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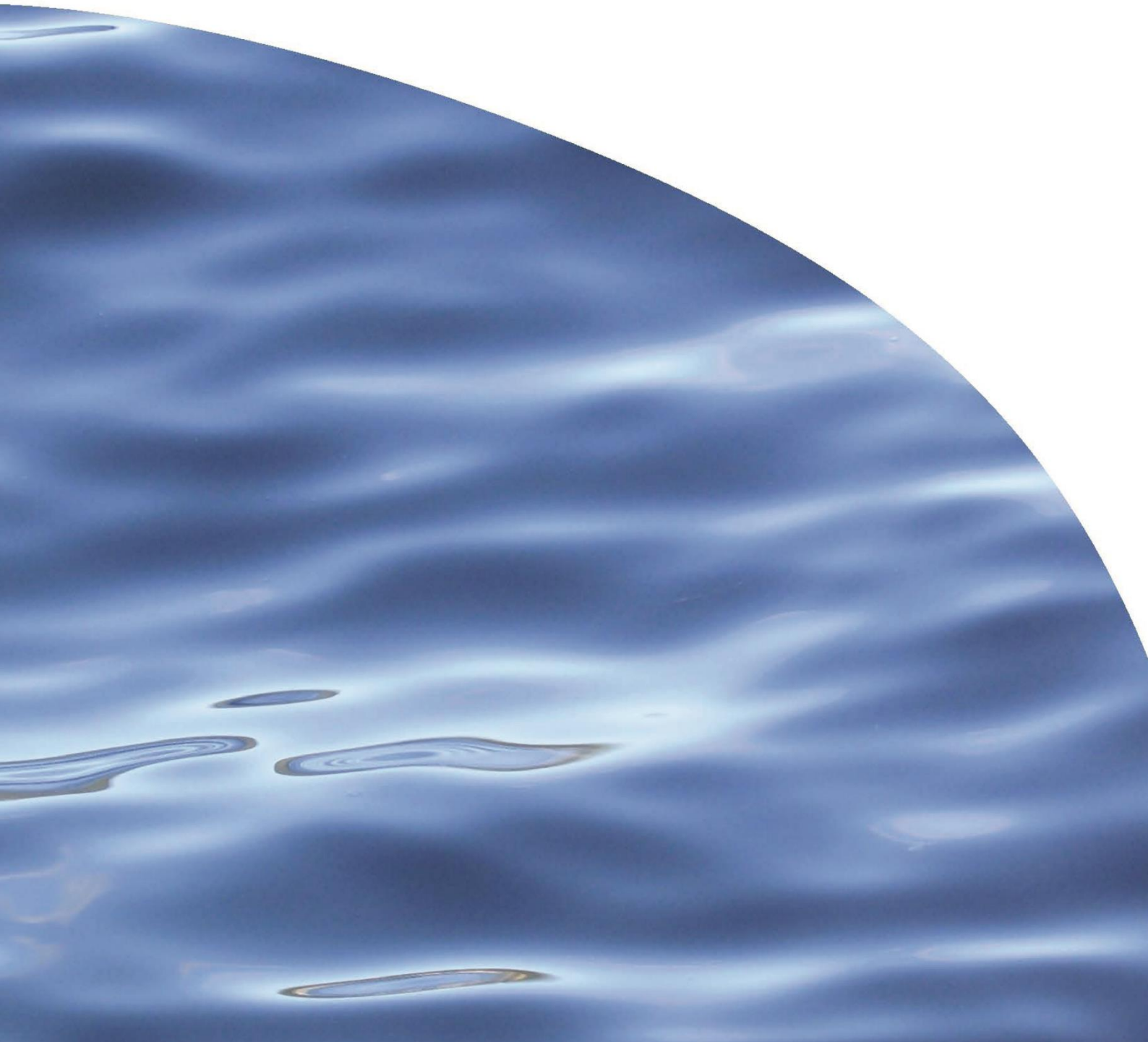
CENTREPORT SEAVIEW WHARF RENEWAL WORKS - MARINE MAMMAL MANAGEMENT PLAN



CENTREPORT SEAVIEW WHARF RENEWAL WORKS - MARINE MAMMAL MANAGEMENT PLAN

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EXECUTIVE SUMMARY

Seaview Wharf is a critical part of the lower North Island fuel supply chain and plays a significant role for the national fuel supply serving around 20% of New Zealand's population. Major upgrade and renewal work is planned to start in late 2021 with completion expected in 2024. The work will include activities such as pile driving, which has potential impacts on marine mammals.

This Marine Mammal Management Plan (MMMP) has been developed to address management and mitigation responses to potential impacts on marine mammals as identified in the associated Assessment of Environment Effects on marine mammals (Childerhouse 2021) and specifically, relevant conditions as part of the resource consents obtained for the work.

A summary of the proposed mitigation is provided in the table below.

Potential effects	Mitigation goal	Best Management Practice	Reporting / monitoring
Behavioural and / or physical responses to underwater sound from pile-driving activities	1. Minimise the avoidance (attraction) or potential for injury of marine mammals to pile-driving activities	1a. Establish a Construction Noise management plan. 1b. Regular maintenance and proper upkeep of all equipment (e.g., lubrication and repair of winches, generators). 1c. Establish designated marine mammal observation zones and use dedicated marine mammal observer on site to maintain a watch before and during any pile-driving activities. 1d. Adoption of soft-start procedures and choose plant / techniques on the basis of best practical option. 1e. Avoid spreading piling over successive seasons.	• Measure actual underwater noise levels from pile-driving activities and adjust any modelling results and mitigation zones based on these data, if necessary. • Record and report the type and frequency of any marine mammal sighted before and during pile-driving activities. Include behavioural data if possible. • All marine mammal sightings should be reported to DOC for input to their national database.
Marine mammal boat strike or entanglement in operational gear and / or debris	2. Minimise any interactions and aim for zero mortality	2a. Adoption of best boating guidelines for operating any project vessels, and equipment, in the presence of any marine mammals. 2b. Avoid loose rope and / or nets (i.e., keep all ropes and nets taut). 2c. Ensure that all support vessels and other project activities have waste management plans in place before the commencement of works.	• Record all sightings (including any interaction with project vessels or equipment), entanglement incidents or near incidents regardless of outcome (e.g., injury or mortality). • In case of a fatal marine mammal incident, carcass(es) recovered and given to DOC, and further steps taken in consultation with DOC to reduce the risk of future incidences.

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GLOSSARY

Consent Holders	CentrePort Limited
CMP	Construction Management Plan
CNMP	Construction Noise Management Plan
DOC	Department of Conservation
GWRC	Greater Wellington Regional Council
HF	High-Frequency
HVCC	Hutt Valley City Council
MMMP	Marine Mammal Management Plan
MMOZ	Marine Mammal Observation Zone
NOAA	United States Department of Commerce National Oceanic and Atmospheric Administration
PTS	Permanent Threshold Shift
TTS	Temporary Threshold Shift

1. INTRODUCTION

Seaview Wharf is a critical part of the lower North Island fuel supply chain and plays a significant role for the national fuel supply serving around 20% of New Zealand's population. The Wharf is also identified in the 'Wellington Lifelines Group Business Case' as the second most critical lifeline asset in the region.

The Wharf is approaching 50 years in service and suffered damage in the 2016 Kaikoura Earthquake. Major upgrade and renewal work is planned to start in late 2021 with completion expected in 2024. The work will extend the operational life of the wharf, improve seismic resilience and increase performance levels in line with current international standards and requirements.

The work to be undertaken includes demolition and piling. CentrePort engaged the Cawthron Institute to provide an assessment of environment effects on marine mammals of the proposed activity and the development of a Marine Mammal Management Plan (MMMP). The MMMP has been developed alongside the Construction Noise Management Plan (CNMP; produced by Marshall Day Acoustics (2021)) and provides details of the management and mitigation of activities that have the potential to impact marine mammals.

Pursuant to the resource consents obtained for the work, all works shall be undertaken in accordance with the measures in this MMMP and the CNMP. These documents identify the performance standards that must be complied with and sets out best practicable options (BPO) for marine mammal mitigation and management.

This MMMP shall be implemented throughout the Seaview renewal works. It shall be considered a 'living document' that is expanded and updated as the Project progresses and working conditions become clearer. It is intended to be used in association with the CNMP for the management of construction noise effects.

This MMMP has been developed to address management and mitigation responses to potential impacts on marine mammals as identified in the associated Assessment of Environment Effects on marine mammals (Childerhouse 2021) and specifically, relevant conditions as part of the resource consents obtained for the work.

1.1. Management Plan objectives

This MMMP briefly describes the proposed works, summarises the marine mammals of interest and outlines in detail the management responses that will avoid or minimise the potential for adverse effects of construction activities, particularly underwater noise, on marine mammals.

Specifically, this report sets out the procedures and protocols to:

- manage construction activities that will avoid, remedy, and / or mitigate adverse effects on marine mammals
- establish and monitor a Marine Mammal Observation Zone (MMOZ)
- record and report on zone monitoring
- review the effectiveness of the MMMP and Construction Noise Management Plan (CNMP).

This MMMP should be read in conjunction with Marshall Day Acoustics' (2021) report on underwater noise, which provides technical details of underwater acoustic modelling and the estimation of MMOZ.

1.2. Roles and responsibilities

CentrePort's Project Manager is ultimately responsible for implementing this MMMP. Table 1 summarises other key staff (including contact details) that also will be involved in the monitoring, reporting and implementation of the MMMP. It is the responsibility of CentrePort as Consent Holders to train and ensure that any staff or sub-contractors involved with the construction activities understand and can implement the requirements of this MMMP.

Table 1. Summary of key contacts, roles, and responsibilities. tbc – to be confirmed.

Name	Role / Responsibility	Organisation	Phone	Email
tbc	CentrePort Project Manager	CentrePort Ltd		
Lee Griffiths	Contractor Project Manager	Brian Perry Civil	027 563 3053	LeeGr@fcc.co.nz
Helen Russell	Contractor Site Manager	Brian Perry Civil	027 403 2370	HelenR@fcc.co.nz
Nick Pearson	Greater Wellington Regional Council Liaison	GWRC	04 830 4345	Nick.Pearson@gw.govt.nz
tbc	Department of Conservation Liaison	DOC	tbc	
Ben Lawrence	Project Specialist – Underwater Noise	Marshall Day	021 277 7164	ben.lawrence@marshallday.co.nz
Dr Simon Childerhouse	Project Specialist - Marine Mammal expert	Cawthron Institute	027 256 5067	simon.childerhouse@cawthron.org.nz

1.3. Review and updates of MMMP

To maintain relevance and to ensure that the various best management practices remain current over the duration of the project, protocols and procedures may require review if there are any significant changes within the project that were not considered during the development of this MMMP. This MMMP should be reviewed at the following times and amended where necessary:

- following any major operational change to the type of pile-driving methods, systems or mitigation being used (e.g., two piling rigs are used simultaneously)
- following any greater than expected levels of underwater noise based on *in situ* noise measurement validation monitoring
- if three or more shut-downs on behalf of marine mammals occur within three consecutive days, a review or update of the MMMP's protocol / procedure is necessary.

Any changes to the MMMP shall be submitted in writing and certified by the Greater Wellington Regional Council (GWRC).

2. PROJECT DESCRIPTION

A project description is provided in Boffa Miskell Ltd (2021). A short summary is given here.

2.1. Description of proposed work

The renewal and upgrade work will include a range of activities that may potentially impact on marine mammals. The main element of the proposed work that may have an impact is underwater noise, primarily from piling-driving activities. These piling activities include:

- Main wharf
  - piling of 750, 1050, 1200 and 1500 mm piles using both impact- and vibro-driving methods
- Approach wharf
  - piling of 1200 mm piles using both impact- and vibro-driving methods
- Compound staging
  - piling of 710 mm piles using both impact- and vibro-driving methods.

Works are scheduled to be undertaken from late 2021 to 2024, with piling work proposed to be undertaken from December 2021 through to late 2023.

2.2. Species of interest

Childerhouse's (2020) *Marine Mammals in Wellington Harbour* summarises the marine mammals potentially found in Wellington Harbour and the wider region, and how they are likely to use the region. A brief summary is provided here.

The species identified as potentially occurring in the vicinity of Seaview Wharf are:

- common dolphin
- bottlenose dolphin
- New Zealand fur seal
- Hector's dolphin
- southern right whale
- humpback whale
- dusky dolphin
- killer whale.

Of the ten marine mammal species that have been reported in the Wellington Harbour area, the three most commonly reported species are killer whales (orca), Hector's dolphins and common dolphins. However, Wellington Harbour appears to be infrequently visited by marine mammals. This suggests that while a variety of marine mammal species visit Wellington Harbour, the likelihood of individuals being found in Wellington Harbour is low and the likelihood of them being in the immediate vicinity of the construction activity is very low.

2.3. Regulatory requirements

There is no national New Zealand guidance on underwater noise effects other than for seismic surveys. However, the US Department of National Oceanic and Atmospheric Administration (NOAA) has provided guidance for assessing the effects of anthropogenic (human-made) sound on marine mammals (referred to as the 'NOAA Guidelines') and these guidelines are used in the absence of any specific New Zealand direction. These guidelines are summarised in Section 9.2 of the CNMP (Marshall Day 2021) and again in Section 3.1.1 of this report.

2.4. Consent conditions

A range of consent conditions relevant to marine mammals are included in the approved consent. A full description of these is included in Section 4 of the CNMP (Marshall Day 2021) and original consent document. They have not been duplicated here but this MMMP has been developed to specifically address the issues identified by the Consent Authority.

3. POTENTIAL FOR ADVERSE EFFECTS

The main activity with the potential to adversely affect marine mammals is underwater noise from pile driving, as assessed in Boffa Miskell Ltd (2021). Other effects, including entanglement and impacts on prey, are considered low risk and are briefly considered separately at the end of this section.

Marine mammals use sound for communication, orientation, foraging and predator avoidance. An increase in underwater noise can impact marine mammals, resulting in avoidance of noisy areas, behavioural changes, auditory masking, or physical injury. The unmitigated likelihood of underwater noise from pile-driving operations impacting on marine mammals is assessed as LOW to MODERATE for the following reasons:

- Pile-driving activities within water are estimated to lead to permanent threshold shift (PTS; permanent physiological hearing damage) levels that may occur up to 750 m from the noise source for species such as Hector's dolphins. However, validation of the actual noise levels is necessary.
- Pile-driving activities within water will also reach temporary threshold shift (TTS; temporary physiological hearing damage) levels. The estimated spatial zone over which TTS may occur is approximately 3,500 m from the source for baleen whales (a low-frequency hearing cetacean) and approximately 2,400 m for Hector's dolphins (a high-frequency cetacean) but confined to less than 220 m from the source for all other species.
- Pile driving will be limited to daylight hours only and will be carried out intermittently in blocks over the duration of the project.

The potential for impact is a direct function of the likelihood of marine mammals being within the harbour and exposed to the underwater noise footprint of the activity. As noted above in Section 2.2, while marine mammals are rare visitors to Wellington Harbour, they have been observed previously within the area around the reinstatement. Applying the appropriate level of mitigation requires balancing the likelihood of a marine mammal being in the area, the magnitude of the impact (e.g., essentially the level of underwater noise), and practical as well as logistical considerations.

3.1. Control measures for pile-driving activities

A complementary description of control measures for pile-driving activities is provided in the CNMP (Marshall Day 2021) with additional details provided here. Because of the low to moderate risk rating and the potential for several noise-sensitive species to occur in the harbour area, control measures are required to manage the risks of pile-driving activities on marine mammals. These measures are described in more detail in the following sections and summarised later in Table 4.

3.1.1. Controls to minimise the effects of physiological hearing impacts

Best Practicable Option for noise emissions

Adopting the Research Management Act's (RMA) best practicable option for noise emissions is the most effective option for minimising underwater noise in the first instance. For this project, adhering to the best practical option would mean selecting the piling method with the lowest underwater noise output that is able to practically and cost effectively complete the work. However, full consideration must be given to other environmental factors such as substrate type and the implications of extending the duration of piling (e.g., one method may be quieter than another but it may take longer to complete works). We note that piling technology is rapidly evolving, and due consideration should be given in the CNMP to any new or alternative piling or mitigation methods (e.g., augering, bottom driving, etc.) that could reduce the overall noise footprint.

Method to characterise noise

Underwater acoustic noise validation should be undertaken at the earliest possible date once pile driving into water has begun (but not later than two weeks from the start of piling) to confirm that the actual noise levels associated with activities are as expected (e.g., Marshall Day Acoustics 2021). Measurements of the underwater noise shall be undertaken during normal operating conditions and:

- during the first occurrence of piling for representative pile types, sizes and at various locations
- for sufficient time to characterise the noise produced by the piling activity (e.g., at least three full piling cycles from first to last strike for representative sizes and types of piles)
- measured as the cumulative Sound Exposure Level ($SELcum_{(24h)}$)
- $SELcum_{(24h)}$ shall be derived from the maximum combined noise within mid-water depth (not the surficial layer), from the impact driven and vibro-driven piling operations over a 24-hour period.

Using these measurements, the existing spatial acoustic modelling will be validated by the Underwater Noise Specialist according to NOAA (2018) guidelines (see Table 2) to confirm that the levels identified in the CNMP are accurate or, if different to the levels identified in the CNMP, that they are amended to the empirically measured levels. The Marine Mammal Specialist will then recommend any modifications to the proposed control measures, which will be finalised by the Project Manager in consultation with the Contractor.

Table 2. Summary of NOAA (2018) underwater noise guidelines for the relevant hearing groups. Full details are provided in the CNMP (Marshall Day Acoustics 2021).

Marine mammal group	Impulsive sources (i.e., impact piling)	Non-impulsive sources (i.e. vibratory piling)
Temporary Threshold Shift Limits (TTS)		
Low frequency (LF) cetaceans (southern right, humpback whale)	168 dB $SEL_{cum(lf)}$	179 dB $SEL_{cum(lf)}$
Mid-frequency (MF) cetaceans (orca, bottlenose dolphin, common dolphin)	170 dB $SEL_{cum(24h)\ (mf)}$ 224 dB L_{peak}	178 dB $SEL_{cum(24h)\ (mf)}$
High-frequency (HF) cetaceans (Hector's dolphin)	140 dB $SEL_{cum(24h)\ (hf)}$ 196 dB L_{peak}	153 dB $SEL_{cum(24h)\ (hf)}$
Otariid pinnipeds (fur seals)	188 dB $SEL_{cum(24h)\ (pw)}$ 226 dB L_{peak}	199 dB S $SEL_{cum(24h)\ (pw)}$
Permanent Threshold Shift Limits (TTS)		
Low frequency (LF) cetaceans (southern right, humpback whale)	183 dB $SEL_{cum(lf)}$	199 dB $SEL_{cum(lf)}$
Mid-frequency (MF) cetaceans (orca, bottlenose dolphin, common dolphin)	185 dB $SEL_{cum(24h)\ (mf)}$ 230 dB L_{peak}	198 dB S $SEL_{cum(24h)\ (mf)}$
High-frequency (HF) cetaceans (Hector's dolphin)	155 dB $SEL_{cum(24h)\ (hf)}$ 202 dB L_{peak}	173 dB $SEL_{cum(24h)\ (hf)}$
Otariid pinnipeds (fur seals)	203 dB $SEL_{cum(24h)\ (pw)}$ 232 dB L_{peak}	219 dB $SEL_{cum(24h)\ (pw)}$

Establish a Marine Mammal Observation Zone (MMOZ)

Marine Mammal Observation Zones (MMOZs) will be implemented for all piling activity. Given the different sensitivities of marine mammal species, the size of the MMOZ will vary by each marine mammal group. Generally, the size of the MMOZ is estimated for the different hearing groups and TTS / PTS criteria for each type of piling, and whichever is larger determines the zone size. However, in some situations (e.g., when marine mammals have a very low likelihood of being in the area), a smaller MMOZ may be appropriate.

The MMOZs estimated in the CNMP are shown in Table 3 and represent the zones estimated when bubble curtain mitigation is being used. If bubble curtain mitigation is not being used, then these zones will be larger. The size of these MMOZs is based on the 'worst-case' piling activity that is expected to be undertaken on any given day and, therefore, days with less piling may have smaller zones. There remains considerable additional work to be undertaken to complete MMOZ estimates for all pile sizes, piling

methods and marine mammal groups. These estimates will be added as they become available.

It is recommended that appropriate MMOZs be established based on TTS estimates for all marine mammal groups, with the exception of high-frequency cetaceans (i.e., Hector's dolphins) and low-frequency cetaceans (i.e., whales), which should be based on PTS estimates.

It is not possible to confidently monitor MMOZs in excess of a 500 m radius with one observer. Any radius larger than this, and the chance of detecting a marine mammal is significantly reduced and effective mitigation cannot be assured. Therefore, any MMOZ of greater than 500 m will require at least two Marine Mammal Observers to robustly monitor the area.

The absolute bottom line for mitigation is that no activity should lead to permanent hearing injury (i.e., PTS) in any marine mammal. It is also highly desirable that no marine mammal should receive any temporary hearing injury; therefore MMOZ based on estimated TTS should be applied whenever possible.

The rationale for applying a MMOZ that is based on PTS rather than TTS for these two hearing groups is as follows:

1. There is a very low likelihood of Hector's dolphins, southern whales or humpback whales being in Wellington Harbour (i.e., only two or fewer reported sightings per year) and an even lower likelihood of them being around Seaview. Therefore, the risk of exposure for any individual is very low.
2. The criterion for the onset of PTS is based on the idea that if a marine mammal enters the PTS zone, then it is at risk of PTS, and the longer they remain in the zone, the higher the risk and the more severe the degree of PTS. Given that these marine mammals are considered transient visitors to the area, it is considered highly unlikely that they will remain inside the PTS zone for long periods.
3. The proposed MMOZ to be monitored will prevent any permanent hearing injury to these whales and dolphins, and Marine Mammal Observers will be encouraged to scan areas outside of the MMOZ as part of their protocol, meaning that individuals may be detected at greater distances.

Table 3. Summary of the estimated radius (m) of the Marine Mammal Observation Zones (MMOZ) for Permanent and Temporary Threshold Shift (PTS, TTS) for different marine mammal groups based on underwater acoustic propagation modelling and proposed piling activities with bubble curtain mitigation. Full details are provided in the CNMP (Marshall Day 2021). The indicated distances proposed to be implemented as the MMOZ for each group.

Marine mammal group	**PTS or TTS threshold**	**1500 mm piles**	**1200 mm piles**	**1050 mm piles**	**750 mm piles**	**710 mm piles**
		Impact piling	Impact piling	Impact piling	Impact piling	Impact piling
Low-frequency cetaceans (southern right whale, humpback whale)	PTS	100 m	120 m	90 m	< 50 m	< 50 m
High-frequency cetaceans (Hector's dolphin)	PTS	160 m	185 m	155 m	200 m	200 m
Mid-frequency cetaceans (orca, bottlenose dolphin, common dolphin)	TTS	< 50 m	55 m	< 50 m	< 10 m	< 10 m
Otariid pinnipeds (fur seals)	TTS	N/A	N/A	N/A	N/A	N/A

Based on the available data provided in Table 3 and, assuming that bubble curtain mitigation will be applied, the largest MMOZs that will need to be implemented will be 200 m. No MMOZs are required for pinnipeds as the estimated zones are less than 10 m. A zone of up to 500 m can be monitored by a single Marine Mammal Observer whereas any MMOZs larger than this will require at least two Marine Mammal Observers.

It is recommended that the following additional mitigations are applied to the MMOZ for Hector's dolphins, southern right whales, and humpback whales:

1. All efforts should be made by Marine Mammal Observers to regularly search areas further out from the designated MMOZ for these three species.
2. If any of these three species are seen, piling should be halted even if the individual appears outside of the designated MMOZ, as they are highly likely to be within the zone for TTS.
3. If a single sighting of any of these three species is made by the Marine Mammal Observer, either inside or outside the MMOZ, it would trigger a review of the MMMP. This should include a review of the MMOZ criteria with consideration given to potentially moving to a MMOZ based on TTS rather than PTS. While a review is triggered by a single sighting, the decision for moving to a TTS rather than PTS-based MMOZ should include the following factors:
   (i) number of individuals
   (ii) total number of sightings over time
   (iii) duration of sighting and length of time individuals are in the MMOZ and surrounding area
   (iv) type of sighting (e.g., large group, mother with calf), behaviour (e.g., travelling, resting, feeding, etc.)
   (v) other information (e.g., media reports of similar sightings in Wellington Harbour).

   If the decision is made to move to a TTS rather than PTS zone, then this is likely to require additional Marine Mammal Observers and resources (e.g., vessels for Marine Mammal Observers to cover the larger zone) for the period that the marine mammal is suspected to be in the area. A good example of such an event is the southern right whale called 'Matariki' that spent several days in Wellington Harbour in 2018. The decision to move to a TTS-based MMOZ should be temporary, and revision back to a PTS-based MMOZ should be triggered when there have been no further sightings in the area (e.g., no more sightings in the MMOZ or surrounding area (including media reports) for 48 hours).
4. The Marine Mammal Observer should also monitor media and social media[1] for any news or observations about marine mammals reported in Wellington Harbour.

[1] Potentially a protocol could be developed with the Department of Conservation who normally receive marine mammal sightings, who could pass them along to the Marine Mammal Observer. Other useful sources of

Any reports of any of the three species being present in Wellington Harbour, would trigger a review of the MMMP criteria and potentially lead to additional Marine Mammal Observer resources moving into standby for fast deployment.

Standard operation procedures for MMOZ

This section discusses several standard operation procedures that must be undertaken by contractors during piling activities to protect against any noise effects.

Marine Mammal Observer – The MMOZ will involve at least one dedicated Marine Mammal Observer scanning a defined radius of the water's surface and coastal shoreline around the construction area for the presence of any marine mammals prior to and during pile-driving activities. The presence of any marine mammal within the MMOZ would result in cessation of pile driving until the animal leaves the pre-determined zone. The Marine Mammal Observer associated with the pile-driving works will be familiar with the standard operating procedure and will document the process. A record is to be kept of all sightings, delayed start-up, or enforced shut-downs due to presence of marine mammals. Details of any shut-down event should be captured on the sighting form (see Appendix 1).

Pre-start procedure – Potential marine mammal presence should be visually monitored by the Marine Mammal Observer for at least 30 minutes before the commencement of the soft start procedure. Particular focus should be put on the MMOZ, but scanning should take place beyond the zone and up to a 1 km radius from the source where visibility allows. Observations should be made from the piling rig or a better vantage point if possible (i.e., in the absence of a high vantage point, a large observation zone may require an additional vessel as another observation platform to ensure complete coverage of the MMOZ).

Soft start procedure – Once 30 minutes of pre-start observations have been completed and no marine mammals have been seen within the MMOZ, soft start procedures may commence. If marine mammals have been seen within the MMOZ during the pre-start observations, then soft start procedures may commence if:

(i) all marine mammals have been observed to have moved out of the MMOZ, or
(ii) any marine mammals seen within the zone have not been seen to leave the MMOZ, but have not been seen for more than 30 minutes, or
(iii) marine mammals have been seen outside the MMOZ and are assessed as not being likely to enter the MMOZ during the pre-start procedure.

Once the soft start procedure is cleared to proceed, the piling impact energy is gradually increased over a 10-minute period. The soft start procedure should also be used after long breaks of more than 30 minutes in piling activity and where visual

information include the Facebook page of *Whale and dolphin watch – Wellington* which regularly post sightings of marine mammals in Wellington Harbour.

observations have ceased. Visual observations for marine mammals within the MMOZ should be maintained by the Marine Mammal Observer throughout soft starts. The soft start procedure may alert marine mammals to the presence of the piling rig and enable animals to move away to distances where injury is unlikely.

In some instances, such as pile testing which requires immediate full energy, soft starts will not be possible. Testing situations will only occur in optimal visibility conditions when the designated Marine Mammal Observer shall ensure that the exclusion zone has been closely monitored for 30 mins and that no mammals have been present in that period.

Normal operation procedure – If marine mammals have not been sighted within or are not likely to enter the MMOZ during the soft start procedure, piling may start at full impact energy. Marine Mammal Observer(s) should continuously undertake visual observations during all normal piling activities and shut-down periods. After breaks longer than 30 minutes in piling activity and where visual observations are not made or are hampered by poor visibility, the pre-start procedure should be used.

Standby operations procedure – If a marine mammal is sighted near the observation zone during the soft start or normal operation procedures, the operator of the piling rig should be placed on standby ready to shut down the piling rig. The Marine Mammal Observer should continuously monitor the marine mammal in sight.

Shut-down procedure – If a marine mammal is sighted within or about to enter the shut-down zone, the piling activity should be stopped immediately. If a shut-down procedure occurred and marine mammals have been observed to move outside the observation zone, or 30 minutes have lapsed since the last marine mammal sighting, then piling activities should recommence using the soft start procedure. If marine mammals are detected in the observation zone and poor visibility sets in, operations should switch to poor visibility procedures.

Post-piling observations – The Marine Mammal Observer(s) should maintain a watch of the MMOZ (and beyond) for up to 1 hour after pile-driving activity has ceased (or as long as daylight allows). In particular, observers are looking for any indication of marine mammal presence in the wider vicinity to evaluate the duration of effect that piling activities might be having on species.

Poor visibility procedure – Poor visibility is defined as sea fog (on the water surface), winds greater than ~20 knots and / or rain or sun glare that obstructs more than 50% of MMOZ. If these any of these conditions occurs to an extent that makes it too difficult for the Marine Mammal Observer to visually inspect the MMOZ for marine mammals, then piling activities should be postponed until conditions improve. If the MMOZ is prone to strong sea chop or afternoon sea breezes (i.e., wind greater than 20 knots), and this does not adversely affect piling operations, an additional Marine

Mammal Observer should be employed at a second observation location to ensure adequate coverage of the MMOZ. If, during periods of poor visibility, there are more than three shut-downs and / or delays to soft starts recorded due to marine mammals within the MMOZ, piling activities should be stopped for the remainder of the day.

Marine Mammal Observers

As many of the mitigation control measures are triggered by the sighting of a marine mammal, a key part of piling mitigation is having at least one Marine Mammal Observer on continuous watch from an elevated position near the pile-driving rig whenever pile driving is underway plus pre-start observations (constrained to daylight hours). The aim of the observers is to ensure that any marine mammals entering the wider project area are promptly identified and appropriate mitigation action is undertaken if necessary.

The Marine Mammal Observer has two general duties:

- detect, record, and report the presence of marine mammals within the wider operations area
- enforce mitigation measures including documenting any action taken (if necessary).

It is the responsibility of CentrePort as the Consent Holder to train and ensure that all staff or sub-contractors involved with noise generating activities understand and can implement the requirements of this MMMP. This induction should include basic information on the marine mammal species of interest and an understanding of the responsibilities of the Marine Mammal Observers and how they may affect piling operations (e.g., standby and shut-down procedures).

The level of Marine Mammal Observer training necessary is determined by the species of interest present (i.e., endangered or threatened) and the type and nature of the piling activity being undertaken. For this project, Marine Mammal Observers do not need to be a formally qualified Marine Mammal Observer under the Department of Conservation's (DOC) observer standards and training for the Code of Conduct for Seismic Surveys[2], as can be the case for some piling consents. Any person, including port or contractor staff[3], iwi, community members or students can be inducted and trained to undertake the role of as a dedicated Marine Mammal Observer on this project. However, these project Marine Mammal Observers must be formally trained by a Marine Mammal Specialist (preferably a Marine Mammal Observer trained or qualified under Code of Conduct for Seismic Surveys and with experience in pile-

[2] As defined by the DOC's observer standards and training for the Code of Conduct for Seismic Surveys e.g., a person who has passed a DOC approved training course under the Code.
[3] Several New Zealand Port companies and contractors already have staff that have undergone Marine Mammal Observer training specifically for pile-driving activities through Blue Planet Marine.

driving activities). After completing and passing training, trainees can then operate as a dedicated Marine Mammal Observer for this project only.

The training will include, but is not limited to:

a. types of marine mammals likely to be present in the area and how to identify them
b. search and scanning protocol and methods to be used including poor visibility protocols
c. the estimation of distance to a sighting
d. marine mammal behaviours
e. measures to be taken if marine mammals are sighted
f. reporting requirements
g. health and safety requirements specific to undertaking the observations.

When undertaking observing duties, the Marine Mammal Observer will need to be dedicated to the role. Where required, the Project Manager will ensure appropriate training is given to other relevant project personnel (i.e., site supervisors, project engineers, etc.) whenever new piling personnel start work on the project.
Through its normal inspection and validation procedures, CentrePort and / or the Contractor will undertake periodic audits of the performance, qualifications, and effectiveness of the Marine Mammal Observer. The CentrePort / Contractor personnel undertaking the audit(s) should consider using an experienced Marine Mammal Specialist.

Recording of marine mammal sightings

The Marine Mammal Observer(s) must visually monitor the pre-determined area of the MMOZ as well as scanning the wider area around the operation. Each observer will have electronic and / or hard copies of the *Marine Mammal Sighting* and *Marine Mammal Observer Watch* forms (Appendix 1 and Appendix 2) with them at all times.

When a marine mammal is sighted, the following information will be recorded on the sighting form sheets at a minimum:

- What species of marine mammal is sighted?
- Date and time the marine mammal is sighted
- At what stage of piling operations is the marine mammal sighted (e.g., pre-start, soft start, normal operation, standby operation, shut-down or post operations)?
- At what approximate distance is the marine mammal visible?
- Heading and distance from the piling operation (if appropriate)
- Direction in which the animal is travelling
- If the marine mammal is present while the pile-driving operation changes, what is its reaction (e.g., does it immediately leave, does it leave and return, does it stay)?

- Short description of the animal(s) and their behaviour
- Mitigation action taken if any
- Observer name and location of observation position
- Photographs and video footage are recommended to be collected
- Local weather conditions and sea state.

The following reporting procedures will be undertaken for all Marine Mammal Observers collected data:

- Marine Mammal Observer data summary and sighting forms to Project Manager (weekly)
- overall data summary, sighting, and watch forms to Project Manager within one month of completion of the piling work
- immediate notification (via phone) to CentrePort Project Manager of any breach of these standard operating procedures with a full written report within 24 hours
- the Marine Mammal Observer's data are available to GWRC, HVCC and the DOC upon request.

3.1.2. Controls to minimise the effects of underwater noise

In addition to adhering to the best practical option for noise emissions, the development of best management practices will help further minimise the possible attraction or avoidance of marine mammals to Seaview Wharf and the project area. The associated reporting measures will allow the site manager to adjust any operations or mitigation to ensure that the complete behavioural abandonment of harbour waters by these species during or after pile-driving activities is avoided.

Operational Best Management Practices for vessel(s) / piling gear

To minimise the attraction (or abandonment) of marine mammals to Seaview Wharf and the project area, the Contractor will follow several operational management practices aimed at minimising any attraction. These practices include:

- crew members are not permitted to carry out activities that could attract marine mammals to the project site (e.g., fishing) or feeding other wildlife (e.g., birds, fish)
- minimising above-water and underwater noise to reduce the attraction of marine wildlife
- all in-water equipment and vessels will be regularly maintained with proper upkeep (e.g., lubrication and repair of winches, generators) to reduce the production of underwater noise
- ensure that all noise suppression equipment, such as mufflers and ventilation baffles are maintained in good working order
- use only the minimal amount of artificial lighting necessary to reduce attraction of prey fish and predators

- adherence to best boating guidelines around marine mammals is practiced to by any project vessels to minimise any avoidance responses (see Section 3.2.1 for more details).

Regular maintenance records should be kept up-to-date and available for GWRC, HVCC or DOC to review upon request.

3.2. Controls to avoid and minimise other effects

Other potential effects of this project on marine mammals include boat strike (if boats are being used) and entanglement. While the likelihood of both effects is considered to be very low, the consequences could be serious for an endangered species if the interaction resulted in a mortality. As a result, the general principle guiding vessel and equipment operations will be to avoid, as far as practicable, any interaction with marine mammals. To achieve this, a number of operational control procedures for vessels and equipment shall be implemented.

3.2.1. Controls to avoid and minimise the effects of boat strike

The Marine Mammals Protection Regulations 1992 list the conditions governing behaviour around marine mammals. All seals, sea lions, dolphins and whales are protected under the Marine Mammals Act (see Section 2.3). Vessels in the vicinity of a marine mammal will (with the exception of emergency situations) adhere to the following DOC general guidelines:

- Approach whales and dolphins from behind and to the side as shown in Figure 1
- Do not circle them, obstruct their path, or cut through any group
- Keep *at least* 100 m from whales (or 200 m from any large whale mother and calf or calves) and 50 m from dolphins and pinnipeds
- Do not encourage bow riding by marine mammals. Should any marine mammal(s) commence bow riding in front of a vessel, the vessel master will not change course or speed suddenly
- Ensure that vessels travel no faster than idle or ‘no wake’ speed within 300 m of any marine mammal
- Idle slowly away. Speed may be gradually increased to out-distance dolphins.

During transiting of any construction vessels, the following specific interaction guidelines are suggested in addition to the general DOC guidelines listed above:

- If a whale or dolphin is sighted, but not directly in the path of the vessel:
  - Keep boat speed constant and / or slow down while maintaining current direction
  - Avoid any abrupt or erratic changes in direction

- Maintain or resume normal operating speeds once well way from animals.

- If a whale is sighted directly in the path of the vessel:
  - If the whale is far enough ahead of the vessel (e.g., > 500 m) and can be avoided, slow to 'no-wake' if necessary and maintain a straight course away from the immediate sighting area (where practicable)
  - If the whale is too close to the vessel and cannot be avoided, immediately place the engine in neutral and allow the boat to drift to one side of the sighting area where practicable (do not assume the whale will move out of the way)
  - Avoid any abrupt or erratic changes in direction while at speed
  - Once the whale has been re-sighted away from the vessel, slowly increase speed back to normal operation levels.
- If a dolphin(s) is sighted directly in the path of the vessel:
  - Keep boat speed constant and / or slow down while maintaining a course slightly to one side of the group and do not drive through the middle of a pod
  - Avoid any abrupt or erratic changes in direction
  - Maintain or resume normal operating speeds once well way from animals.
- If a dolphin approaches an underway vessel to bow-ride or ride the stern wave:
  - Keep boat speed constant and / or slow down while maintaining course
  - Avoid any abrupt or erratic changes in direction
  - Do not drive through the middle of a pod
  - Maintain or resume normal operating speeds once well way from animals (> 500 m).

Any marine mammal sightings and subsequent interactions (i.e., physical contact between an animal and project equipment / gear) needs to be recorded and additional details of the interaction noted on a sighting form (Appendix 1).

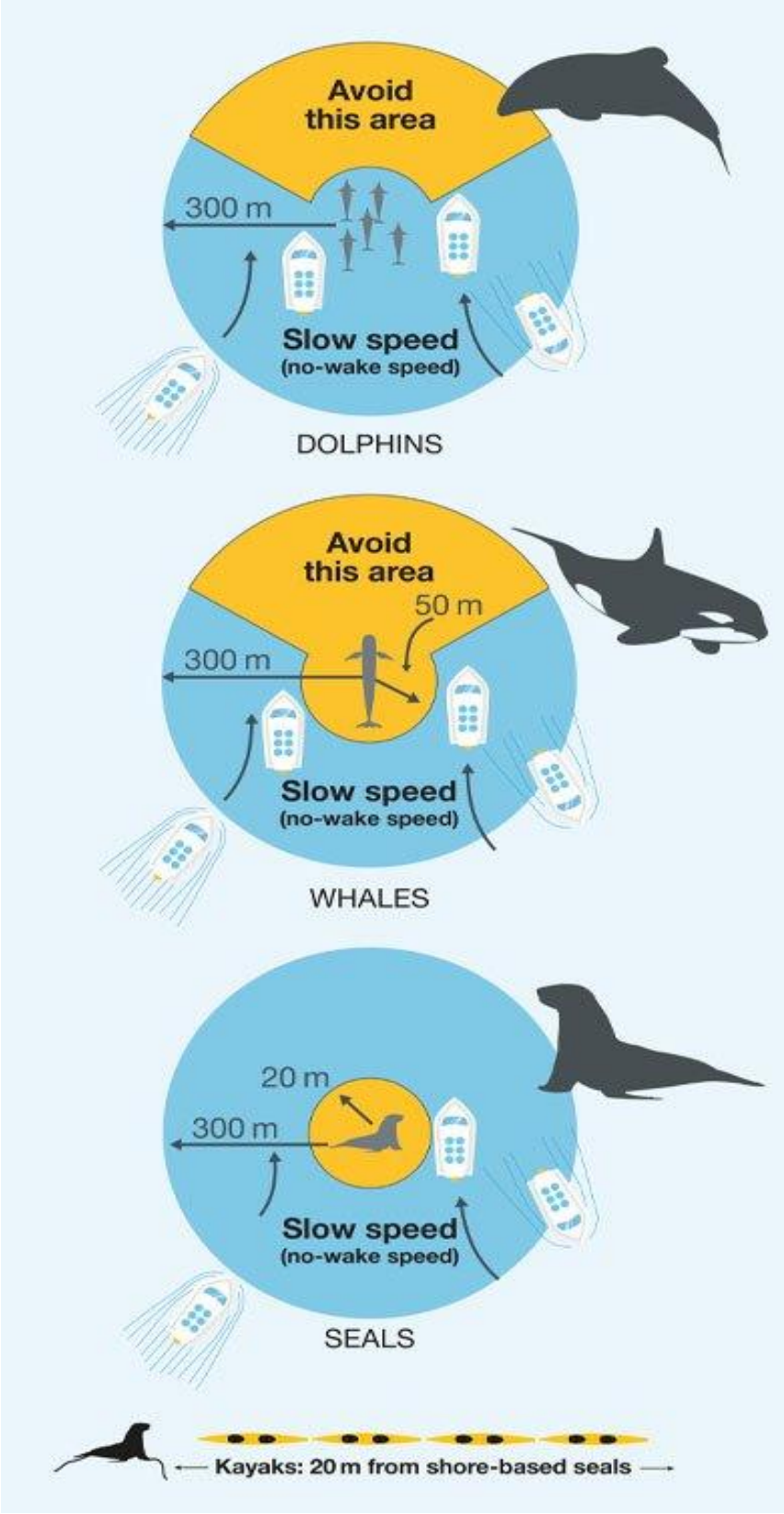

Figure 1. DOC guidelines for vessel interactions when approaching, manoeuvring, and passing by marine mammals.

3.2.2. Controls to avoid and minimise entanglement effects

To avoid the risk of entanglement to any marine mammals, all support vessels and other in-water or near-water project activities shall have waste management plans in place prior to the commencement of works. Waste management shall, at a minimum, include:

- avoiding use of any looping lines or net-like material
- slack or free-floating lines or nets should be avoided where practicable
- any lines or nets to be kept under tension
- proper disposal, and secure storage of plastics and other wastes, especially in higher wind conditions.

If silt curtains are used for erosion and sediment controls, extra care is needed to ensure that they are installed properly and, in a manner, so as not to be an entanglement hazard for marine mammals (e.g., no billowing or single access points in which marine mammals cannot escape). Daily checks of project silt curtains for any entangled wildlife will be undertaken for the duration of their instalment.

Any marine mammal sightings and subsequent interactions (i.e., physical contact between an animal and project equipment / gear) need to be recorded and additional details of the interaction noted on a sighting form (Appendix 1).

Table 4. Control measures to mitigate or minimise the risk of any adverse effects of construction activities on marine mammals. DOC = Department of Conservation.

Potential effects	Mitigation goal	Best Management Practice	Reporting / monitoring
Behavioural and / or physical responses to underwater sound from pile-driving activities	1. Minimise the avoidance (attraction) or potential for injury of marine mammals to pile-driving activities.	1a. Establish a Construction Noise management plan. 1b. Regular maintenance and proper upkeep of all equipment (e.g., lubrication and repair of winches, generators). 1c. Establish designated marine mammal observation zones and use dedicated marine mammal observer on site to maintain a watch before and during any pile-driving activities. 1d. Adoption of soft-start procedures and choose plant / techniques on the basis of best practical option. 1e. Avoid spreading piling over successive seasons.	• Measure actual underwater noise levels from pile-driving activities and adjust any modelling results and mitigation zones based on these data, if necessary. • Record and report the type and frequency of any marine mammal sighted before and during pile-driving activities. Include behavioural data if possible. • All marine mammal sightings should be reported to DOC for input to their national database.
Marine mammal boat strike or entanglement in operational gear and / or debris	2. Minimise any interactions and aim for zero mortality.	2a. Adoption of best boating guidelines for operating any project vessels, and equipment, in the presence of any marine mammals. 2b. Avoid loose rope and / or nets (i.e., keep all ropes and nets taut). 2c. Ensure that all support vessels and other project activities have waste management plans in place before the commencement of works.	• Record all sightings (including any interaction with project vessels or equipment), entanglement incidents or near incidents regardless of outcome (e.g., injury or mortality). • In case of a fatal marine mammal incident, carcass(es) recovered and given to DOC, and further steps taken in consultation with DOC to reduce the risk of future incidences.

4. REPORTING AND COMMUNICATION

4.1. Reporting requirements

The reporting requirements associated with the MMMP are discussed below and summarised in Table 5 with timeframes. Regular updates and reviews of reporting measures will allow the CentrePort Project Manager and Contractor to adjust mitigation where necessary to manage any risk of impacts on marine mammals. Using these recorded data, CentrePort (or an independent marine mammal expert) will regularly review recorded shut-down events and / or incidents and determine whether there is any pattern(s) in terms of the number and / or nature of reported shut-down events as indicated in Section 1.3. Where an assessment indicates that there are potential areas for improvement, CentrePort shall:

- identify whether any change needs to be made to piling methods or operational procedures in order to further reduce noise levels or interactions; and / or
- consider whether it should engage an independent expert to help review the MMMP.

Within 6 months of the completion of all piling activities, a summary report will be prepared that summarises all Marine Mammal Observer data and shut-down events to help inform CentrePort for any future piling works.

Table 5. Report requirements for marine mammal and pile-driving activities. DOC = Department of Conservation; GWRC = Greater Wellington Regional Council; HVCC = Hutt Valley City Council.

Information	Timeframe
Noise verification data collated and reported to Project Manager, GWRC, DOC, and iwi if requested.	Measurements undertaken within 2 weeks of piling commencing and report on measured noise levels provided within 4 weeks of piling. Provide relevant reports to DOC within two weeks of providing to GWRC
Marine mammal observation sheets and sighting forms collated and provided to the Project Manager	Weekly
Notification to Project Manager of any breach of standard operating procedure	Immediate notification (via phone) to Project Manager with a full written report within 24 hours.
Collated marine mammal observation and sighting data to CentrePort and GWRC	Quarterly
Any incidents involving the injury or mortality of a marine mammal by a project vessel or equipment	Recorded on incident form and reported to the DOC's hotline or Wellington office immediately with written report as soon as is practicable within 24 hours.
Reporting to Project Manager if there are two or more Hector's dolphins sighted within 7 days	Reported immediately. Project Manager to review data and consider if any amendments may be appropriate to the mitigation proposed in the MMMP.
Summary report	Within 6 months of completing piling activities

4.2. General communications for marine mammal issues

A two-way liaison with DOC shall be established for exchange of real-time / recent sighting information on marine mammals (i.e., Hector's dolphin, whales, and orca) in the wider Wellington Harbour region throughout the project. This will allow project managers to anticipate and mitigate potential interactions with any species sighted in and near the project area.

In addition, the Port shall collate and, on a quarterly basis, share any observer sighting data with DOC.

Contact persons and contact details

Contact person (DOC): XXXX, Department of Conservation Ranger;
Email XXXX Ph. XXXX

Contact person (CentrePort): XXXX, CentrePort Project Manager;
Email XXXX Ph. XXXX

4.3. Incident reporting

Any incidents involving the injury or mortality of a marine mammal by a project vessel or equipment shall be reported to the DOC hotline or Wellington DOC office as soon as is practicable within 24 hours.

Any incident that results in marine mammal injury or fatality will be documented using the incident reporting form (see Appendix 3). Incident details shall include as much information as possible relating to incident (e.g., date, time, weather conditions [visibility, sea state, etc.], vessel location, speed, activity, etc.). Any details of the marine mammal (e.g., species, group size) and its behaviour before, during and after the incident shall also be recorded. If practicable, video or photos should be taken. Information will be used to inform future incidences and how they could be avoided.

5. REFERENCES

Boffa Miskell Limited 2021. Seaview Wharf renewal: application for resource consent and assessment of environmental effects to undertake renewal works. Report prepared by Boffa Miskell Limited for CentrePort Ltd.

Childerhouse S 2020. Marine mammals in Wellington Harbour. Prepared for CentrePort Ltd. Cawthron Report No. 3536. 18 p. plus appendix. October 2020

Childerhouse S 2021. DRAFT CentrePort Seaview Wharf renewal - assessment of environmental effects on marine mammals. Prepared for CentrePort Ltd. Cawthron Report No. 3651. 22 p. plus appendix.

Marshall Day Acoustics 2021. Seaview renewal works construction noise management plan. Report for CentrePort Ltd. Report number: Rp 001 r02 20210175. 12 April 2021. 25 p.

NOAA (National Oceanic and Atmospheric Administration) 2018. Technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing: underwater acoustic thresholds for onset of permanent and temporary threshold shifts. U.S. Dept. of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-55. 178 p.

6. APPENDICES

Appendix 1. Marine mammal sightings form.

<table>
<tr><td>Date</td><td colspan="2">Pile driver type / name</td><td>Pile number</td><td>Time at start of encounter</td><td>Time at end of encounter</td></tr>
<tr><td colspan="2">Observer name</td><td colspan="2">Location / position on land</td><td colspan="2">Water depth (metres), Beaufort, glare:</td></tr>
<tr><td colspan="2">Species</td><td colspan="2">Bearing / angle to animal (when first sighted)</td><td colspan="2">Distance to animal (when first sighted)</td></tr>
<tr><td colspan="2" rowspan="2">Description (include features: size, colour and pattern, shape and position of dorsal fin, direction, and shape of blow)</td><td colspan="2">Total number</td><td colspan="2">Number of adults</td></tr>
<tr><td colspan="2">Number of juveniles</td><td colspan="2">Number of calves</td></tr>
<tr><td colspan="4" rowspan="2">Behaviour (at start of sighting and any changes observed relative to changes in pile driving activity)

(Feeding, resting, travelling, socialising, breaching, bowriding etc. – see reference sheets)</td><td colspan="2">Photograph taken

Y N</td></tr>
<tr><td colspan="2">Direction of travel (compass)

N S
NE SW
E W
SE NW
variable stationary</td></tr>
<tr><td colspan="2">Direction of travel (relative to platform)
Towards
Away
Parallel (east or west direction)
Variable
Stationary
Other (explain)</td><td colspan="2">Piling activity at first animal detection

Normal
Soft start
Pre-start
Post-observation
Standby
Shut-down</td><td colspan="2">Piling activity at last animal detection

Normal
Soft start
Pre-start
Post-observation
Standby
Shut-down</td></tr>
<tr><td rowspan="2">Time animals entered mitigation / exclusion zone</td><td colspan="3">Action taken
None required
Delayed start
Standby
Shut down</td><td rowspan="2">Time animals left mitigation/exclusion zone</td></tr>
<tr><td colspan="3">Length of time mitigation employed</td></tr>
</table>

Appendix 2. Marine mammal observer watch form.

Observer name and location:

Observer watch start / end times:

							Pre-start Obs			Soft Start Obs			Normal Operation			Post-Observation		
Pile Number	**Observer initials**	**Date**	**Observer Watch Start Time**	**Observer Watch End Time**	**Piling Start Time**	**Piling End Time**	**Start time**	**End time**	**Mammals sighted (Y/N)**	**Start time**	**End time**	**Mammals sighted (Y/N)**	**Start time**	**End time**	**Mammals sighted (Y/N)**	**Start time**	**End time**	**Mammals sighted (Y/N)**

* A form should be recorded for all watches even if no marine mammals are seen.

** Start a new line for each new start-up of pile driver.

Appendix 3. Marine mammal incident reporting form. Any interactions with marine mammals (minor contact to collision) shall be recorded into a tabulated format as shown below.

INCIDENT REPORTING FORM

Date	Time	Incident Location on Vessel or Gear (description; port, bow, propeller)	Position		Vessel type, activity, and speed at time of incident and any subsequent responses	Species ¥	No. of animals involved	Animal(s) activity before incident and after #	Description of any injury or mortality	Observer/ reporter	Additional comments (e.g., weather and sea conditions)
			Latitude (northing	Longitude (easting)							

¥ Using a species guide such as Baker (1999) Whales and dolphins of New Zealand and Australia, or https://www.doc.govt.nz/globalassets/documents/conservation/native-animals/marine-mammals/whale-id-flip-cards-web.pdf.

Feeding, resting, travelling, socialising, breaching, bowriding etc. (e.g., see IFAW and AHP (2005]).