

Skidegate Channel Pile Construction
F1705-170070
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APPENDIX C
ENVIRONMENTAL PROTECTION PLAN
Page 1

ENVIRONMENTAL PROTECTION PLAN

See following pages.

**Skidegate Narrows
Navigation Aids Rebuild
Environmental Protection Plan**



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1.0 Introduction

1.1 Project Background

The Canadian Coast Guard (CCG) proposes to rebuild a series of fixed aids to navigation (minor shore lights) within the Skidegate Narrows of the Haida Gwaii region, British Columbia (BC). (the 'Project', see Figure 1).

The Project is located as four groups of sites along the Skidegate Narrows waterway. The Haida Gwaii archipelago (or Gwaii Haanas) is located off the north coast of BC, separated by about 80 kilometers from the coastal mainland by the Hecate Strait. Haida Gwaii is approximately 10,000 km² in size and consists of two large islands (Graham and Moresby Islands), about 150 smaller islands and is host to designated protected areas (Park Reserve, Heritage Site, National and Provincial Parks, Conservancies and Ecological Reserves). The Skidegate Inlet is located at the west end of the narrows and hosts three small towns, Queen Charlotte City, Skidegate and Alliford Bay.

This Project aligns with the CCG's goal of providing safe, economical, and efficient services for marine navigation and is critical for CCG's mandate of providing safe and accessible waterways. As part of its mandate, the CCG has the responsibility to provide aids to navigation, and marine communications and traffic management services that contribute to the safety, accessibility and security of Canadian waters. Through an ongoing review process, the CCG identifies locations where aids to navigation are required to be constructed or modified to better provide their service and to improve the safety to those who maintain them.

The CCG intends to complete construction activity on 27 fixed navigational aids (minor shore lights) and potentially relocate two of the existing fixed aids. Of these, 15 fixed aids are located on shore and 12 sites are in-water timber pile fixed aids. Two fixed nav-aids may be considered for relocation to an adjacent site that will allow for improved visibility and to accommodate for natural changes in the waterway.

The Project will approach the work in two phases - shore based sites construction will occur separately from the in-water construction sites. All in-water fixed aid sites are located in proximity to a shoreline. Shore based sites are close to the foreshore or located on beaches, rocky outcrops or small islands.

The in-water nav- aid structures are supported on a timber pile dolphin structure while the shore based sites are a mast or tower mounted upon a concrete base. Each site is by an assigned CCG navigational aid number (lighted aid LL, unlighted aid UL). See Table 1-1, 1-2.

Table 1-1 In-Water Navigation Aids (12 sites)

LL/UL No.	Aid Name	Latitude	Longitude
6090.5	Skidegate Channel East Narrows Daybeacon #2	53° 8' 43.8"	132° 14' 23"
6091.4	Skidegate Channel East Narrows Daybeacon #3	53° 8' 43.5"	132° 14' 31.3"
6091.7	Skidegate Channel East Narrows Daybeacon #5	53° 8' 46.4"	132° 14' 53.1"
6092.4	Skidegate Channel East Narrows Daybeacon #6	53° 8' 47.9"	132° 15' 8"
6092.8	Skidegate Channel East Narrows Daybeacon #7	53° 8' 53"	132° 15' 24"
6093.5	Skidegate Channel East Narrows Daybeacon #8	53° 8' 54.5"	132° 15' 33.6"

6094.2	Skidegate Channel East Narrows Daybeacon #9	53° 8' 54.9"	132° 15' 59.9"
6094.3	Skidegate Channel East Narrows Daybeacon #10	53° 8' 57.9"	132° 16' 16.4"
6094.5	Skidegate Channel East Narrows Daybeacon #11	53° 8' 59"	132° 16' 26"
6094.6	Skidegate Channel East Narrows Front Range #5	53° 9' 7.7"	132° 16' 55.5"
6095.3	Skidegate Channel West Narrows Daybeacon #1	53° 9' .6"	132° 21' 11.7"
6095.4	Skidegate Channel West Narrows Daybeacon #2	53° 8' 58"	132° 21' 43"

Table 1-2 Shore Based Navigation Aids (15 sites)

LL/UL No.	Site Name	Latitude	Longitude
781	Flowery Islet	53° 13' 21"	132° 0' 20.6"
782	Kwuna Point	53° 12' 55.4"	131° 59' 25.7"
782.1	Alliford Bay	53° 12' 48.1"	131° 59' 30.7"
782.3	South Bay	53° 9' 52.8"	132° 3' 53.8"
783	Gillatt Island	53° 14' 41.4"	131° 53' 52.3"
6087	Sandilands Islands Daybeacon	53° 9' 53.2"	132° 6' 37.9"
6089	Skidegate Channel East Narrows Daybeacon #1	53° 8' 41"	132° 13' 56"
6091	Skidegate Channel East Narrows Daybeacon #4	53° 8' 44"	132° 14' 41"
6091.9	Skidegate Channel East Narrows Front Range #2	53° 8' 46"	132° 15' 4"
6092	Skidegate Channel East Narrows Rear Range #2	53° 8' 45"	132° 15' 2"
6093.9	Skidegate Channel East Narrows Front Range #4	53° 8' 52.3"	132° 15' 57.2"
6094	Skidegate Channel East Narrows Rear Range #4	53° 8' 52.2"	132° 15' 55.4"
6094.7	Skidegate Channel East Narrows Rear Range #5	53° 9' 9"	132° 17' .6"
6096	Skidegate Channel West Narrows Daybeacon #3	53° 8' 59"	132° 21' 51.2"
6096.2	Skidegate Channel West Narrows Entrance	53° 8' 43.1"	132° 22' 4.2"

Scope of work activities are proposed to take place over 8 weeks between September and November, 2017. The CCG intends to retain a Contractor for each phase of work (shore aids and in-water aids) that will provide a tug/ crane barge to assist with construction activity including sites access, transfer of materials and wastes, conduct piling works and provide equipment and storage space.

In-water works: comprised of steel pile and timber pile extraction and removal using a vibratory hammer. This is to be replaced with a new single steel pile using a pile driving hammer (vibratory or impact) followed by installation of a platform, ladder and the nav-aid components (i.e. day markers, lights).

Shore based works: scope will vary depending on the assessment per site and may include fixed aid decommissioning of the nav-aid components and tower/ mast to demolish and rebuild/ relocate the concrete base, encapsulate the concrete base, or install hardware such as railings, ladders, towers/ masts, and upgrade nav-aid components. CCG will be using a design concept from past projects to reduce the amount of concrete used for a couple of sites (e.g. UL 6093.9). This is the same design as the in-water piling only anchored to concrete rather than piling driven.

The Project specific Environmental Protection Plan (EPP) will be implemented during this

Project by the CCG, DFO and all Project contractors and sub-contractors.

1.2 Purpose of Environmental Protection Plan

The EPP is intended to demonstrate the CCG's commitment to protecting valued ecosystem components by avoiding or mitigating potential adverse environmental effects, and reducing the risk of unforeseen environmental incidents resulting from the activities of this Project. This will be achieved through Project planning, implementing industry and government best management practices (BMPs), mitigation measures and environmental monitor (EM) when required.

The scope of work has been assessed by CCG/DFO under the CEAA 2012 Federal Land Provision (Sec 67) and Environmental Effects (Sec 5) using a Project effects determination process. The mitigation measures and monitoring requirements outlined in this EPP may be re-evaluated during the course of construction if on-site personnel identify any deficiencies, and/or improve construction methods or the environmental protection measures.

This EPP identifies environmental protection and mitigation measures that should be followed by the Project's personnel during this Project. To supplement, a set of Site Specific Environmental Plans (SSEPs) will be provided prior to the construction schedule that outlines each of the 27 Fixed Aid sites associated with the Project, and will include a map showing the location of the Fixed Aid site, a summary of the proposed work; identification of key biophysical or human environment issues of concern at the site and site any specific mitigation measures and recommendations.

1.3 Description of Work

The proposed work on the fixed aids will include pile extraction/ pile driving, concrete demolition, installation of work platforms, ladders, towers, nav-aid components, and vegetation removal. For more details, refer to the Project's Construction Information Package.

Table 1-3 Project Sites - Work Activities

LL/UL No.	Site Name	Physical Activities	Description of Location	
781	Flowery Islet	Encapsulate base. Demolish additional concrete block. Install lattice tower and electrical components.	Skidegate Inlet	Bedrock intertidal
782	Kwuna Point	Relocate base from wharf to land. Install rock anchors. Build concrete base. Install lattice tower and electrical components.	Skidegate Inlet	Wharf/ private property. To new location
782.1	Alliford Bay	Build concrete base on top existing pad. Install rock anchors. Install lattice tower and electrical components.	Skidegate Inlet	Bedrock intertidal, low freeboard
782.3	South Bay	Install rock anchors. Install lattice tower and electrical components.	South of Sandilands Island	Terrestrial shoreline, shrub
783	Gillatt Island	Encapsulate base. Install new lattice tower and electrical components.	Skidegate Inlet	Terrestrial shoreline, shrub
6087	Sandilands Islands Daybeacon	Keep concrete base and anchor a single steel pile into concrete. Install platform and handrails.	South of Sandilands Island	Gravel beach, no bedrock distance
6089	Skidegate Channel	Demolish and rebuild concrete base.	Skidegate	Rocky intertidal, no

	East Narrows Daybeacon #1	Anchor a single steel pile into concrete. Install platform and handrails.	Channel	bedrock, low freeboard/ awash
6090.5	Skidegate Channel East Narrows Daybeacon #2	Extract existing steel pile. Replace with new single pile structure and platform/ handrails.	Skidegate Channel	Insufficient freeboard
6091	Skidegate Channel East Narrows Daybeacon #4	Demolish and rebuild concrete base (possible rock anchors). Anchor a single steel pile into concrete. Install platform and handrails.	Skidegate Channel	Rocky intertidal, above HHW but low freeboard
6091.4	Skidegate Channel East Narrows Daybeacon #3	Remove discarded (failed) steel pile and temporary buoy. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water near gravel beach low slope
6091.7	Skidegate Channel East Narrows Daybeacon #5	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water
6091.9	Skidegate Channel East Narrows Front Range #2	Demolish concrete base and rebuild, including slightly larger concrete pad. Anchor a single steel pile into concrete. Install platform and handrails.	Skidegate Channel	Boulder/ cobble beach, above HHW
6092	Skidegate Channel East Narrows Rear Range #2	Encapsulate existing concrete base. Install new lattice tower. Possible vegetation brushing	Skidegate Channel	Terrestrial shoreline, shrub and forest edge. Moss. No bedrock.
6092.4	Skidegate Channel East Narrows Daybeacon #6	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6092.8	Skidegate Channel East Narrows Daybeacon #7	Extract existing timber pile dolphin. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6093.5	Skidegate Channel East Narrows Daybeacon #8	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6093.9	Skidegate Channel East Narrows Front Range #4	Encapsulate existing concrete base. Anchor a single steel pile into concrete. Install platform and handrails. Tree falling is required.	Skidegate Channel	Rocky intertidal, bedrock?, low freeboard
6094	Skidegate Channel East Narrows Rear Range #4	Encapsulate existing concrete base. Install rock anchors. Install new lattice tower.	Skidegate Channel	Rocky intertidal, bedrock?, low freeboard, close to terrestrial shore/ trees, low elevation
6094.2	Skidegate Channel East Narrows Daybeacon #9	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6094.3	Skidegate Channel East Narrows Daybeacon #10	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6094.5	Skidegate Channel East Narrows Daybeacon#11	Extract existing timber pile dolphin. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water, distance from shore
6094.6	Skidegate Channel East Narrows Front Range #5	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel	In-water
6094.7	Skidegate Channel East Narrows Rear Range #5	Demolish concrete base and rebuild. Anchor a single steel pile into concrete. Install platform and handrails.. May require some vegetation brushing.	Skidegate Channel	Bedrock intertidal, close to sloped shore, tree overhangs water
6095.3	Skidegate Channel West Narrows Daybeacon #1	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel West	In-water, away from shore

6095.4	Skidegate Channel West Narrows Daybeacon #2	Extract existing steel pile. Replace with new single pile structure and platform and handrails.	Skidegate Channel West	In-water, away from shore
6096	Skidegate Channel West Narrows Daybeacon #3	Remove and relocate the nav-aid to an in-water pile structure with platform and handrails. OR Encapsulate base and rebuild. Anchor a single steel pile into concrete. Install platform and handrails.	Skidegate Channel West	Rocky/ cobble sloped intertidal, algae, close to shoreline, shrubs overhang
6096.2	Skidegate Channel West Narrows Entrance	Encapsulate existing concrete base. Install new lattice tower.	Skidegate Channel West	Bedrock on small island, minor low vegetation

The work may be conducted using the following equipment; tug boat, barge, crane, excavator, small work boat, generator and power tools. Pile extraction may require the use of a vibratory hammer. Equipment to install steel pilings may require the use of a vibratory, impact or hydraulic hammer.

2.0 Project Assessment

The Project assessment identifies the Project components that have the potential to cause direct and indirect environmental effects to the surrounding environment at the Project site(s), followed by a description of what these potential impacts may be.

2.1 Project Components with Potential to Cause Adverse Environmental Effects

The Project is located along the on Skidegate Narrows waterway in four general areas - the east end of Skidegate Inlet, South of Sandiland Island, Skidegate Channel and Skidegate Channel West. Construction will occur in two phases using CCG staff and contractors and will be accessed by tug/crane barge, small vessel, shoreline access to land based sites and potentially by helicopter. Shore based construction will potentially occur after the in-water fixed-aid construction sites.

Project Timing: The construction window is approximately 8 weeks, anticipated for September 2017 to November 2017 to avoid the potential for disruption to marine traffic during the peak season.

Timing Windows (Haida Gwaii/ Sandspit Region-2W, 2E): The DFO fishery recommended timing window for least risk to fish and fish habitat for the Project area is shared between two separate DFO timing areas 2W and 2E but they share the same timing windows dates. Area 2W is West Coast Haida Gwaii and Area 2E is Sandspit are;

Summer Window: July 1 – July 31

Winter Window: January 1 – March 1

The in-water fish timing window is established when there are no spawning fish, eggs or overwintering juvenile present. Working in-water when outside of the timing work window may result in the potential for Project interaction with fish species during sensitive life stages or migrating adults. This construction period will occur between the summer and winter timing windows.

Equipment working in Skidegate Narrows: During construction there can be the potential for

equipment accidents and /or malfunctions in the waterway. Accidents or malfunctions could include spills/leaks (e.g., hydrocarbons, wood preservative), debris from collisions, scour from accidental groundings and other types of incidents. These could potentially affect water and sediment quality, or cause direct physical impacts to flora and fauna. Any spills associated with this Project are anticipated to be small as they are limited by volume of the containment reservoirs and equipment and machines. The Project will be working adjacent to and within a navigable waterway and submit a Notice of Works to Transport Canada.

Generation of construction waste: The Project will include the generation of construction waste materials. This waste may include but is not limited to; wood waste (treated wood/ saw dust), concrete rubble, hardware, food waste, metal waste (welding) and other miscellaneous wastes. Waste deposition has the potential to indirectly affect water and sediment quality, as well as directly by physically affecting flora and fauna (physical harm, smothering). The deposition of treated timber waste (sawdust) into the aquatic environment has the potential to affect water quality and flora and fauna.

Barging spudding and anchoring: Barge spudding and anchoring can physically disturb sediments and damage habitat. Disturbing sediments can result in particle suspension in the water column, increasing turbidity and lowering the water quality. Spudding and anchoring can also damage spawning habitats (by depositing sediment on top of these habitats, and/or kill or injure aquatic flora and fauna through crushing, smothering or disturbance to gills.

Pile Removal: Pile removal can physically disturb sediments, affect water quality and damage habitat. Suspended sediments in the water column can negatively affect water quality by elevating turbidity and total suspended solids (TSS). The removal of treated piles has the potential to introduce harmful chemicals, such as polycyclic aromatic hydrocarbons (PAHs) to the aquatic environment. Pile removal has the potential to affect any existing bird nests that may be situated on the piles.

Pile Driving: Pile driving has the potential to suspend sediment and cause acoustic disturbances (noise, shock waves, vibration) to fish and wildlife. Suspended sediments in the water column can negatively affect water quality by elevating turbidity and TSS. Pile driving activities have the potential to produce excess noise both in and out of the water, which depending on the method, pile size and pile material can injure or kill fish. Land or underwater pile rock drilling has the potential to suspend sediment, accumulate rock bed sediments in the drill casing, generate dust and cause acoustic disturbances to fish and wildlife.

Acoustic disturbance is expected to be limited when applying a vibratory hammer or when using an underwater drill. These processes have little impact on the fish habitat as they do not generate shock waves. When driving steel piles of less than 24 inches in diameter it is an accepted principle that the energy required to drive the pile to final point of installation would not result in shock wave in excess of 30 kPa, and therefore would not require protective measures from the possibility of shock waves. Regardless of the type of hammer being used, best management practices will be implemented to minimize the impact on the fish habitat (BC MPDCA, March 2003).

While birds and wildlife may experience temporary sensory disturbance, the work is taking place within areas already subject to some acoustic disturbance (marine and air traffic) and sites have sufficient space around them to allow for species to move away.

This EPP includes measures to mitigate and/ or avoid potential adverse environmental effects

associated with the project.

2.2 Impacts That Cannot Be Avoided

No unavoidable or immitigable adverse environmental effects are anticipated for this project.

3.0 Roles and Responsibilities of Project Team

The roles and responsibilities of the Project Team, which includes CCG, the Contractors and the CCG/DFO Environmental Monitors as described in the following sub-sections. It is the responsibility of all Project personnel to protect environmental, heritage and socio-economic values during the course of the Project.

3.1 All Project Personnel

All Project personnel must work in accordance with applicable regulations and engineering specifications. In addition, personnel must comply with the mitigation measures identified in this EPP and /or provide suitable alternative approaches, which have been pre-approved by the CCG and/or the Project EM. All CCG staff and Contractor crews will be introduced to and be required to implement the EPP properly as part of the Project standard operating procedure.

3.2 Canadian Coast Guard

CCG is responsible for the overall Project management and environmental management of this Project. In addition, CCG will be responsible for the following:

- Supplying the Contractor with details regarding the Project, such as background information, any regulatory permits and this EPP
- Delegating authority and communicating requirements, as required, for all aspects of communication with interested parties about construction activities and potential disturbances with respect to this Project
- Promoting compliance with the terms of the regulatory permits or notifications as mandated under the applicable legislation
- Coordinating environmental and construction inspections to check compliance with permits and this EPP
- Notifying regulatory agencies or authorizing notification on their behalf to regulatory agencies of environmental non-compliance or environmental incidences
- Reviewing environmental monitoring reports prepared by the EM for completeness, accuracy and assessment of mitigation measures
- Authorizing stop work authority for non-compliance with this EPP and contravention of regulatory permits
- Granting stop-work authority to Project personnel and allow them to have the ability to suspend Project activities that are at risk of potentially causing serious harm to fish and to valued ecosystem components
- Submit of a Notice of Works to Transport Canada, under the Navigation Protection Act (NPA), where required

- Submit a DFO Request for Project Review, under the Fisheries Act, where required

3.3 Contractor

The Contractor will be responsible for constructing the Project in accordance with the design specifications. In addition the Contractor will be responsible for;

- Understanding details of the Project by reviewing relevant documentation supplied by CCG and DFO, such as background information, permits and this EPP
- Facilitating effective environmental communication among crews and any subcontractors so that environmental responsibilities and requirements are understood by crews and subcontractors prior to the start of work, and are implemented through tailgate or other meetings
- Following the EPP and having on-site environmental protection measures to mitigate potential environmental impacts
- Inspecting the work regularly to evaluate adherence to this EPP and regulatory requirements
- Facilitating personnel training and verifying that personnel are competent in the use of environmental protection and mitigation measures, such as sediment, waste, spill and noise control measures

3.4 Environmental Monitor

It is anticipated that this Project will have an on-site EM perform environmental inspections during the work. The EM will be appropriately qualified to conduct this work, based on Project experience, appropriate training and professional responsibility.

The EM will be responsible for;

- Evaluating and reporting on the effectiveness of the environmental mitigation measures and on the Contractor's work procedures and practices
- Confirming with construction crews that they are aware of the environmental requirements of the work
- Inspecting regularly the effectiveness of sediment control measures, where appropriate
- Conducting visual monitoring of water quality during in-water construction activities
- Communicating with CCG and DFO on the effectiveness of the mitigation measures being implemented, any difficulties encountered and how they are being managed
- Reporting environmental non-compliance and environmental incidents to CCG
- Writing an Environmental Monitoring report upon completion of the Project (Sec 5.0)

4.0 Environmental Protection Measures

4.1 Development of Protection Measures

This EPP has been developed based on the current understanding, levels of detail related to construction methods and the Project assessment (Sec 2.0). The EPP has been prepared

using the Project specifications developed by CCG and existing BMPs adhered to by CCG, DFO and the pile driving industry. These and other documents are used in the development of the mitigation measures within this EPP include but are not limited to:

- BC Conservation Data Center, SARA and Provincial species review (CDC iMap)
- BC MoE Approved Water Quality Guidelines-Turbidity (MoE 2001)
- Best Management Practices for Pile Driving and Related Operations (BC MPDCA, 2003)
- CCG Protocol for On-Site Visits to Navigation Aids in Sensitive Bird Nesting Sites
- DFO Standard Mitigation Measures Organized by Project Activity
- DFO Projects Near Water, Online Assessment
- DFO Aquatic Species at Risk Map
- Standards and Best Practices for Instream Works (MWLAP 2004)

The development of this EPP also takes into account the following Act and Regulatory frameworks;

Federal framework:

- Canadian Environmental Assessment Act 2012
- Canadian Environmental Protection Act
- Transportation Dangerous Goods Act
- Canada Shipping Act
- Fisheries Act
- Species At Risk Act
- Navigation Protection Act
- Migratory Birds Convention Act

Provincial framework:

- BC Environmental Management Act, Waste Regulations
- BC Wildlife Act
- BC Heritage Conservation Act
- BC Park Act
- BC Land Act

The mitigation measures in Sec 4.0 and monitoring requirements in Sec 5.0 outlined in this EPP may be re-evaluated during the course of the construction, to identify and improve upon deficiencies, and improve on the environmental management and protection where needed.

Project construction is anticipated to occur between the months of September to November 2017, approximately 8 weeks. The Project's habitat area is a series of small footprint sites along the long narrow marine channel of varying depths with a mixed coastline of rocky beach, bedrock or sandy estuary shorelines of low to moderate elevations. The Project has been reviewed using the following resources;

DFO Projects Near Water Online Assessment Tool: The online assessment was conducted using Fisheries Protection's determination tool based on the scope of work for a Project working near or in water and identified that the Project will occur outside of recommended fish timing window of least risk, generally timed when fish are not spawning; no eggs are present; or no over-wintering juveniles.

Fish Timing Windows: The DFO fishery recommended timing window for least risk to fish and fish habitat for the project area is shared between two separate DFO timing areas 2W and 2E but they share the same timing windows dates. Area 2W is West Coast Haida Gwaii and Area 2E is Sandspit are;

Summer Window: July 1 – July 31

Winter Window: January 1 – March 1

The Project's activities are identified under the criteria for Harbour/ Marine Commercial Activities and will apply the DFO Measures to avoid causing harm to fish and fish habitat including aquatic species at risk with regard to project planning, erosion/sediment control, shoreline stabilization, fish protection and operation of machinery. Due to the information on existing species and habitat in the project area, the CCG work activities for fixed aid construction, small existing footprints, the implementation of a project specific Environmental Protection Plan and presence of an onsite environmental monitor, this project is unlikely to result in serious harm to fish or fish habitat, or that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

DFO Authorization or Request Project Review: It was concluded that a Sec 35 authorization is not required but a DFO project review is recommended, based on the in-water works occurring outside of the fish timing windows, the potential for a new location to be established for an in-water navigation aid (pile), and the environmentally sensitive nature the region,. Any further recommendations that are received from the project review results would be incorporated into a revised EPP.

DFO Aquatic Species At Risk:

A review of the DFO Aquatic Species At Risk Map (Map 1) did not identify any endangered or threatened fish species or critical habitat that has a direct relation to the project area, but does reflect the potential for several mobile species (i.e. marine mammals, sea turtle, fishes, sea lion) to be present, as well as two sessile species (northern abalone and Olympia oyster). The likelihood of the Olympia oyster presence is less probable in the project area.

SARA permit: there are no anticipated interactions with species or critical habitat therefore no permit is required.

BC Conservation Data Center Species Map:

A search of the BC Conservation Data Center's BC Species and Ecosystem Explorer website and identified the potential presence of 9 federally listed species at risk (Schedule 1, Species At Risk Act) within the Haida Gwaii region, 7 mobile and 2 sessile species.

Table 4-1 Potential SARA Listed Species within Project Area

Species		BC Listed	SARA Listed		Species Occurrence within 300m
Northern Goshawk	<i>Accipiter gentilis laingi</i>	Red	Threatened	1-T (2003)	
Green Sturgeon	<i>Acipenser medirostris</i>	Red	Special Concern	1-SC (2006)	
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Blue	Threatened	1-T (2007)	

	<i>brooksi</i>				
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	Blue	Threatened	1-T (2003)	6095.4, 6096.2
Steller Sea Lion	<i>Eumetopias jubatus</i>	Blue	Special Concern	1-SC (2005)	
Peregrine Falcon	<i>Falco peregrinus pealei</i>	Blue	Special Concern	1-SC (2003)	
Northern Abalone	<i>Haliotis kamtschatkana</i>	Red	Endangered	1-E	
Ermine	<i>Mustela erminea haidarum</i>	Red	Threatened	1-T (2003)	781, 782, 782.1, 783
oldgrowth specklebelly	<i>Pseudocyphellaria rainierensis</i>	n/a	Special Concern	1-SC (2012)	
Dotted Saxifrage	<i>Saxifraga punctata</i>	Blue	n/a	n/a	6095.4, 6096.2, 6096, 6095.3
Queen Charlotte Avens	<i>Geum schofieldii</i>	Blue	n/a	n/a	6095.4, 6096.2, 6096, 6095.3

The BC Conservation Data Center's Internet Mapping tool (CDC iMap) indicated recorded occurrences of two federally listed species and two BC Provincial listed species within 300m of some project sites See Table 4-1.

To comply with the Fisheries Act and the Species at Risk Act (SARA) with respect to aquatic species, the measures to avoid and mitigate harm are applied with regard to project planning, machinery operation and containment and spill management response planning.

Migratory Birds Convention Act:

Several species of birds in Canada are protected under the Migratory Birds Convention Act, 1994 (MBCA). Bird species that are not listed in the Act may or may not be protected under provincial or territorial legislation (i.e. BC Wildlife Act) or the federal Species at Risk Act. Under the Act, ***it is illegal to harass or kill migratory birds, or to destroy or disturb their nests or eggs. It is also an offence to deposit any substance that is harmful to migratory birds, or permit such a substance to be deposited in waters or areas frequented by birds.*** Families of migratory birds that may be present in the area:

- Migratory Game Birds: Waterfowl (i.e. ducks, geese, oystercatchers) and shorebirds (i.e. plovers, cranes, doves)
- Migratory Insectivorous Birds: (i.e. swallows)
- Other Migratory Nongame Birds: (i.e. herons, gulls, loons)

The nest of the following other birds are protected under the BC Wildlife Act, even when the nest is unoccupied; eagle, osprey, heron, Peregrine falcon, Gyrfalcon and Borrowing owl. The in-water fixed aids have the ability to function as perching and nesting habitat for marine and nearshore birds.

This region is recognized as a summer breeding ground for the Marbled Murrelet, a small seabird that will burrow nest in forest trees at high elevations and forage on shorelines. Adults and juveniles leave the nest sites and begin the shift to their wintering grounds starting late summer. The species is protected by the federal Migratory Birds Convention Act. Under this Act, it is prohibited to kill, harm, or collect adults, young, and eggs. It is protected by the Canada National Parks Act, where it occurs in the Gwaii Haanas National Park Reserve. The CCG Protocol for Sensitive Bird Nesting Sites recommends a work window of September to April.

A pre-construction site survey determined that there were no active bird nests at the work sites or suitable Marbled Murrelet nesting habitat. One inactive and unidentified nest was observed at LL 783 Gillatt Island (low bank with shrub vegetation). No permits or approvals are required for the work sites with regard to the MBCA.

Protected Areas/ Heritage Conservation Act:

The Project intersects with one protected area (Daawuuxusda Conservancy) but will not require Parks permitting due to a pre-existing agreement between BC parks and DFO/CCG before the Conservancy was established. Land use arrangements for the fixed nav-aids are all as Map Reserve agreements, thus a Parks Use Permit (PUP) is not required. Provincial guidelines and best management practices are recognized in the EPP's mitigation measures, as applicable.

Archaeological sites on Crown or private lands are protected under the BC Provincial *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the BC Provincial Archaeology Branch. The subsurface nature of archaeological deposits, boundaries of archaeological sites are often difficult to determine thus any mapped archaeological site boundaries are considered as approximate. If work activity is proposed to take place within a known archaeological site or within 50m of a known archaeological site, an Eligible Consulting Archaeologist (holds a Provincial heritage permit) should be obtained to assess if any potential impacts to the site could occur. If they determine that the work activities will not impact any archaeological deposits, then a site alteration permit would not be required.



Due to the strong presence of archaeological activity in the Haida Gwaii region, a review for known archaeological sites was conducted in relation to the individual work sites. Results from the BC provincial Archaeology Branch database identify only one archaeological site FgUb-10 is within 100m of the aid to navigation range (UL 6091.9 and UL 6092). Should an archaeological representative be required at a work site, it is recommended that the project seek further direction with the Province and Coastal Haida First Nation (CHN), and consider a request for review by the CHN of the current archaeological dataset to close any data gaps for known archaeological sites.

Canada Shipping Act

The Canada Shipping Act includes the Vessel Pollution and Dangerous Chemicals Regulation, which governs the discharge of wastewater from marine vessels and structures into Canada's seas. Project personnel intend to be housed at existing shore accommodation but some contractor crew may opt to use vessel accommodation of which the regulations will apply for wastewater management and discharges. For project activities, the current plan is to store and haul wastewater for appropriate disposal offsite (e.g. discharge into a municipal system).

4.2 General Mitigation Measures

Many of the environmental mitigation measures can be applied to all phases of the Project's construction activities. Without the implementation of mitigation measures, construction activities associated with the Project may have the potential to directly and indirectly impact wildlife and its habitat, and cause adverse environmental effects (Sec 2.0). Through the use of mitigation measures, the potential for impacts associated with the Project can be limited.

Table 4-2 will provide the general measures whereas ones applicable to more specific Project activities (i.e pile driving, concrete works) will be provided in Table 4-2 through to Table 4-8.

Table 4-2 General Mitigation Measures

Category/ Activity	Mitigation Measures
Project Timing	<ul style="list-style-type: none"> • The construction schedule fall outside of the DFO timing windows due to scheduling to avoid significant disruption to the navigation waterways. (Timing windows of least risk are July 1 to July 31 and January 1 to March 1. • Ensure mitigation measures are in place prior to starting construction and a copy of any required approvals, permits or conditions is available at the work site. • Follow the most current revised EPP to ensure any DFO-FPP conditions are also being followed. •
Permits/ Authorizations	<ul style="list-style-type: none"> • A copy of any permits or authorizations will be onsite and readily available. Public notices should be given to transportation authorities to warn of potential disruptions to navigation during works.
EPP	<ul style="list-style-type: none"> • A copy of the Project’s Environmental Protection Plan will be onsite and readily available. The EPP should be accessible to Contractors to ensure familiarity with the Project’s requirements.
Training	<ul style="list-style-type: none"> • The Contractor will verify personnel involved in construction activities are adequately trained and use personal protective equipment necessary for work.
Site Access	<ul style="list-style-type: none"> • Site access practices must be undertaken with regard to resident flora and fauna, especially during times of the year when they are most sensitive.
Pre-Construction Survey	<ul style="list-style-type: none"> • A pre-construction survey is recommended to identify if any wildlife habitat or species at risk located at the construction site, and if encountered, determine the level of protection if necessary. If a nest is encountered, it is recommended that construction does not proceed until the EM has determined if a permit is required or that work can proceed.
Aid Maintenance	<ul style="list-style-type: none"> • Equipment maintenance activities must be completed in a manner that prevents the deposit of foreign materials to the environment. • Power washing activities must follow mitigation provided under “Power Washing” • An approach of “contain and recover” should be adopted. Drop sheets or other means should be used to prevent paint chips and other debris from entering the surrounding environment. Refuse should be disposed of properly. • Painting activities should be completed in such a way as to minimize the amount of fumes that may enter the environment. The amount of paint used should be minimized and unused containers must be covered.

Stop Work	<ul style="list-style-type: none"> The Contractor will stop work and contact the EM for assistance prior to commencing and continuing with any Project activities that may pose an environmental risk not addressed in this EPP. The EM will have the authority to issue a Stop Work order where activities are or will adversely affect the environment (flora/fauna, water quality). The EM will also make in-field recommendations for avoiding or mitigating impacts.
Site Cleanliness	<ul style="list-style-type: none"> The Project site(s) should be kept tidy during work activities and left in good condition at the Project's closure. Materials and wastes should be contained and secured when not in use, including at the end of a work day.
Power Washing	<ul style="list-style-type: none"> Activities should be completed in such a way as to minimize the amount of fines and organic debris that may enter nearby aquatic environments.
Laydown Area/	<ul style="list-style-type: none"> Operate machines and equipment from the barge platform to limit the level of disturbance to the aquatic environmental and to reduce the chance of a spill or incident. Stockpiles of any materials or wastes should be safely placed/ contained within the barge platform. Avoid placement of materials or waste on shore.
Equipment Operation	<ul style="list-style-type: none"> All equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products. This includes hydraulic fluid, diesel, gasoline and other petroleum products. Vehicles should not be operated below the line of Highest High Water in the intertidal zone. If no other method is available to access/ complete the work, the vehicle should proceed with due care and minimize its foot print wherever possible. Operations should only operate where entirely necessary to complete the works to reduce effects to nearby soils, vegetation, and resident species. Respect should be given to the natural environment to minimize the footprint of the Project. Machinery must be operated efficiently, to ensure that noise and air quality issues are short-term and local.
Air Quality and Noise	<ul style="list-style-type: none"> Operate machinery efficiently to limit noise and air quality issues and comply with local Noise Control Bylaws, where applicable. Limit night time construction activity to low noise activities, where appropriate.

Water Quality	<ul style="list-style-type: none"> • <u>Oil, Fuels, Grease</u>: The Contractor will have measures in place (e.g. routine equipment maintenance) to prevent the release of oil, fuel and grease (detectable by sight and smell) to the environment. • <u>Turbidity</u>: Visually monitor turbidity prior to the construction to observe the general instream conditions. Plan in-water activities in a manner that will reduce the amount of turbidity and sea floor disturbances, where possible. During construction activities, visually monitor turbidity within the work site area to confirm that any changes to water quality. • The terms clear water and turbid flow are used to describe when suspended sediment concentrations in the aquatic environment are low (< 8 NGTU) and relatively elevated (≥ 8 NTU). (MoE Water Quality Guideline, 2001)
Sediment Control	<ul style="list-style-type: none"> • Work will be conducted with limited sediment disturbance. Work activities will require pile extraction and replacement. Visually monitor turbidity levels during this activity. • Where high water flow is not a factor, the Contractor should be prepared to install a silt curtain if increased turbidity is a concern for aquatic habitat or permits require such mitigation measures (e.g. working outside of the DFO Fish Timing Window). Turbidity levels may be monitored for compliance with the BC Water Quality Guideline (e.g. if as required by DFO Project Review).
Prop Wash	<ul style="list-style-type: none"> • Prop wash and scouring will be avoided in shallow water, to the extent possible.
Deleterious Substances	<ul style="list-style-type: none"> • Deleterious substances (e.g. hydrocarbons and wood preservatives) will not be deposited into the environment (aquatic, terrestrial).
Spudding and Anchoring	<ul style="list-style-type: none"> • Barges and other Project support vessels will avoid disturbing the sea floor, unless where disturbance will be reasonably required (e.g. from use of barge spuds) • If a spud barge is used for the Project, position the barge strategically to limit repeated lifting and lowering of the spuds where practicable. • The Contractor will position their water borne equipment in a manner that will limit damage to habitat and where possible, employ alternative methods.
Flora and Fauna	<ul style="list-style-type: none"> • Operations should only be conducted where it is necessary to reduce the effects on nearby vegetation, soil substrates and resident species. Respect should be given to the natural environment to limit the footprint of the Project's activities. • If stressed animals are observed in or near the construction area, stop work and contact the EM for an assessment on the interaction. • Marine mammals are classified as "fish" under the Fisheries Act and additional regulations specific to these taxa are detailed in the Marine

4.3 Pile Removal and Installation

Pile removal and installation have the potential to adversely affect water and sediment quality, fish and wildlife and important habitats. Table 4-3 outlines mitigation measures aimed to limit effects of pile removal and installation on valued ecosystem components, such as flora and fauna, water quality and important habitats.

Table 4-3 Pile Removal and Pile Installation - Mitigation Measures

Category/ Activity	Mitigation Measures
General	<i>Best Management Practices for Pile Driving and Related Operations</i> (BC MPDCA, 2003) will be applied. For work sites with sensitive species present, additional mitigation measures to reduce acoustic noise, vibration and shock waves should be implemented (i.e. bubble curtain, exclusion net). These measures may be present in any terms and conditions the Project receives through aquatic species approvals and permitting.
Pre-Construction Survey	<ul style="list-style-type: none"> • A pre-construction survey will be completed and identify any existing bird nesting sites on the navigation aids and take the appropriate steps taken to reduce effects.
Equipment	<ul style="list-style-type: none"> • Equipment (e.g. cables, vibratory hammer, buckets) should be kept out of the water to avoid a release of deleterious substances. • Where possible, avoid pinching the treated timber (i.e. pile) below the waterline.
Containment Booms	<ul style="list-style-type: none"> • Sorbent booms should be on hand and readily available. • At the discretion of the EM, deploy sorbent booms around the perimeter of the work area and maintain them during the removal of treated timber. These booms should remain in place and operational until such time as visible evidence of wood treatment chemicals on the water surface is no longer apparent. • At the discretion of the EM, a floating surface boom shall be installed to capture floating surface debris where practicable.
Cutting	<ul style="list-style-type: none"> • Cutting of treated wood should take place on the barge or an area approved by the EM. All waste materials must be kept out of the aquatic environment, be contained, and be properly disposed of offsite. • Work that is to be done <i>in situ</i> is to be fully contained so that no waste materials are deposited into the aquatic environment. Any debris on the water surface should be recovered as soon as possible.

<p>Pile Removal and Containment</p>	<ul style="list-style-type: none"> • When removing timber piles, the Contractor will remove the piling by mechanical means, and make every effort to remove the pile intact (one piece). Where complete removal is not possible, piles will be cut off within 100mm of the sea floor. • Avoid intentionally breaking the pile by twisting and bending as this can cause the wood treatment to release into the water column. • Use methods to reduce turbidity and recover of blocks of sediment adhered to the pile (e.g “wake up” the pile by vibrating it to break its bond with the seabed sediment). • Sediment blocks found attached to a pile will not be returned to the aquatic environment. Instead they will be collected, contained and disposed of appropriately offsite. • A containment area (e.g. sediment control; hay bales, geotextile fabric, silt fence, plastic sheeting) for removed treatment timber piles and any adhering sediment shall be included into the work platform/ surface (i.e. the barge deck).
<p>Pile Installation</p>	<ul style="list-style-type: none"> • To limit impacts to fish and wildlife and reduce shock waves, a vibratory hammer is recommended to install piles. • Given the material (steel) and size of the piles (12.75 inch diameter) yes, the energy required to drive the pile to the final point of installation would not result in shock waves in excess of 30Kpa acoustics, therefore protective measures to reduce shock waves are not expected to be required (BC MPDCA, 2003). • During pile installation, visually monitor the effects on fish. If activities are causing observable signs of fish stress or fish kill, work must stop without delay. If this situation occurs, the Contractor will be responsible for introducing effective means of reducing the level of shock waves, or measures to protect fish from entering the potentially harmful shock wave area such as a confined bubble curtain, before any construction activity can proceed. A fish kill is designated as <u>serious harm to fish</u>, and is a violation of the <i>Fisheries Act</i>. • Any instances of fish kill must be reported to the EM without undue delay. If serious harm to fish (or fish mortality) occurs, or if there is imminent danger of such an occurrence, DFO (or delegate) will report to the DFO’s Observance and Record/ Report phone line. • Once pilings are installed, if the piling ends are open, ensure that a cap is included to prevent wildlife from entering the pile.

4.4 Concrete Works and Rock Drilling

Concrete works and pile/ rock drilling have the potential to adversely affect water and sediment quality, fish and wildlife and important habitats. Table 4-4 outlines mitigation measures aimed to limit effects of these construction activities on valued ecosystem components, such as flora and fauna, water quality and important habitats.

Table 4-4 Concrete Works and Rock Drilling - Mitigation Measures

Category/ Activity	Mitigation Measures
Concrete Base Removal	<ul style="list-style-type: none"> • Contractors where possible will position their water borne equipment in a manner that will minimize damage to identified fish habitat (e.g. eel grass). Where possible, alternative methods will be employed (e.g. use of anchors instead of spuds). • All debris deposited throughout the life of the aid should be removed from the site.
Rock Drilling and Excavation	<ul style="list-style-type: none"> • Rock drilling and excavation activities must be conducted conservatively so that physical changes to rock remain small and localized. • Reduce the entry of dust and fines into the water, where feasible. Archeological sites in remote locations are not likely to have been previously identified. Care should be taken to observe archaeological deposits while work is being completed. Work must be stopped if evidence shows a potential archaeological artifact or deposit. Refer to the DFO Archeological Chance Find Protocol (Appendix B). • Loose material at excavation sites should be managed to avoid excessive migration of silt and debris to nearby waters, especially during heavy rainfall events. • All excavation below Highest High Water should be completed by hand, as no vehicles should be operated in the intertidal zone. • Any blasting will follow the Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters.
Dust Management	<ul style="list-style-type: none"> • There is the potential for dust emissions to be generated from concrete works (demolishing, cutting) and by rock drilling. • If the work activity is consistently generating dust, employ methods to minimize or contain the dust emissions (i.e. water spray/ fog to capture airborne dust; dampen work site (i.e. concrete base); install tarps/hoarding; control equipment use to duration of dust emissions)

Sediment Management	<ul style="list-style-type: none"> • There is the potential for loose sediments to be generated or accumulated from rock drilling and certain concrete work activities. • Where possible, employ methods to minimize the amount of sediment created from the work activity • Sediment levels that create a significant change in the water's turbidity may also impact the aquatic and terrestrial environments. Contain and control the sediments at the work site by the use of silt curtains
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4.5 Wildlife - Bird Nest Management

Fixed aids to navigation near or over water have the potential to function as nesting sites for birds, especially Osprey or ground nesting birds such as Seagulls or nearshore birds. Disruption of bird nests during a breeding season can adversely affect this wildlife. For some species, an intact nest that was used that year can be considered active for several years afterward and should not be destroyed. If movement of the nest is required, options for relocation should first be considered. Table 4-5 outlines mitigation measures aimed to limit effects of construction activities on bird nests, with regard to relocation.

Table 4-5 Bird Nest - Mitigation Measures

Category/ Activity	Mitigation Measures
Nest Interaction	<ul style="list-style-type: none"> • If a nest is discovered, notify the EM and refer to the CCG Protocol for Sensitive Bird Habitat at Navigation Aids • If a nest must be removed (i.e. health and safety), use a removal method that will keep the nest integrated (in one piece) when lifting it from the nest platform on the nav-aid. Create a temporary nest platform to secure the nest during its removal • Place a removed nest in a location where it will not be damaged. • Bird nests may contain organic materials, fish carcasses and guano. Use PPE when handling the nest. • If eggs are found in the nest prior to removal, and work is occurring outside of the breeding season and have been abandoned, leave the eggs on site. • If a bird is observed approaching a nest or the site and appears distressed, notify the EM directly and stop work • If the nest incurs damage during or after it is removed, notify the EM

4.6 Waste Control

This Project will generate construction related waste. Improper handling, storage, transportation and disposal of construction waste all have the potential to cause adverse environmental effects. Follow waste disposal requirements as per the BC Environmental Management Act Waste Regulations. Table 4-6 presents mitigation measures to be implemented to control wastes.

Table 4-6 Waste Control Mitigation Measures

Category/ Activity	Mitigation Measures
Waste	<ul style="list-style-type: none"> • Waste or any miscellaneous unused materials will be recovered for either disposal or a designated facility or placed in storage. Under no circumstances will materials be deliberately thrown into the aquatic or terrestrial environment. • Onsite personnel will make reasonable efforts to prevent debris from re-entering the environment. • Any treated cut wood, chips, sawdust that enters the aquatic environment is to be promptly collected, contained and disposed. Disposal of spoils (e.g. removed broken piles, metal, screw/nail findings and similar materials) is prohibited in the aquatic environment. • Any wastes from metal hot work should be kept out of the aquatic environment including welding rods and tips, and scrap metal. Collect and contain wastes and dispose of appropriately. • Litter in the form of coffee cups, lunch wrappers, cigarette butts and other such items will be placed in covered trash containers. • Debris/ waste will be kept on the barge or an approved laydown area and disposed of appropriately. • Sewage from portable toilets will be disposed of in an approved sewage disposal facility on an as-needed basis.
Portable Toilets	<ul style="list-style-type: none"> • Place materials defined as hazardous or toxic waste in designated containers. Seal and store emptied containers separately from non-hazardous waste.
Hazardous Waste	<ul style="list-style-type: none"> • Store preservative treated wood waste (e.g. pile material, sawdust) in a separate sealed water-proof container if there is a risk of leaching. • Hazardous waste, such as sorbent pads, will be collected and disposed of appropriately offsite. • Do not dispose of preservative treated wood through incineration, or with other materials destined for recycling or reuse, or into the aquatic environment, onto the ground, or in other locations where they could pose a health or environmental hazard. • Dispose of treated wood, end pieces, wood scraps and sawdust at an approved offsite facility.

4.7 Spill Prevention, Control and Response

Measures will be implemented to prevent and control the introduction of hazardous material to the environment. Hazardous materials likely to be onsite during the Project may include but not limited to:

- Fuels (gasoline, diesel)
- Lubricants (hydraulic oil, engine oil, grease)
- Transmission fluid

Measures to prevent and control the release of spills are provided in Table 4-7. In the event that a spill occurs during the Project, Table 4-8 provides the spill response measures and reporting requirements.

Table 4-7 Spill Prevention, Control and Response

Category/ Activity	Mitigation Measures
Spill Coordinator	The Contractor will appoint a Spill Coordinator who has knowledge of spill mitigation, containment and reporting procedures. They will also know the inventory of hazardous materials on site.
Training	The Contractor will confirm that onsite personnel understand the nature of the hazardous materials located at the Project site, and know the location of spill kits, containment berms, and other spill control measures and that they are readily accessible.
Fuel	Storage of fuels and petroleum products will comply with safe operating procedures, including containment measures. Portable fuel tanks (jerry cans) will be stored with leak proof secondary containment. Fuel storage, including secondary containment, shall be kept free and clear of collected rainwater, snowfall and other equipment/ materials. While refueling, the operator must stay with the fuel nozzle. Use biodegradable lubricants and hydraulic fluids where possible. Vehicles and equipment must be shut off while refueling.
Equipment Maintenance and Servicing	Impervious materials, such as tarps, drip pans or spill trays must be placed underneath equipment and machinery during servicing when there is the potential for accidental drips or spills. Servicing and maintenance of equipment shall be conducted on the barge or at the Contractor's shop facilities. Servicing and maintenance of equipment is not permitted in aquatic or terrestrial environments unless are exceptional circumstances and approved by the EM.

<p>Equipment</p>	<p>Machinery (excluding barges and vessels) should not be operated in the water unless approved by the EM.</p> <p>Equipment will be maintained in proper running order to prevent leaking or spilling of potentially hazardous or toxic products (includes hydraulic fluid, diesel, gasoline and other petroleum products).</p> <p>Maintain equipment in good working condition and free of excess oil and grease to prevent leaking or spillage of deleterious substances into the aquatic environment. Containers, nozzles, hoses will all be free of leaks.</p> <p>At the discretion of the EM, drip trays capable of containing 150% of the fuel will be placed beneath the machinery, equipment and fuel storage facilities that are within 30m of the high water line or in vessels.</p> <p>Small machinery (e.g. generators) should be placed in secondary containment, such as drip trays.</p> <p>Couplings, connectors, hydraulics and hoses should be in good condition and inspected throughout each day whenever possible.</p> <p>The Contractor should conduct spot-checks during equipment operation to verify that couplings, connectors, hydraulics and hoses are not leaking.</p> <p>Containers not in use will be sealed with a proper fitting cap or lid.</p>
<p>Spills</p>	<p>In the event of a leak, all fueling/ filling operations will be stopped until the cause of the leak has been identified and it has been repaired.</p> <p>All spills must be reported to the EM without undue delay, regardless of volume.</p>

Table 4-8 Spill Response Mitigation Measures and Reporting

Category/	Mitigation Measures
Spill Response Materials	<p>Spill response materials are required to be readily available when working at the Project site. These materials include but not limited to;</p> <ul style="list-style-type: none"> • Spill kits • Personal protective equipment (e.g. nitrile gloves, safety glasses) • Fire extinguishers • Shovels
Spill Kits	<p>The Contractor will provide an appropriate number of spill kits on site. The suggested contents of the spill kits are;</p> <ul style="list-style-type: none"> • 100 sorbent pads, including universal pads suitable for water based fluids (coolant) • 25kg of dry oil sorbent • 2 x 10m sorbent floating booms • 1 roll of 25 x 4m polyethylene sheeting (for underlay) • 10 heavy-duty plastic garbage bags <p>In addition to the spill kits on site, each piece of mobile equipment is suggested to have spill kit with contents as;</p> <ul style="list-style-type: none"> • Round nose shovel or equivalent • Absorbent sock/roll • 10 sorbent pads • Heavy-duty plastic garbage bags • Personal protective equipment <p>Spill kits will be inspected on a regular basis and will be refilled without undue delay.</p>
Response	<p>In the event of a spill, the Spill Coordinator will direct on site personnel to the location and use of the spill kits.</p> <ul style="list-style-type: none"> • The initial response to the spill may include; • Stop work • Confirm your own safety and safety of others • On site personnel wear personal protective equipment • Identify the spilled materials and refer to the MSDS to determine if human health or ignition hazards exist • If possible, and safe to do so, contain the spill by any safe means possible (e.g. plug leak, close/ isolate leaking valve) • Obtain assistance from others • Begin containment of spill and stop it from spreading • Clean up the spilled substance using available supplies from onsite spill kits • If the spill kit is on the barge, dyke around the affected areas to prevent spill from entering the aquatic environment

Reporting	<p>The CCG or DFO on site representative is responsible for notifying regulatory agencies or authorizing notification on their behalf to regulatory agencies of hazardous spills and to verify the spill meets provincial and federal requirements.</p> <p>The Spill Reporting Regulation under the BC Environmental Management Act identifies externally reportable quantities for certain substances.</p> <p>All spills to water will be reported by the CCG (or delegate) to the Provincial Emergency Program (Table 6-1)</p> <p>The EM will prepare an Environment Incident/ Non-Compliance Report in the event of a spill.</p> <p>The following information should be collected as it may be required when reporting a spill to regulatory agencies and may be included in the Environment Incident/ Non-Compliance Report;</p> <ul style="list-style-type: none"> • Reporting person's name and telephone number • Name of the owner of the product spilled and phone number • Date and time of the spill or leak • Location of the spill or leak • Providing a description of the environment • Type of material spilled and quantity • Source of leak or spill • If the spill or leaked product is contained. If not, what is flow direction • Description of the spill response and when it occurred • Percent of material recovered • Details of further action required • Recommendations for preventative/ mitigation measures • Names of other persons or agencies advised concerning the spill
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5.0 Environmental Monitoring

5.1 General Monitoring and Reporting

A qualified EM is recommended to be available during the Project work at the initiation of each activity to verify compliance with the EPP. Monitoring may continue until the EM is confident that the Contractor has met the mitigation measures and is conducting work according to the EPP recommendations. The EM will communicate with CCG/ DFO and the Contractor and may conduct spot checks if needed.

When the EM is not on site, a CCG representative will act as the EM. The Contractor will communicate with CCG to discuss any potential environmental risks related to the Construction activity. The EM will be responsible for verifying that the measures outlined in this EPP are adhered to, maintain detailed notes, photographs and report non-compliances or environmental incidents. If this EPP is followed, the potential for environmental impacts and adverse environmental effects are low and an on-site EM should not be required

constantly for the duration of the Project. It is recommended that an EM be on-site at key activities for in-water work conducted outside of the Fish Timing Windows for this area. An environmental monitoring Field Sheet is available in Appendix A and is recommended for use at each site.

An environmental monitoring report will be prepared by the EM and submitted to the CCG and any other applicable regulatory agencies. The environmental monitoring report will include:

- Names of on-site personnel (consultants, contractors, sub-contractors)
- Dates and brief description of the construction activities the EM was present for
- Description of environmental concerns and corresponding mitigation measures implemented
- Description of environmental incidents and actions taken to mitigate impacts
- Photographs documenting activities, environmental issues, mitigation measures, spill kits
- Water quality data if required

5.2 Stop Work

The EM will have authority to alter work methodology and/or issue stop work orders, in order to prevent environmental impacts and/or adverse environmental effects, whether probable, imminent, or occurring. The EM may also stop work if circumstances are likely to result in a non-compliance with a regulation, Project approvals, or this EPP.

Once corrective actions have been implemented and deemed appropriate by the EM, suspended Project activities will be allowed to resume under the guidance of the EM.

5.3 Environmental Incidents and Non-Compliance

Examples of environmental incidents are ones that cause environmental damage or adverse environmental effects to fish, fish habitat, wildlife and other environmental resources.

Environmental incidents can be caused by hazardous material spills, discharges of deleterious substances into the aquatic environment, and serious harm to fish and fish habitat without prior written approval or authorization. Non-compliances can occur with this EPP or with applicable legislation. Incidents can include workplace incidents such as spills, hazards, injuries, etc.

Environmental non-compliances and incidents must be reported to the CCG representative within 24 hours of occurrence. This representative will then report to the appropriate regulatory agencies, if it is required. Reporting requirements will include:

- Reporting a person's name and telephone number
- Name and phone number of the person who caused the incident or non-compliance
- Date and time of the incident or non-compliance
- Names of other persons or agencies advised concerning the spill (see Table 4-7)

6.0 Emergency Contacts

An emergency contact list will be posted in visible areas on-site by CCG. See Table 6-1.

Table 6-1 Emergency Contacts

Contact	Phone Number
CCG Project Manager: Andrew Wight	Phone: 250-413-2835 Mobile: 250-686-5902
DFO On Site Representative: Andrew Wight Alanna Morbin Barbara Rober	Phone: 250-413-2835 Mobile: 250-686-5902 Phone: 250-363-8725 Mobile: 250-415-0086 Phone: (250) 413-2866 Mobile: (250) 216-3726
Environmental Monitor: CCG Representative or Alanna Morbin	Phone: 250-363-8725 Mobile: 250-415-0086
Provincial Emergency Program, 24-hr spill reporting (BC Emergency Management Branch)	Phone: 1-800-663-3456
DFO Observe, Record and Report Line	Phone: 1-800-465-4336 or 604-607-4186
Medical Emergency	Use 911 or VHF Radio Ch 16
Work Safe BC	Phone: 1-866-621-7233

7.0 Closure

It is determined that the Project is not likely to cause significant adverse environmental effects and the Project can be carried out in accordance with the current environmental standards, guidelines and objectives. Project specific environmental protection measures as outlined in the document will be applied during the course of the construction. The outcome of the DFO Request for Review process (for construction in a species critical habitat area) may result in additional required mitigation measures. If this occurs, the requirements will be communicated to the CCG and the Contractor directly, and the environmental protection plan will be updated.

8.0 References

BC Provincial Parks, Geographic Regions, Website 2017

<http://www.env.gov.bc.ca/bcparks/explore/map.html>

BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development, Archaeology Branch
<http://www.for.gov.bc.ca/archaeology/>

Best Management Practices for Pile Driving and Related Operations (BC MPDCA, 2003)

CCG Protocol for On-Site Visits to Navigation Aids in Sensitive Bird Nesting Sites, July 2004

DFO Management Plan Series, Species At Risk Act, Section 6, Updated August 2014

DFO Best Management Practices for All Projects, 2016

DFO Measures to Avoid Causing Harm to Fish, Fish Habitat and Aquatic Species at Risk,

<http://www.dfo-mpo.gc.ca/pnw-ppe/measures-mesures/measures-mesures-eng.html>

DFO Standard Mitigation Organized by Project Activities Table, 2016

DFO Projects Near Water Online Assessment Tool <http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>

DFO Aquatic Species at Risk Map <http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/bc-s-eng.html>

Standards and Best Practices for Instream Works (MWLAP 2004)

Species at Risk Act, Marbled Murrelet Assessment Report in Canada, 2012,

http://www.sararegistry.gc.ca/virtual_sara/files/cosewic/sr_quillemot_marbre_marbled_murrelet_1012_e.pdf

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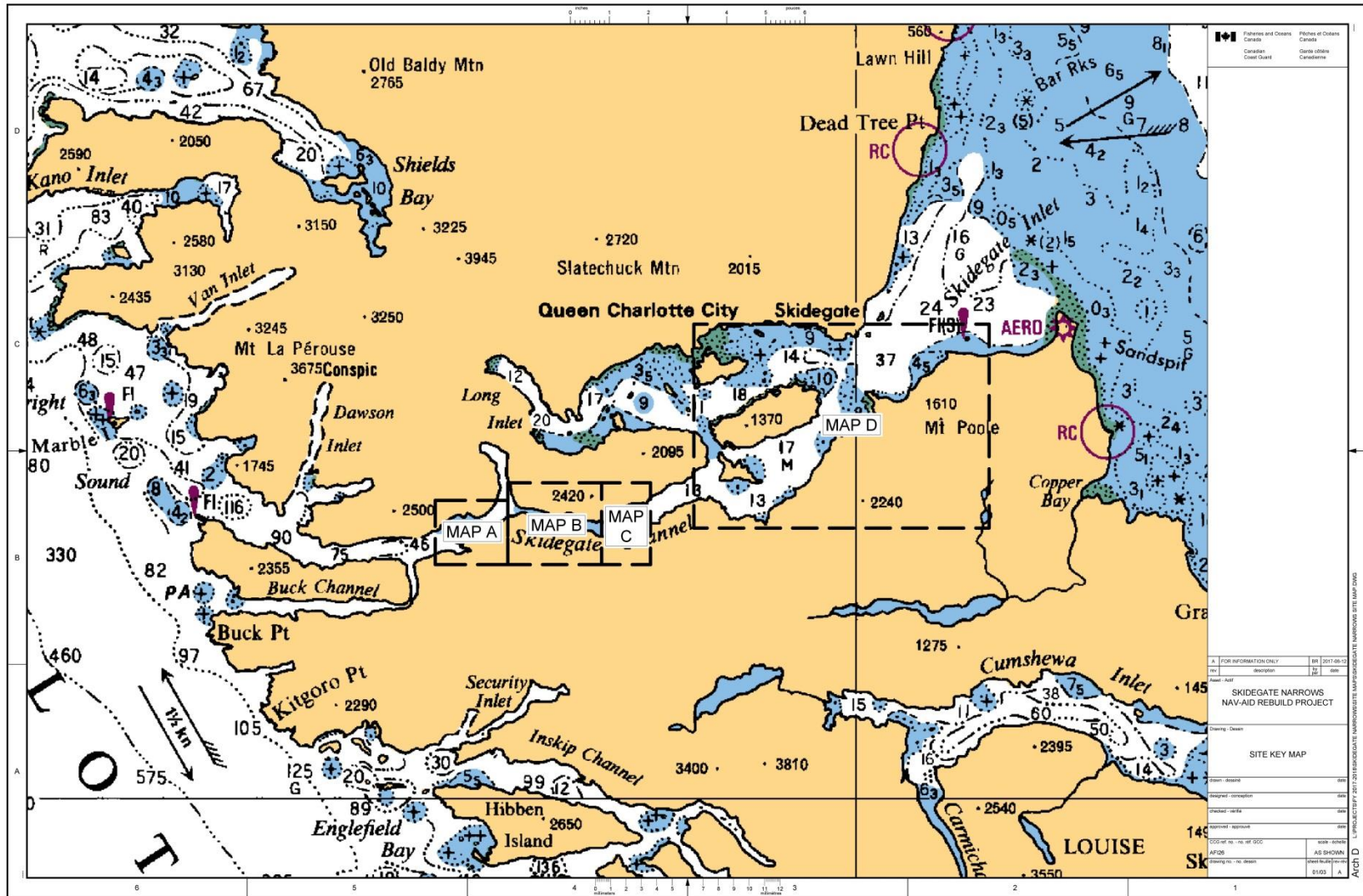


Figure 1 Overview of Skidegate Narrows in Haida Gwaii (Map A, B, C, D)

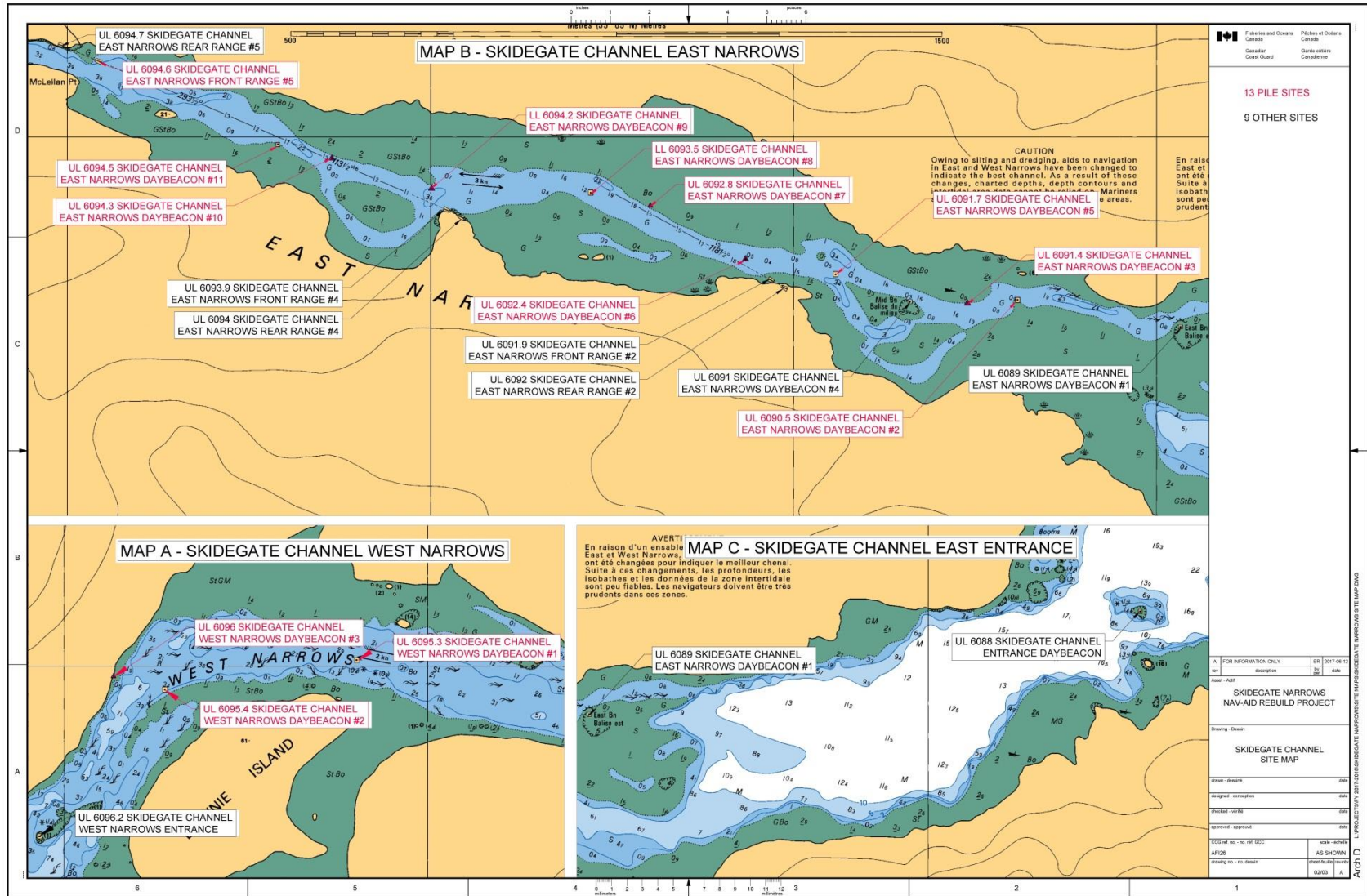


Figure 2 Project Fixed Aid Locations, Skidegate Narrows and Channel (Map A, B, C)

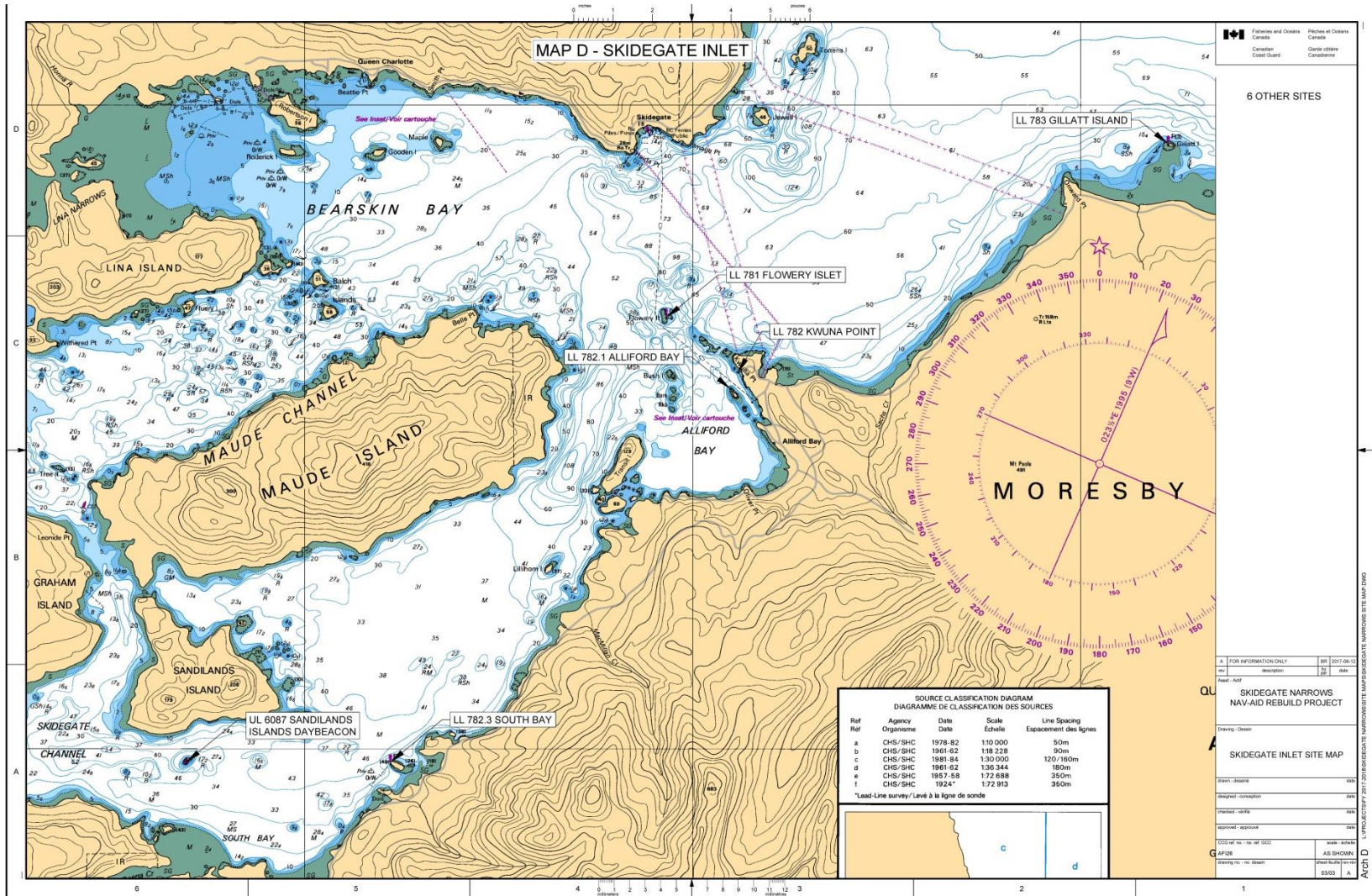


Figure 3 Project Fixed Aid Locations in Skidegate Inlet (Map D)

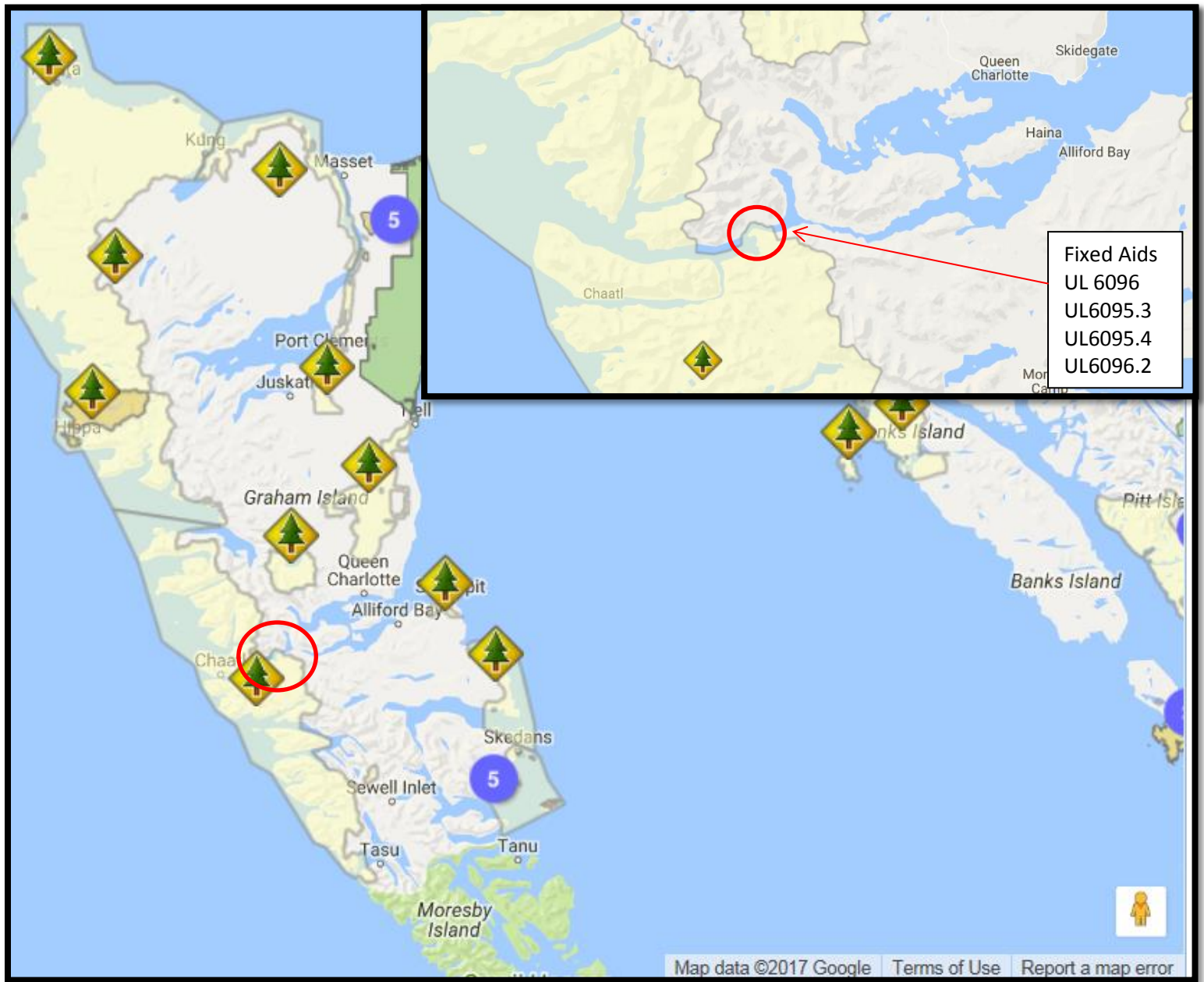


Figure 4 Project Fixed Aids Potentially within Daawuuxusda Conservancy

Daily Environmental Monitoring Field Sheet

Client:	__ of __
Site Location:	Foreman:
Date:	EM:
Time:	
Weather:	

Mitigation / Management Measure	Status	Revisions/Actions
<u>Permits/EPPs/Contingency Plans</u>		
<u>Site Access</u>		
<u>Hydrocarbons/Spill Control</u>		
<u>Sediment & Erosion Control</u>		
<u>Wildlife & Vegetation</u>		
<u>Barge Camp</u>		
<u>Waste Control</u>		
<u>Concrete</u>		
<u>Archaeology</u>		
<u>General Other</u>		

<u>Compliance Status Definitions</u>	
✓	In compliance with EMP. No action required.
!	In compliance with EMP. Requires revised measures.
x	Out of compliance with EMP. Action required.

Daily Environmental Monitoring Field Sheet

Construction Activities

__ of __

Record of Communications

Additional Notes

Site Drawings

APPENDIX B
CHANCE FIND PROTOCOL:
ARCHAEOLOGICAL SITES IN BRITISH
COLUMBIA'S COASTAL REGION

Chance Find Protocol

Archaeological Sites in British Columbia's Coastal Region

This document presents a descriptive summary of archaeological sites commonly found in British Columbia's coastal region and provides contractors with a protocol should archaeological sites be encountered during the course of ground disturbing activities. It is recommended that all people involved in ground disturbing activities become familiar with the types of archaeological sites present in the region of development and what to do in the event of a chance find.

What is an archaeological site?

Heritage sites and objects on private and Provincial Crown Land in British Columbia that predate 1846 are protected under the *Heritage Conservation Act* (HCA), which is administered by the Archaeology Branch of the Ministry of Forests, Lands and Natural Resource Operations. Heritage resources specifically protected by the Act include Provincial heritage sites, burial places with historical or archaeological value, aboriginal rock paintings or carvings, sites with evidence of human habitation or use before 1846 and heritage wrecks.

Common archaeological sites in the region:

Shell midden: Shell midden is typified by the presence of shellfish (clam, mussel, scallop, etc.) shells discarded after the consumption of shellfish. Shell midden also commonly contains charcoal, ash and burnt sediments, fire-broken rock, and stone, bone and antler artifacts. Shell midden deposits vary from small pockets to very large sites many hundreds of metres long. They are usually but not only found along or near the shoreline. Shell midden sites often represent villages or seasonal encampments where shellfish were consumed in quantity. Shell midden deposits are unique inasmuch as the shells neutralize soil acidity, such that archaeological materials that usually degrade quickly are preserved. Artifacts of bone and antler, faunal remains, and human bone all preserve in shell midden.

Tools manufactured from bone/antler: Tools manufactured from the bones of land and sea mammals or of antler from land mammals vary in size, form and function but on the coast are largely associated with fishing economies. These are known to have served as parts of spears, gaffs, fish hooks, harpoons, etc. Others were used as multipurpose tools like awls or as wedges/chisels for woodworking and some bone/antler artifacts were simply fashioned as decorative items. These types of artifacts may be found along the ground surface or buried, often within shell midden.

Human remains and burial features: Respect is paramount when dealing with human remains. It must be remembered at all times that human remains are exactly that – human remains – and should be shown the proper respect and dignity due any human being, living or deceased. Mortuary features represent deliberate depositional events and can be identified by a number of different practices some of which include barrows/mounds, burial cairns, box and crevice burials or interment within shell midden.

Lithic (stone) scatters: Lithic scatters are sites comprised of stone tools, stone tool fragments, and *debitage*—the flakes of stone that are produced when stone tools are manufactured. These stone artifacts may be found scattered across the ground surface or may have been buried since their original

deposition. These sites may vary from a single, isolated artifact—a stone arrowhead, knife, or hide- scraper, for example—to extensive scatters of hundreds of tools, tool fragments and debitage flakes.

Culturally Modified Trees (CMTs): In the most general sense, CMTs are any trees having evidence of human modification. In a more specific and commonly used sense, CMTs are trees that have been modified by aboriginal people for traditional purposes such as removal of bark or wood for traditional building materials, and removal of cambium for consumption. Provincial guidelines suggest most CMTs should be recorded as traditional use sites unless they pre-date AD 1846. The majority of CMTs recorded in the study region are western red cedars although other species such as western hemlock, Douglas-fir, spruce, and western yew have also been reported. CMTs, especially recently modified trees, may have visible cut marks on the scar from the tools used in cultural modification.

Rock art: Rock art pictographs (paintings) and petroglyphs (carvings) are located on the surfaces of rock walls in caves/shelters or on rocky outcrops or boulders. They are often found in association with geographic locations thought to hold spiritual power and are common in mountainous areas or near water sources. They are also found in areas where groups were known to congregate for fishing and for trade in places of economic and environmental diversity and to mark significant past occurrences. Pictographs and petroglyphs often display anthropomorphic (human) or zoomorphic (animal) figures, but may also be entirely abstract designs.

Shipwrecks: Unlike terrestrial archaeological sites, all abandoned vessels (ships, aircraft, submarine, etc.) located in a submerged or intertidal setting older than 2 years are considered provincial heritage resources under the HCA. The condition and significance of these sites can vary greatly based on age, exposure and method of deposit. The variety of sites along the Pacific Northwest coast makes a precise definition difficult. However, any vessel remains identified should be considered and the instructions below followed.

If you encounter archaeological or heritage resources:

If you encounter possible archaeological or heritage resources in the course of work, or if in doubt, the following steps are recommended:

- Cease all ground disturbance in the vicinity of the find and leave all possible archaeological or heritage materials in place
- Briefly note the type of archaeological materials you think you've encountered, and their location, including, if applicable, the depth below surface of the find
- Cordon off a no-work-zone, no less than 30 m in diameter, with flagging tape. Photograph the material, preferably with a scale, and record the location with GPS
- Notify your Project Manager who will then contact an archaeological consultant for advice, the applicable First Nations and the Archaeology Branch at 250-953-3334. In the unlikely event that possible human remains are encountered the Project Manager will also contact the RCMP.



Shell Midden



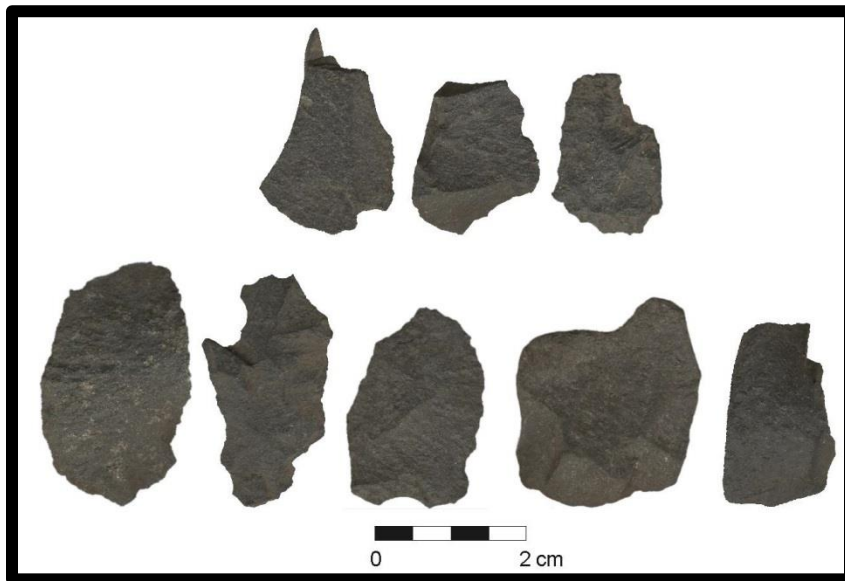
Exposed Shell Midden



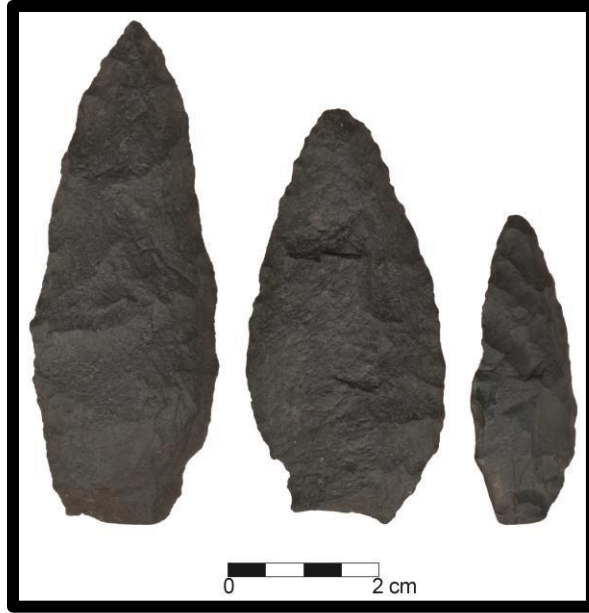
Burial Cairn



Lithic (Stone) Scatter



Debitage (waste material from stone tool manufacturing)



Projectile Points



Bone and antler artifacts



Culturally Modified Tree (CMT)



Pictograph



Petroglyph