



Iqaluit Marine Infrastructure Project

Nunavut Impact Review Board – Deep Sea Port End of Construction Report

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We trust that this report satisfies your requirements as per Condition No. 3 of the Nunavut Impact Review Board (NIRB) Screening Decision Report (SDR) (Permit No. 17XN021).

If there are further questions or details required, please contact the undersigned, Victoria Burdett-Coutts, at any time by email at Victoria@dynamicocean.ca or by phone at 778-839-2372 (mobile).

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Executive Summary

This report meets the requirements for the Final Report - Construction Condition 3 for the Monitoring and Reporting Requirements of the Nunavut Impact Review Board (NIRB) Screening Decision Report (SDR) for the Iqaluit Deep Sea Port (DSP) (Permit No. 17XN021). Construction of DSP was underway through five open-water seasons, where construction was initiated in 2018 and substantial completion was reached in 2022. The facilities were operational in 2023. There were no non-compliances with the NIRB SDR during construction. A Table of Concordance in this report is provided to describe how compliance with the SDR conditions has been met with reference to details throughout the Report.

Acronyms and Abbreviations

Acronym or Abbreviation	Definition
Advisian	Worley Canada Services Ltd
BWG	Boaters Working Group
CCEMP	Contractor Construction Environmental Management Plan
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CEMP	Construction Environmental Management Plan
CGS	Community and Government Services
CIRNAC	Crown-Indigenous Relations and Northern Affairs Canada
CWP	Contractor Work Plan
DAS	Disposal At Sea
DFO	Fisheries and Oceans Canada
DG	Dangerous Good
DP	Development Permit
DSP	Deep Sea Port
Dynamic Ocean	Dynamic Ocean Consulting Ltd.
ECCC	Environment and Climate Change Canada
EDT	Economic Development and Transportation
EM	Environmental Monitor
EMPs	Environmental Management Plan
EnCMP	Environmental Compliance Monitoring Program
EZ	Exclusion Zone
FAA	<i>Fisheries Act</i> Authorization
FFHPP	Fish and Fish Habitat Protection Program

Acronym or Abbreviation	Definition
GN	Government of Nunavut
HTA	Hunters and Trappers Association
HWL	High Water Line
ISQG	Interim Sediment Quality Guidelines
MMO	Marine Mammal Observer
MP	Monitoring Plan
MSP	Marine Safety Plan
NoW	Notice of Work
NES	Nunnata Environmental Services
NIRB	Nunavut Impact Review Board
NPC	Nunavut Planning Commission
NRcan	Natural Resources Canada
NWB	Nunavut Water Board
PPD	Petroleum Product Division
QIA	Qikiqtani Inuit Association
SCH	Small Craft Harbour
SCOPs	Standards and Code of Practice
SDR	Screening Decision Report
SEC	Sediment and Erosion Control
SRP	Spill Response Plan
SRM	SRM Consulting Ltd
TC	Transport Canada
The City	The City of Iqaluit
The DSP Project	Iqaluit Marine Infrastructure Deep Sea Port Project

Acronym or Abbreviation	Definition
The Works	Minor works construction works remaining to complete the DSP Project
TMP	Traffic Management Plan
Tower	Tower Arctic Ltd.

Permit Conditions Tables of Concordance

The Nunavut Impact Review Board (NIRB) Iqaluit Deep Sea Port (DSP) Permit No. 17XN021 conditions are summarized in this section. The Conditions are referenced to the relevant sections in the report for descriptions.

No.	Condition	Report Section
NIRB Recommended Project-Specific Terms and Conditions		
General		
1.	The Government of Nunavut (the Proponent) shall maintain a copy of the Project Terms and Conditions at the site of operation at all times.	Section 1.3
2.	The Proponent shall forward copies of all permits obtained and required for this project to the Nunavut Impact Review Board (NIRB) prior to the commencement of the project.	Section 1.3
3.	The Proponent shall operate in accordance with all commitments stated in correspondence provided to the Nunavut Planning Commission (Application to Determine Conformity, February 17, 2017), and the NIRB (Online Application Form, June 12, 2017, and Response to Comments, August 16, 2017).	Section 1.3
4.	The Proponent shall operate the site in accordance with all applicable Acts, Regulations and Guidelines.	Section 1.3
Water Use		
5.	The Proponent shall not extract water from any fish-bearing waterbody unless the water intake hose is equipped with a screen of appropriate mesh size to ensure that there is no entrapment of fish.	Section 3.1
6.	The Proponent shall not use water, including constructing or disturbing any stream, lakebed or the banks of any definable water course unless approved by the Nunavut Water Board or Fisheries and Oceans Canada.	Section 3.1

No.	Condition	Report Section
Waste Disposal		
7.	The Proponent shall keep all garbage and debris in bags placed in a covered metal container or equivalent until disposed of at an approved facility. All such wastes shall be kept inaccessible to wildlife at all times.	Section 3.2
Fuel and Chemical Storage		
8.	The Proponent shall store all fuel and chemicals in such a manner that they are inaccessible to wildlife.	Section 3.3
9.	The Proponent shall use adequate secondary containment or a surface liner (e.g., self-supporting insta-berms and fold-a-tanks) when storing barreled fuel and chemicals at all locations.	Section 3.3.2
10.	The Proponent shall ensure that appropriate spill response equipment and clean-up materials (e.g., shovels, pumps, barrels, drip pans, and absorbents) are readily available during any transfer of fuel or hazardous substances, at all fuel storage sites, and at all refuelling stations.	Section 3.3.3
11.	The Proponent shall remove and treat hydrocarbon contaminated soils on site or transport them to an approved disposal site for treatment.	Section 3.2
12.	The Proponent shall ensure that all personnel are properly trained in fuel and hazardous waste handling procedures, as well as spill response procedures. All spills of fuel or other deleterious materials of any amount must be reported immediately to the 24-hour Spill Line at (867) 920-8130.	Section 3.3
Wildlife - General		
13.	The Proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.	Section 3.4
14.	The Proponent shall not harass wildlife. This includes persistently circling, chasing, hovering over pursuing or in any other way harass wildlife, or disturbing large groups of animals.	Workers were informed during the Contractor's induction training on requirements for

No.	Condition	Report Section
		appropriate wildlife management.
15.	The Proponent shall ensure that all project personnel are made aware of the measures to protect wildlife and are provided with training and/or advice on how to implement these measures.	See No. 14
Migratory Birds and Raptor Disturbance		
16.	The Proponent shall not disturb or destroy the nests or eggs of any birds. If nests are encountered and/or identified, the Proponent shall take precaution to avoid further interaction and or disturbance (e.g., a 100 metres buffer around the nests). If active nests of any birds are discovered (i.e., with eggs or young), the Proponent shall avoid these areas until nesting is complete and the young have left the nest.	Section 3.4
17.	The Proponent shall minimize activities during periods when birds are particularly sensitive to disturbance such as migration, nesting and moulting.	No wildlife features were identified, and activities did not interfere with sensitive periods such as migration, nesting or moulting.
Ground Disturbance		
18.	The Proponent shall not move any equipment or vehicles unless the ground surface is in a state capable of fully supporting the equipment or vehicles without rutting or gouging. Overland travel of equipment or vehicles must be suspended if rutting occurs.	Section 3.6
19.	The Proponent shall implement suitable erosion and sediment suppression measures on all areas before, during and after conducting activities in order to prevent sediment from entering any waterbody.	Section 3.6
20.	All construction and road vehicles must be fitted with standard and well-maintained noise suppression devices and engine idling is to be minimized.	Engine idling was kept to a minimum throughout construction.

No.	Condition	Report Section
21.	The Proponent shall use water or other non-toxic and biodegradable additives for dust suppression as necessary to maintain ambient air quality without causing water to pool or runoff.	Section 3.7
Marine-Based Activities		
22.	The Proponent shall not deposit, nor permit the deposit of any fuel, chemicals, wastes (including waste water) into any marine waters.	There were no harmful substances (i.e., fuel, chemicals) or wastes deposited in the marine environment throughout construction.
23.	The Proponent shall suspend all project activities should any dead fish or wildlife, or any injured wildlife be observed during any works or activities in and around the marine waters.	No injured or dead fish or wildlife were observed during construction.
24.	The Proponent shall implement measures designed to minimize disturbance to seabed sediments and benthic communities and marine wildlife when carrying out project activities within the marine environment.	Section 3.8 An Offsetting Plan was developed as a component of the Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program (DFO-FFHPP) <i>Fisheries Act</i> Authorizations (FAAs) to compensate for habitat loss or change due to the DSP Project.
25.	The Proponent shall implement suitable erosion and sediment suppression measures on all areas before, during, and after conducting activities in order to minimize turbidity plumes from the work site into the waterbody including the installation of silt screens.	Section 3.8.1

No.	Condition	Report Section
26.	Deep Sea Port construction shall be carried out during periods when wind, wave and tidal conditions minimize the dispersion of silt and sediment from the work site.	Weather conditions did not impact the dispersion of silt and sediment from the work site.
Restoration of Disturbed Areas		
27.	The Proponent shall remove all garbage, fuel, and equipment upon abandonment and completion of the construction activities.	Section 3.12
28.	The Proponent shall complete all clean-up and restoration of the lands used prior to the end of each field season and/or completion of site construction.	Section 3.12
Other		
29.	The Proponent should engage with local residents regarding planned activities in the area and should solicit available Inuit Qaujimaningit and information regarding current recreational and traditional usage of the project area which may inform project activities. Posting of translated public notices and direct engagement with potentially interested groups and individuals prior to undertaking project activities is strongly encouraged.	Section 3.11
30.	The Proponent shall ensure that project activities do not interfere with Inuit wildlife harvesting or traditional land use activities.	See No. 14
31.	The Proponent should, to the extent possible, hire local people and access local services where possible.	Locals were hired as Marine Mammal Observers (MMOs) and in some cases equipment operators, and support staff at the local accommodation.
32.	The Proponent shall ensure that access to work areas is controlled and restricted to construction personnel. This should	Section 3.11

No.	Condition	Report Section
	include the posting of signs noting hazards during construction activities.	
33.	The Proponent should discuss potential implications of the project on on-land and marine traffic movement with the City of Iqaluit, applicable territorial and federal government agencies, and local facility users before the implementation of the project.	Section 3.10
Monitoring and Reporting Requirements		
Environmental Management Plans – Constructions and Operations		
1.	Prior to the start of construction activities, the Proponent will provide the final Construction Environmental Management Plan to the NIRB including an updated Spill Contingency and Emergency Management Plans.	A Construction Environmental Management Plan (CEMP) was developed to support permitting. This was replaced by a Contractor CEMP (CCEMP), which met the minimum requirements outlined in the CEMP, for the construction phase of the DSP Project. Section 4
2.	The Proponent will provide to the NIRB copies of any new or updated operational plans associated with management of the site, especially the most recent Emergency or Spill Response Plan for the operation of the dock that would include, but not limited to, identification of signage at the site, description of any consultation measures to educate the public on commitments made for re-fueling, and requirement for spill control and reporting from usage of the small craft harbour.	Section 4.2
Final Report – Construction		
3.	The Proponent shall submit a comprehensive final report to the NIRB at the completion of construction activities and prior to operations. This report must contain the following information:	Section 3.5 (Sediment Contaminants)

No.	Condition	Report Section
	<ul style="list-style-type: none"> A summary of activities undertaken during the construction phase, including: <ul style="list-style-type: none"> The process undertaken to determine if contaminants were present in the dredged material (including whether on-site or laboratory testing was undertaken). Mitigation measures undertaken if contaminants were identified. Reasons for any installation of silt fences or other erosion control measures and location. 	Section 3.6 (Sediment and Erosion Control [SEC])
	<ul style="list-style-type: none"> A log of wildlife observed in or near the project site, especially marine mammals, including: <ul style="list-style-type: none"> Identification of the wildlife observed and a brief description of the animal or group's behaviour. A description of mitigation activities undertaken, specifically stop work events, and the outcome of the encounter. Discussions that occurred with any regulatory authorities regarding wildlife encounters, recommendations, and any updated procedures that resulted. 	Appendix A (Table A- 2, Table A- 3)
	<ul style="list-style-type: none"> Description of any fuel spills and response measures undertaken to contain or clean up the spill. 	Appendix A (Table A- 4).
	<ul style="list-style-type: none"> A summary of how the Proponent has complied with terms and conditions contained within this Screening Decision Report, and all conditions as required by other authorizations associated with the project proposal. 	This Report provides a summary of compliance with the terms and conditions of the Screening Decision Report (SDR).

1. Introduction

This Report provides a summary of construction and environmental monitoring for the Iqaluit Marine Infrastructure Deep Sea Port (DSP) Project (the DSP Project), which meets Condition No. 3 of the Nunavut Impact Reviewing Board (NIRB) Screening Decision Report (SDR) – Monitoring and Reporting Requirements. The Table of Concordance (Table A) at the beginning of this Report references the SDR Conditions to describe compliance commitments that occurred during DSP Project construction.

1.1. Background and Project Status

Construction of the DSP Project occurred during the open water season (June to November) over a five-year period from 2018 to 2022. A SDR was issued by the NIRB (Permit No. 17XN021) on October 2, 2017 (NIRB, 2017). Detailed design, permitting and construction of the DSP Project was led by the Government of Nunavut (GN) - Community and Government Services (CGS). Consultant support for detailed design and regulatory support has been provided by Worley Canada Services Ltd (Advisian) SRM Consulting Ltd (SRM) and Dynamic Ocean Consulting Ltd (Dynamic Ocean). Tower Arctic Ltd. (Tower) was the Contractor for the DSP Project and was responsible for the development of an Environmental Compliance Monitoring Program (EnCMP).

The DSP Project was operational for 2023 open-water season and responsibility has been transferred to the GN - Economic Development and Transportation (EDT).

Minor construction works (the Works) are remaining to complete outstanding deficiencies for the DSP Project. An amendment request was submitted to the Nunavut Planning Commission (NPC) on December 19, 2023, to confirm that the Works will be in compliance with the NIRB SDR. An addendum to this Report will be issued to the NIRB once the Works are complete.

Permits issued for the DSP Project are summarized in Appendix A (Table A- 1).

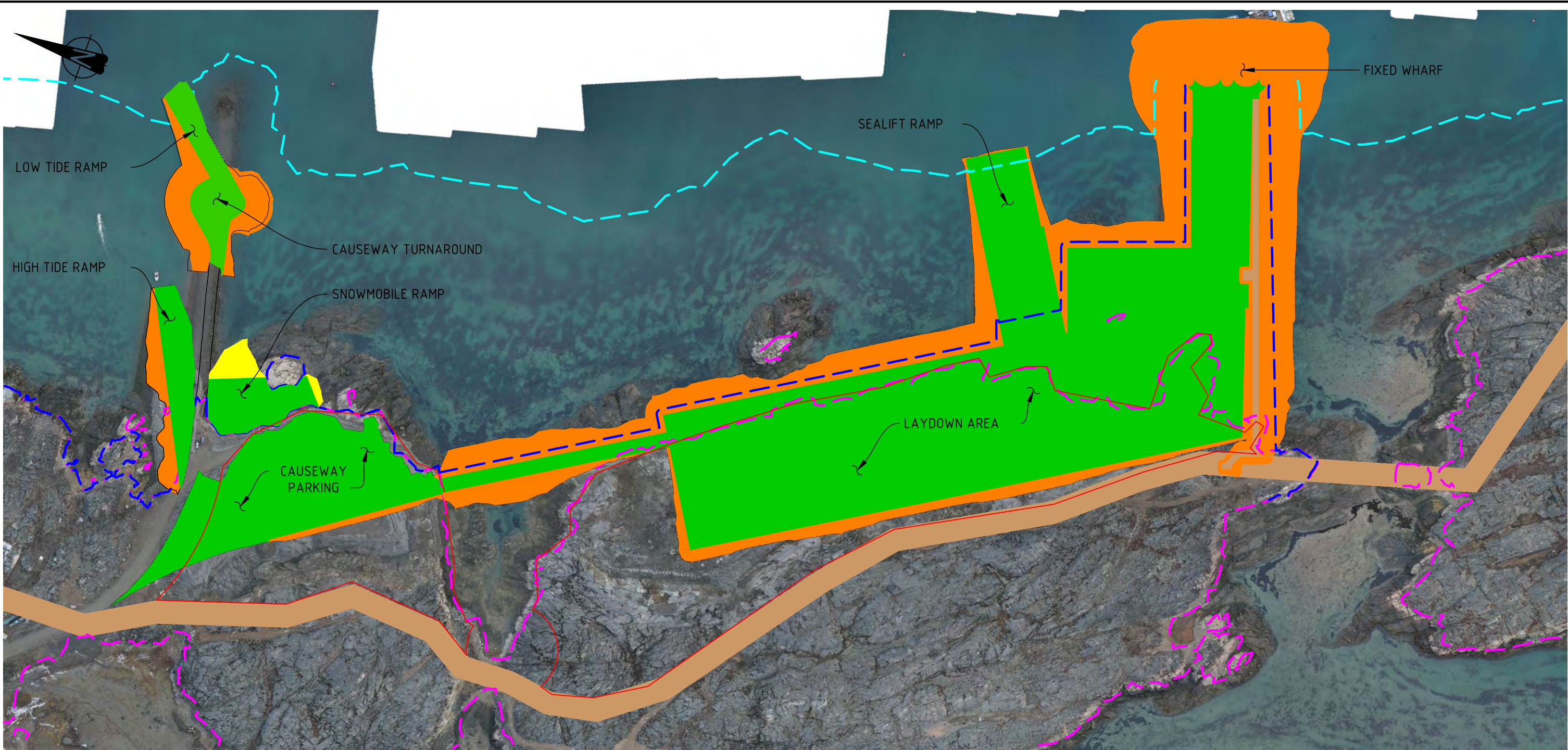
1.2. Project Components

The DSP Project components are described in Table 1-1 and depicted in Figure 1-1. The DSP Project consisted of the construction of the DSP and upgrades to the existing causeway.

To support DSP Project construction, Tower required laydown areas outside of the DSP Project footprint. This included a laydown area A and B for equipment, chemicals and hazardous materials storage, and an explosives storage area (see Figure 1-2, Figure 1-3).

Table 1-1: Deep Sea Port Project Components

Facility	Component
Deep Sea Port (DSP)	Fixed Wharf
	Wharf Access
	Sealift Laydown Area
	Sealift Ramp
	Access Road (Connecting Akilliq Road to the DSP)
	Causeway Parking Area
	Quarry
Causeway	High Tide Ramp
	Low Tide Ramp
	Vehicle Turn Around
	Snowmobile Ramp



LEGEND:

WATER LEVELS

- HHWL: 11.7m CD PRE-CONSTRUCTION
- HHWL: 11.7m CD POST-CONSTRUCTION
- LLWL: 0.0m CD

ZONE

- MAXIMUM BLAST AREA FOR DSP
- EXISTING FUEL LINE

FAA 17-HCAA-00961/00964

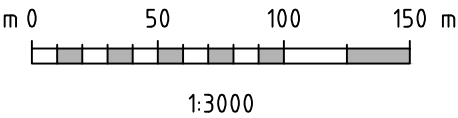
- GRAVEL - DRIVEABLE
- SLOPE - FILL OR CUT

FAA 19-HCAA-00476

- GRAVEL - DRIVEABLE
- SLOPE - FILL OR CUT

PLAN

1:3000



GOVERNMENT OF NUNAVUT
DEEP SEA PORT AND CAUSEWAY

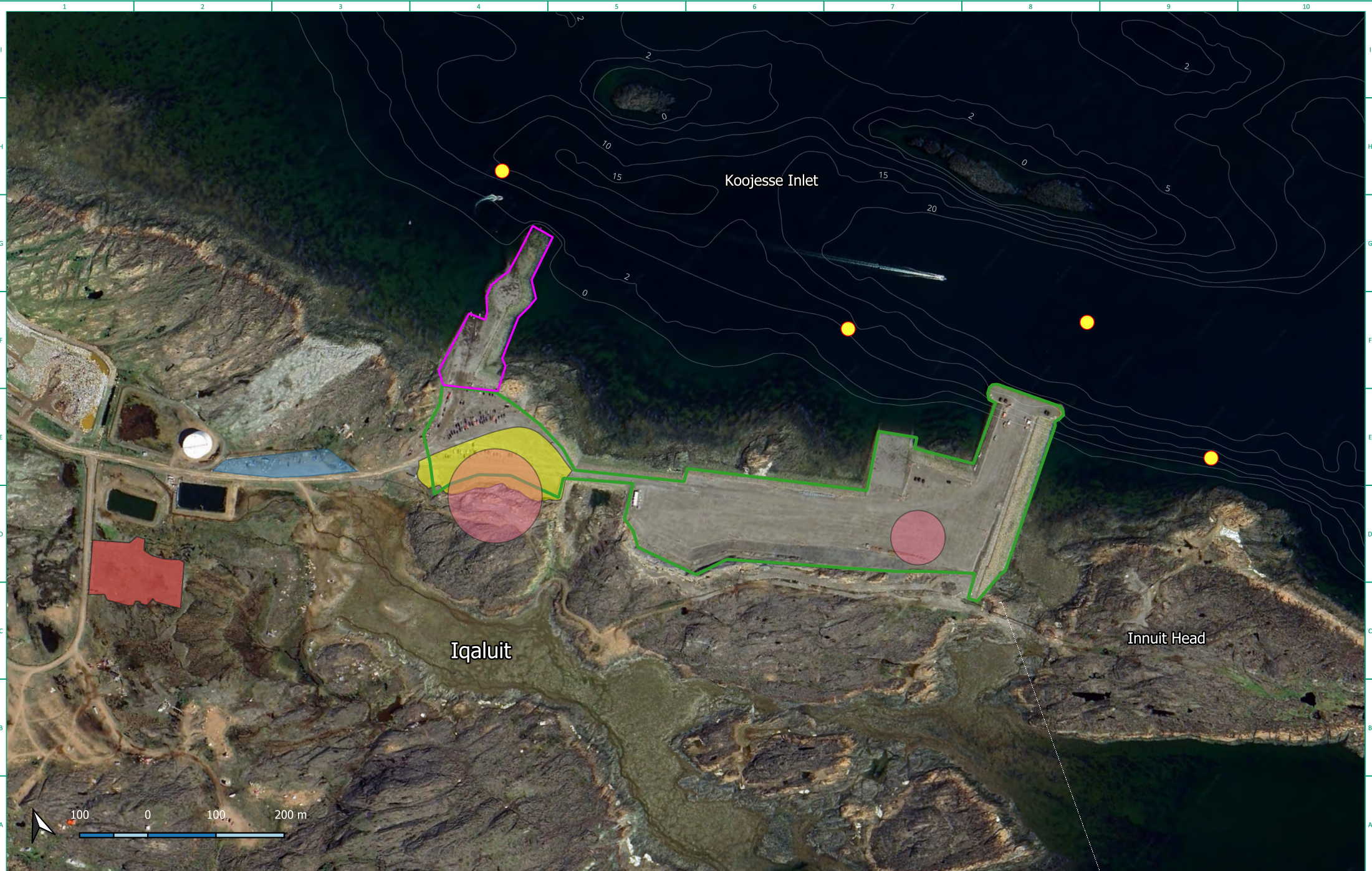
**GENERAL ARRANGEMENT
(REVISED)**



Date: 09-MAR-21	Drawn by: JLC	Edited by: JLC	App'd by: VBC
Worley Project No. 307071-01148		REV A	
FIG No. 1-1			

Advisian
Worley Group

"This drawing is prepared for the use of our customer as specified in the accompanying report.
Worley Canada Services Ltd. assumes no liability to any other party for any representations contained in this drawing."



LEGEND:

	Deep Sea Port		Contractor Laydown
	causway		Temporary Buoys
	Stock Pile		Temporary Parking
	Rock Crushing		

SOURCES / NOTE:
WGS 84 / EPSG Canada Polar Stereographic
Units: meters
Dynamic (relies on a datum which is not plate-fixed)
Celestial body: Earth
Based on World Geodetic System 1984 ensemble (EPSG:6326), which has a limited accuracy of at best 2 meters.

PROJECT: DSP-IQ

SYSTEM:

ASSET:

DISCIPLINE: Regulatory

REV	YYYY-MM-DD	DESCRIPTION	DRAWN	APPROVED
A	2023-08-27	DSP-IQ	C.Knight	
B	2023-09-19	DSP-IQ	C.Knight	

ISSUES / REVISIONS

VENDOR:

Dynamic Ocean Consulting Ltd.

Advisian

Nunavut

TITLE: Figure 1-2 Deep Sea Port Temporary Areas and Laydown

SCALE:	SHEET 1 OF 1	DRAWING NO. 20230827-001	REV: B
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LEGEND:

- Explosives storage area
- Contractor Camp Yard

SOURCES / NOTE:
WGS 84 / EPSG Canada Polar Stereographic
Units: meters
Dynamic (relies on a datum which is not plate-fixed)
Celestial body: Earth
Based on World Geodetic System 1984 ensemble (EPSG:6326), which has a limited accuracy of at best 2 meters.

PROJECT: DSP-IQ

SYSTEM:

ASSET:

DISCIPLINE: Regulatory

REV	YYYY-MM-DD	DESCRIPTION	DRAWN	APPROVED
A	2023-08-27	DSP-IQ	C.Knight	
B	2023-09-19	DSP-IQ	C.Knight	

ISSUES / REVISIONS

VENDOR:

Dynamic Ocean Consulting Ltd.

Advisian

TITLE:

Figure 1-3 Explosives Storage Area and Contractor Camp Yard

SCALE:	SHEET	OF	DRAWING NO.	REV:
	1	1	20230827-003	B

1.3. Permits and Regulatory Compliance

Permits pertinent to the DSP Project are summarized in Appendix A (Table A- 1).

The GN-CGS developed a Commitment Register which incorporated all permit conditions and Construction Environmental Management Plan (CEMP) (Advisian, 2017a) mitigations. The Commitment Register provided the GN-CGS with a reference point to consolidate all DSP Project commitments.

Tower was responsible for the implementation of regulatory commitments during construction of the DSP Project and developed an Environmental Monitoring Compliance Program (EnMCP). Environmental Monitor (EM) support was provided by Tower's internal team, local support and SNC Lavalin. The GN-CGS was supported by Advisian, Dynamic Ocean and SRM for regulatory oversight on the EnMCP.

Several Contractor Work Plans (CWPs) were developed to support the implementation of the EnMCP as listed below and summarized in Section 4, Table 4-1:

- Contractor CEMP (CCEMP) (Tower, 2018a).
- Monitoring Plan (MP) (Tower, 2021a).
- Spill Response Plan (SRP) (Tower, 2021c).
- Fuelling Method (Tower, 2020).
- Marine Safety Plan (MSP) (Tower, 2021b).
- Traffic Management Plan (TMP) (Tower, 2018b).

The GN-CGS and their regulatory support team reviewed the CWPs prior to the start of DSP Project construction, and through construction when revisions occurred.

Tower was provided with copies of all permits and copies were kept on site during DSP Project construction.

2. Construction Summary

Construction of the DSP Project consisted of primary and supporting construction activities. Primary construction was considered those activities specific to the construction of the DSP Project components (see Section 1.2, Table 1-1, Figure 1-1), where supporting activities are those required to facilitate primary construction (e.g., crushing of rock).

A summary of construction activities for the DSP Project is presented in Table 2-1. Construction start and stop dates for activities are presented for each year of construction by DSP Project component.

Table 2-1: Summary of Construction Activities

Construction Activity	Component	Construction Status			
		Date		Year	
		Start	Stop	Complete	Occurred
Deep Sea Port					
Infill	Access Road	8-Aug	15-Nov	2022	2018
		26-Jun	10-Aug		2022
	Laydown Area	15-Aug	15-Nov	2022	2018
		07-Jul	16-Oct		2019
		14-Aug	15-Aug		2020
		13-Sept	25-Sept		2021
		24-May	24-Jul		2022
		Fixed Wharf	02-Sept		15-Oct
	15-Aug		16-Nov	2019	
	31-Aug		18-Nov	2020	
	9-Jul		4-Oct	2021	
	09-Jul		15-Jul	2022	
	Wharf Access	04-Jul	23-Oct	2022	2019
		2-Sept	14-Oct		2021
		26-Jun	21-Oct		2022
	Sealift Ramp	27-Aug	15-Oct	2022	2018
		22-Aug	23-Oct		2020

Construction Activity	Component	Construction Status			
		Date		Year	
		Start	Stop	Complete	Occurred
		19-Jun	16-Jul		2022
	Causeway Parking Area	16-Jun	4-Aug	2022	2022
Sheet Piling	Fixed Wharf	14-Oct	07-Nov	2021	2019
		26-Jul	14-Nov		2020
		27-Jul	06-Sept		2021
Dredging	Fixed Wharf	17-Aug	25-Oct	2019	2018
		09-Jul	05-Sept		2019
Disposal at Sea (DAS)	NA	17-Aug	25-Oct	2019	2018
		10-Jul	05-Sept		2019
Blasting, Drilling, Rock Crushing	NA	31-Jul	24-Oct 20-Oct	2021	2018
		19-Jun	26-Oct		2019
		19-Jun	13-Sept		2020
		05-Aug	21-Oct		2021
Rock Crushing	NA	31-Jul	20-Oct	2022	2018
		19-Jun	26-Oct		2019
		22-Jun	30-Oct		2020
		08-Jul	26-Jul		2021
		14-Jun	13-Sept		2022

Construction Activity	Component	Construction Status			
		Date		Year	
		Start	Stop	Complete	Occurred
Stockpiling	NA	22-Jun	16-Oct	2022	2019
		22-Jun	18-Nov		2020
		05-Jul	24-Oct		2021
		02-May	19-Oct		2022
Fence Installation	NA	16-May	23-Jun	2022	2022
Pipeline Installation	NA	24-May	12-Oct	2022	2022
Electrical Installation	NA	05-Jul	14-Sept	2022	2022
Causeway					
Infill	High Tide Ramp	16-Sept	16-Oct	2022	2018
		09-Jul	01-Aug		2022
	Low Tide Ramp	16-Sept	16-Oct	2022	2018
		09-Jul	01-Aug		2022
	Vehicle Turnaround	16-Sept	16-Oct	2022	2018
		09-Jul	01-Aug		2022
	Snowmobile Ramp	15-Aug	22-Aug	2020	2020

3. NIRB Compliance Requirements

A summary of compliance and environmental monitoring undertaken throughout the DSP Project, specific to the NIRB SDR, is provided in this section.

Types of monitoring performed throughout the DSP Project are summarized in Table 3-1. Check marks indicate that monitoring types were used for the corresponding construction activity.

Table 3-1: Monitoring Summary

Construction activity	General	Turbidity	Marine Mammal Observer (MMO)	Acoustic (Fish)	Acoustic (Marine Mammal)	Sediment and Erosion Control (SEC)	Dust Control	Year(s) Conducted
Infill	✓	✓	✓	-	-	-	-	2019, 2020, 2021, 2022
Pile driving	✓	✓	✓	✓	✓	-	-	2019, 2020, 2021
Dredging	✓	✓	✓	-	-	-	-	2019
Disposal at Sea	✓	✓	✓	-	-	-	-	2019
Temporary Works	✓	-	-	-	-	-	-	2019, 2020
Blasting	✓	-	✓	-	-	-	✓	2019, 2020, 2021
Drilling	✓	-	-	-	-	-	✓	2019, 2020, 2021
Rock Crushing	✓	-	-	-	-	✓	✓	2019, 2020, 2021, 2022
Stockpiling	✓	-	-	-	-	✓	✓	2019, 2020, 2021, 2022
Fuel Management	✓	-	-	-	-	-	-	2018, 2019, 2020, 2021, 2022
Spill Response	✓	-	-	-	-	-	-	2018, 2019, 2020, 2021, 2022

Construction activity	General	Turbidity	Marine Mammal Observer (MMO)	Acoustic (Fish)	Acoustic (Marine Mammal)	Sediment and Erosion Control (SEC)	Dust Control	Year(s) Conducted
Rock/Sediment Transport	✓	-	-	-	-	✓	✓	2019, 2020, 2021

3.1. Water Use

Water withdrawal was undertaken during the 2021 and 2022 construction seasons to support concrete mixing and dust suppression. Tower obtained a Type-B water licence from the Nunavut Water Board (NWB) which was issued on June 9, 2021 (License No. 8BC-IMI2122). Tower was responsible for submitting annual reports to the NWB (Tower, 2022a).

The GN-CGS engaged Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program (DFO-FFHPP). A summary of planned water withdrawal activities was shared with DFO-FFHPP on May 17, 2021 (Advisian, 2021) and DFO-FFHPP did not acknowledge any concerns. Water withdrawal was conducted in compliance with DFO-FFHPP Standards and Codes of Practice (SCOPs) for end-of-pipe fish protection screens for small water intakes in freshwater (DFO, 2020).

Maximum daily water withdrawal did not exceed 30 m³ per day (as per Part C Condition 1 of NWB License No. 8BC-IMI2122).

Appropriate mesh size was used on water intakes to prevent fish entrainment. This was communicated by Tower in their weekly EM reports and in the NWB annual report (Tower, 2022a). While Tower did not provide their mesh size, there were no fish entrainment events.

3.2. Waste Disposal

Tower was responsible for ensuring that all wastes (e.g., garbage, debris, scrap metal) were removed from Territorial lands to an approved landfill or disposal facility (Tower, 2018a). Debris was collected from the DSP and transported to the City of Iqaluit (the City) landfill. When stored at the work site, garbage was maintained in a way that prevents access by wildlife.

Disposal of Dangerous Goods (DGs) consisted primarily of contaminated soils from minor oil spills (Appendix A (Table A- 4)). Dangerous goods were disposed of by Nunnata Environmental Services (NES) who are certified to handle the contaminated material.

3.3. Fuel and Chemical Storage

3.3.1 Dangerous Goods Storage

A storage area for DGs was established within Tower's laydown area and within the explosives storage area (see Figure 1-3). Items were stored in designated shipping containers that were inaccessible to wildlife. A SRP was developed to outline procedures for secondary containment and spill prevention of DGs (Tower, 2021c).

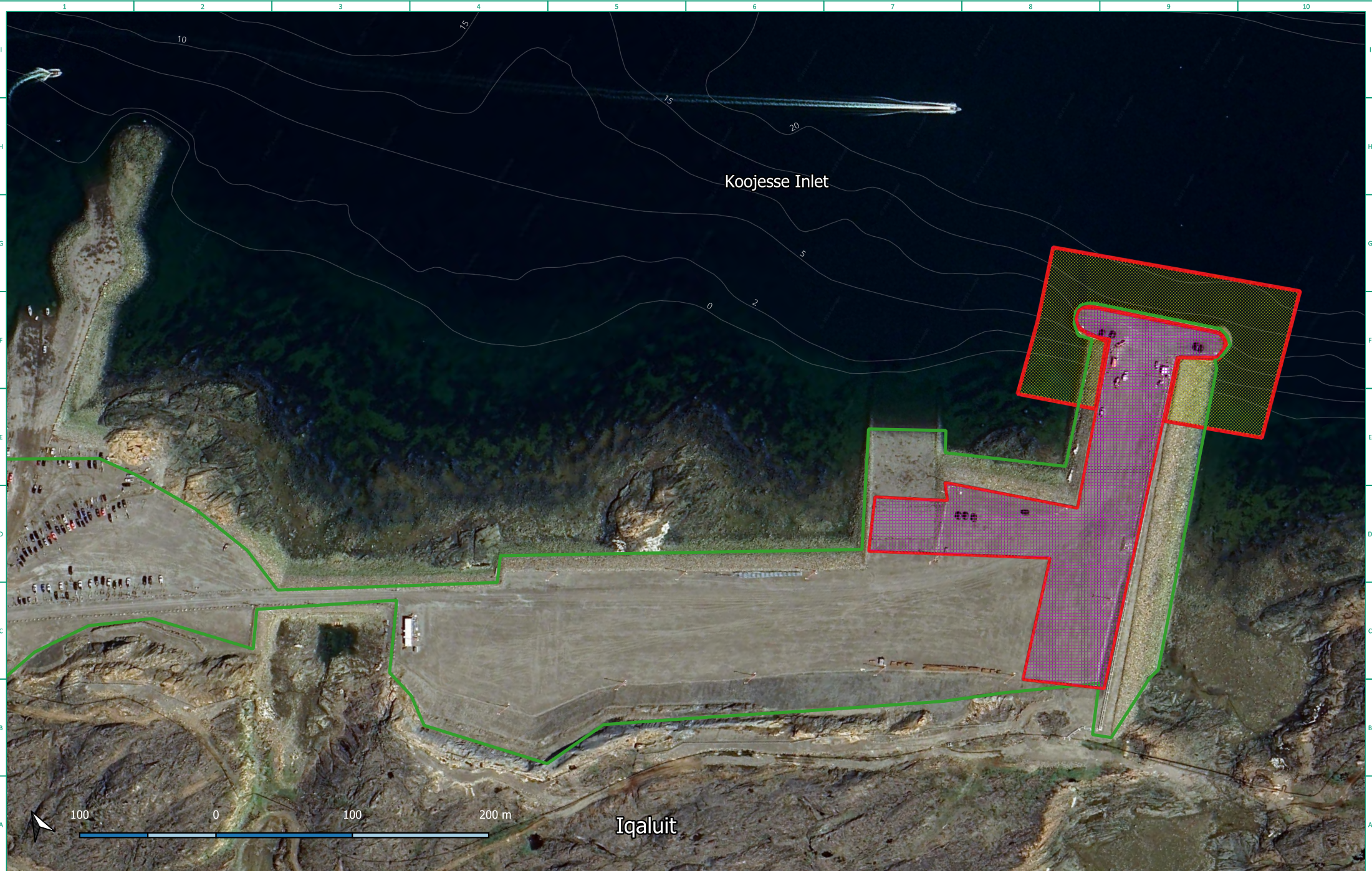
3.3.2 Refuelling and Fuel Storage


Fuel for the DSP Project was provided through existing fuelling facilities in Iqaluit as well as the use of Tower's own fuel truck. In addition, diesel and gasoline were stored in two 9,000 L fuel storage tanks in


another section within Tower's Laydown Area. A Fuelling Method CWP was developed to outline proper fuelling procedures (Tower, 2020).


As is typical for marine construction projects, near-water fuelling was required for construction equipment. An amendment to the Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) Land Use Permit (LUP, Permit No. N2018X0011 [DSP]) was required to allow for fuelling within 31 m of water (CIRNAC, 2020).

Near-water and marine fuelling locations for the DSP Project are depicted in Figure 3-1.



 Deep Sea Port

 Open Water Fueling

 Near Water Fueling

SOURCES / NOTE:
WGS 84 / EPSG Canada Polar
Stereographic
Units: meters
Dynamic (relies on a datum which is not
plate-fixed)
Celestial body: Earth
Based on World Geodetic System 1984
ensemble (EPSG:6326), which has a
limited accuracy of at best 2 meters.

PROJECT: DSP-IQ


SYSTEM:


ASSET:

DISCIPLINE: Regulatory

REV	YYYY-MM-DD	DESCRIPTION	DRAWN	APPROVED
A	2023-08-27	DSP-IQ	C.Knight	
B	2023-09-19	DSP-IQ	C.Knight	
ISSUES / REVISIONS				

VENDOR:


Advisian



TITLE:

Figure 3-1 Deep Sea Port Near Water Fuelling Areas

SCALE:	SHEET	OF	DRAWING NO.	REV:
	1	1	20230827-002	B

3.3.3 Spill Response

Compliance measures for spill response were outlined in Tower (2021c).

Tower's sequence of events to be followed in the event of spill are outlined below:

- Control the leak.
- Containment of the spilled product.
- Inform the supervisor.
- Recover contaminated material.
- File environmental report.

Three general spill response stations were established for the DSP Project. Smaller kits were available in all vehicles and equipment. As per Tower's weekly EM reports there was appropriate spill response equipment available at all spill response stations. All spills were immediately reported to the 24-hour Spill Line per Condition 12 of the NIRB SDR (NIRB, 2017), and spill reports were completed the same day.

A summary of spills that occurred during DSP Project construction are provided in Appendix A (Table A-4).

3.3.4 Equipment Inspections

As per the CCEMP (Tower, 2018a), equipment was required to be routinely inspected for leaks, cracked hoses and other conditions that could result in spills. Equipment was inspected prior to the start of each construction season and regularly during construction by the Tower EM to confirm it was free of leaks. Weekly equipment inspections were conducted by equipment operators and was documented in Tower's weekly EM reports.

3.4. Wildlife Monitoring

No negative impacts to wildlife occurred during DSP Project construction. Summaries of environmental monitoring activities for wildlife are provided in this section.

Monitoring types included:

- Pre-construction wildlife surveys.
- Marine Mammal Observers (MMOs) during in-water works.
- Establishment of Exclusion Zones (EZs) during sound producing activities.

Methodologies carried out by Tower for each of the monitoring types are provided in the respective section of the MP (Tower, 2021a).

3.4.1 Pre-Construction Wildlife Surveys

A pre-construction wildlife surveys occurred annually. Summaries of pre-construction wildlife surveys are provided in Tower's weekly EM reports and Appendix A (Table A- 3).

3.4.2 Marine Mammals

Exclusion Zones were required to minimize negative effects to marine mammals either due to physical interaction or noise disturbance. During in-water activities (see Table 3-2), an EZ was established and monitored by the MMO. During all in-water construction activities MMO's monitored for marine mammal presence and stress-related behaviours. The locations that MMOs were positioned relative to construction activities can be found in Section 7.2.2 of the MP (Tower, 2021a). The names of MMOs were provided on MMO tracking sheets which were appended to the pertinent Tower weekly EM report. Marine mammal observations were carried out for the construction activities as outlined in Table 3-2.

For underwater noise generating activities (e.g., pile driving, near water blasting), real-time acoustic monitoring (pressure and sound) was undertaken for fish and marine mammals, as per condition 2.2.3.2 of the *Fisheries Act* Authorization (FAA, (DFO, 2018)).

A summary of marine mammal observations for the DSP Project is provided in Appendix A (Table A- 2).

Table 3-2: Marine Mammal Observer and Exclusion Zone Size by Construction Activity Type

Category	Activity Type						
	In-water Infill	Out-of-Water Infill	Dredging	Disposal at Sea	Near Water Blasting	Pile Driving	Sheet Pile Driving
Exclusion Zone (EZ, m)	20	10	20	100 ¹	500	800 (adapted as per acoustic program)	150 (adapted as per noise monitoring program)
Marine Mammal Observer (MMO)	Equipment operator	Equipment operator	Dedicated MMO	Ship crew	Workers enforcing security	Dedicated MMO	Dedicated MMO

Note: ¹As per Marine Mammal Regulations if those change from 100 m so does compliance distance

3.5. Sediment Contaminants

Sediment sampling took place during the permitting phase of the DSP Project to support the Disposal at Sea (DAS) application. A comprehensive sediment sampling and analysis program was undertaken in 2015 and 2016, where samples were collected from the load site (dredge footprint) and the disposal site (see Appendix B, Figure B- 1, for load site sampling locations). Laboratory analysis of sediment sample characteristics were compared against Environment and Climate Change Canada (ECCC) DAS Regulations (ECCC, 2018) and Canadian Council of Ministers of the Environment (CCME) Sediment Quality Guidelines, Interim Sediment Quality Guidelines (ISQG) (CCME, 2003) for marine environments.

Chemical analysis of sediment at the DSP showed that all sediment characteristics were below CCME ISQG and DAS regulation guideline limits (Advisian, 2017b).

3.6. Sediment and Erosion Control

The primary areas to be monitored for Sediment and Erosion Control (SEC) were the stockpiles and rock crushing areas (Figure 1-2). The EM was responsible for weekly SEC monitoring during DSP Project construction. No silt fences were required for SEC.

Rutting did not occur due to DSP Project construction activities.

3.7. Dust Suppression

Dust was at times generated from the rock crushing activity and from machinery on the access roads. The EM monitored for dust production during DSP Project construction, and water withdrawn from the Apex River (see Section 3.1), or calcium, was used for dust suppression at the DSP, which included the access road and the quarry, as required.

3.8. Marine Based Activities

3.8.1 Turbidity

Turbidity monitoring was carried out for construction activities that had the potential to result in sediment disturbance. Tower's turbidity monitoring protocol is described in the CCEMP (Tower, 2018a) and MP (Tower, 2021a). For each of the activities outlined in Table 7-1 of the MP (Tower, 2021a), compliance monitoring was carried out at the start of each new construction activity. Compliance monitoring was conducted as follows:

- Visual observation.
- Turbidity sampling when plume exceeds 100m (compliance monitoring zone).

Following the initial turbidity sampling, the EM conducted visual monitoring of the construction activity for plumes. When plumes occurred, they were monitored by the EM for the duration of the plume, and plume size and activity were documented (examples shown in Photo 3-1). If plumes exceeded 100 m

from the construction activity, turbidity sampling was undertaken. While occasional plumes did occur, no turbidity generated from DSP Project construction resulted in concerns for deleterious substances.

Silt curtains were not required during DSP Project construction.

See Table 3-3 for turbidity monitoring reference and compliance location based on construction activity.

Table 3-3: Turbidity Monitoring Summary

Location	Construction Activity				
	In water infill or infill removal	Out of water infill or infill removal	Dredging	Erosion	Disposal at Sea
Background	More than 25m up current or at a distance 5 times the size of the plume				On site before disposal
Compliance	100m				

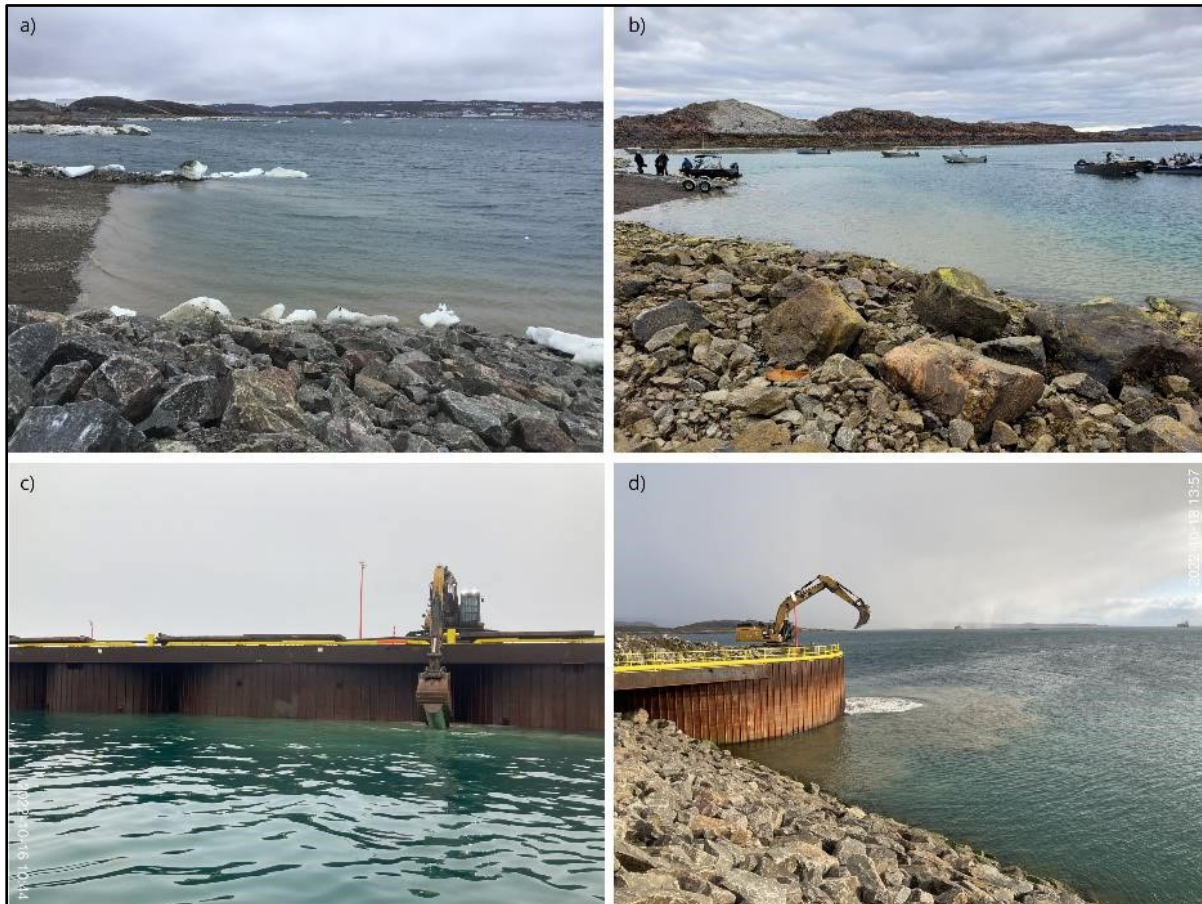


Photo 3-1: Representative Turbidity Plume Photos - 2022 Construction Season: a) Sealift Ramp; b) Causeway Boat Ramp; and c) Deep Sea Port Fixed Wharf; d) Deep Sea Port Fixed Wharf

Source: Tower Weekly EM Reports

3.9. Other

3.9.1 Community Consultation

3.9.1.1. Government of Nunavut

Community engagement, including consultation with the Amaruq Hunter and Trappers Association (HTA) and Qikiqtani Inuit Association (QIA), was undertaken by the GN-CGS throughout the DSP Project. During the design and permitting phase, collaboration with the Amaruq HTA was instrumental in

designing the marine facilities in Iqaluit that would meet the needs and priorities of the community as well as ensuring that Inuit harvesting rights would not be affected by the DSP Project.

During DSP Project construction, the GN-CGS consulted with the Amaruq HTA and QIA specific to additional works required in the 2021 construction season. Consultation was associated with temporary improvements to the intertidal access route between the DSP and Innuvit Head, water withdrawal at the Apex River and a geotechnical drilling program.

3.9.1.2. Tower Arctic Ltd.

Prior to DSP Project construction, Tower was required to develop a community consultation program. Community consultation was undertaken prior to and during each construction season to inform the community about planned construction activities and address any community concerns. Tower's community consultation program consisted of:

- Posting and distribution of pre-season construction information packages in town (e.g., post office information board, Facebook community group).
- Community open houses.
- Construction notices for specific construction activities with the potential to impact the community (posted online, on radio, and around the City).
- Meetings with:
 - The City.
 - The Boaters' Working Group (BWG).
 - The Amaruq HTA.
 - The QIA.

3.9.2 Community Construction Signs

English and Inuktitut signs were posted at access points to the DSP to warn of potential hazards (e.g. blasting), and/or to notify of changes to marine access (Photo 3-2). Notifications of these potential hazards/access changes were also posted to the Iqaluit community Facebook page.



Photo 3-2: Demonstrative Community Notice Sign

Source: Respective Tower Weekly EM Report

3.10. Cautionary Buoys

As a component of the Transport Canada (TC) Notice of Work (NoW) Approval, cautionary buoys were required at the DSP to minimize navigational interferences and confirm marine users were informed about activities that may influence navigation routes.

The approximate location of the buoys during DSP Project construction is depicted in Figure 1-2.

3.11. Community Access and Communication

Throughout DSP Project construction, Tower periodically required restricted parking near the causeway due to safety requirements. Communication regarding community access was carried out by Tower, where they posted on Facebook to inform the community when construction began for the season and

where access was being restricted (Figure 3-2). Temporary parking was made available to the community during periods of restricted access (Figure 1-2).

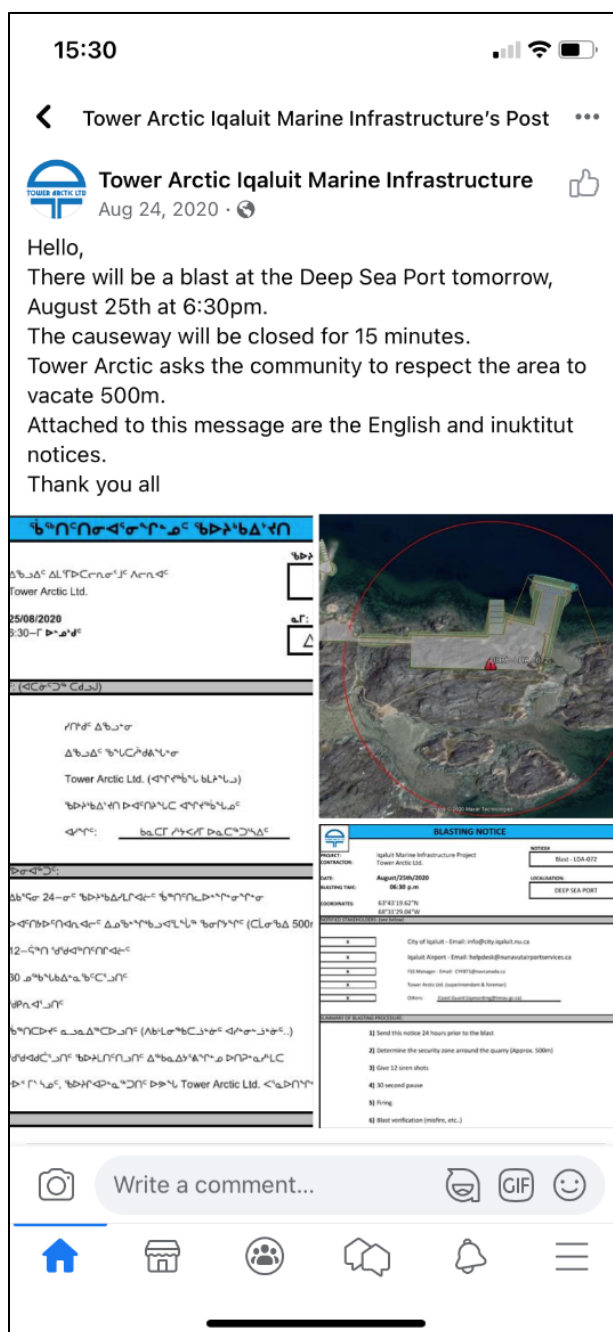


Figure 3-2: Example Temporary Access Restriction Notice

Source: Facebook, Tower Marine Infrastructure page

REP-GN-02-Deep Sea Port End of Construction-0001-23.R1

3.12. Restoration of Disturbed Areas

By the end of construction in 2022 all marine equipment, including the barge, cranes, and tugboats were demobilized from the site. Land-based equipment was either demobilized or stored at Tower's laydown area A (Figure 1-2). Minimal land-based equipment will be required for completion of minor works at the DSP.

Tower was required to submit an end of season check list at the end of each construction season. This can be found in the Appendix of the CIRNAC annual construction reports and can be provided to the NIRB upon request.

No site restoration activities were undertaken for the DSP Project as this is permanent marine infrastructure.

4. Monitoring and Reporting Requirements

4.1. Monitoring Report

This Report provides a summary of compliance with the terms and conditions of the SDR. All monitoring activities undertaken throughout the DSP Project relevant to the SDR are summarized in Section 3. Wildlife logs are provided in Appendix A (Table A- 3), with further description of wildlife monitoring and mitigation available in Section 3.4.

4.2. Environmental Management Plans

Several Environmental Management Plans (EMPs) have been developed for the DSP Project and were implemented through the CWPs developed by Tower (Table 4-1). Copies of EMPs and CWPs were submitted to the NIRB prior to the start of DSP Project construction and during construction following document updates.

An SRP was developed by Tower for the Project for both construction and operation phases. The construction SRP was included in the CEMP, which was submitted to NIRB on November 18, 2018. Updated SRP's were submitted to NIRB prior to the start of construction season when updates were made. See Table 4-1 for a detailed list of EMPs in place during construction.

Table 4-1: Deep Sea Port Project Construction - Environmental Management Plans

Report	Phase	Description	Developed By	Reference
Construction Environmental Management Plan (CEMP)	Permitting	The CEMP describes the mandates of pertinent Authorities Having Jurisdiction (AHJ), associated legislation to confirm permit approvals and relevant compliance requirements for the construction of the DSP Project. This document details and outlines commitments, environmental effects and DSP Project-specific mitigation and monitoring measures implemented during construction to minimize negative effects to physical, biological and socio-economic features associated with construction.	Advisian	(Advisian, 2017a)
Contractor CEMP (CCEMP)	Construction	The Contractor developed a CCEMP to outline environmental management requirements that met the minimum requirements of the CEMP.	Contractor	(Tower, 2018a)
Monitoring Plan (MP)	Construction	The Contractor developed a MP to detail their Environmental Monitoring Compliance Program (EnMCP) to meet the commitments outlined in the CEMP. This included wildlife (including marine mammal), underwater noise and turbidity monitoring programs.	Contractor	(Tower, 2021a)
Traffic Management Plan (TMP)	Construction	<p>The Contractor developed a TMP to manage land-based transportation to and from the DSP. This included:</p> <ul style="list-style-type: none"> Outlining the requirements and management for site access, traffic within the DSP and communication 	Contractor	(Tower, 2022b)

Report	Phase	Description	Developed By	Reference
		<p>plans between pertinent personnel to address traffic management related concerns.</p> <ul style="list-style-type: none"> • Providing commitments for the community to access and use the DSP, including details on safety restrictions on access, and the process for interactions and controls with sea lift operators. 		
Marine Safety Plan (MSP)	Construction	The Contractor developed a MSP to outline safety management for marine-related construction. The plan included the requirements stipulated in the TC Approval received for the DSP Project.	Contractor	(Tower, 2021b)
Spill Response Plan (SRP)	Construction	<p>The Contractor developed an SRP, which included:</p> <ul style="list-style-type: none"> • Plans for responding to emergencies and accidental spills. • Outlined of spill response procedures in the event of emergencies consistent with BMPs, legislation, and GN procedures. • Outlined of a schedule for checking spill kits. • Specified spill response materials and spill kit contents, notification, and communication commitments. • Identified fuel storage locations and handling procedures. 	Contractor	(Tower, 2021c)

4.2.1 Operational Management Plans

The GN-EDT are responsible for the management of all components of the Port of Iqaluit. This includes the DSP, the Causeway, and the SCH. The GN-EDT has produced a number of documents that address all aspects of the management, operation and maintenance of the Port of Iqaluit.

4.2.1.1. Deep Sea Port

The “Port of Iqaluit Operations Manual, 2023 Edition” (Operations Manual) (GN-EDT, 2023b) is an internal GN-EDT document that covers all aspects of the Port of Iqaluit and currently remains in draft form.

To date, the only document that has been distributed outside the GN-EDT is the “Port of Iqaluit User’s Manual” (GN-EDT, 2023c) and the “Port of Iqaluit Cargo Terminal – 2023 Season Notice of Operations” (GN-EDT, 2023a). These two documents are written specifically for those involved in the handling of dry cargo only and has been distributed to the Canadian Coast Guard (CCG), the dry cargo carriers, local cartage companies and contractors that generally load and transport their own cargo.

The GN-EDT was scheduled to hold a post-season review meeting with dry cargo stakeholders in December 2023. The lessons learned will be discussed and the GN-EDT will advise of other improvements that are planned for the 2024, including working toward full signage that has been identified in the Operations Manual (GN-EDT, 2023b). It is expected that the User’s Manual (GN-EDT, 2023c) will be updated for the coming 2024 season based on changes agreed amongst the stakeholders to the operations of the DSP.

The DSP is not accessible to the public and during the sealift season, the gate and security building are manned by the GN-EDT staff during the day and a security firm during night shifts. Photo 4-1 (Panel a and b) show some of the signage that has been used for the 2023 season.

The delivery of bulk fuel, which also occurs at the DSP, remains the responsibility of the fuel carrier and the tank farm operator who are contracted by the GN’s Petroleum Product Division (PPD). The operations of fuel delivery remain the same will continue to follow TC’s TP10783e “Arctic Waters Oil Transfer Guidelines” (Transport Canada, 1997) and TP 12402 “Oil Handling Facilities Standards” (CCG, 1995), which together describe operating procedures, spill response and spill equipment to remain on hand.

4.2.1.2. Causeway

In October 2023, the GN-EDT met with the HTA and with the BWG. The BWG is a local group of boaters that was formed by the GN-CGS’s Project team to attend design workshops early in the design stage of the Project. Both the HTA and the BWG were consulted through the design and the construction phases of the Project. The October 2023 meeting was specifically held to obtain feedback from users of the facilities following the first season of full use and discuss the protocol for finalizing the rules of operations of the facilities, including refueling and spill response.

The GN-EDT is procuring additional signage, safety equipment, spill kits, and waste receptacles to be located at the Causeway.



Photo 4-1: a), b) Signage at the Entrance Roadway to the Cargo Terminal Indicating No Parking and Restricted Areas; c), d) Signage at the Industrial Entrance to Cargo Terminal, Adjacent to the Security Office Indicating Restricted Access During Site Sealift Operations, Speed Limit and Directing Visitors to the Site Offices

4.2.2 Summary of Requirements

A summary of construction activities undertaken is provided in Section 2. A schedule of requirements is provided in Table 4-3.

A summary of regulatory inspections conducted throughout the DSP Project construction is provided in Table 4-4.

Table 4-2: Summary of Requirements

Requirement	Summary
Activities	
The process undertaken to determine if contaminants were present in the dredged material including whether on-site or laboratory testing was undertaken.	For a DAS permit was issued by ECCC to manage for disposal of dredged sediment from the DSP. To support the application, a sediment sampling program was implemented (see Section 3.5, Figure A-1). No contaminants were identified and therefore no mitigation measures were necessary.
Mitigation measures undertaken if contaminants were identified.	Not relevant, there were no contaminants identified during DSP Project construction. Management measures in place for accidental spills is summarized in Section 3.3.
Reasons for any installation of silt fences or other erosion control measures and location.	Addressed in Section 3.6.
Wildlife	
The Proponent shall ensure that there is no damage to wildlife habitat in conducting this operation.	See Section 3.4.1.
The Proponent shall not harass wildlife. This includes persistently circling, chasing, hovering over pursuing or in any other way harass wildlife, or disturbing large groups of animals.	Workers were informed during the Contractor's induction training on requirements for appropriate wildlife management.

Requirement	Summary
The Proponent shall ensure that all project personnel are made aware of the measures to protect wildlife and are provided with training and/or advice on how to implement these measures.	Workers were informed during the Contractor's induction training on requirements for appropriate wildlife management.
Fuel	
Description of any fuel spills and response measures undertaken to contain or clean up the spill.	See Section 4.3.3 and Appendix A (Table A- 3).
Compliance	
A summary of how the Proponent has complied with terms and conditions contained within this Screening Decision Report, and all conditions as required by other authorizations associated with the project proposal.	See Section 2.3.

Table 4-3: Regulatory Inspections for the Project for the 2018-2022 Construction Seasons

Year	Regulatory Authority	Personnel Attending	Title	Construction Week	Date
2018	DFO-FFHPP	Andrea Doherty	Senior Biologist	Week 5	August 28
		William Glass	Senior Fish and Fish Habitat Protection Biologist		
	TC	Laura Jones	Navigation Protection Officer	Week 11	October 10
	ECCC	Curtis Didham	Enforcement Officer	Week 12	October 17
	CIRNAC	Jonathan Mesher, LeeAnn Pugh, Laura Churchill, Jeremy Fraser	Resource Management Officer	Post construction	November 26
2019	DFO-FFHPP	Andrea Doherty	Senior Biologist	Weeks 14, 15	September 22 - 26
		Steven Cho	Fish and Fish Habitat Protection Biologist		
	TC	Laura Jones	Navigation Protection Officer	Week 12	September 5
	ECCC	Monika Trottier	Enforcement Officer	Week 7	August 1
		Curtis Didham	Enforcement Officer		
	CIRNAC	Johnathan Mesher	Resource Management Officer	Week 21	November 7
				Week 22	November 14
	GN – Department of Environment (DoE)	Name not provided	Environment Officer	Week 16	October 3

Year	Regulatory Authority	Personnel Attending	Title	Construction Week	Date
2020	CIRNAC	Jonathan Mesher	Resources Management Officer	Week 8	August 7
2021	CIRNAC	Jonathan Mesher & Jeremy Fraser	Resources Management Officer & Land Administrator Specialist	Week 16	August 27
2022	DFO-FFHPP	Chris Strand	Fish Habitat Biologist	Week 20	September 13

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Appendix A: Supporting Tables

Table A-1: Deep Sea Port Project Permits

Regulatory Authority	Permit Type	Permit #	Issued	Expiry	Permit Holder
Federal					
DFO	FAA	17-HCAA-00961	29-Mar-2018	31-Dec-2022	GN
		17-HCAA-00964			
		19-HCAA-00476	07-Oct-2019	31-Dec-2022	
ECCC	DAS	4543-2-02900	10-Jul-2019	09-Jul-2020	GN
		4544-70-PNR	11-Jun-2019	09-Jul-2020	
TC	NoW	8200-2016-600096-001	13-Apr-2018	NA	GN
		8200-2016-600096-003	19-Aug-2019		
		8200-2016-600096-002	13-Apr-2018		
CIRNAC	LUP	N2018X0011 (DSP)	21-Mar-2018	01-Oct-2023	GN

Regulatory Authority	Permit Type	Permit #	Issued	Expiry	Permit Holder
Natural Resources Canada (NRCan)	Explosive Magazine Permit	U300111/E	09-Jun-2021	30-Jun-2022	Tower
		U300112/E	21-Jul-2020	30-Jun-2021	
Territorial					
NPC	Territorial referral	148429 (DSP)	15-Feb-2017		GN
NIRB	SDR	17XN021 (DSP)	15-Feb-2017 (NPC referral)	End of Project	GN
			29-Sept-2017 Screening Decision Report (SDR)		
			02-Oct-2017 (Ministerial support)		
NWB	Type-B water license	8BC-IMI2122	09-Jun-2021	31-Dec-2022	Tower
Municipal					

Regulatory Authority	Permit Type	Permit #	Issued	Expiry	Permit Holder
the City	Exemption 'City of Iqaluit Noise By-law No. 879		18-Jul-2019		GN
	Development Permit (DP)	DP 17-058 (DSP) DP-17-059 (Causeway)	15-May-2018		GN

Table A-2: Marine Mammal Observations

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
2018							
NA	Disposal at Sea	NA	Seal	NA	NA	multiple	NA
NA	Blasting	NA	Seal	<500	NA	multiple	NA
2019							
14-Jul-19	Dredging	5	Harp seal	100	20	80	1
15-Jul-19	Dredging	4	Harp seal	200	20	180	4
29-Jul-19	Dredging	120	Harp seal	40	20	20	4
30-Jul-19	Dredging	5	Harp seal	30	20	10	1
30-Jul-19	Dredging	5	Harp seal	25	20	5	1
30-Jul-19	Dredging	5	Seal	50	20	30	1
31-Jul-19	Dredging	2	Harp seal	25	20	5	1
03-Aug-19	Dredging	1	Harp seal	50	20	30	2

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
04-Aug-19	Dredging	4	Ring seal	50	20	30	1
07-Aug-19	Dredging	20	Seal	200	20	180	2
08-Aug-19	Dredging	1	Harp seal	300	20	280	1
10-Aug-19	Dredging	10	Ring seal	20	20	0	1
14-Aug-19	Dredging	3	Harp seal	200	20	180	3
14-Aug-19	Dredging	5	Seal	25	20	5	3
19-Aug-19	Dredging	1	Harp seal	100	20	80	1
19-Aug-19	Dredging	1	Harp seal	25	20	5	1
19-Aug-19	Dredging	2	Harp seal	200	20	180	1
20-Aug-19	Dredging	1	Harp seal	200	20	180	1
22-Aug-19	Dredging	3	Harp seal	25	20	5	1
23-Aug-19	Dredging	20	Harp seal	50	20	30	1
23-Aug-19	Dredging	5	Harp seal	21	20	1	1

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
27-Aug-19	Dredging	25	Harp seal	50	20	30	1
2020							
27-Jul-20	none	45	Beluga whale	400	500	2	Normal, feeding mother and baby
27-Jul-20	none	10	Harp seal	350	500	1	Normal, feeding
29-Jul-20	Pile Driving (inactive)	10	Harp seal	350	500	1	Normal, feeding
30-Jul-20	none	40	Ring seal	375	500	1	Normal, feeding
30-Jul-20	none	15	Beluga whale	475	500	3	Normal, moving
30-Jul-20	none	5	Ring seal	60	500	1	Normal, resurfacing
31-Jul-20	none	10	Harp seal	375	500	1	Normal, feeding
31-Jul-20	none	15	Harp seal	25	500	1	Normal, resurfacing
31-Jul-20	none	NA	Ring seal	475	500	1	Normal, feeding
2-Aug-20	none	3	Seal	150	500	1	Normal, feeding

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
2-Aug-20	none	4	Seal	100	500	1	Normal, feeding
2-Aug-20	none	2	Seal	80	500	1	Normal, feeding
2-Aug-20	none	2	Seal	120	500	1	Normal, feeding
3-Aug-20	none	5	Harp seal	120	500	1	Normal, feeding
11-Aug-20	welding	25	Harp seal	375	500	5	Normal, feeding
13-Aug-20	welding	25	Harp seal	25-375	500	1	Normal, feeding
13-Aug-20	welding	15	Harp seal	50	500	1	Normal, feeding
13-Aug-20	welding	10	Ring seal	80	500	1	Normal, feeding
13-Aug-20	welding	10	Ring seal	50	500	1	Normal, feeding
13-Aug-20	welding	15	Ring seal	200	500	1	Normal, feeding
13-Aug-20	welding	20	Harp seal	20	500	1	Normal, feeding
14-Aug-20	welding	15	Harp seal	425	500	1	Normal, feeding
14-Aug-20	welding	50	Harp seal	375	500	3	Normal, feeding

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
14-Aug-20	welding	25	Ring seal	350	500	1	Normal, feeding
14-Aug-20	welding	10	Harp seal	175	500	2	Normal, feeding
15-Aug-20	welding	1	Seal	>500	500	1	Normal, resurfacing
18-Aug-20	pile driving	40	Beluga whale	>500	500	1	Normal, feeding
19-Aug-20	pile driving (inactive)	15	Harp seal	300	500	1	Normal, feeding
20-Aug-20	pile driving	15	Ring seal	350	500	1	Normal, feeding
21-Aug-20	pile driving (inactive)	20	Harp seal	360	500	1	Normal, feeding
21-Aug-20	pile driving (inactive)	20	Harp seal	280	500	1	Normal, feeding
27-Aug-20	pile driving (inactive)	10	Ring seal	300	500	1	Normal, feeding
27-Aug-20	pile driving (inactive)	NA	Harp seal	NA	500	NA	Normal, moving

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
28-Aug-20	none	5	Ring seal	300	300	1	Normal, moving
7-Sep-20	NA	10	Ring seal	200	No marine activity requiring Exclusion Zone (EZ)	1	Normal, moving
8-Sep-20	NA	45	Harp seal	80	No marine activity requiring EZ	1	Normal, feeding
8-Sep-20	NA	60	Harp seal	160	No marine activity requiring EZ	1	Normal, feeding
10-Sep-20	NA	20	Harp seal	300	No marine activity requiring EZ	1	Normal, feeding
10-Sep-20	NA	15	Harp seal	475	No marine activity requiring EZ	1	Normal, feeding
29-Sep-20	cell installation	15	Harp seal	460	600	1	Normal, feeding
26-Oct-20	Infill	11	Bearded seal	60-150	150	1	Normal, feeding

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
30-Oct-20	pile driving (inactive)	5	Seal	200	500	1	Normal, diving/surfacing
30-Oct-20	pile driving (inactive)	15	Seal	700	500	2	Normal, diving/surfacing
30-Oct-20	pile driving (inactive)	5	Harp seal	500	500	4	Normal, diving/surfacing
30-Oct-20	pile driving (inactive)	5	Harp seal	225	500	2	Normal, feeding
31-Oct-20	aggregate cell levelling	25	Ring seal	250-500	500	1	Normal, diving/surfacing/feeding
2021							
29-Jul-21	Pile Driving	1	Harp seal	1100	800	1	Normal, bobbing
29-Jul-21	Pile Driving	2	Harp seal	1300	800	4	Normal, bobbing
30-Jul-21	Cell template installation	1	Harp seal	800	150	1	Normal, bobbing

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
30-Jul-21	Cell template installation	7	Ring seal	450	150	1	Normal, floating
02-Aug-21	Pile placement (no driving)	2	Ring seal	1200	NA	1	Normal, floating
06-Aug-21	Pile placement (no driving)	5	Harp seal	210	NA	1	Normal, feeding
08-Aug-21	Pile placement (no driving)	2	Bearded seal	1150	NA	1	Normal, passing
22-Aug-21	Pile Driving	<1	Harp seal	800	150	1	Normal, bobbing/feeding
14-Sept-21	Blasting (prior to scheduled blast time)	15	Bearded seal	300	500	1	Normal, passing
2022							

Date	Activity	Duration of Observation (minutes)	Observed species	Distance from Work Area (m)	Exclusion Zone Size (m)	# of Species Observed	Comment on Animal(s) Behaviour
No observations of marine mammals were recorded in the 2022 construction season.							

Table A-3: Pre-Construction Wildlife Survey Summary

Date	Species	Number Observed	Activity
2018			
31-Jul-2018	Raven	Multiple	NA
1-Aug-2018	Raven	Multiple	NA
2-Aug-2018	Raven	Multiple	NA
2019			
19-Jun-2019	Raven	Multiple	NA
	Fox	NA	Tracks and excrement
2020			
20-May-2020	Raven	22	Flying over
	Snow Bunting	2	Flying over
	Seagull	3	Flying over
	Horned lark	1	Flying over

Date	Species	Number Observed	Activity
	Raven	4	Sitting on stockpile
2021			
03-May-2021	Raven	1	Sitting on rocks
	Raven	6	Flying over
	Raven	1	Sound only
	Seagull	1	Flying over
2022			
21-Apr-2022	Raven	1	Flying over
	Raven	4	Sitting on cables

Table A-4: Summary of Spills that Occurred at the Deep Sea Port Project

Occurrence No. During the Construction Season	Date	Location	Spill Report No.	Summary	Corrective Action
2018					
There were no spills reported by Tower in the 2018 construction season.					
2019					
1	Date provided was before July 4, 2019	End of Akilli Road, at the DSP	19-266	5L of hydraulic oil was noted on the ground between traction crawler.	<p>Drip tray was placed under the crane to prevent any further spill.</p> <p>The crane was moved and an inspection of the crane was made with no observations of signs of leaking.</p> <p>Approximately 0.2 m³ of contaminated soils were excavated and set for disposal at Nunnata Environmental Services (NES), located in Iqaluit. Excavation was carried out until no odours were detected.</p>
2	27-Jul-19	DSP laydown	20-20240	Hydraulic hose on the skytrak ruptured, spilling approximately 1L of biodegradable hydraulic oil on the soil. Incident occurred above the High Water Line (HWL).	A spill tray was placed underneath the leak to collect any residual oil and absorbent pads were placed on the soil to collect excess oil. The incident was reported to superintendent who then contacted Environmental Monitor (EM). EM was present on site to assess affected area and collect required info to complete spill report. Spill was reported to the Government of Nunavut (GN) and other relevant parties. Follow up was carried out by EM and superintendent to ensure the contaminated soil (1 m ²) was excavated and stored properly.
3	20-Aug-19	DSP laydown	Not given	The hydraulic hose on the excavator ruptured, spilling approximately 20 L of biodegradable hydraulic oil on underlying rocks and soil. Incident occurred at about the HWL during the night shift.	Hydrophobic absorbent pads were placed around the equipment to absorb excess oil. Incident was reported to superintendent who then contacted the EM. The EM who was present on site assessed the affected area and collect the required info to complete the spill report. Incident occurred at 5:20 am and was reported at 8:00 am to the GN and other relevant parties. A follow up was carried out by the EM with the superintendent to ensure the contaminated rock and soil (1 m ³) was excavated and disposed of appropriately.
4	5-Oct-19	Tower laydown	Not given	Spill caused by mechanical failure of drill. Hydraulic hose broke spilling around 1 L of biodegradable oil on the ground. No oil reached any water. Spill occurred above HWL.	Contaminated soil will be completely recovered and placed in a container which will then be disposed of at NES.

Occurrence No. During the Construction Season	Date	Location	Spill Report No.	Summary	Corrective Action
5	28-Oct-19	Tower laydown	Not given	Tank truck overflow during refuelling by tank truck causing spill of 5 L of fuel. Area of 2 m ² contaminated.	The contaminated soil/snow has been completely recovered by UQSUQ Corporation employees.
2020					
2	29-Sept-2020	Contractor Laydown	19-406	0.05 L of diesel dripped out of a flat bed of a 6-wheel truck due to rain. The hydrocarbon mixture did not penetrate to the ground but expended over a 12 m ² area.	Absorbent pad was used to recover the spill. The residual contaminated ground was shoveled by hand. The contaminated soil and absorbent were stored in Tower's used oil and absorbent which were discarded at NES with other contaminated waste. The truck responsible for the spill was inspected and cleaned.
3	01-Oct-2020	Laydown south slope	Not provided	10 L of biodegradable hydraulic oil was spilled from a broken cylinder on an excavator. The spill was below the HWL (2 m elevation) and during low tide. No spill occurred in the water.	Absorbents were placed immediately to contain the leak. The spill was completely recovered by excavating the contaminated stones (approximately 3 m ³). Contaminated stones were sent to NES.
4	03-Oct-2020	Barge off of the fixed wharf	Not provided	5 L of bio-degradable hydraulic oil leaked from the filter on the deck of the barge and on the water. Operator of the hydraulic unit immediately stopped equipment.	Absorbents were placed on the barge and on the water to contain the product. Hydraulic oil on the water was absorbed by oil booms. Absorbents were sent to NES.
2021					
1	14-May-2021	Tower laydown	Not given	During the operation of the telehandler, a hydraulic hose broke. Determined by the mechanic that around 40 L of biodegradable oil spilled.	Spill trays and absorbent pads were placed under the equipment and most of the spilled oil has been contained. The uncaptured oil remained at the surface and the contaminated soil was recovered. The contaminated soil and the absorbents are going to be disposed to an authorized receiver from Iqaluit.
2	20-Aug-2021	DSP laydown	Not given	A mechanic was performing minor maintenance activities on compressor. Thinking the hose was empty, he tested the equipment. Some residual oil was left in the hose which spilled 40 L of biodegradable oil. The spill occurred inland, 100 m from the HWL.	Absorbent pads used to remove the excess oil. Contaminated soil (less than 1 m ²), completely recovered and placed in a sealed container. Will be disposed of at NES.

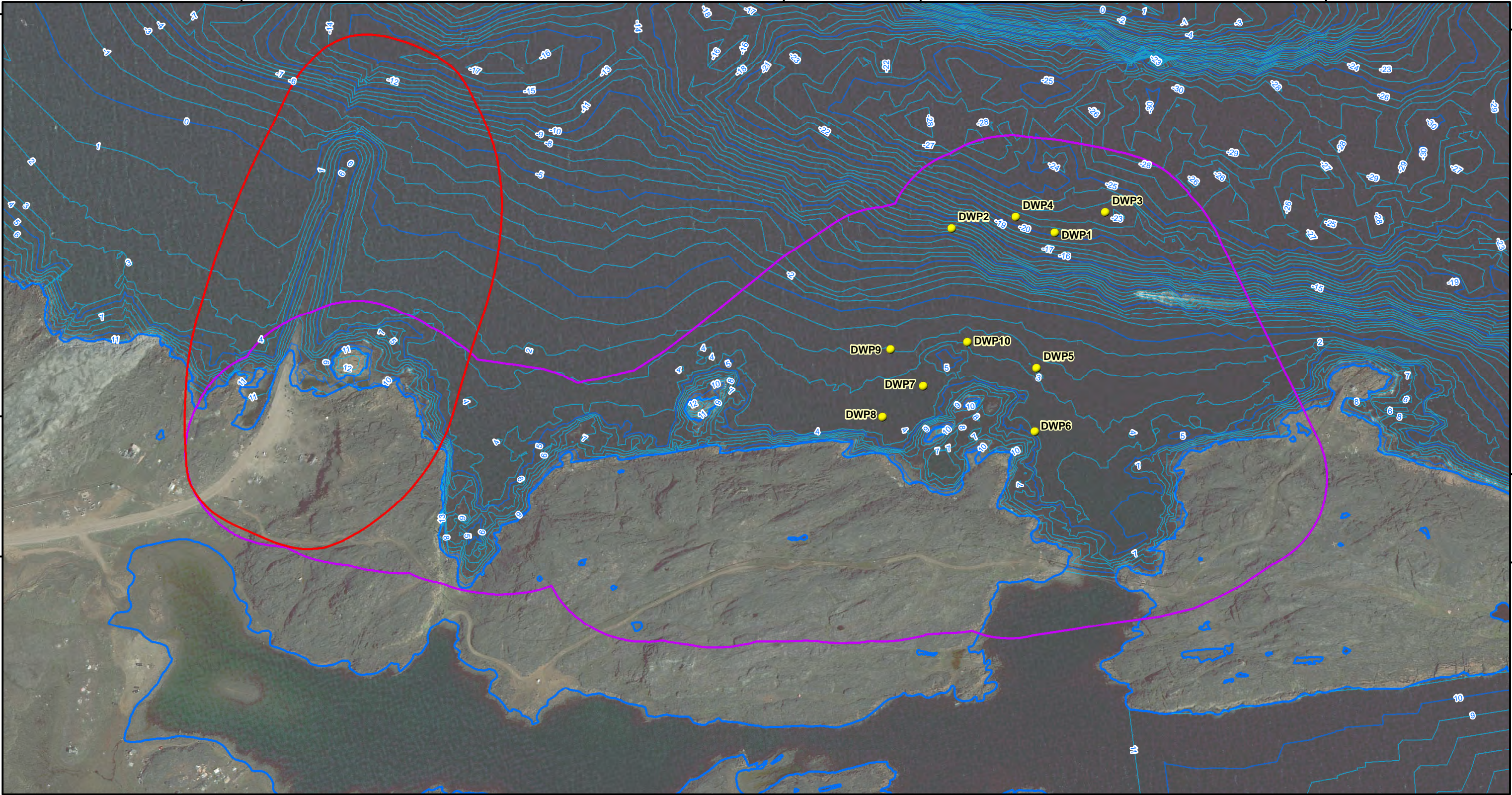
Occurrence No. During the Construction Season	Date	Location	Spill Report No.	Summary	Corrective Action
3	26-Aug-2021	DSP (Cell 4)	Not given	Product (bio-cable lubricant), applied to crane apparatuses. Excess lubricant (<1 L) dripped onto rocks surrounding apparatus	Contaminated rocks (<1 m ²) will be completely recovered and stored at Tower laydown in a sealed container. Will be disposed of at NES. The work method will be revised with the crane operator to prevent reoccurrence.
4	01-Sept-2021	DSP	Not given	Hydraulic hose feeding the vibratory hammer burst upon attempt to pile drive. The emergency stop button was pressed immediately when it occurred, ceasing the flow of hydraulic oil. 50 L of oil spilled in water.	Within 8 minutes, boom socks deployed to contain hydraulic oil which had spilled into the water on the west side of the arch and cell structure. Boom sock barrier was deployed on the west side of the cell structure and a double boom sock barrier was deployed on the east side of the cell structure. All work activities ceased, mechanics were called immediately to inspect and repair the equipment, while workers continued cleaning the structure using absorbent pads to remove the hydraulic oil which had spilled onto the steel structure. The boom socks will remain in place to absorb the hydraulic oil that spilled into the water and will be kept as a preventive measure when work activities recommence, after a complete inspection of the equipment. Materials used to recover the spilled substance will be stored in a Quatrex and disposed of at NES.
5	10-Sept-2021	DSP laydown	Not given	The spill was caused by hydraulic line failure of the loader, spilling hydraulic oil on ground (gravel surface, 3 L). No oil reached the water. The spill occurred above the HWL.	The contaminated gravel material will be recovered and placed in a container (drum or Quatrex) and disposed of at NES.
6	13-Sept-2021	DSP, wharf access	Not given	Surface staining as a result of a small diesel spill (2 L) was observed above HWL at the DSP wharf access construction ramp during a routine environmental site inspection. Determined to have been caused as a result of fuel cap not being properly sealed on a bulldozer following refueling.	The contaminated soil completely recovered and placed in pails which will be transferred to a contaminated soil storage drum and ultimately disposed of NES. During the upcoming safety meetings this incident will be discussed with workers and they will be reminded of the importance of verifying that caps to mobile equipment fuel tanks are properly sealed to avoid spills.
7	20-Sept-2021	DSP laydown	Not given	Spill (2 L) caused by a hydraulic line failure of the crane oil onto the steel of the machine and the ground surface below. No oil reached the water. The spill occurred above HWL (approximately 25 m from the water).	The spilled oil was immediately cleaned up with absorbent pads.

Occurrence No. During the Construction Season	Date	Location	Spill Report No.	Summary	Corrective Action
					Once the hydraulic line has been repaired and the crane can be moved, the contaminated soil will be recovered, placed in a container (drum or Quatrex) and disposed of at NES.
8	04-Oct-2021	DSP laydown	Not given	Repair work being performed on an excavator to replace its engine. Most of the oil had been emptied into identified oil waste containers with spill trays underneath prior to undertaking the maintenance work. Freeze-thaw cycles however may have dislodged any remaining oil from the equipment. Spill trays were already in place to contain most of the substance, however some did manage to spill onto the soil surface. The spill occurred above the HWL. Spill volume of 1 L.	Once maintenance work on the excavator is complete and the excavator is able to be displaced, the contaminated soil (<1 m ²), will be completely recovered and stored at the Tower's laydown in a sealed container which will then be disposed of at NES. Training will be provided to workers regarding appropriate containment methods based on the type of maintenance work being performed and which are adapted to the expected volume of substance that is being manipulated.
9	05-Oct-2021	Quarry	Not given	The O-ring on excavator broke spilling biodegradable hydraulic oil onto the ground surface (2 L). The spill occurred above the HWL.	Oil that spilled onto the excavator's tracks was recovered using absorbent pads and stored in Quatrex bags at Tower's laydown area. The contaminated soil and rocks (about 1.5 m ³), were completely recovered and immediately disposed of at NES.
2022					
1	23-May-2022	DSP	Not given	A hydraulic hose on a loader operating in the quarry area at the DSP laydown broke and spilled biodegradable hydraulic oil onto the ground surface. The spill occurred above the HWL.	The hydraulic hose was replaced, and an inspection of the equipment was done before pursuing work activities. The contaminated soil and rocks (about 1 m ³), were completely recovered and stored in Quatrex bags at Tower's laydown area until the contaminated is going to be disposed at an authorized facility.
2	1-Jun-2022	DSP laydown	Not given	Less than 5 L of an unknown substance, at an unknown time from an unknown source was reported as spilled.	The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
3	10-Jun-2022	DSP	Not given	Mechanical problem occurred in the brake system of a rock truck in repair. The brake system hose leaked and 20 L of biodegradable hydraulic oil was spilled.	The spill was controlled using absorbent pads. The repairs were completed on the rock truck and the truck was fully inspected before continuing work activities. The contaminated soil was recovered and stored in a Quatrex bag at Tower's laydown area until the contaminated is going to be disposed at an authorized facility.
4	11-Jun-2022	Tower Laydown	Not given	A hydraulic hose on the Skytrack leaked approximately 1 L of biodegradable hydraulic oil at the mechanic shop. The problem was discovered when crew moved the equipment in the morning.	The leaking hose was replaced and inspected prior to resuming activities. The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.

Occurrence No. During the Construction Season	Date	Location	Spill Report No.	Summary	Corrective Action
5	16-Jun-2022	Tower Laydown	Not given	Less than 1 L of EUCON DX was spilled from its packaging while handling.	The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
6	16-Jun-2022	Tower Laydown	Not given	A concrete mixer spilled less than 1 L of engine oil during its operation.	The rented concrete mixer is not planned on being used again. The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
7	18-Jun-2022	DSP laydown	Not given	A leak was observed near the injection pump of a Komatsu PC800LC. The mechanic placed a spill tray down when restarting the engine to identify the exact source of the leak; however approximately 2 L of engine oil sprayed outside of the spill tray.	The leaking hose was replaced and inspected prior to resuming activities. The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
8	19-Jun-2022	DSP	Not given	Less than a 1 L lump of mechanical grease fell from equipment that passed through the work area above the high tide line.	The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
9	22-Jun-2022	DSP Laydown	2022305	3 L of engine oil leaked as a result of a hose slipping from the primary crusher above the high tide line.	The contaminated soil was collected and stored in a Quatrex bag at Tower's laydown area for future disposal at an authorized facility.
10	24-Jun-2022	DSP Laydown	2022343	20 L of fuel leaked from the fuel tank valve of a loader at the laydown area.	The leak was quickly contained and the 2 m ³ of contaminated soil was recovered and directly disposed of at an authorized facility.
11	22-Jul-2022	Tower Laydown	2022375	A hydraulic hose broke under Loader 500. Less than 10 L of hydraulic oil leaked over approximately 2 m ² of soil above the high tide line.	The leak was quickly contained and the 2 m ² of contaminated soil was recovered and directly disposed of at an authorized facility.
12	11-Aug-2022	Tower Laydown	2022413	The O-ring of a filter moved resulting in a leak of engine oil. Less than 10 L leaked over approximately 2 m ² of soil above the high tide line.	Everything was clean and disposed of in a Quatrex bag. The Quatrex bag will be disposed of appropriately.
13	7-Sept-2022	Tower Laydown	2022451	4 L of engine oil leaked as a result of a hose on the primary crusher ripping.	The engine was quickly stopped, and everything was cleaned and disposed in a Quatrex bag. The leak occurred above the HWL and the contaminated Quatrex will be disposed appropriately.
14	14-Sept-2022	Tower Laydown	2022468	1 L of hydraulic oil leaked due to the O-ring on the loader hose leaking.	The leak was quickly controlled and the O-ring was repaired. Everything was cleaned rapidly and disposed in a Quatrex bag. The leak occurred above the HWL and the contaminated Quatrex will be disposed appropriately.

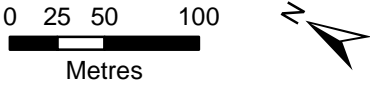
Appendix B: Supporting Figures

FILE LOCATION: U:\YVR\307071\01148_GON_NV\MarInfra10_Eng\16_Geomatics\01_Mxd\Baseline_Report\IQ_Marine_Baseline\2017-01-26_IQ_DWP_Sampling_Location.mxd



Legend

- DWP Sediment Sampling Location
- Causeway Study Area
- Deep Sea Port Study Area
- Major Contour (5m)
- Minor Contour (1m)
- Shoreline



Note:
Coordinate System: NAD 1983 UTM Zone 19N
Vertical Elevation Refers to Chart Datum

B SHEET		CUSTOMER:	
DATE:	25/05/2017		
DRAWN:	Y.M.		
EDITED:	K.R.		
APPROVED:	V.S.		
<small>*This drawing is prepared for the use of our customer as specified in the accompanying report. WorleyParsons Canada Ltd. assumes no liability to any other party for any representations contained in this drawing.*</small>			

IQALUIT MARINE INFRASTRUCTURE BASELINE REPORT SEDIMENT SAMPLING LOCATIONS AT THE DEEP SEA PORT		
WORLEYPARSONS PROJECT No: 307071-01148	FIG No: A-1	REV 0