at the Outfitting pier expansion has been identified that would be affected by the outfitting pier expansion.

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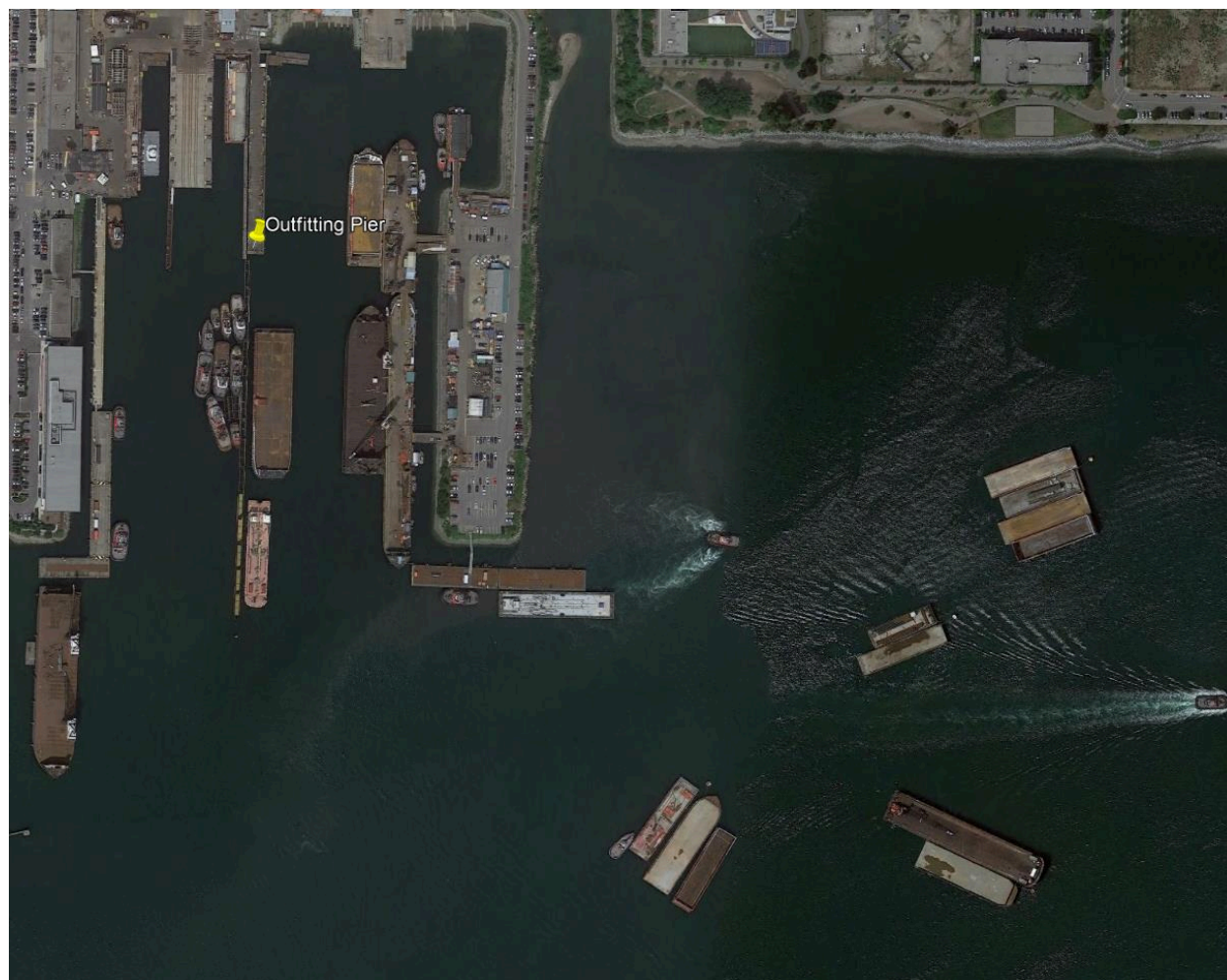


Figure 9 Mooring Buoys Adjacent to the Outfitting Pier

4.5.4 ADDITIONAL INFORMATION

The outfitting pier is planned for construction within the protected waters of the Seaspan basin inside Burrard Inlet. The currents within the Seaspan basin are expected to be low at the construction site for the outfitting pier. The low current velocities, combined with Seaspan extensive knowledge of the environmental conditions at the site, are important to minimize any special tug requirements for vessels movement within the Seaspan basin and around the outfitting pier.

No additional navigation aids are required for the Project within the Seaspan basin. All traffic into and within the Seaspan basin is managed through Seaspan internal operations.

No training requirements are needed from the Pacific Pilotage Authority.

4.6 ARCHEOLOGICAL OVERVIEW ASSESSMENT

The Archaeological overview assessment is provided in Appendix K.

4.7 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

The draft CEMP for the construction of the outfitting pier extension is provided in Appendix L and will be updated as the design process is completed, and the construction contractor is selected.

4.8 FISHERIES AND OCEANS REQUEST FOR REVIEW APPLICATION

Seaspan has submitted a Request for Review and a design Project update to Fisheries and Oceans Canada (DFO). Both documents are included in Appendix M. Fisheries and Oceans Canada has assigned the following project file to Seaspan's project request: 20-HPAC-01057.

5.0 CONSULTATION REQUIREMENTS

5.1 INDIGENOUS GROUPS

Initial engagement has been conducted with Indigenous groups, including the Tsleil-Waututh and Squamish Nations during October and November 2020. Additional virtual and on-site meeting will be facilitated between Seaspan and Indigenous groups throughout the project review process.

5.2 STAKEHOLDERS

Project notification letters will be distributed by VFPA to adjacent VFPA tenants including:

- Fibreco Export Inc.
- District of North Vancouver,
- Pacific Pilotage Authority,
- BC Coast Pilots.

Seaspan will participate in any meetings or provide additional background information as requested by VFPA.

5.3 DRAFT COMMUNICATIONS PLAN

A draft construction communications plan is provided in Appendix N.

5.4 PORT COMMUNITY LIAISON COMMITTEES

Draft communication materials for the North Shore Waterfront Liaison Committee (NSWLC) are provided in Appendix O.

6.0 CLOSURE

On behalf of Seaspan, we trust that this PER application meets the VFPA's information needs for the issuance of a Project Permit for the Seaspan VSY Outfitting Pier Extension Project. Should you require additional information or wish to discuss in more detail, please do not hesitate to contact the undersigned.

Regards,



George Geatros
Manager, Special Projects
Seaspan ULC.

cc: Mark Johannes, Ph.D., R.P.Bio., P.Biol.
Chuck Rosner, P.Eng.



Seaspan Vancouver Shipyards Outfitting Pier Extension

**Appendix A PROJECT AND ENVIRONMENTAL REVIEW APPLICATION
SUBMISSION REQUIREMENTS AND APPLICATION FORM**

Provided as a separate document.



Appendix B LOCATION PLAN

Provided as a separate document.



Appendix C SITE PLAN

Provided as a separate document.



Appendix D SEASPAN SITE PHOTO LOG

Provided as a separate document.



Appendix E DETAILED DESIGN DRAWINGS

Provided as a separate document.



Appendix F CONSTRUCTION FIRE SAFETY PLAN

Provided as a separate document.



**Appendix G PRE-DEMOLITION HAZARDOUS BUILDING MATERIALS
ASSESSMENT**

Provided as a separate document.



Appendix H GEOTECHNICAL REPORT

Provided as a separate document.



Appendix I BIOPHYSICAL SURVEY REPORT – SUBTIDAL DIVE SURVEY

Provided as a separate document.



Appendix J DREDGE SEDIMENT REPORT

Provided as a separate document.



Appendix K ARCHEOLOGICAL OVERVIEW ASSESSMENT

Provided as a separate document.



Appendix L CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Provided as a separate document.



Appendix M FISHERIES AND OCEANS REQUEST FOR REVIEW APPLICATION

Provided as a separate document.



Appendix N DRAFT COMMUNICATIONS PLAN

Provided as a separate document.



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**Appendix O DRAFT MATERIAL FOR THE NORTH SHORE WATERFRONT
LIAISON COMMITTEE (NSWLC)**

Provided as a separate document.