TOWN OF HARBOUR MAIN-CHAPEL'S COVE-LAKEVIEW

Chapel's Cove Breakwater Mitigation

Environmental Assessment Registration Document

2025-05-23

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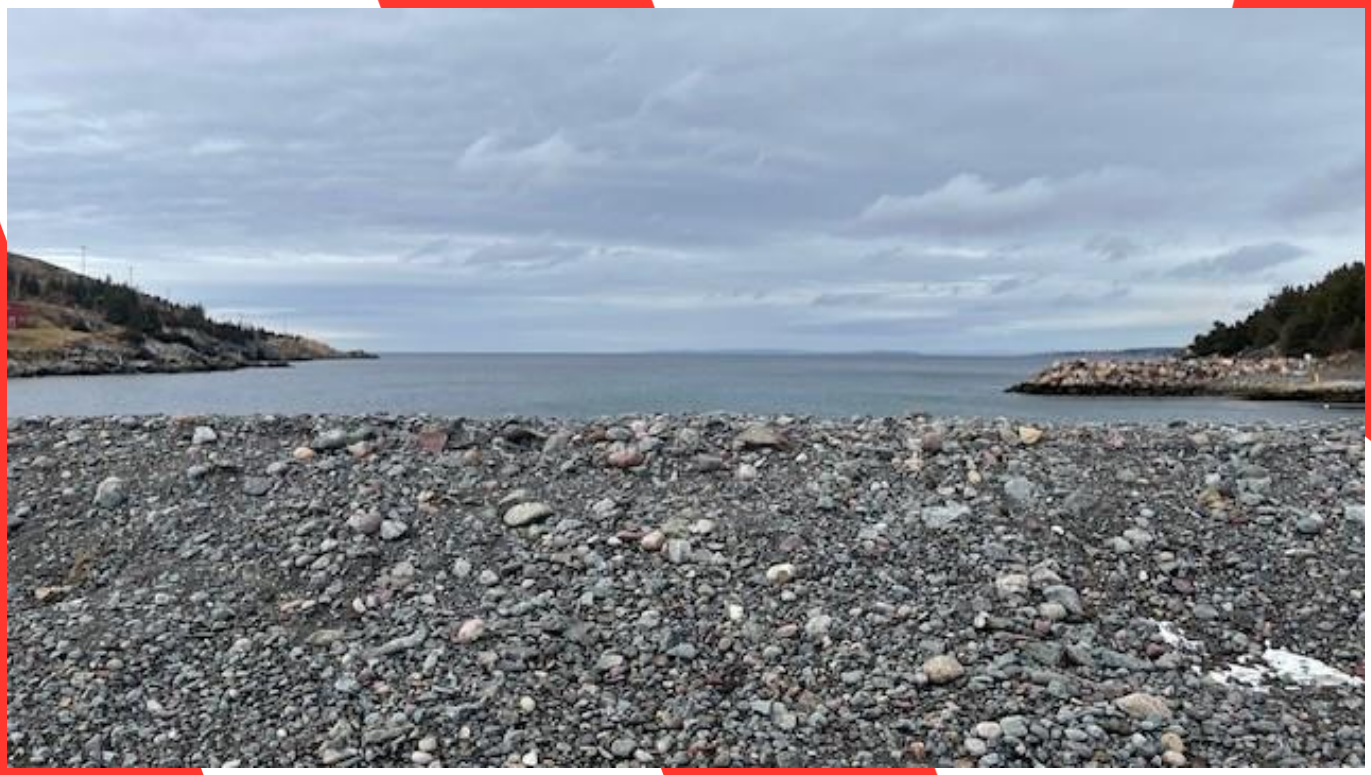

Chapel's Cove Breakwater Mitigation

Environmental Assessment Project Registration

Town Of Harbour Main-Chapel's Cove-Lakeview

REGISTRATION FINAL

PROJECT NO.: CA0023296.9719
CLIENT REF: 17-GI-24-00085
DATE: MAY 23, 2025

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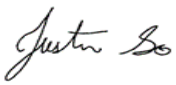

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1 NAME OF UNDERTAKING

Breakwater Construction, Chapel's Cove, Town of Harbour Main- Chapel's Cove-Lakeview, Newfoundland and Labrador (NL).

2 PROPONENT

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3 THE UNDERTAKING

3.1 NAME OF THE UNDERTAKING

Breakwater Construction, Chapel's Cove, Town of Harbour Main-Chapel's Cove-Lakeview, NL.

3.2 PURPOSE FOR THE UNDERTAKING

The proposed Project will involve the construction of a breakwater in the West side of Chapel's Cove. This breakwater will provide protection from wave action during storm surge events, mitigating coastal erosion and flooding and damage to the coast, adjacent road and neighbouring houses.

This Project is necessary to protect the coastline and mitigate the risk of flooding and washout of the adjacent road. Due to climate change this area has experienced flooding and washouts during storm surges with water levels flooding the road and reaching nearby houses. These extreme weather events have resulted in damaged infrastructure (CBC News, 2020; Mooney 2021). Breakwaters are designed to disperse waves and provide protection for coastal infrastructure and environments (Ogbuchukwu et al. 2020). Construction of this breakwater will lessen the chances of damages in similar situations and ensures roads remain safe for transportation and local houses are not at risk from flooding. The breakwater will also mitigate coastal and beach erosion, preserving beach conditions and making for a more stable environment.

4 DESCRIPTION OF THE UNDERTAKING

The scope of this undertaking involves the construction of a breakwater constructed of rock rubble fill with 2 m of armour stone protection (See Figure 4-1 to Figure 4-4) to be built in Chapel's Cove, NL. The total footprint of the breakwater is 2,410 m² with a footprint below high tide of 2,287 m² and below low tide of 2,185 m². The total length of the breakwater extends roughly 115 m. The height of the breakwater is approximately that of the adjacent road with the top of the armour stone extending 4.46m from the deepest area of the seabed. The width of the top of the breakwater is approximately 5 m with a 3 m width of rock rubble topped with armour stone with 1.5:1 side slopes. The design includes 0.5 m of embedded armour stone.

The breakwater will be constructed at the West side of Chapel's Cove in the shallowest section of the harbour where a wharf was previously located. No dredging or clearing of the underwater substrate is required. The work will be conducted using heavy equipment including excavators, dump trucks, and loaders. A temporary access will be from Point Road at an exact location determined between the Town and contractor. No laydown is required, all rock will be trucked in and dumped at the site. If the parking of heavy equipment is required the location will be decided through communication between the Town and selected contractor.

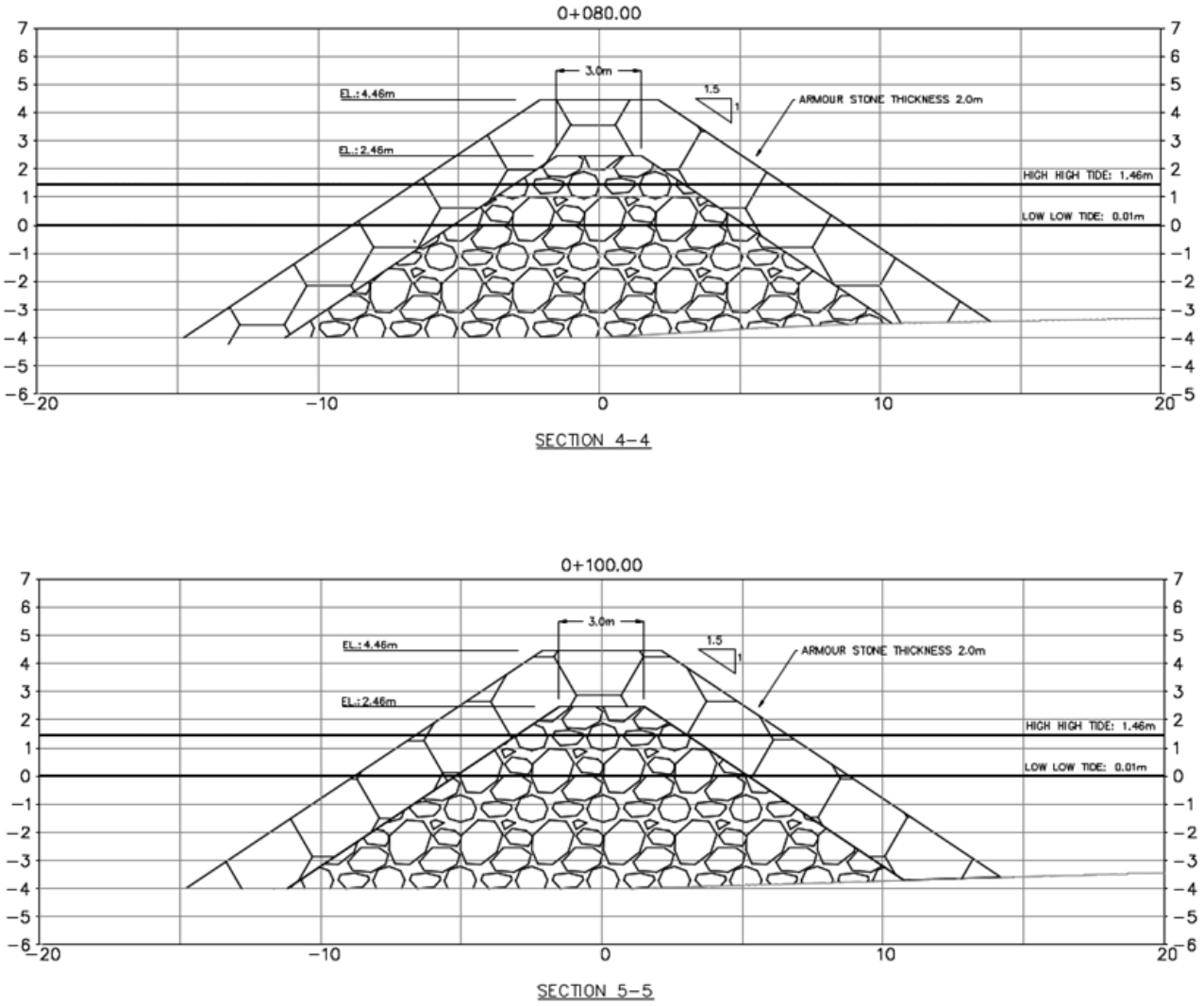

Figure 4-1: Cross Section of Proposed Breakwater Design

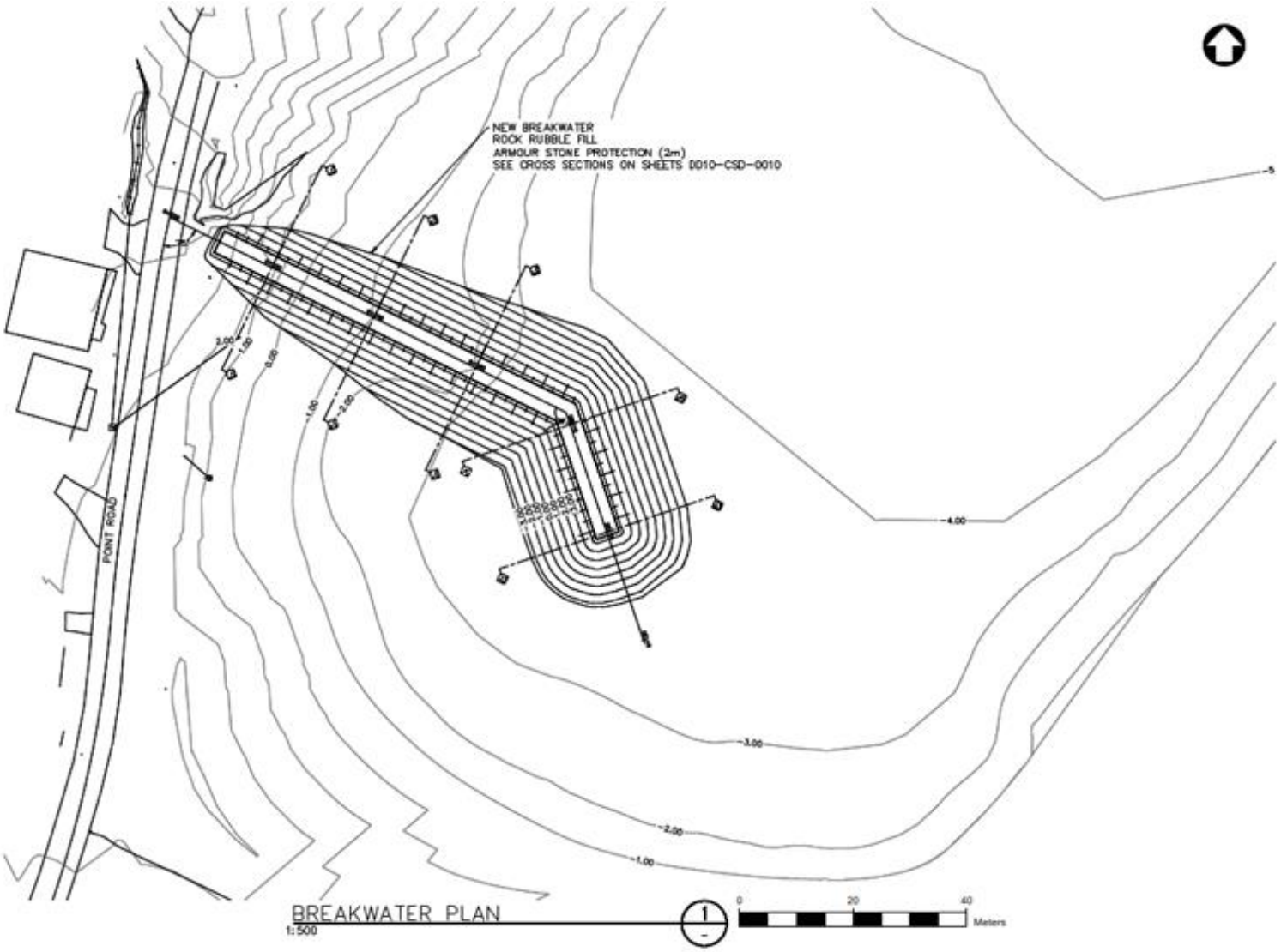

Figure 4-2: Breakwater Plan

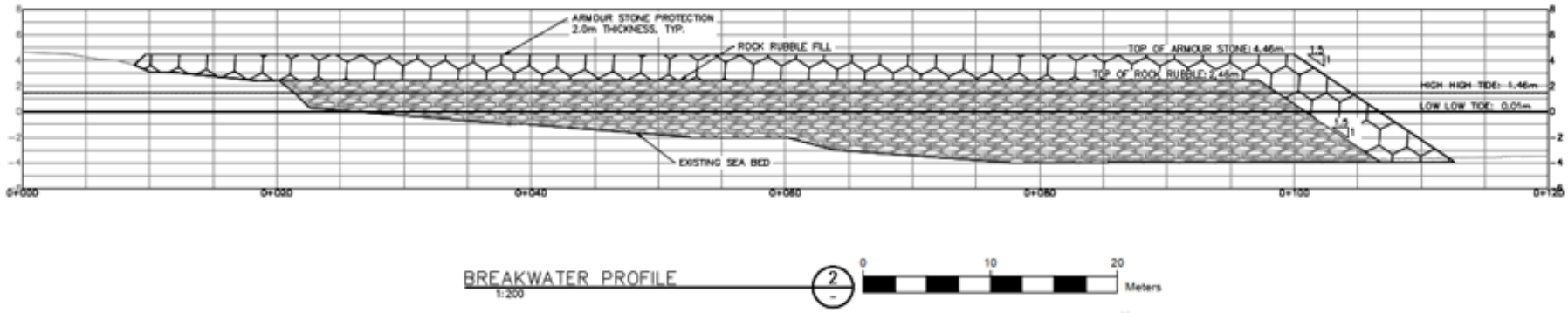

Figure 4-3: Section Thru Breakwater

Figure 4-4: Proposed Breakwater Location in Relation to Existing Infrastructure in Chapel's Cove

4.1 GEOGRAPHICAL LOCATION

The Project site is located in Chapel's Cove which is part of the Town of Harbour Main-Chapel's Cove-Lakeview (See Figure 4-5). Chapel's Cove is located approximately 12.5 km for the Trans-Canada Highway and 40 minutes from St. John's. Chapel's Cove is adjacent to Point Road and Beach Road. Point Road has residences located near the west edge of Chapel's Cove.

Figure 4-5: Chapel's Cove Project Location Shown on Map

4.2 PHYSICAL FEATURES

Chapel's Cove is a U-shaped cove with a rocky beach. There is an existing breakwater on the east side of the cove. The approximate area of the cove is 37,250 m², with depths ranging from, 5 m in the deepest part of the cove to <1 m near the coast (Figure 4-6). See Figure 4-1, Figure 4-2, Figure 4-3 and Figure 4-4 for conceptual drawings of the breakwater design.

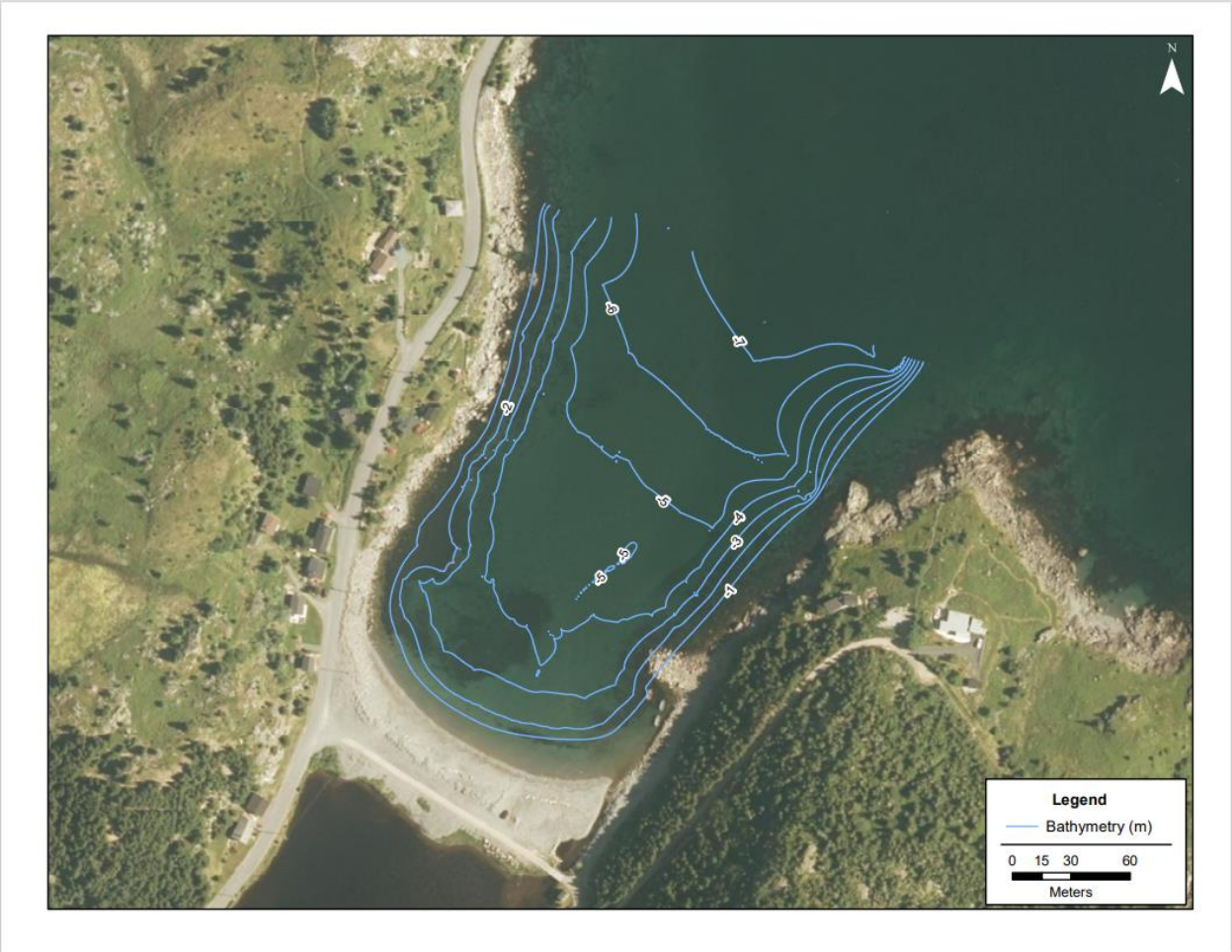

Figure 4-6: Bathymetry Map of Chapel's Cove

4.2.1 PHYSICAL AND BIOLOGICAL ENVIRONMENT

4.2.1.1 *PHYSICAL*

The project area is located at Chapel's Cove in the Town of Harbour Main-Chapel's Cove- Lakeview. Located along the coast between Conception Harbour and Holyrood on the Avalon Peninsula of Newfoundland. The Avalon Peninsula is the easternmost land mass in North America and spans approximately 10,000 km² (Catto, 2003).

Chapel's Cove had its first recorded settler in 1836, attracting residence due it potential for small farms and agriculture. Chapel's Cove was used as a fishing harbour prior to the moratorium on cod fishing (Tilley, 2023). As per the 2021 census the Harbour Main-Chapel's Cove-Lakeview region has a population of 1.07 k. The beach at Chapel's Cove is utilized by the locals recreationally and capelin are caught during spawning season. Adjacent to the cove there are several residences.

Chapel's Cove is within the Maritime Barrens ecoregion. Precipitation is common in this area with fog occurring throughout the year along with high winds during stormy conditions. The project area topography is defined by valleys and hills made up of igneous rock.

Chapel's Cove has a low-sloping rocky beach with sediment less resistant to erosion (Tilley, 2023). The beach primarily consists of pebble and cobbles with few boulders located on the sides of the cove (Tilley, 2023). A beachbar used as a roadway separates Chapel's Cove from Small Pond, a freshwater lagoon (Tilley, 2023). Chapel's Cove was an active site for livelihood fisheries until the cod moratorium in 1992 (Tilley, 2023). Small Pond is located just behind Chapel's Cove and is connected to the cove by a small river. This river was frequently dredged prior to 1992 to allow small boats access to and from Small Pond to store their boats during the cod fishery. The cove is currently still utilized by boaters. There is a rock breakwater on the east side of the cove, consisting of large boulders. The west side of the cove, where the new breakwater construction is proposed has boulders and concrete debris dumped along the beach in an effort to protect Point Road from erosion (Tilley, 2023).

No transmission lines are located near Chapel's Cove.

4.2.1.2 *BIOLOGICAL*

Various wildlife species inhabit the Chapel's Cove region and are important to consider when planning construction of a breakwater. Capelin (*Mallotus villosus*) and brown trout (*Salmo trutta*) were identified in public engagement sessions as important consumed species in the region.

Chapel's Cove is a known capelin spawning location where capelin roll in the early summer months during high tide. Capelin are a forage fish species that spawn annually on rocky beaches around Newfoundland. As they prefer gentle slopes and granular sediment, the characteristic of the rocky beach at Chapel's Cove make it advantageous for capelin spawning (Tilley, 2023). When compared to adjacent beaches, Chapel's Cove is more dynamically stable and is less impacted by anthropogenic factors (Tilley, 2023). Capelin come inshore during early summer and spawn on the beach at high tide during a process locally referenced to as "capelin rolling". During the spawning process capelin ride the waves to shore and fully emerge from the water. The females deposit their eggs which are then fertilized by the males. Some fish manage to return to sea while others die, littering the beach with dead fish, attracting wildlife that feed on small fish. During this time, locals frequent the area to catch the capelin as they roll. In recent years capelin have spawned at Chapel's Cove during the first two weeks of July (Capelin Rolling, Squid Catching, Whale Watching NL 2024, n.d.).

Brown trout were identified as being present in the cove as they migrate towards the connecting Small Pond. This species was introduced to Newfoundland and eventually established self-sustaining populations (Westley et al. 2011). Brown trout are a salmonid species commonly referred to as sea trout. Brown trout are an anadromous fish and migrate from salt water to freshwater. They spawn in rivers and streams in late fall and early winter and the young emerge from the gravel in April and May (DFO, 1988). Brown trout migrate to sea between April and June and generally stay at sea for 2-4 months or they may stay out for one of more winters before returning to freshwater (DFO, 1988). When returning they do not always return to their river of origin (DFO, 1988). However, brown trout in the marine environment are known to remain close to their natal rivers (Westley et al. 2011).

Many bird species also frequent the area including both ducks (e.g., Mallard (*Anas platyrhynchos*), Bufflehead (Bucephala albeola)), seabirds (e.g., Black-Legged Kittiwake (*Rissa tridactyla*), Herring Gull (*Larus argentatus*), Leach's Storm-Petrel (*Oceanodroma leucorhoa*), Arctic Tern (*Sterna paradisaea*), Common Murres (*Uria aalge*)), raptors (e.g., Bald Eagle (*Haliaeetus leucocephalus*)), and song birds (e.g., Dark-eyed Junko (*Junco hyemalis*), American Robin (*Turdus migratorius*), Boreal Chickadee (*Poecile hudsonicus*)) (ebird 2025, iNaturalist 2025).

SPECIES AT RISK

Species at risk are of special concern when assessing environmental impacts of the Project. Species at risk that may potentially occur within or near the Project site have been identified by Atlantic Canada Conservation Data Centre (ACCDC). No rare flora identified within 5 km of the Project site are on the provincial *Endangered Species Act* (ESA), COSEWIC, or considered globally rare (See Table 4-1,Table 4-2, Figure 4-7) (ACCDC, 2025).

Rare animal sightings within 5 km of Chapel's Cove included (ACCDC, 2025):

- 1 Yellow-banded Bumble Bee (*Bombus terricola*)
- 4 Red-necked Phalarope (*Phalaropus lobatus*)
- 2 Red Crossbill (*Loxia curvirostra*)
- 2 Leach's Storm-Petrel (*Hydrobates leucorhous*)
- 1 Ivory Gull (*Pagophila eburnea*)
- 2 Little Brown Bat (*Myotis lucifugus*)
- 1 American Eel (*Anguilla rostrata*)

ACCDC identifies potential for species at risk occurrence based on their Expert Opinion maps. Boreal Felt Lichen (*Eriodemra pedicellatum*), Rusty Blackbirds (*Euphagus carolinus*), and Short-eared owls (*Asio flammeus*) were identified to be possible within 5 km of the Project site, while Banded Killifish (*Fundulus diaphanus*), Polar Bears (*Ursus maritimus*), and American (Newfoundland) Marten (*Martes americana atrata*) are possible, but unlikely (ACCDC, 2025). The Project area falls within the range of Barrow's Goldeneye (*Bucephala islandica*) (ACCDC, 2025).

A search within 1 km of the project site using the DFO Aquatic species at risk map online tool indicated that six species may potentially be found within area (Table 4-2). No critical habitats are within 5 km of the project site.

Table 4-1: Species at Risk That may Potentially Occur Within 5 km of the Site

Name	Scientific Name	SARA	COSEWIC	Population
Birds				
Barrow's Goldeneye	*Bucephala islandica*	SC	SC	Eastern
Ivory Gull	*Pagophila eburnea*	E	E	-
Leach's Storm-Petrel	*Hydrobates leucorhous*	-	T	-
Little Brown Bat	*Myotis lucifugus*	E	E	-
Red Crossbill	*Loxia curvirostra*	T	T	-
Red-necked Phalarope	*Phalaropus lobatus*	SC	SC	-

Name	Scientific Name	SARA	COSEWIC	Population
Rusty Blackbird	*Euphagus carolinus*	SC	SC	-
Short-eared Owl	*Asio flammeus*	SC	T	-
Fish				
American Eel	*Anguilla rostrata*	-	T	-
Banded Killifish	*Fundulus diaphanus*	SC	SC	Newfoundland
Insects				
Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	-
Mammals				
Polar Bear	*Ursus maritimus*	SC	SC	-
Newfoundland Marten (American Marten)	*Martes americana atrata*	T	SC	Newfoundland
Lichens				
Boreal Felt Lichen	*Eriodemra pedicellatum*	E	E	Atlantic Population
Notes: Status: Special Concern (SC), Threatened (T), Endangered (E)				

Table 4-2: Marine Species That may Potentially Occur within 1 km of the Site

Name	Scientific Name	SARA	COSEWIC	Population
Fish				
Spotted Wolffish	*Anarhichas minor*	T	T	-
White Shark	*Carcharodon carcharias*	E	E	Atlantic
Marine Mammals				

Name	Scientific Name	SARA	COSEWIC	Population
Blue Whale	*Balaenoptera musculus*	E	E	Atlantic
Fin Whale	*Balaenoptera physalus*	SC	SC	Atlantic
North Atlantic Right Whale	*Eubalaena glacialis*	E	E	-
Reptiles				
Leatherback Sea Turtle	*Dermochelys coriacea*	E	E	Atlantic
Notes: Status: Special Concern (SC), Threatened (T), Endangered (E)				

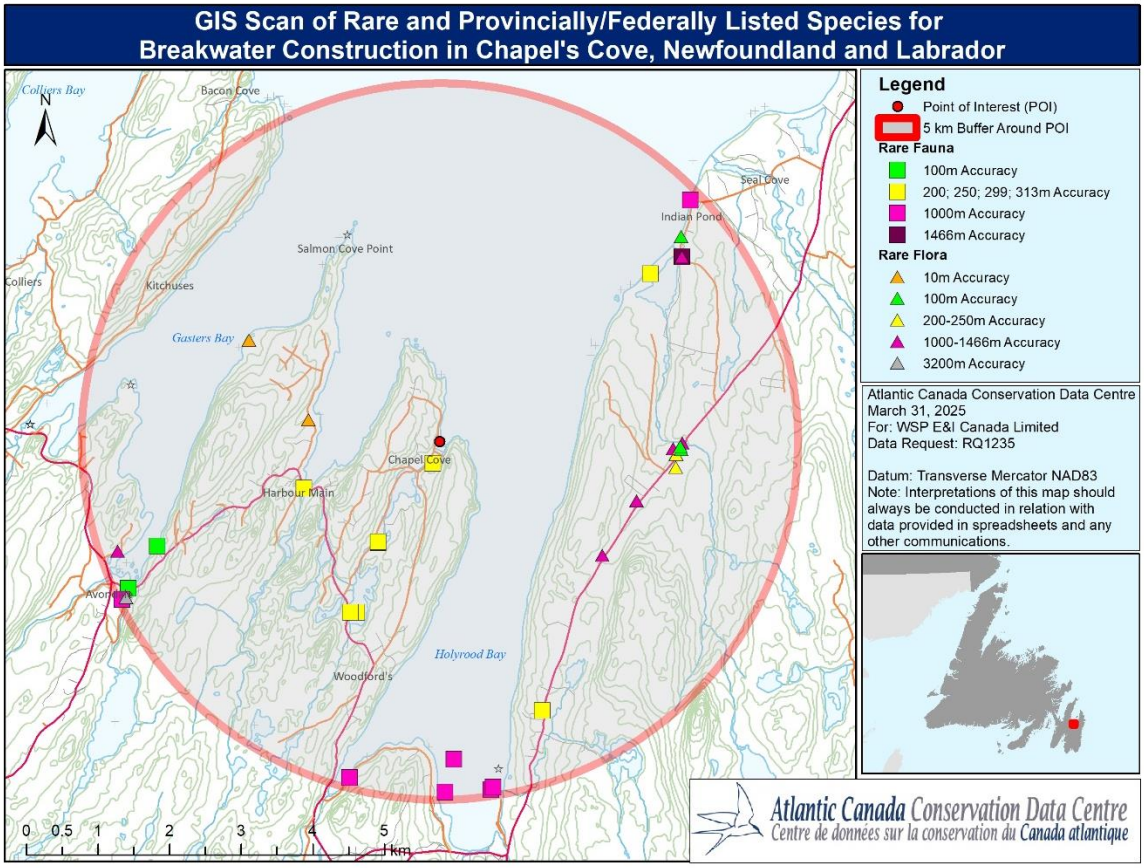

Figure 4-7: Rare and Provincially/Federally Listed Species within 5 km of the Chapel's Cove Breakwater Project

4.3 CONSTRUCTION

On-site activity is proposed to begin late summer 2025 and span a period of 90 days. The construction of the breakwater will involve the preparation of the seabed and the transportation and laying of materials including the rock rubble fill and the armour stone. The material will be sourced offsite from a nearby quarry. Standard heavy civil equipment will be used to transport and place the rock rubble and amour stone.

Equipment to be used includes the following:

1. Excavator
2. Loaders
3. Dump trucks
4. Site generators (if needed)

The majority of construction will be completed during daylight hours and will not require personnel to work throughout the night. The following sections detail the potential effects on environmental receptors and planned mitigations for the Project. All construction work will be conducted in accordance with conditions associated with permits received for the Project (see Section 5).

4.3.1 WILDLIFE

The construction of the breakwater is not predicted to have any significant effects on wildlife including species at risk. The breakwater construction is not anticipated to interact with local wildlife as the temporary activities are localized to the coastal area. To mitigate any impacts the following actions will be taken:

- Construction vehicles will adhere to local speed limits to minimize impacts on wildlife.
- Wildlife are not to be harassed, disturbed or fed by personnel for the Project duration.
- Silt curtains will be used during construction to minimize turbidity and suspended sediment in the water column.
- Any areas disturbed by the construction will be stabilized and revegetated to match the existing environment.

4.3.2 FISH/FISH HABITAT AND WATER

The construction of the breakwater is not predicted to have any significant effects on fish and fish habitat including species at risk. No fish critical habitats are within Chapel's Cove. The breakwater is being constructed where a wharf was previously present and therefore will be utilizing seabed already impacted by anthropogenic infrastructure. The breakwater footprint is relatively small in comparison to the cove area and is proposed to be on the shallowest area. The breakwater will allow amble space for fish species to swim in and out of the bay and will not obstruct capelin spawning of brown trout movement. To mitigate any impacts the following actions will be taken:

- A Request for Review for the project will be submitted to DFO.
- In-water work will be minimized during time periods where habitat is used for fish spawning, rearing, feeding, or migration. Specifically, in-water work will not occur during capelin spawning season.
- Silt curtains will be used during construction to minimize turbidity and suspended sediment in the water column.
- Any areas disturbed by the construction will be stabilized and revegetated to match the existing environment.

4.3.3 BIRDS AND BIRD HABITAT

The construction of the breakwater is not predicted to have any significant effects birds or bird habitat including species at risk. During the construction phase increased noise levels may act as a deterrent to the area. However, all work will be conducted during 10-hour workdays during daylight hours allowing for noise breaks outside of these hours. No bird habitat will be lost due to the construction of the breakwater. The Project area is not designated as an Important Bird Area (IBA, 2020). To mitigate any impacts the following actions will be taken:

- All work will take place during daylight hours to eliminate the need for spotlights which could increase bird strandings.
- Work will not extend past 10-hour periods to allow for noise breaks.
- Any areas disturbed by the construction will be stabilized and revegetated to match the existing environment.

4.3.4 MARINE MAMMALS

The construction of the breakwater is not predicted to have any significant effects on marine mammals including species at risk. The constructed breakwater will allow amble space for species to swim in and out of the cove and will not obstruct movement. Marine mammals may be more prevalent when capelin are spawning. Construction is planned for outside of the capelin spawning season. To mitigate any impacts the following actions will be taken:

- A Request for Review for the project will be submitted to DFO.
- In-water work will be minimized during time periods where habitat is used for fish spawning, rearing, feeding, or migration. Specifically, in-water work will not occur during capelin spawning season.
- Silt curtains will be used during construction to minimize turbidity and suspended sediment in the water column.

4.3.5 AIR QUALITY AND WATER QUALITY

Greenhouse gases will be emitted during the construction of the breakwater due to the use of heavy machinery using diesel fuel. Emissions are not predicted to be high enough to require offsetting due to the short duration of the Project and the limited equipment required.

No liquid effluents or solid waste materials are expected to enter into the marine environment. Dumped material will be sourced from a nearby quarry and will be free of contaminants. To mitigate the spread of dumped material the following actions will be taken:

- Rock material will be placed using an excavator or similar equipment and will not be end-dumped.
- Silt curtains will be used to mitigate the spread of sediment.
- Heavy machinery will be operated from stable dry areas.
- Schedule work will avoid wet, windy periods that could increase erosion.
- Emergency plans should be in place in case of emergency spill.

4.3.6 RESOURCE USE AND SOCIO-ECONOMIC IMPACTS

No conflicts with resource use are expected to arise due to the construction of the breakwater. On-site activities will be limited during capelin spawning season and will not affect recreational catches of capelin. The breakwater will not obstruct entrance to the cove.

There will be short-term obstruction of landscape views during the construction of the breakwater. However, this short-term loss is offset by the long-term decreased risk of road and residential flooding due to the addition of the breakwater.

To mitigate any impacts the following actions will be taken:

- In-water work will be minimized during time periods where habitat is used for fish spawning, rearing, feeding, or migration. Specifically, in-water work will be limited during capelin spawning season.
- All construction will be undertaken in accordance with the Department of Transportation and Infrastructure's "Building near Highways Regulations", "*Works, Services and Transportation Act*" and departmental policies.
- The height of the breakwater is designed to be of similar height to the adjacent road.

4.3.7 ENGAGEMENT

A public information session was held virtually on April 17, 2025 to share information about the Project and identify and address any concerns regarding the construction of the Chapel's Cove breakwater. Summarized comments on the Project included:

- Visual Impacts: Residents voiced concerns that the height of the breakwater would obstruct the view of the cove. It was clarified that the breakwater does not extend above road height (See Section 4.3.6).
- Impacts to marine species: Residents were concerned the breakwater would impacts whales having access to the bay. It was clarified that the breakwater is on the shallowest section of the cove, leaving deeper waters open for whales to enter. There were also concerns that brown trout would lose access to the mouth of the river connecting Chapel's Cove to Small Pond. It was clarified that that area of the cove would be relatively unaffected as the breakwater dissipates wave power and does not redirect it towards the other side of the cove.
- Construction and Maintenance: Residents inquired about removal of concrete rubble from the old wharf. It was clarified that there is no need for removal. Residents wanted to know who was responsible for maintenance of the breakwater. They were informed that the town would be responsible maintenance following one year after installation.
- Breakwater Location: Residents wanted to know the location of the breakwater in comparison to the existing infrastructure in the bay. A map of the breakwater location relative to cove has been generated (Figure 4-7). There were inquiries about the consideration of other locations as well as size and shape of the breakwater. A sea wall was brought up as an alternative. The need for a breakwater was explained and the design specification were justified. Conceptual drawings were shown. There were concerns that the location and shape of the breakwater would cause wave power to be redirected to the other side of the cove, including the river mouth. It was explained breakwaters are designed to dissipate the wave power and is not anticipated to direct it towards the other side of the cove.
- Recreational use of the cove: There was concerns that boaters would be affected. It was clarified that deeper waters and the other side of the cove would be unaffected.

Overall, participants were in support of the breakwater development and wanted to be informed on construction design and activities.

4.4 OCCUPATIONS

A crew of 6-8 trained professionals will be utilized for construction (Table 4-3). The construction is estimated to take approximately 90 days with crew working 10-hour days.

Table 4-3: List of Personnel to be Utilized in the Construction of the Chapel's Cove Breakwater

Occupation	NOC	No. of Personnel
Site Supervisor	72013	1
Truck Driver	73300	4
Excavator Operator	72021	2
Labourers	75110	2
Total Personnel	-	9

Employment equity will be addressed through the hiring of skilled personnel. Crew will be selected based on qualifications and experience regardless of age and gender.

5 APPROVAL OF THE UNDERTAKING

Project related permits already completed or anticipated are presented in Table 5-1. This document is to be submitted to the Department of Environment and Climate Change to register the Project. The Project was posted to the Impact Assessment Registry on October 20, 2023 with a 30-day comment period. The notice of determination was posted on March 20, 2024 indicating that the Project "is not likely to cause significant adverse environmental effects" (IAAC 2024). All construction work will be conducted in accordance with conditions associated with permits received for the Project.

No Crown Land application is required for the undertaking.

Table 5-1: Approvals, Permits and Registrations for the Project

Approvals / Permits	Legislation / Regulation	Activity	Regulatory Authority
NL Environmental Assessment Registration (this document)	Environmental Assessment Regulations 2003, *Environmental Protection Act*	Project permits and approvals	Department of Environment and Climate Change, and Municipalities, Environmental Assessment Division
Canadian Impact Assessment Act Project Description and Registration	*Impact Assessment Act*	Project permits and approvals	Impact Assessment Agency of Canada
DFO – Request for Review (RFR)	Section 35, *Fisheries Act*	Breakwater construction in the marine environment	Fisheries and Oceans Canada, Fish and Fish Habitat Protection Program
Permit to Alter a Body of Water	Section 48, *Water Resources Act*	Breakwater construction including infilling and debris removal	Department of Environment and Climate Change; Water Resources Management Division
Permit to Work within Transportation and Infrastructure Right of Way	Building Near Highways Regulations 1997, *Works, Services and Transportation Act*	Construction near highways	Department of Transportation and Infrastructure

6 SCHEDULE

Construction is set to begin near the end of summer 2025 and continue for a period of roughly 90 days. This will extend into the fall and be completed before spring 2026.

7 CAPITAL COST AND FUNDING

The total project funding is $1,096,732.00 available through the investing in Canada Infrastructure Program (ICIP). This funding is to cover the entirety of the project including but not limited to engineering, construction and contingencies.

BIBLIOGRAPHY

Atlantic Canada Conservation Data Centre (ACCDC). (2025). *Chapel's Cove data request, Newfoundland and Labrador*. Personal communication, March 31, 2025.

Capelin Rolling, Squid Catching, Whale Watching NL 2024. (n.d). [Facebook Group]. Retrieved April 14, 2025 from https://www.facebook.com/share/g/16ZSC1mp4a/?mibextid=wwXIfr

Catto, N., Scruton, D., & Ollerhead, L. (2003). *The coastline of eastern Newfoundland*. Canadian Technical Report of Fisheries and Aquatic Sciences, No. 2495, 252 p.

CBC News. (2020). Cost to repair blizzard damage to Chapel's Cove beach almost as high as town's entire budget. Retrieved from http://cbc.ca/news.

Fisheries and Oceans Canada. (1988). Trout in Canada's Atlantic Provinces. Underwater World.

eBird. (2025). *eBird: An online database of bird distribution and abundance* [web application]: CBN-Chapel's Cove, Avalon Peninsula-St. John's, Newfoundland and Labrador, Canada. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available: http://www.ebird.org (Accessed: February 28, 2025).

IAAC; Impact Assessment Agency of Canada (2024). Chapel's Cove Breakwater Mitigation Project. Accessed April 29, 2025. Retrieved from https://iaac-aeic.gc.ca/050/evaluations/proj/86022.

IBA; Important Bird Areas Canada. (2020). *Map viewer*. Accessed February 29, 2025. Retrieved from http://www.ibacanada.ca/mapviewer.jsp?lang=en.

iNaturalist. (2025). *Observations in Chapel's Cove, Newfoundland and Labrador*. Retrieved from http://iNaturalist.org.

Mooney, K. (2021). Chapel's Cove beach is finally reopened, but resident says town is ill-prepared for next storm. Retrieved from http://cbc.ca/news.

Ogbuchukwu, P. O., Okeke, O. C., Urom, O. O., Usen, O. S., and Agoha, C. D. (2020). Geotechnical aspects of breakwater design and construction: A review. International Journal of Advanced Academic Research (Sciences, Technology and Engineering), 6(12): 12-39.

Tilley, B. (2023). *Mapping areas of interest for coastal enhancement related to capelin spawning in Conception Bay, Newfoundland and Labrador* (Doctoral dissertation, Memorial University of Newfoundland).

Westley, P.A.H., Ings, D.W., and Fleming, I.A. 2011. A review and annotated bibliography of the impacts of invasive brown trout (*Salmo trutta*) on native salmonids, with an emphasis on Newfoundland waters. Canadian Technical Report of Fisheries and Aquatic Sciences. 292