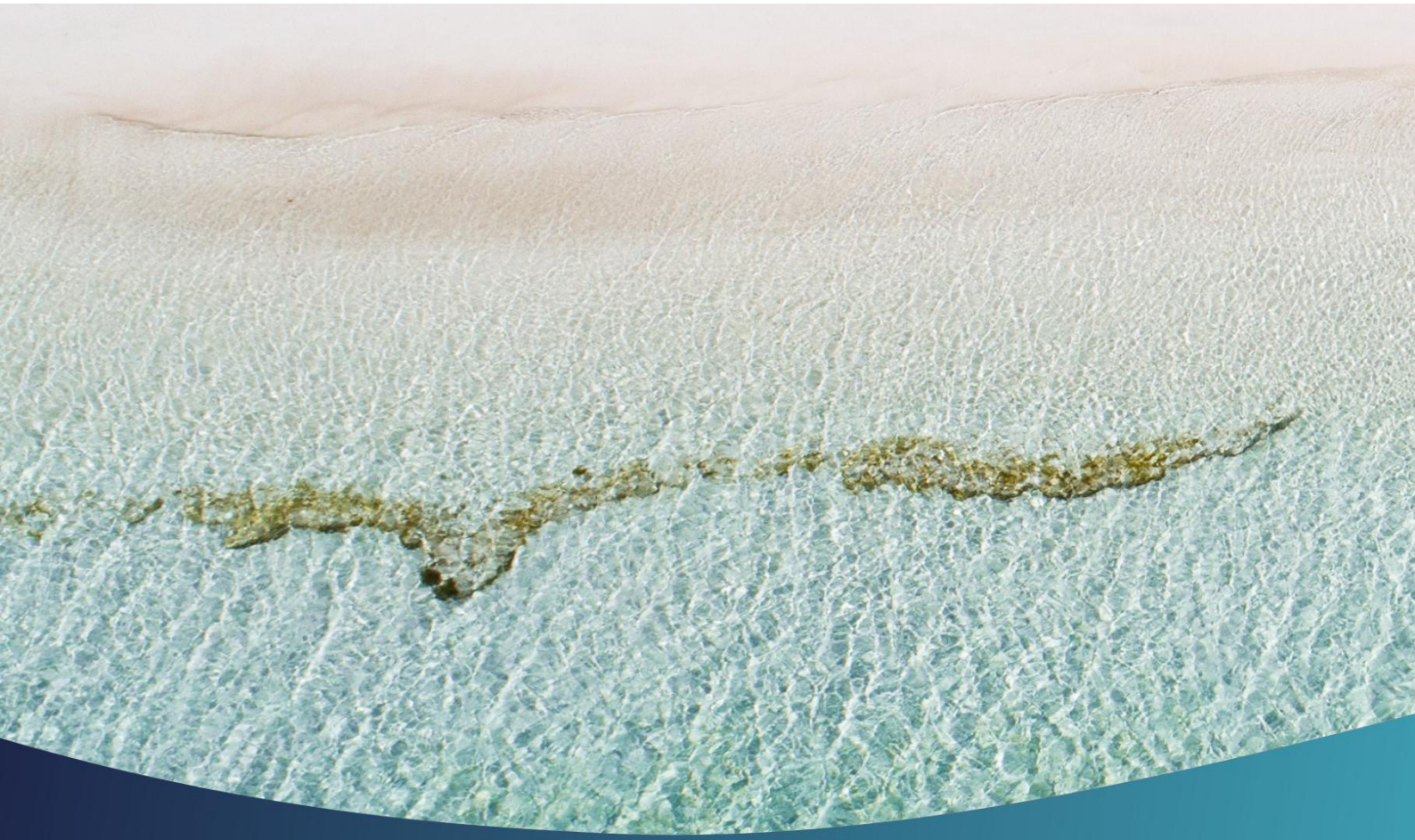
Construction Environmental Management Plan

South Thomson Barge Landing Development

ENVIRONMENT
An O2Marine company



CLIENT: Rottnest Island Authority

STATUS: Rev 0

REPORT NUMBER: R250026

ISSUE DATE: 6 March 2025

MARINE

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Important Note

Maps are created in WGS 84 - Pseudo-Mercator (EPSG:3857) coordinate reference system and are not to be used for navigational purposes. Positional accuracy should be considered as approximate.

Acknowledgement Of Country

In the spirit of reconciliation O2 Marine Pty Ltd acknowledge that this project is proposed on the lands of the Whadjuk Noongar People. We pay our respects to Elders past, present and emerging and recognise their continuing connection to land, sea, culture and community.

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Version Register

Version	Status	Author	Reviewer	Comments	Authorised for Release (signed and dated)
Rev A	Draft	N Claydon B Campbell	G Motherwell (O2M)	Draft review	G Motherwell 14/2/2025
Rev B	Draft	N Claydon B Campbell	A Vlok (Emerge)	Draft review	N Claydon 14/2/2025
Rev 0	Final	B Campbell	N Claydon G Motherwell	Final Issued for Use	N Claydon 6/3/2025

Transmission Register

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Acronym Table

Acronyms/Abbreviation	Description
ACH	Aboriginal Cultural Heritage
ASS	Acid Sulfate Soil
BAT	Best Available Technologies
BC Act	Biodiversity Conservation Act
BCH	Benthic Communities and Habitat
BHD	Backhoe Dredge
BoM	Bureau of Meteorology
BTEX	benzene, toluene, ethyl-benzene and xylene
CEMP	Construction Environmental Management Plan
DBCA	Department of Biodiversity Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DE	Development Envelope
DEMMP	Dredging Environment Management and Monitoring Plan
DoEE	Department of Energy and Environment
DoT	Department of Transport
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands and Heritage
DMIRS	Department of Energy, Mines, Industry Regulation and Safety
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EIL	Ecological Investigation levels
EPA	Environmental Protection Authority
EP Act	Environmental Protection Act 1986
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPO	Environmental Protection Outcomes
ESL	Ecological Screening Levels
GPS	Global Positioning System
Habitat	Ha
HIL-A	Health Investigation Levels for residential soil access
HSE	Healthy Safety and Environment
IMP	Introduced marine pests
The Island	Wajemup/Rottnest Island
Km	Kilometre
LAU	Local assessment unit
LoR	Limit of Reporting
m	Metre

Acronyms/Abbreviation	Description
MARPOL	International Convention for the Prevention of Pollution from Ships
MCEMP	Marine Construction Environmental Management Plan
MEER	Maritime Environmental Emergency Response
MEQ	Marine Environmental Quality
MFO	Marine Fauna Observer
MNES	Matters of national environmental significance
MT	Management Targets
MWQMP	Marine water quality monitoring program
NAGD	National Assessment Guidelines for Dredging
NATA	National Association of Testing Authorities
NTC	Native Title Claimant
NTU	Nephelometric Turbidity Units
PAH	polycyclic aromatic hydrocarbons
PFAS	per- and poly-fluoroalkyl substances
PM	Project Manager
POLREP	Pollution Report Form
The proposal	The South Thomson Barge Landing development
PTS	Permanent Threshold Shift
RIA	Rottnest Island Authority
ROLO	Roll On Roll Off
TMF	Tiered Management Framework
TRH	total recoverable hydrocarbons
TSS	Total Suspended Solids
TTS	Temporary Threshold Shift
UXO	Unexploded Ordnance
WA	Western Australia
ZoHI	Zone of High Impact
ZoI	Zone of Influence
ZoMI	Zone of Moderate Impact

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1. Introduction

The Rottnest Island Authority (RIA) (the Proponent) is intending to redevelop an area of South Thomson Bay to provide a barge landing for commercial marine and barge services. The South Thomson Barge Landing development (the Proposal) will consist of the construction of a laydown area and breakwater/groyne extension which involves dredging, construction of the laydown using the dredged material and piling for the jetty. A summary of the Proposal is given in Table 1.

Table 1: Summary of the proposal

Proposal title	South Thompson Barge Landing Development
Proponent name	Rottnest Island Authority
Short description	The Rottnest Island Authority is proposing to develop the South Thomson Barge Landing Development at the existing Army Groyne in South Thompson Bay. The proposal will be primarily used for barge operations, which will be relocated from the existing ferry terminal at central Thompson Bay to the proposed location at South Thompson Bay. This will separate barge operations from public passenger transfer activities and ease congestion at the ferry terminal.

Wadjemup (Rottnest Island) is located approximately 20 km west of the port of Fremantle in Western Australia (WA). It is an A-class reserve of ecological, cultural and social significance. It is a world-renowned tourist attraction with over 780,000 visitors annually. Most visitors travel by ferry, though many can travel by private vessel or even by small plane. There are limited short stay accommodation, and a very small resident population. The Proposal will be located at the existing Army Groyne less than 1 kilometre (km) south of the existing ferry terminal, where the cargo barges are berthed currently. The Rottnest Island Master Plan highlighted the need to improve functionality and efficiency of transporting bulk cargo to and from Rottnest Island, reduce noise levels for residents and to improve safety and amenities for visitors. It is proposed that redeveloping the Army Groyne will achieve this, by converting it into a barge landing, freight handling and associated storage area.

1.1. Proposal description

The construction of the barge landing will be undertaken in two stages, Stage 1 involving the marine infrastructure and Stage 2 involving the onshore infrastructure and ferry berth.

Key activities involved in the Stage 1 works include:

- Mobilisation and setup: installation of site sheds and preparation of laydown areas. This includes mechanical clearing of vegetation and cut and fill/leveling of adjacent dune.
- Dredging: an estimated 14,000 m^3 of sand and 2,107 m^3 of rock will be dredged using a backhoe dredge (BHD). Dredged material will be placed onto a flat top barge and then taken off by excavator to a Roll On Roll Off (RORO) facility at the existing Army Groyne until construction of the laydown area and wharf structure commences.
- Reclamation: a laydown area shall incorporate the reclaimed dredged fill material. Bunding will be constructed along the eastern and northern side of the reclamation zone to allow dredge spoil to settle and remain in place. The bunding is to prevent dredge spoil from being washed away into the marine environment by waves or during high tides.

- Construction: on completion of the reclamation works, construction and upgrade of the army groyne will take place, in addition to marine infrastructure which will include piling (barge landing ramp), underground services infrastructure (electrical, water, fuel) road works, storage shed, and finally a demobilisation process to ensure and debris on the seabed has been removed.

Key activities involved in the Stage 2 works include:

- Ferry berth: includes the installation of piles, precast concrete deck and surface, and the installation of the wharf with fenders, fender chains, mooring bollards, signage, lighting and other relevant marine infrastructure
- Small craft landing works: includes installation of piles, abutment, floating deck units and navigational aids
- Storage building installation: installation of storage building.

It is anticipated that the Proposal will commence in 2026, during day light hours only.

The Proposal location with construction footprint and development envelope is shown in Figure 1.

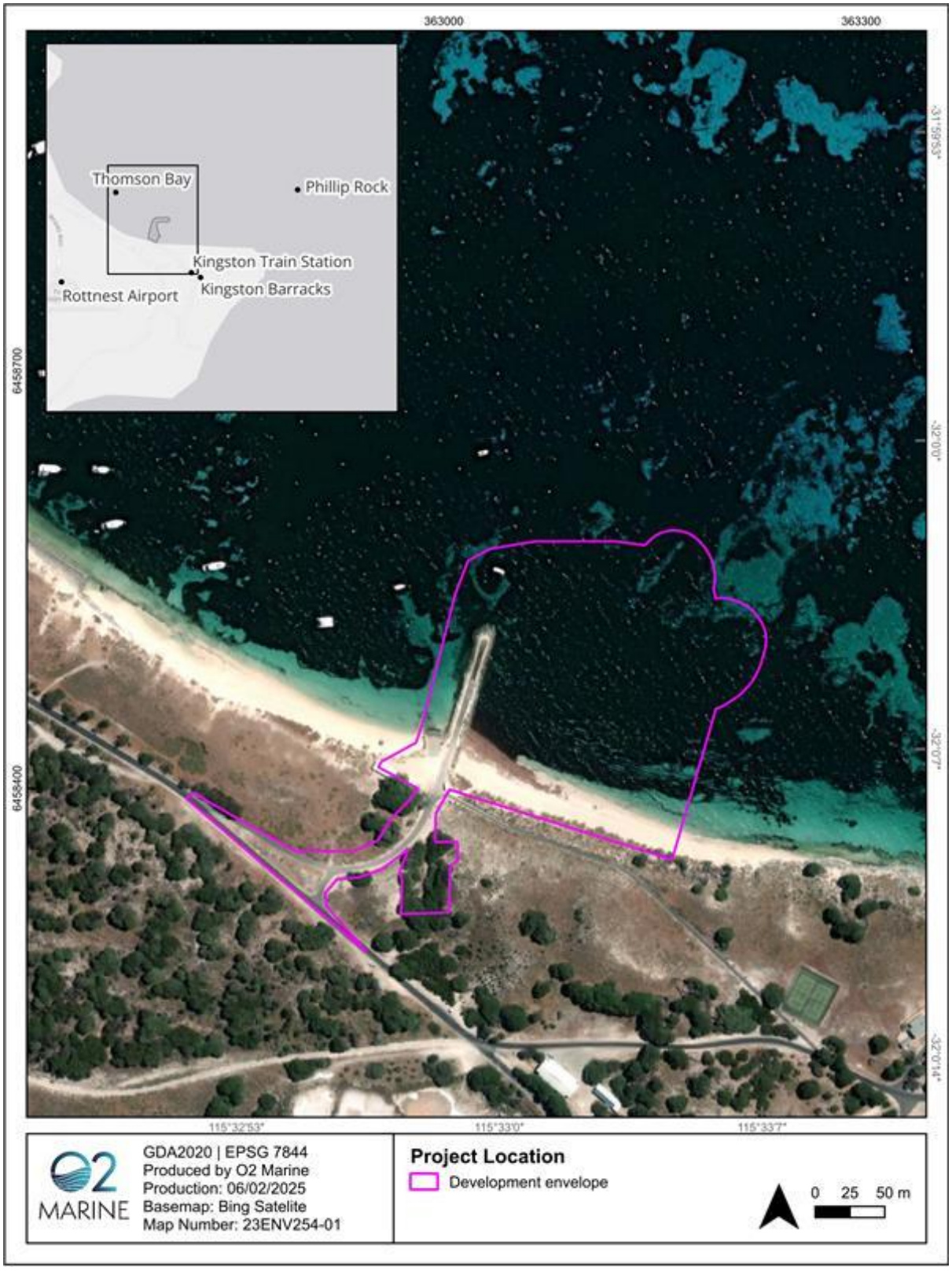

Figure 1: Proposal development envelope overview

1.2. Purpose of this plan

The purpose of this Construction Environmental Management Plan (CEMP) is to ensure that potential environmental impacts resulting from construction activities are effectively mitigated and to assign appropriate management targets and management actions. Dredging and disposal are not included in this plan but will be managed under a Dredge Environmental Monitoring and Management Plan (DEMMP; O2 Marine 2025).

This CEMP has been prepared for inclusion in the environmental referral documents to the Western Australian Environmental Protection Authority (EPA) for the approval of the Proposal. This CEMP outlines the framework for the construction activities including:

- Legislation and regulations that apply to the construction program
- Overall management framework
- The areas where construction and piling are to occur
- Environmental values to be protected, the risks that these activities may pose, and the mechanisms to be implemented to mediate these risks (management strategies)
- Responsible parties
- Monitoring and reporting
- Consultation.

This CEMP is a live document and may be updated to reflect the needs of the Proposal. The revision process is also included in this document.

This CEMP is also to be read in conjunction with the other management plans for the Proposal, namely:

- DEMMP – addressing the management of dredging activities of the Proposal
- Operations Environmental Management Plan – addressing the management of operations activities of the Proposal.

1.3. Definitions

For the purpose of this CEMP, the following definitions are to be used throughout the document:

- Construction: the overall construction including Stage 1 and Stage 2 works. This includes the marine and terrestrial components.
- Marine Construction: dredging, piling, rock dumping and reclamation works within the marine environment.

As mentioned in Section 1.2, there is a DEMMP specifically for dredging and therefore the potential impact pathways, monitoring and management for dredging activities is not included in this CEMP. Marine environmental quality and benthic communities and habitat (BCH) monitoring and management for marine construction is also included in the DEMMP, however any additional requirements during non-dredging periods (and for other environmental factors such as marine fauna during piling) is included within this CEMP. Therefore, during marine construction periods, both management plans should be read in conjunction with each other.

1.4. Environmental objectives

The specific objectives of this CEMP are aligned with the relevant environmental objectives presented within the EPA's statement of principles, environmental, factors, objectives and aims of EIA, which are summarised below and explained in greater detail in Section 4 (EPA 2021a):

- Benthic communities and habitats: to protect BCH so that biological diversity and ecological integrity are maintained.
- Marine environmental quality: to maintain the quality of water, sediment and biota so that environmental values are protected.
- Marine fauna: to protect marine fauna so that biological diversity and ecological integrity are maintained.
- Flora and vegetation: to protect flora and vegetation so that biological diversity and ecological integrity are maintained.
- Terrestrial fauna: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
- Social surroundings: to protect social surroundings from significant harm.

1.5. Legislation, regulations and guidelines

The potential environmental impacts of the Proposal will be assessed at Commonwealth, State and Local Authority level with each Authority providing guidance on the level of assessment required. This CEMP was developed with consideration of those approvals and with the following legislation and guidelines.

1.5.1. State

- *Environmental Protection Act 1986* (EP Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Port Authorities Act 1999*
- Navigable Waters Regulations 1958
- Shipping and Pilotage (Port and Harbour) Regulations 1967
- *Western Australian Marine Act 1982*
- *Pollution of Waters by Oil and Noxious Substances Act 1987*
- *Marine and Harbours Act 1981*
- *Environmental Protection Act 1986*
- *Environmental Protection Regulations 1987*
- *Fisheries Resource Management Act 1994* (relevant to Introduced Marine Pests)
- Western Australia Environmental Protection Authority - Instructions on how to prepare Environmental Protection Act 1986 Part IV Environmental Management Plans (EPA 2021a)
- Western Australia Environmental Protection Authority Technical Guidance - Assessment Guidelines of Marine Dredging Proposals (EPA 2021b)
- Western Australia Environmental Protection Authority Technical Guidance - Protecting the Quality of Western Australia's Marine Environment (EPA 2016a)

- Western Australia Environmental Protection Authority Technical Guidance – Protection of Benthic Communities and Habitats (EPA 2016b).

1.5.2. Commonwealth

- *Environment Protection and Biodiversity Conservation Act (1999)* (EPBC Act)
- *Environment Protection (Sea Dumping) Act 1981*
- *Protection of the Seas (Prevention of Pollution from Ships) Act 1983*
- *Biosecurity Act 2015*
- Biosecurity Regulations (2016)
- Australian Ballast Water Management Requirements Version 7 2017
- National Water Quality Management Strategy (Commonwealth of Australia 1992).

1.6. Approvals background

Environmental Protection and Biodiversity Conservation Act 1999

RIA referred the Proposal to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) in late 2024 within consideration to the relevant matters of national environmental significance (MNES) for this proposal including:

- Listed threatened species and communities (sections 18 and 218A)
- Listed migratory species (sections 20 and 20A)
- The world heritage values of a declared world heritage property (sections 12 and 15A)
- The heritage values of a national heritage place (sections 15B and 15C)
- Commonwealth land (section 26 and 27A).

On 16 January 2025 the DCCEEW decided the Referral was “not a controlled action” and therefore did not require further approval under the EPBC Act. The Proposal is currently being assessed by the EPA as described below.

Environmental Protection Act, 1986 Part IV

The Proposal was referred to the EPA for assessment on 23 August 2024 and decision on whether to assess the proposal was provided on 13 September by the EPA. It was determined that the Proposal would be assessed at the level of ‘Referral Information with additional information’ (required under s.40(2)(a) of the EP Act) with public review.

The environmental factors include:

- Benthic communities and habitat
- Coastal processes
- Marine environmental quality
- Marine fauna
- Flora and vegetation
- Terrestrial fauna
- Social surroundings

- Other factors.

In 2023 the RIA met with the WA EPA to discuss referral of the Proposal. Following this meeting the RIA recommenced the Proposal, and as such the following studies have been recently completed to progress environmental approvals:

- Terrestrial flora and fauna survey of the onshore area
- Benthic habitat assessment of the marine development area and surrounds
- Marine fauna desktop assessment of the marine development area and surrounds
- MNES assessment
- Dredge plume modelling
- Coastal processes assessment
- Baseline water quality monitoring.

Environmental Protection Act, 1986 Part V

A works approval and operating licence for the proposal may be required under the EP Act Part V. The following items will be assessed, and management provisions assigned:

- Noise emissions
- Air emissions
- Wastewater disposal
- Solid waste disposal.

1.7. Port governance

RIA is the responsible authority over the marine jetties around the Island.

2. Existing Environment

2.1. General environment

The existing jetty at the Proposal area at Rottnest Island (the Island) was built from rock fill and compacted limestone base in 1972, which replaced an older jetty at the same location (RPS 2020). It is approximately 120 m long and approximately 1,700 m^2 and in 2018 the platform was removed and converted into a rock groyne due to its fragility and partial collapse (RPS 2020). It is within a relatively healthy environment, with little turbidity and abundant seagrasses and macroalgae.

The Rottnest Island Marine Reserve encapsulates all waters around the Island, and is characterised by a unique blend of tropical and temperate species (RPS 2024a), and supports some of the most diverse marine gardens, ~20 species of coral and ~400 species (RIA n.d.). To protect this biodiversity there are five marine sanctuary zones in waters around Rottnest Island. The Proposal sits within the Rottnest Island Marine Reserve it is not within or adjacent to any of the Island's five Sanctuary Zones.

2.2. Climate and oceanography

The Island is located within in the temperate region of the Indian Ocean approximately 18 km west of Perth in WA.

Sea water temperature generally ranges between 16.4℃ in September and 26.5℃ in March (Sea Temperature 2024). Air temperature ranges between a mean minimum of 12.4℃ in August and mean maximum of 27.2℃ in February (BoM 2024), coinciding with the six seasons. Mean annual rainfall is 558.4 mm, with a maximum average monthly rainfall of 111.5 mm in July. Annually, the 9 am wind direction varies from northeasterly and easterly to southern winds, as shown in Figure 2. By 3 pm there is less variation annually, with winds generally south to south-west, as shown in Figure 3.

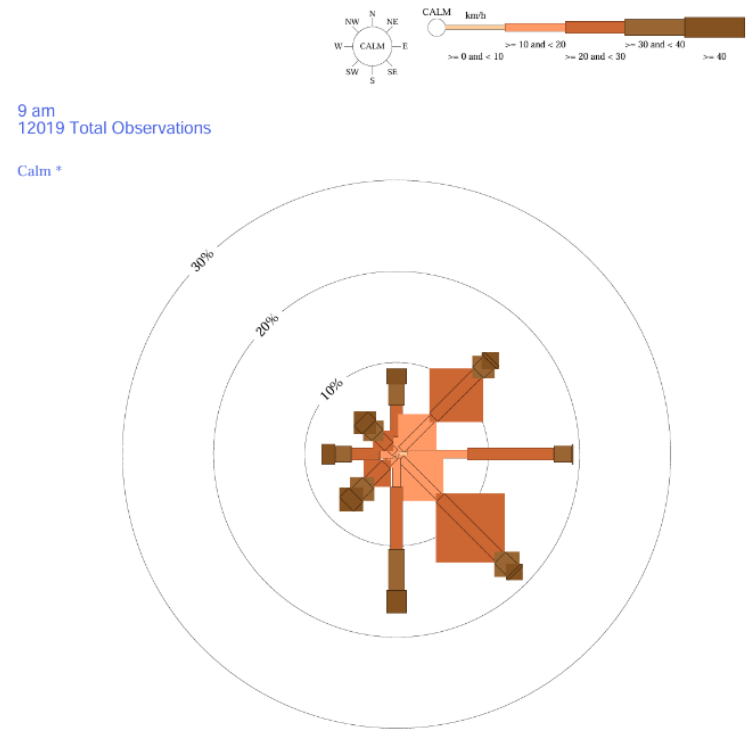

Figure 2: Wind direction and speeds measured at 9am over 12019 daily observations (BoM 2024)

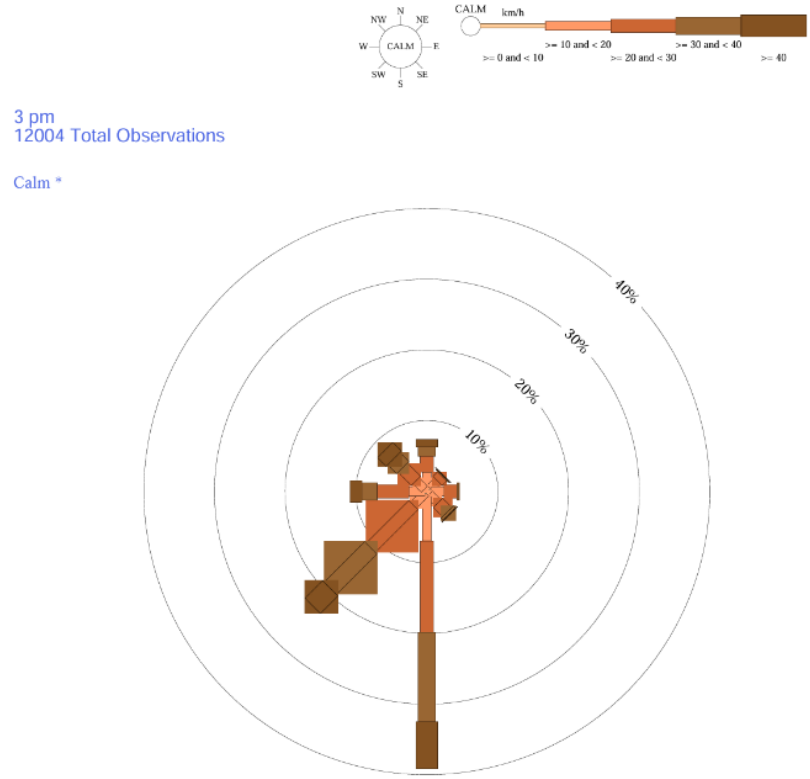

Figure 3: Wind direction and speeds measured at 3pm over 12004 daily observations (BoM 2024)

Currents measured around the Proposal site (Baird 2024) found a depth averaged peak current speed of 0.05 ms^{-1} to 0.1 ms^{-1} during neaps and 0.1 ms^{-1} to 0.15 ms^{-1} during spring tides. Current direction was relatively consistent across the tidal cycle at 80° - 100°, changing to come from northerly directions occasionally. Increasing wind speeds also seemed to strongly correlate with increasing current speeds (Baird 2024). Waves around the Island were found to be dominated by diffracted and refracted swell waves ranging from 0.4 m to 0.7 m with peak periods 12 to 18 seconds. Occasionally wind sea resulted in higher waves (0.8-0.9 m at peak wave periods of 5-10 s) arriving from the northwestern sector.

Within the Proposal area, the bathymetry is relatively shallow, up to 1.6 m at the end of the Army Groyne and decreasing to approximately 3.5 m CD depth 100 m offshore (DoT 2022). The rest of the Island is also relatively shallow, though to the west of Rottnest Island there is a large drop in depth within 2 km, down to approximately -55 m at mean sea level.

2.3. Geology and geomorphology

The Island is the largest and northernmost island of the Garden Island Ridge, a rocky remnant Pleistocene ridge forming a chain of submarine reef platforms and emergent islands of approximately 12 km offshore of the Swan Coastal Plain. The Island sits within the middle shelf region of the narrow Rottnest shelf (Brooke 2010). The Proposal site consists of white medium-grained sand, well-sorted, sub-angular quartz and shell debris.

2.4. Water quality

Water quality sampling was undertaken between November and December 2023 at six locations in and around the Proposal site. Samples were analysed for turbidity (Nephelometric Turbidity Units (NTU) and total suspended solids (TSS)) in November, and in December the samples were analysed for NTU, TSS, hydrocarbons and metals. Hydrocarbons and phosphorus were all below the limit of reporting (LoR) in all samples. All metals sampled were also below the ANZG (2018) water quality guidelines except for one sample which had a high zinc concentration, however this would be considered to be an anomaly likely due to contamination from sunscreen or similar.

Turbidity at the site is very low, with profiles taken in December finding zero NTU at several sites within the Proposal area. Turbidity of water samples was also measured in the laboratory in November and December 2023, which ranged between 0 and 0.66 NTU. Total suspended solids (TSS) was also found to be low, with <5.0 mg/L in all samples. This is not surprising due to the water clarity in the area during this time of year.

2.5. Sediment quality

Sediment sampling was undertaken in November 2019 (with some additional sampling in March 2020) at seven locations within the proposed dredge area (RPS 2020). Sediment samples were analysed for metals and metalloids, acid sulfate soil (ASS) parameters, pesticides, polycyclic aromatic hydrocarbons (PAHs), total recoverable hydrocarbons (TRHs) and benzene, toluene, ethyl-benzene and xylene (BTEX), nutrients and per- and poly-fluoroalkyl substances (PFASs).

Samples were taken from each 0.5 m horizon where possible, up to a depth of 1.2 m at each location. Some locations reached refusal due to hard sediment layers at approximately 1 m depth, and therefore there were a total of 17 samples (with 14 additional samples taken in March 2020 to re-analyse for PFAS due to laboratory contamination).

Particle distribution was found to be predominantly sand between 0.06 and 2 mm, with the mean median particle size being 0.242 mm (242 µm). There was only a small proportion of sediment larger than 2 mm.

The toxicants were all analysed by a NATA accredited laboratory, and the results compared to the following guideline values:

- Ecological Investigation levels (EILs) and Ecological Screening Levels (ESLs) for areas of ecological significance and public open space (NEPM 2013)
- Health Investigation Levels for residential soil access (HIL-A) (NEPM 2013 and CRC CARE 2011)
- National Assessment Guidelines for Dredging (Commonwealth of Australia 2009) screening levels.

All metals, metalloids, pesticides, PAHs, TRHs, BTEX, nutrients and PFAS tested were below their respective guideline values. The site is also not considered to be an ASS risk (RPS 2020). One sample being classified as potential ASS as inorganic acidity was detected. However, there was a significant amount of acid neutralising capacity, so RPS (2020) recommended that no liming would be required if onshore disposal was conducted. Therefore, the material is considered suitable for reuse as fill for the construction of the jetty (or onshore disposal if required).

2.6. Benthic communities and habitat

In accordance with EPA (2016) a local assessment unit (LAU) should be established in order to calculate and assess the cumulative impacts of disturbance to BCH from projects. They are location specific, and would typically be approximately 50 km^2, though large or smaller areas would be considered by the EPA if well justified. An LAU around Rottnest Island has been nominated for this Proposal based on the assessment area for a previous study of the BCH by Harvey (2009). The BCH within the LAU is given in Figure 4, and Harvey (2009) identified bare substrate, seagrass, macroalgae, coral and intertidal reef within the assessment area.

A BCH assessment was undertaken by RPS in 2019, updated in 2023 for the Proposal area and then updated again in early 2024 to include additional area where modelling predicted possible impacts (RPS 2024a). Within South Thomson Bay, RPS (2023) conducted a finer scale survey within and around the Proposal area, as shown in Figure 5. Seagrass and macroalgae species were identified, and the habitats were classified by species dominance (a species was dominant if it was more than 50% covered by that species). The classification scheme is presented in RPS (2023), and the data was then used to determine BCH loss within the Proposal area and the context of the survey area. These loss calculations are shown in Table 2. Within the wider LAU, historical BCH loss was also assessed to determine a cumulative loss. Overall, it was estimated that a 1.95% loss of seagrass had occurred over time due to human activities, and the Proposal would lead to an additional 0.36% loss, resulting in a cumulative loss of 2.31% over the LAU (RPS 2025).

Table 2: Area of habitats within the development footprint (RPS 2025)

Area	Habitat (Ha)			
	Mixed seagrass	Macroalgae dominated	Sand/Sand with Wrack	Limestone reef/pavement
Field survey area (2019/2023 survey area)	108.10	10.80	42.43	1.79
Survey area (2024 plume extension survey area)	0.92	0	1.27	0.35
Total survey area	109.02	10.80	43.70	2.14
Development envelope	2.06	0	1.26	0

Figure 4: Broad scale benthic habitat within the Rottnest Island LAU (Harvey 2009)

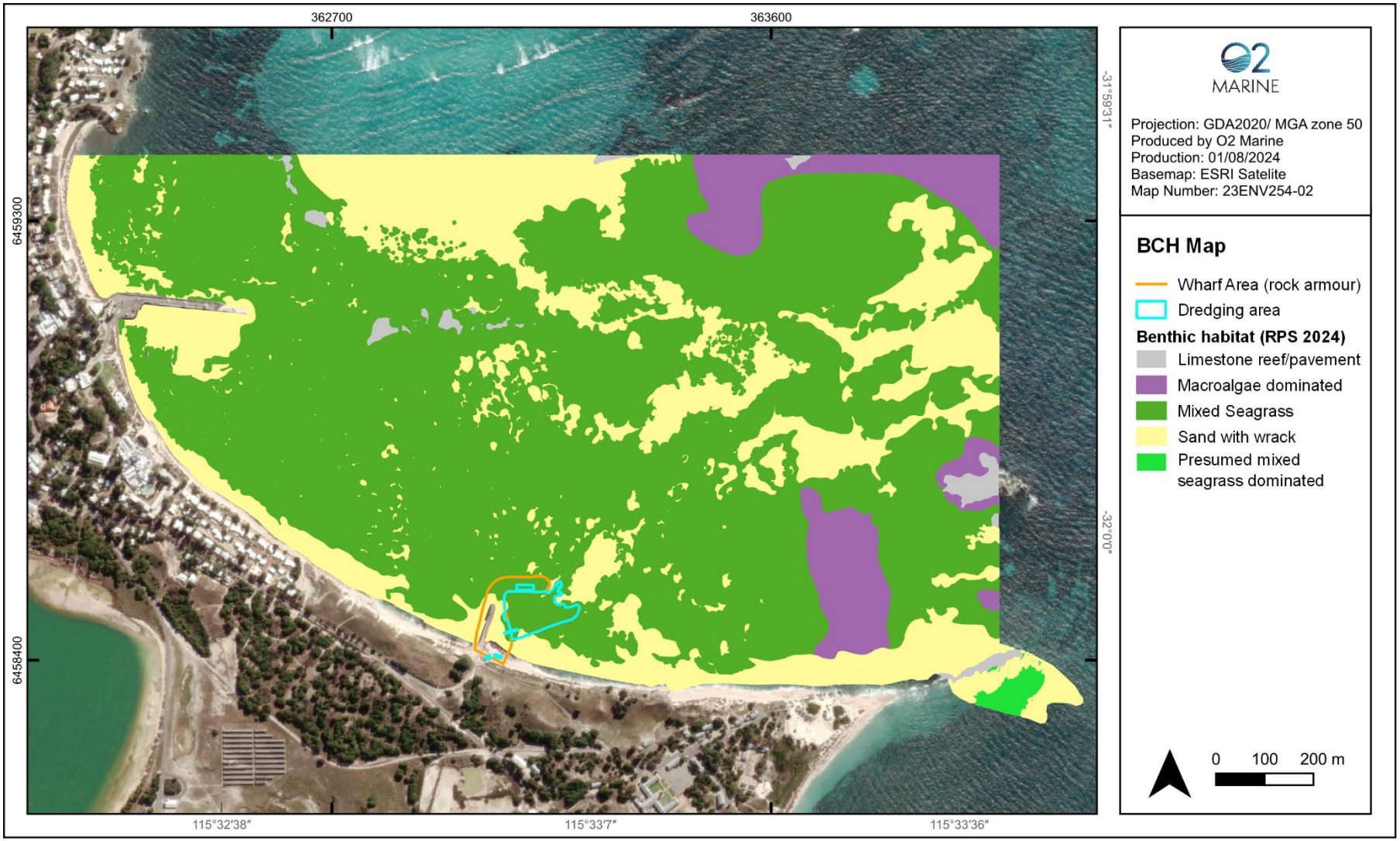

Figure 5: Benthic habitat within and around the proposal development envelope (data source: RPS 2024a).

2.6.1. Zones of impact and influence

Dredging will be occuring prior to construction activities, however these zones have also been used for the environmental outcomes for marine construction activities and specific monitoring will be inclusive of both construction and dredging activities.

The zones of impact and influence associated with levels of dredging pressures on benthic communities and habitats (BCH) were determined by Baird (2024). The methods used were based on plume modelling undertaken with impact zone definitions and boundary thresholds from a previous Port Beach project by BMT (2021). These definitions were given in Baird (2024) and replicated here in Table 3. As dredging will be occuring in winter, the winter scenario was used for the calculations.

The calculated zones for this proposal are presented in Table 4 and Figure 6.

Table 3: Impact zones, definitions and boundary thresholds (BMT 2021 as presented in Baird 2024)

Impact zone	Definition	Boundary Threshold(s)
Zone of High Impact (ZoHI)	The area where impact on BCH are predicted to be irreversible. The term irreversible means 'lacking a capacity to return or recover to a state resembling that prior to being impacted within a timeframe of five years or less'. Areas within and immediately adjacent to proposed dredge and disposal sites are typically within the ZoHI.	• Boundary of the dredging and placement area • Where sedimentation/burial is >10 cm or 10,000 g/m^2
Zone of Moderate Impact (ZoMI)	The area within which predicted impacts on BCH are recoverable within a period of five years following completion of the dredging and placement activities. The ZoMI abuts and lies immediately outside of the ZoHI.	• The 95th percentile of the area where a total suspended solids (TSS) concentration of >10 mg/L was exceeded. • Where sedimentation burial is 5-10 cm or 5,000 – 10,000 g/m^2
Zone of Influence (ZoI)	The are within which changes in environmental quality associated with turbid plumes are predicted and anticipated during dredging and placement activities, but where these changes would not result in a measurable impact on BCH.	• The 100th percentile of the area where a TSS concentration of >2 mg/L above background was exceeded (representing the maximum predicted extent of visible plumes).

Table 4: Calculated zones of impact and influence for the Proposal

Impact zone	Resultant area definition	Resultant calculated area (km^2) (Baird 2024)
ZoHI	The ZoHI encompasses all the dredging area and construction area (which is also where disposal will occur) with a minimum distance of 25 m from the dredging footprint to be conservative	0.02
ZoMI	The ZoMI encompasses the area outisde the ZoHI to at least 150 m from the dedging area	0.07

Impact zone	Resultant area definition	Resultant calculated area (km^2) (Baird 2024)
ZoI	The ZoI encompasses the maximum predicted extent of visible plumes (though these would not result in a measurable impact on BCH)	0.17

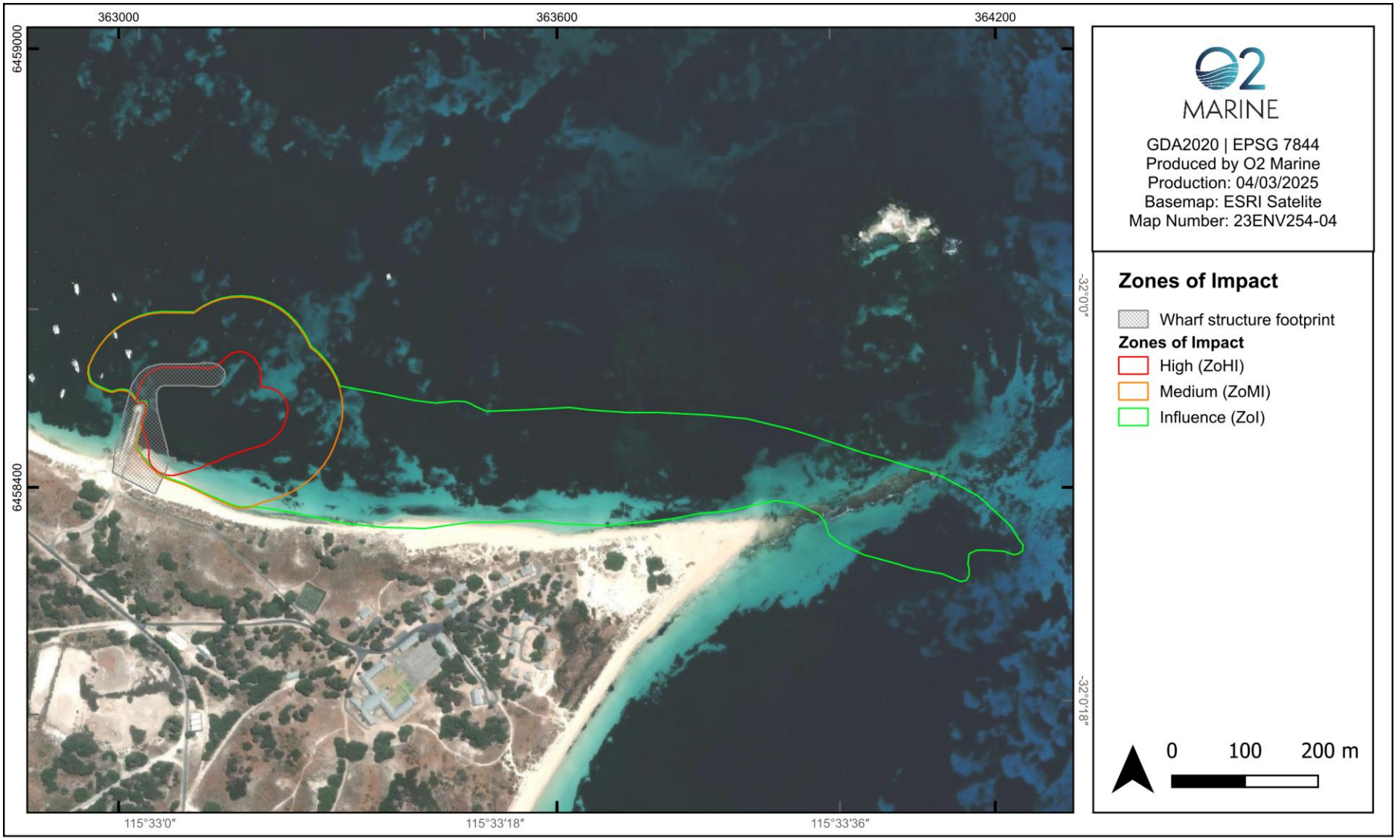

Figure 6: Wharf structure and dredging zones of impact (Source: Baird (2024)

2.7. Marine fauna

A marine fauna desktop analysis was undertaken for the Proposal by RPS (2024a). A list of species that may occur within the Proposal area was collated and included 41 Threatened marine fauna species and 92 listed Marine or Migratory marine fauna species that may occur in Thomson Bay. Key species and their ecological windows for monitoring and management were not identified by RPS (2024a), though ecological windows for species that may occur we identified in the referral supporting document (RPS 2025; Table 5). Of the species that may occur within the Proposal area and that can be monitored during construction and marine construction activities include:

- Humpback whale (*Megaptera novaeangliae*)
- Killer whale (*Orcinus orca*)
- Pygmy blue whale (*Balaenoptera musculus brevicauda*)
- Minke whale (*Balaenoptera acutorostrata*)
- Australian sea lion (*Neophoca cinerea*)
- New Zealand fur seal (*Arctocephalus forsteri*)
- Indo-pacific bottlenose dolphin (*Tursiops aduncus*)
- Spinner dolphin (*Stenella longirostris*)
- Loggerhead turtle (*Caretta caretta*)
- Leatherback turtle (*Dermochelys coriacea*)
- Green turtle (*Chelonia mydas*).

These can often be viewed as umbrella species, so mitigation and management put into place to protect these species will also protect others that may occur within the Proposal area. Sharks, rays and fish species are occasionally visible if close enough to the surface and when weather conditions (e.g. wind, glare) and water clarity are favourable.

Table 5: Ecological windows for key marine fauna receptors as presented in RPS (2025)

Shading= peak period, light blue shading= mammals, yellow shading= fish, green shading= birds, teal shading= reptiles

Species	J	F	M	A	M	J	J	A	S	O	N	D	Reference (RPS 2024b)
Humpback whale (north migration)													DCCEEW (2024)
Humpback whale (south migration)													DCCEEW (2024)
Pygmy blue whale (north migration)													McCauley and Jenner (2010); McCauley and Duncan (2011); Double et al. (2012; 2014)
Pygmy blue whale (south migration)													McCauley and Jenner (2010); McCauley and Duncan (2011); Double et al. (2012; 2014)
Australian sea lion													
New Zealand fur seal													
White shark foraging BIA*													DCCEEW (2024)
Scalloped hammerhead migration													López et al. (2022)
Little penguin foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)

Species	J	F	M	A	M	J	J	A	S	O	N	D	Reference (RPS 2024b)
Wedge-tailed shearwater foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Caspian tern foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Pacific gull foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Bridled tern foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Roseate tern foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Fairy tern foraging													Higgins (2003); DAWE (2020); DCCEEW (2024)
Green turtle													
Leatherback turtle													
Loggerhead turtle													
**noting that the white shark BIA does not overlap with the Proposal.*													

2.8. Terrestrial environmental quality

Terrestrial environmental quality is an EPA environmental factor, however it has not been identified as a key factor for this Proposal. RPS (2025) conducted a search of the DWER Contaminated Sites Database and found no known contaminated sites within the Proposal DE. The closest registered contaminated sites is Site 39676 (portion of Lot 10976 on Deposited Plan 216860) located approximately 0.9 km west of the Proposal DE. Hydrocarbons have been found to be present within the groundwater below the registered contaminated site, though the site has been remediated so that it is suitable for public open spaces and public roads and classified as 'remediated for restricted use'.

A review of the DWER ASS mapping database also indicates that there is a low risk of ASS occurring within the development envelope (RPS 2024b).

2.9. Terrestrial flora and vegetation

The condition of the vegetation across the Proposal area is largely good, with some mixed patches of degraded vegetation (RPS 2024b). One vegetation unit (MIAp*Td) is considered to be representative of the State-listed Threatened Ecological Community (TEC) *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain and is considered to be of State significance. This vegetation unit is also representative of a pre-European vegetation association and/or complex that has less than 30% of the original extent remaining and is therefore considered regionally significant. Two other vegetation units were described to cover the DE (ApAf*Td and Sc*TdSl) which were both considered Good to Degraded condition. During the vegetation survey, 17 flora species were recorded, including four introduced species (RPS 2024b). None of these were Declared Organisms or Weeds of National Significance.

2.10. Terrestrial fauna

A total of 76 conservation significant fauna species were identified as having a likelihood of occurrence within the site. One conservation significant species was recorded within the Proposal area, being the quokka (Kwoka; *Setonix brachyurus*) listed as Vulnerable (VU) under the EPBC Act and BC Act. Four fauna species are considered as having the potential to occur within the Proposal area including:

- Osprey (*Pandian haliaetus*) (Migratory)
- Rottnest Island bobtail (*Tiliqua rugosa konowi*) (Vulnerable)
- Perth slider (*Lerista Lineata*) (Priority 3 under BC Act only)
- Rottnest Island dugite (*Pseudonaja affinis exilis*) (Priority 4 under BC Act only).

Two fauna habitat types were recorded within the Proposal area, namely:

- Trees and tall shrubs over low shrubs, grasses and herbs on sand dunes
- Low shrubs over grasses and herbs on sand dunes.

Both of these habitat types are suitable and potentially used by each of the conservation significant species listed above.

2.11. Social surroundings

The local community, visitors and tourists utilise the area, including recreational boat users who hold existing moorings within the vicinity of the Army Groyne. The site contains cultural, spiritual and heritage values associated with the broader cultural indigenous significance with Rottnest Island, and the historical heritage values of the Army Groyne.

Rottnest Island and the surrounding marine waters are within a reserve for public recreation and conservation. Recreational fishing for species including rock lobster, abalone, squid, cuttlefish, octopus and crabs occur, with spear fishing and commercial or amateur net fishing prohibited.

A search of the Department of Planning and Land Heritage (DPLH) Aboriginal Heritage Inquiry System database did not identify any Aboriginal cultural heritage (ACH) within or adjacent to the DE. The closest ACH is located approximately 400 m away and will not be impacted by the Proposal.

An Ethnographic Aboriginal survey was undertaken in 2019 (Brad Goode and Associates 2019) and found no new ethnographic sites were identified. However, representatives of the Whadjuk NTC group identified the potential for artefacts to occur in the subsurface and potential burials could be located in the dunes close to the DE. However, it was recommended in Brad Goode and Associates (2019) that the Proposal could proceed without undue risk of breaching the *Aboriginal Heritage Act 1972* in relation to ethnographic sites and places.

3. Roles and responsibilities

The roles and responsibilities for the implementation of the CEMP are summarised in Table 6.

Table 6: Roles and responsibilities of key personnel

Position	Responsibility
RIA Project Manager	• Overall responsibility for implementation of this CEMP • Overall responsibility for complying with relevant legislation, standards and guidelines • Ensures construction activities are conducted in an environment safe for both site personnel and the public • Responsible for reporting all environmental incidents to the Department of Transport (DoT) within 24 hours in accordance with DoT incident reporting procedures.
RIA Environment Manager	• Develop, implement and review health, safety and environmental systems • Promotes and maintains environmental management by aiming to prevent environmental impacts caused by work practices. • Monitors compliance with environmental legislation, regulation, standards, and codes • Ensures all environmental management needs are adequately met within construction contractor(s) Scope of Works. • Provision of competent person(s) to investigate environmental incidents and accidents and initiate corrective (preventative) actions. • Provision of adequate resources for effective environmental management • Notification to contractors(s) of potential environmental issues

Position	Responsibility
	• Assessing and reviewing Contractor(s) abilities to comply with environmental management requirements, including safe systems of work and other WHS documentation • Confirmation of contractors(s) adherence to the CEMP requirements • Ensuring adequate instruction and training is provided for all employees • Conducts inspections and audits of environmental performance and compliance on the proposal.
Construction contractors	• Complies with the requirements of this CEMP • Undertakes construction works • Prepares and implements an environmental management plan in accordance with the requirements of this CEMP • Implements the management actions of this CEMP • Ensures adequate training of all staff within their area of responsibility • Ensures all equipment is adequately maintained and correctly operated • Ensures construction activities are conducted in an environment safe for both site personnel and the public • Responsible for reporting all environmental incidents are reported to the Project manager as soon as possible.
Construction Contractor Manager	The Contractor(s) is responsible for the day-to-day activities during normal site operations during construction. The Contractor(s), as far as it is practical, are responsible for: • Monitoring construction activities against the requirements of CEMP and oversees all day-to-day environmental matters • Conducting inspections and periodic formal audits of the worksite to monitor Environmental performance and identify and implement improvement strategies • Ensuring subcontractor compliance with approved safe systems of work and the maintenance of records to demonstrate compliance • Conducting regular toolbox meetings to discuss Environmental issues with employees and identify areas for improvement • Directly accountable for the safe operation of the proposal's works and compliance with the CEMP • Ensures that a proposal's risk identification, assessment, and control process has been undertaken and that all persons working on the proposal are made aware of the hazards and the risk control requirements • Manages all aspects of workers' compensation and rehabilitation • Responsible for reporting all environmental incidents to RIAs Environmental Advisor's within 24 hours in accordance with incident reporting.
Piling contractor	• Prepares and implements an environmental management plan in accordance with the requirements of the CEMP • Implement the management actions of this CEMP

Position	Responsibility
	• Ensures adequate training of all staff within its area of responsibility • Ensure all equipment is adequately maintained and correctly operated • Responsible for reporting all environmental incidents to RIA Environmental Advisor's within 24 hours in accordance with incident reporting.
Site Supervisor	• Directly accountable for setting up the worksites to ensure that all activities can be conducted in a safe manner both for persons working on the site, visitors, and members of the general public • Responsible for ensuring pre-start communications are held daily with all personnel working on the proposal including subcontractor personnel • Ensures that all incidents are reported to the Construction Contractor Manager as soon as possible • Conducts visual daily inspections of the work site to ensure that Health Safety and Environment (HSE) procedures are being followed • Documents fortnightly inspections and take immediate and effective action to correct reported or observed breaches • Ensures that all personnel working on the site are competent to carry out the tasks for which they are assigned by checking evidence of competency and observing work practices.
Construction Contractor employees	• Must always work in a safe manner and immediately report all incidents, hazards or near misses to the site supervisor • Takes all reasonable steps to seek information on the Environmental working requirements of the proposal. Ensures their own fitness for work • Always co-operates with site management in ensuring compliance with company health, safety and environment procedures and statutory requirements • Does not work outside areas of competency • Where applicable, completes pre-start checks correctly for plant and equipment prior to operation and reports any damages or repairs immediately to the site supervisor • Actively participates in safety discussions at pre-start and toolbox meetings • Actively participates in the completion of JHA's and Risk Assessments where applicable • Take part in onsite audits when required.
Two Dedicated Marine fauna observers	• Two dedicated MFOs to be on shift at all times during marine piling and rock dumping works • Undertake management and mitigation measures for marine piling • Dedicated MFOs will be suitably trained and qualified • Adhere to the requirements of the (Closed Season Marine Mammals) Wildlife Conservation Notice 1998

Position	Responsibility
	• Knowledge of marine wildlife species in the Proposal area, including Threatened and Migratory Species listed under the EPBC Act and BC Act • Evidence of MFO suitability will be kept on record through staff curriculum vitas, training certifications and daily MFO logs, which may be used in future audits.
Trained Marine Fauna observers	• Trained MFOs are crew members trained in marine fauna species observations and mitigation measures, consistent with the Project environmental management plans. • Trained MFOs will be on duty on Project vessels during construction and during landside piling construction works. There will be always at least one Trained MFO on duty during vessel transits and during landside piling. • Maintain detailed daily records of all sightings of marine mammals, marine reptiles (i.e. turtles) shorebirds and seabirds and other notable observations • Evidence of MFO training/induction.
All persons involved in the project	• Comply with the requirements of this CEMP • Comply with all legal requirements under the approval's documents and relevant Acts • Exercise a Duty of Care to the environment at all times • Report all environmental incidents

4. Environmental factors and objectives

The key environmental factors and objectives to be managed under this CEMP have been derived from the Statement of environmental principles, factors, objectives and aims of EIA (EPA 2021), which outlines objectives aimed at protecting all environments (Themes) including Sea, Land, Water, Air and People. The Key Environmental Factors and EPA Objectives to be managed under this CEMP are listed below:

- Benthic communities and habitats
- Marine environmental quality
- Marine fauna
- Flora and vegetation
- Terrestrial fauna
- Social surroundings

The proposal specific Environmental Protection Outcomes (EPOs) and Management Targets (MTs) for each of these key environmental factors are outlined in Table 7.

Table 7: Potential environmental impacts from construction and associated proposal specific Environmental Protection Outcomes and Management Targets

Environmental Factor	EPA Objective	Potential Environmental Impact Pathway	Environmental Protection Outcome (EPO)	Management Target (MT)	Risk Management Strategy
Marine Environmental Quality (MEQ)	To maintain the quality of water, sediment and biota so that environmental values are protected.	Changes to the physico-chemical properties of the water column as a result of marine construction including, excavation, rock dumping and piling	Within two weeks following cessation of marine construction and dredging works, marine water quality will return to a High Level of Ecological Protection	MEQ shall be maintained at a Moderate Level of Ecological Protection during marine construction and return to a High Level of Ecological Protection within 2 weeks following completion marine construction. MT allows for the increased turbidity which will occur within the ZoHI and	Refer to Table 8, Table 14, and Table 15.

Environmental Factor	EPA Objective	Potential Environmental Impact Pathway	Environmental Protection Outcome (EPO)	Management Target (MT)	Risk Management Strategy
				wharf structure during marine construction activities.	
		Hydrocarbon release into the marine environment from a vessel spill. Release of toxicants or nutrients into the water column due to spills from land-based construction.	No reported hydrocarbon spills or release of waste into the marine environment from marine construction activities.	No hydrocarbon spills to the marine environment. No release of waste into the marine environment.	
Benthic Communities and Habitats	To protect BCH so that biological diversity and ecological integrity are maintained.	Direct impacts of BCH due to smothering within the wharf footprint.	Irreversible impacts to benthic communities and habitats are limited to the wharf structure and ZoHI (Figure 6)	Disturbance of the seabed occurs only within the wharf structure and ZoHI during marine construction.	Refer to Table 9.
		Indirect impacts of BCH due to reduction in available light caused by increase in suspended sediments released into the water column during construction of wharf including rock dumping..	No observable impacts to BCH outside of the ZoMI (Figure 6).	No observable impacts to BCH outside of the ZoHI and wharf structure (Figure 6).	
Marine Fauna	To protect marine fauna so that biological diversity and ecological integrity are maintained.	Injury or death of marine fauna as a result of construction activities including hydrocarbon or waste spills or underwater noise impacts from piling.	Irreversible impacts to marine fauna habitat are limited to the wharf structure and ZoHI. No reported introduction or establishment of IMS as a result of	No loss of marine fauna habitat outside of the construction area	Refer to Table 10, Table 14, Table 15 and Table 16.
				Manage vessel bunkering, chemical storage, spill response and debris to ensure no adverse impacts to the marine environment	

Environmental Factor	EPA Objective	Potential Environmental Impact Pathway	Environmental Protection Outcome (EPO)	Management Target (MT)	Risk Management Strategy
		Injury or death of marine fauna due to vessel movement (strike), entrapment during rock dumping for breakwater construction, or artificial light Introduced Marine Pests translocation from dredging vessels.	construction activities associated with the Proposal No reported impacts to marine fauna as a result of hydrocarbon spill or release of waste associated with construction activities including entanglement or ingestion of waste No reported behavioural changes which are known to be associated with distress or injury of marine fauna, health impacts (including temporary or permanent hearing loss), physical injury or mortality from underwater noise emissions from construction activities to significant marine fauna species No reported death or injury to marine fauna from vessel strike within the Rottnest Island Marine Reserve Boundary which is associated with the construction of the Proposal No changes in marine fauna behaviour attributable to the construction lighting requirements of the Proposal.	No incidences of marine fauna injury or death as a result of vessel strike. No introduction and/or spread of introduced marine species. No injury or death of marine fauna associated with piling. No behavioural change, injury or death of marine fauna from underwater noise. No injury or death of marine fauna from rock dumping, excavation or other construction works. No disruption to marine fauna from artificial light.	
Flora and vegetation	To protect flora and vegetation so that biological diversity	Direct removal of vegetation within DE	Direct impacts to native vegetation resulting from the Proposal will be confined to the DE	Clearing of native vegetation within the DE will not exceed 0.46 ha	Refer to Table 11

Environmental Factor	EPA Objective	Potential Environmental Impact Pathway	Environmental Protection Outcome (EPO)	Management Target (MT)	Risk Management Strategy
	and ecological integrity are maintained	Indirect impacts due to introduction and/or spread of weeds and disease (i.e. dieback) into adjacent vegetation Indirect impacts from localised erosion or accidental clearing/ over clearing	Direct impacts to native vegetation (MIAp*Td) analogous with the TEC, *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain will be confined to the DE and will not exceed 0.23 ha. No reduction in the extent or modification of the TEC, *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain outside the DE as a result of the Proposal No introduction of new weed species attributable to the Proposal	No more than 0.23 ha of vegetation type MIAp*Td (vegetation representative) will be cleared No incidents of vegetation clearing outside of the approved disturbance area No degradation to adjacent land/vegetation from erosion. No introduction of invasive weeds not already present and no introduction of disease within immediate adjacent areas attributable to construction activities.	
Terrestrial fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained	Direct removal of native vegetation comprising fauna habitat, including accidental over clearing Injury or death of fauna due to infrastructure, machinery or vehicles Indirect impact due to introduction and/or spread of weeds/disease impacting fauna habitat Alteration of fauna behaviour due to noise, lighting and increased human presence	No Proposal-related disturbance of conservation significant terrestrial fauna or fauna habitat outside the DE No introduction of new weed species attributable to the Proposal No increase in incidents of terrestrial fauna injury or death during operations of the Proposal	Minimise disturbance to terrestrial fauna habitat during construction No incidents of terrestrial fauna injury or death during construction associated with the Proposal Prevent the alteration of fauna behaviour due to noise, lighting and increased human presence	Refer to Table 12

Environmental Factor	EPA Objective	Potential Environmental Impact Pathway	Environmental Protection Outcome (EPO)	Management Target (MT)	Risk Management Strategy
Social surroundings	To protect social surroundings from significant harm	Restricted public access to Proposal area during construction phase and temporary relocation of some existing vessel mooring holders Increase waste to Rottnest Island during construction works Impacts to recreational values including impacts to recreational fishers from loss of fish feeding/spawning habitat; potential impact to public safety particularly swimmers, impacts to mooring users from lighting, odour, noise or dust Potential for bushfire Potential disturbance of Unexploded Ordinance (UXO) site Potential impacts to previously unidentified Aboriginal cultural heritage	No exceedance of *Environmental Protection (Noise) Regulations 1997* No reduction in recreational fishing outside the DE and ZoMI which are attributable to the Proposal The risk for disturbance to UXO is managed so that there is not a significant risk for injury to people or wildlife, or damage to infrastructure No impacts to registered ACH sites, either through direct disturbance or indirect impacts to ACH within South Thomson Bay No impacts to amenity values from noise, odour and dust within South Thomson Bay during construction and operation of the Proposal which result in a reduction in recreational values.	Noise emissions do not exceed assigned noise levels as prescribed in the *Environmental Protection (Noise) Regulations 1997* No fugitive dust emission outside of the DE Reduce waste volume, maximise recycling, reuse and recovery, prevent any construction waste/litter entering the environment. Zero incidents of fire resulting from the Proposal Minimise risk of disturbance to UXO site Minimise potential impacts to any previously unidentified subsurface Aboriginal Cultural Heritage (ACH) No complaints regarding relocation of moorings No complaints regarding artificial lighting Ensure adequate public safety measures are implemented to avoid incidents on the public (i.e. swimmers)	Refer to Table 13

5. Monitoring and Management

In addition to the management actions that will be implemented during construction activities to avoid adverse impacts on the surrounding environment, environmental monitoring of the marine environment will also be undertaken to verify the predicted impacts and to ensure that impacts do not exceed their predicted magnitude or trigger thresholds. The following monitoring will be undertaken for the Proposal:

- Physical water quality monitoring as outlined in the DEMMP (O2 Marine 2025) during marine construction works (including baseline prior to commencement and at least 2 weeks post construction) to identify any changes in water quality that may impact BCH health outside the ZoHI.
- Monitoring of seagrass and macroalgae health as outlined in the DEMMP (O2 Marine 2025) during marine construction works (including baseline prior to commencement and post-construction as required) to identify any change in health of BCH outside the ZoHI during marine construction works
- Marine fauna observations
- Flora and vegetation management inspections
- Terrestrial fauna management inspections.

The potential environmental impacts identified above in Table 7 have been assigned monitoring and management actions to measure compliance against the EPOs and MTs. Management measures for each environmental factor (EPA 2018) are detailed below. Management actions have been separated into:

- Tier 1, which specially address the identified environmental factors
- Tier 2, which relate to the overall works and can be managed through standard operational procedures (including hydrocarbons, waste and introduced marine pests)).

5.1. Marine environmental quality

The (Tier 1) management actions proposed to minimise potential impacts on the environmental factor 'Marine Environmental Quality' are described in Table 8. For the management targets associated with hydrocarbon spills please refer to Section 5.7 and for waste management please refer to Section 5.8.

Table 8: Management actions to minimise impacts on MEQ

Marine environmental quality					
Activity	Marine construction activities				
Potential Impacts	• Changes to the physico-chemical properties of the water column as a result of marine construction including dredging, excavation, rock dumping and piling				
	Management Actions Environmental Performance				
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
MEQ shall be maintained at a Moderate Level of Ecological Protection during marine construction and return to a High Level of Ecological Protection within 2 weeks following completion marine construction. MT allows for the increased turbidity which will occur	Piling will be undertaken using vibro-hammering which encapsulates sediment within the core and therefore no suspended sediment is likely to be released into the water column. Construction of the wharf area (including rock dumping and excavation) will be undertaken using methods which minimise sediment suspension. This will be done concurrently with dredging. The placement of geofabric (such as Texcel 1200R) textile weave along the bund wall will ensure that the placement of dredge spoil during reclamation works will not impact or increase the zones of impact/influence. If a visible plume is identified during piling, then a silt curtain around the piling activity may be implemented	Contractor	• Contractor vessel logs to report on visible plumes, use of silt curtains • Contractor construction management plan to outline the sequence and methods of construction to reduce sediment runoff and suspension	• Throughout construction.	• Temporarily pause in construction works to determine the cause of sediment plume and allow to settle before recommencing with additional management in place if possible. Repair geofabric if found to be damaged.

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
within the ZoHI and wharf structure during marine construction activities.	Implement the Marine Water Quality Monitoring Program (MWQMP) as defined in the DEMMP (O2 Marine 2025)	RIA	• Water quality monitoring in accordance with the MWQMP and final report following the cessation of dredging and construction.	• Pre dredging, during dredging and marine construction works, and up to two weeks following the cessation of marine construction and dredging.	• Implement Tiered Management Framework (TMF) as defined in Appendix B.1 of the DEMMP (O2 Marine 2025).

5.2. Benthic Communities and Habitats

The (Tier 1) management actions to minimise potential impacts on the environmental factor 'Benthic Communities and Habitat' are described in Table 9.

Table 9: Management actions to minimise impacts on BCH

Benthic Communities and Habitats					
Activity	Marine Construction activities				
Potential Impacts	• Direct loss of benthic communities and habitats due to smothering within the ZoHI and wharf footprint • Indirect impacts of benthic communities and habitats due to reduction in available light caused by increase in suspended sediments released into the water column during construction of wharf including rock dumping.				
	Management Actions		Environmental Performance		
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
Disturbance of the seabed occurs only within the wharf structure and ZoHI during marine construction.	Marine construction will only be undertaken within the DE using a global positioning system (GPS) and ensuring activities are undertaken in the correct locations.	Construction and piling contractors	• Daily logs from vessels	• To be undertaken daily, including prior to changes in activity or movement of the vessel to another area within the DE.	• Stop work and reassess, move works back to within DE.
No observable impacts to BCH outside of the ZoHI and wharf structure (Figure 6).	Piling will be undertaken using vibro-hammering which encapsulates sediment within the core of the pile and therefore no suspended sediment should be released to the water column during piling. Movement of rock armour will be undertaken using methods which minimise sediment suspension. The placement of geofabric (such as Texcel 1200R) textile weave along the bund wall will ensure that the	Construction and piling contractors	• Validate positioning and vessel monitoring system • Construction progress reports submitted throughout construction works period • Monitoring reports to be proved as per DEMMP (O2 Marine 2025)	• Prior to and throughout marine construction operations • Monitoring will be undertaken in accordance	• Cessation of piling and equipment servicing as required • If disturbance outside of the wharf structure, work is to be paused and methods to be reviewed to minimise disturbance.

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	placement of dredge spoil during reclamation works will not impact or increase the zones of impact/influence. Ensure equipment is in working order and undertaking the work efficiently without leaks All vessels will comply with Commonwealth biosecurity requirements and complete Department of Primary Industries and Regional Development (DPIRDs) 'Vessel check'. All vessels will have a ballast water management plan and ballast water exchanges will be in accordance with IMO requirements and the *Commonwealth Biosecurity Act 2015*. Undertake BCH monitoring as described in Section 6 and Appendix B.2 of the DEMMP (O2 Marine 20205)			with the DEMMP	• Other management actions in accordance with the TMF in the DEMMP.

5.3. Marine Fauna

The (Tier 1) management actions proposed to minimise potential impacts on the environmental factor 'Marine Fauna' (including MNES) are described in Table 10. For the management targets associated with hydrocarbons, waste or introduced marine pests please refer to Sections 5.7 to 5.9.

Table 10: Management actions to minimise impacts on marine fauna

Environmental Factor	**Marine fauna**				
Activity	Marine construction				
Potential Impacts	• Injury or death of marine fauna due to vessel movement (strike), entrapment during rock dumping for breakwater construction, or artificial light • Introduced Marine Pests translocation from dredging vessels.				
	Management Actions		Environmental Performance		
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
No loss of marine habitat outside of the marine construction area	Construction will be undertaken within the construction footprint only Silt curtains will be implemented if piling is producing visible plume	Contractor	• In accordance with the BCH and MEQ requirements in the DEMMP.	• Throughout marine construction works.	• Follow the TMF in the DEMMP.
No incidences of marine fauna injury or death as a result of vessel strike	Implement marine fauna monitoring and management as outlined in Appendix B.4. The maximum vessel speed within all areas of the proposal is 5 knots and all vessels are to adhere to standard set in the National Whale Watching Guidelines (DoEE 2017b). At least one trained MFO on all Proposal vessels when in transit Apply vessel approach distances (Appendix B.4)	Contractor Trained MFO will be on duty on Proposal vessels during construction (may have other vessel duties)	• Refer to Appendix B.4. • Reporting of incident as outlined in Table 19.	• Daily • Refer to Appendix B.4.	• Where marine fauna are observed within an exclusion zone then marine construction will cease immediately where possible. • Should a travelling dolphin enter the No Approach Zone, including bow riding the

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	• The no approach zone is the area directly in front and behind fauna where boats should not enter (cut in front of fauna or follow fauna) and area a zone of total vessel exclusion • The caution zone is the area surrounding fauna in all directions where vessel speeds are limited to no more than 6 knots – noting the Proposal area speed limit is 5 knots				vessel shall either maintain its course and speed, or maintain its course and gradually slow down.
No injury or death of marine fauna associated with piling No behavioural change, injury or death of marine fauna from underwater noise	Piling will be undertaken using vibro-hammering which produces continuous (non-impulsive) noise reducing noise exposure, where possible. If vibro-piling meets refusal then impact hammer piling will be used. Marine fauna management zones (Appendix B.1; Appendix B.2) have been developed with a conservative approach to be suitable for impact hammer piling in case this is required, and therefore will be suitable for both piling methods. Implement Appendix B.2 including the following: • Pre-start, soft-start, shut-down and low-visibility requirements • Piling to be completed during daylight hours only • Piling to be undertaken outside key ecological windows for key marine fauna species • Piling operations should be completed using the best available technologies (BAT) for noise reduction and installation	Piling contractors Dedicated MFOs (Appendix B.1)	• Marine fauna observations to be recorded in daily MFO logs • Reporting of incident as outlined in Table 19 • A full summary report of operations, sightings and mitigation actions to be provided to RIA who provide to the Department of Biodiversity, Conservation and Attractions (DBCA).	• Throughout piling activities.	• As provided in Appendix B.2.

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	• Implement underwater management zones (Observation and Exclusion Zones) • Two Dedicated Marine Fauna Observers during piling Construction activities, such as dredging and piling, which generate underwater noise during known critical spatial and temporal windows of marine environmental sensitivity will be avoided. Key windows of sensitivity, such as periods of whale migration, see Table 5.				
No injury or death of marine fauna from rock dumping, excavation of other marine construction works	Dedicated MFOs (See Appendix B.3) during rock dumping and excavation to implement management measures Implement rock dumping and excavation Management Zones (Observation and Exclusion Zones) Rock dumping and excavation to occur during daylight hours only	Construction contractors Dedicated MFOs (Appendix B.1)	• Marine fauna observations to be recorded in daily MFO logs • Reporting of incident as outlined in Table 19 • A full summary report of operations, sightings and mitigation actions to be provided to DBCA.	• Throughout construction activities.	As provided in Appendix B.3.
No disruption to marine fauna from artificial light	Construction activities restricted to daylight hours only	Contractors	• N/A	• Throughout construction.	• N/A

5.4. Terrestrial flora and vegetation

The (Tier 1) management actions to minimise potential impacts on the environmental factor 'terrestrial flora and vegetation' are described in Table 11.

Table 11: Management actions to minimise impacts on terrestrial flora and vegetation

Terrestrial flora and vegetation					
Activity	Construction activities				
Potential Impacts	• Direct removal of vegetation within DE • Indirect impacts due to introduction and/or spread of weeds and disease (i.e. dieback) into adjacent vegetation • Indirect impacts from localised erosion or accidental clearing/over clearing				
	Management Actions	Environmental Performance			
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
Clearing of native vegetation within the DE will not exceed 0.46 ha No more than 0.23 has of vegetation type MIAp*Td (vegetation representative) will be cleared No incidents of vegetation clearing outside of the approved disturbance area	• Delineation of the approved clearing area prior to commencement of clearing activities (e.g. via a survey and the installation of temporary fencing) to prevent clearing outside of approved areas (i.e. No Go zones) • Clearly delineate all identified populations of MIAp*Td using highly visible flagging or similar around all identified populations. Clearly delineate the vegetation to be cleared and the vegetation not to be cleared. • Establishment of clearly delineated access points to prevent unauthorised disturbance and access. • Ensure site access and laydown areas for vehicles and plant is arranged to utilise designated tracks and existing areas cleared of vegetation to minimise vegetation disturbance.	Contractors	• Daily inspections to visually check/review clearing boundaries and compliance during clearing activities. • Photographic records of the clearing area pre- and post-clearing activities. • Inspection to verify no degradation/disturbance beyond approved clearing boundary from erosion. • Inspection of stockpile heights and areas of placement. • Maintain clearing register that includes date, location of clearing.	• Photographs prior to construction activities • Daily inspections during clearing activities.	• Temporarily pause construction works and move back into the construction area. • Report and incident register will be completed and provided to RIA • Further corrective measures will be undertaken as necessary through adaptive management • Maintenance of temporary erosion controls.

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
No degradation to adjacent land / vegetation from erosion	• Ensure all applicable vehicles and plant remains within designated tracks, works areas, and laydown areas. • All construction personnel will be made aware of the clearing area boundaries through the induction / training process. • Installation of temporary fencing, inclusive of sediment controls, along the boundary of the terrestrial construction works area to restrict machinery access to be within the approved disturbance area. • Controlled placement of stockpiles within existing cleared areas within the DE. Ensure no erosion or damage to surrounding vegetation and use of sediment control structures (if required). • Placement of vegetation and topsoil stockpiles will not preclude access/egress of vehicles via designated access points from the site. • Topsoils stockpiles will be no more than 2m tall and external bunding used for stockpiles where required. • Ensure waste management implementation and rubbish disposal on site during construction.		• Post clearing inspection confirms there are no incidents of disturbance outside approved/disturbance boundary. • Records (written and photographic) will be kept of native vegetation clearing including; date, location and size of the area that was cleared. • Incident Register • Induction and Training Register		

No introduction of invasive weeds not already present and no introduction of disease within immediate adjacent areas	• Weed management protocols will be implemented prior to commencement of construction, including:
	  • Vehicle inspection on entry and exit to ensure the vehicle is free from obvious soil/organic material prior.
	  • All cleaning of machinery to be cleared of soil and plant material. This will include the spraying of tyres/ tracks using disinfectant.
		Contractor	• Visual inspections for unauthorised access to surrounding native vegetation e.g. damage to fencing and observation of vehicles or machinery.
			• Visual inspection of earth moving mobile equipment and vehicles prior to leaving site for
				• Weekly visual inspections
				• Weekly spot checks of mobile equipment and vehicles.
					• If weeds are identified manually remove or use targeted herbicide application (if approved) to prevent further establishment. Ensure disposal

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
attributable to construction activities	Cleaning will occur at a suitable designated cleaning point with waste removed from the site (as required when detected). • Hygiene practices to ensure no spread of weeds/ diseases within the development envelope, including brush down of boots alongside wash-down. • All personnel will be made aware of weed management practices through the induction / training process. • Controlled placement of stockpiles within existing cleared areas within the DE. Ensure no erosion or damage to surrounding vegetation and use of sediment control structures (if required). • Contractor to supply weed and seed certificates for all vehicles and machinery prior to first mobilisation on Rottnest Island.		evidence of weed contamination. • Regular inspection/audit/incident reports verify no introduction of weeds to site. • Inspection/audit/pre-start logbooks verify implementation of hygiene measures, including hygiene points at key road entry and exit points along the alignment, and food waste management measures. • Inspection/audit/pre-start logbooks verify vehicles, plant and equipment enter site clean, including boots if at wash down facility, and are regularly maintained.		follows biosecurity guidelines. • If signs of plant disease are detected, isolate the area to prevent further spread. Remove infected plants or soil following biosecurity disposal protocols.

5.5. Terrestrial fauna

The (Tier 1) management actions to minimise potential impacts on the environmental factor 'terrestrial fauna' are described in Table 12.

Table 12: Management actions to minimise impacts on terrestrial fauna

Terrestrial fauna					
Activity	Construction activities				
Potential Impacts	• Direct removal of native vegetation comprising fauna habitat, including accidental over clearing • Injury or death of fauna due to infrastructure, machinery or vehicles • Indirect impact due to introduction and/or spread of weeds/disease impacting fauna habitat • Alteration of fauna behaviour due to noise, lighting and increased human presence				
	Management Actions	Environmental Performance			
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
Minimise disturbance to terrestrial fauna habitat during construction No incidents of terrestrial fauna injury or death during construction associated with the Proposal Prevent the alteration of fauna behaviour due to noise, lighting and	• The construction boundary will be clearly delineated to prevent encroachment of construction outside of the DE (e.g. via a survey and the installation of temporary fencing) to prevent clearing outside of approved areas. • Installation of temporary fencing, inclusive of sediment controls, along the boundary of the terrestrial construction works area to restrict machinery access to be within the approved disturbance area. • All site personnel to undertake environmental induction, including information on terrestrial fauna and associated management actions. • Targeted pre-clearance surveys for terrestrial fauna (i.e. walkover prior to clearing) • Undertake vegetation clearing commencing from a disturbed edge, where practicable, to encourage	Construction Contractor	• Weekly Inspection Checklist - weekly inspections to ensure fencing and other controls are maintained. • Pre-mobilisation checklist covers any necessary approvals for clearing including construction boundaries, no-go areas and vehicle access. • Documentation / photographs verifying that pre-clearance surveys were undertaken prior to clearing. • Inspection/audit reports verify no injury or deaths to fauna as a result of speeding, unauthorised	• Weekly inspections - prior to construction activities • Prior to clearing activities (daily) • Reporting of incidents daily / where required during ground disturbance.	• Temporarily pause construction works and move back into the construction area. • Report and incident register will be completed and provided to RIA • Further corrective measures will be undertaken as necessary through adaptive management • Fauna interactions that result in serious injury or vehicle strikes to be reported to DBCA

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
increased human presence	remaining mobile fauna to naturally relocate to areas of adjacent vegetation. • Clearing will be conducted progressively to allow any fauna within the site boundaries to naturally migrate to surround habitats off-site. • Established roads used for access and limited to roads essential for operations and travelling where practicable. Speed limits are adhered to prevent injury or death to fauna. Vehicles to be restricted to within the DE only. • Construction works to occur during daylight hours only. • A fauna spotter will be present during all clearing activities to ensure fauna are not directly impacted during construction. • If native fauna is encountered during clearing works it should, initially, be allowed to make its own way from the works area. However, if this is not possible or practicable, a qualified wildlife handler will be contacted to relocate it. • Injured animals will be provided with first aid and handled on advice from the Wildcare Helpline (ph. 9474 9055) and RIA Rangers (ph. 9372 9788). • Hygiene practices to ensure no spread of weeds/ diseases within the DE. • All personnel will be made aware of weed management practices through the induction / training process.		night driving/works or access using unapproved routes. • Toolbox talks / site inductions to address site access and vehicle requirements and likely fauna present and procedures should any be hit.		(within 24hours (9474 9055).

5.6. Social surroundings

The (Tier 1) management actions to minimise potential impacts on the environmental factor 'social surroundings' are described in Table 13.

Table 13: Management actions to minimise impacts on social surroundings

Social surroundings					
Activity	Construction activities				
Potential Impacts	• Restricted public access to Proposal area during construction phase and temporary relocation of some existing vessel mooring holders • Increase waste to Rottnest Island during construction works • Impacts to recreational values including impacts to recreational fishers from loss of fish feeding/spawning habitat; potential impact to public safety particularly swimmers, impacts to mooring users from lighting, odour, noise or dust • Potential for bushfire • Potential disturbance of Unexploded Ordinance (UXO) site • Potential impacts to previously unidentified Aboriginal cultural heritage				
	Management Actions	Environmental Performance			
Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
Noise emissions do not exceed assigned noise levels as prescribed in the *Environmental Protection (Noise) Regulations 1997*	• Construction contractor specifications will require that all construction work will be carried out in accordance with control of noise practices set out in Section 4 of Australian Standard 2436 "Guide to Noise Control on Construction, Maintenance and Demolition Sites. • Vehicle operation will occur during prescribed hours (between 07:00 and 17:00). Noise is not to exceed *Environmental Protection (Noise) Regulations 1997*. • Equipment will be fitted with noise control devices where possible and appropriate.	Contractor	• Physical inspections during works with the potential to generate noise impacts, e.g. heavy equipment operation. • Noise monitoring may be undertaken if ongoing complaints are received. • Weekly Inspection Checklist. • Equipment Maintenance Register. • Complaints register detailing date, time. Location and nature of complaint	• Prior to construction activities • Daily or weekly where required during ground disturbance	• Complaints will be investigated, and the complainant contacted within seven days

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	• A community complaints procedure will be implemented for the construction period of the proposal and the community will be notified of how to make a complaint.				
No fugitive dust emission outside of the DE	• Implement dust suppression measures, including use of water carts on cleared areas. • Enforce speed limits in construction areas • Daily visual monitoring of airborne dust to confirm no offsite dust impacts and efficacy of dust control measures.	Contractor	• Complaints register detailing date, time. Location and nature of complaint • Daily visual monitoring records	• Daily throughout construction activities	• Complaints will be investigated, and the complainant contacted within seven days • Review effectiveness of dust suppression and implement further management actions if necessary
Reduce waste volume, maximise recycling, reuse and recovery, prevent any construction waste/litter entering the environment.	• Provide labelled waste bins to accommodate the type, volume and service frequency of anticipated waste streams. • Daily inspection of work site to occur. Review of waste bins (% full, time to next service). • All loads arriving or leaving the site will be appropriately secured. • Provide information regarding waste management in sites specific inductions, including waste separation and importance of securing vehicle loads. • Each construction laydown will have a dedicated storage area for fuels, lubricants, and small quantities of other hazardous materials. • Implementation of an active program of recycling for office paper and cardboard, plastics, glass, batteries and scrap metal.	Contractor	• Daily visual monitoring • Complaints register detailing date, time. Location and nature of complaint	• Daily throughout construction activities	• Contractor to immediately report any non-conformance to RIA without delay.

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	• Implementation of responsible handling and storage procedures for wastes such as waste oil until collected by a licenced waste transporter for removal and recycling • Waste volumes will be monitored leaving the site from waste contractors				
Zero incidents of fire resulting from the Proposal	• Emergency response protocols will be developed and implemented by the Contractor • Fire extinguishers within all vehicles and plant	Contractor	• Record of any fire occurrences during construction • Weekly inspections testing compliance for fire extinguishers • Incident register	• Throughout construction	• Any fires to be reported immediately to RIA • Cause of fire to be investigated and risk assessment and management actions to be undertaken to prevent further occurrences
Minimise risk of disturbance to UXO site	• Undertake UXO survey prior to construction works to assess anomalies identified during the initial UXO survey	Contractor	• Pre-mobilisation checks, risk register • UXO survey report	• Pre-mobilisation	• Survey to be appended to contractor construction management plan to be considered during construction activities
Minimise potential impacts to any previously unidentified subsurface Aboriginal Cultural Heritage (ACH)	• As per the recommendations from the representatives of the Whadjuk NTC group: • Archaeological monitors are to be present during all ground disturbing works and that archaeological techniques, such as test pitting and sieving, are employed if artefacts are found.	Contractor	• Visual inspection / monitoring present during ground disturbance and all Aboriginal Heritage fins are to be recorded and reported to the Department of Planning, Lands and Heritage (DPLH).	• Throughout ground disturbance	• Monitors are to be consulted for adaptive management recommendations

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	• A proprietary ritual (Welcome to Country and Smoking Ceremony) be performed prior to the works occurring. • Interpretative signage be installed at the site to provide people visiting the island with more information about Aboriginal history of the area. • Availability to hold Smoking ceremonies throughout the project should the Whadjuk Traditional Owners request the need to do so. • Cultural heritage inductions for all project members to be undertaken by a senior Whadjuk Elder at the commencement of the project with ongoing inductions to be done by RIA Heritage for new project staff. • Ongoing consultation will be undertaken with traditional owners as required to determine additional Aboriginal heritage information about potential sites.				
No complaints regarding relocation of moorings	• RIA to undertake ongoing stakeholder consultation and the minimum number of moorings will be relocated as required to construct the facility.	RIA	• Stakeholder engagement records • Complaints register	• Pre-mobilisation and ongoing if necessary	• Further stakeholder engagement to be undertaken and complainant contacted within 7 days
No complaints regarding artificial lighting	• Ensure works to be undertaken during daylight hours only. • Lighting monitoring on a monthly basis to ensure compliance	Contractor	• Monitoring reports	• Day works and monthly monitoring throughout construction	• Adaptive management to be investigated depending on the situation

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
Ensure adequate public safety measures are implemented to avoid incidents on the public (i.e. swimmers)	• Installation of floating markers and signs to limit access to the construction areas • Weekly site inspections (walk overs) to ensure appropriate signage is displayed and visible to prevent boat anchorage and limit public access to construction areas	Contractor	• Visual sites inspection logs and photos	• Weekly throughout construction works	• Add more signs or move them to be more visible • More markers

5.7. Hydrocarbon Management

The (Tier 2) management actions proposed to minimise potential impacts associated with hydrocarbon spill described in Table 14.

Table 14: Management actions to minimise the risk of hydrocarbon pollution

Activity	General Vessel Operations				
Potential Impacts	• Decrease in MEQ quality due to water and potential sediment contamination • Potential smothering of BCH and marine fauna				
Management Targets	Management Actions	Environmental Performance			
	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
No hydrocarbon spills to the marine environment from construction/dredging activities	Document vessel bunkering management, including appropriately licensed bunkering facilities	Contractor	• Vessel management procedures	• Prior to dredge entering Western Australian Waters from overseas or interstate.	• Marine construction operations not to commence prior to development and Proponent approval of vessel bunkering management procedure
	Undertake vessel maintenance and bunkering in accordance with contractor approved vessel management systems	Contractor	• Vessel management procedures	• For the duration of dredging/ construction	• Vessel bunkering management systems to be reviewed and refined (if required) in the event of an identified procedural breach or hydrocarbon spill
	Implement industry standard hydrocarbon management practices (chemical handling, storage, segregation and spill response) No discharge of fuel, oil, or lubricants within the Marine Reverse Boundary.	Contractor	• Vessel management procedures • The approval holder and RIA is to be notified immediately in the event of a hydrocarbon	• Prior to commencement of dredging/ construction	• Marine construction operations not to commence prior to development and approval of vessel management procedures • Investigate spill event and review management actions and responses

			spill of any volume		
	Undertake an environmental inspection of all construction vessels	Contractor	• Vessel management procedures	• Prior to the commencement of dredging/ construction	• Marine construction operations not to commence prior to development and approval of vessel management procedures

5.8. Waste Management

The (Tier 2) management actions proposed to minimise potential impacts that waste management may have on the environment are listed in Table 15.

Table 15: Management actions to manage waste

Activity	Incorrect or accidental disposal from a vessel				
Potential Impacts	• Impacts on the MEQ (both sediment and water) and marine fauna due to presence of foreign materials				
Management Actions	Environmental Performance				
Management Targets	**Actions**	**Responsibility**	**Reporting/Evidence**	**Timing**	**Contingency**
No release of waste into the marine environment.	Manage waste in compliance with requirements for RIA and in accordance with MARPOL 73/78 Convention Annex IV (sewage) and Annex V (garbage). Contractors to establish and implement a sewage and garbage disposal plan in accordance with RIA requirements and MARPOL 73/78 No discharge of blackwater solid waste, fuel, oil, or lubricants within the Marine Reverse Boundary.	Contractor	• Plan – one week prior to construction • Incident - Within 12 hours of a reportable incidence.	• Prior to and throughout marine construction	• RIA to approve Plan prior to commencement of construction • Plan and procedures to be revised to prevent recurrence of incident • RIA to audit performance during construction if/as required.
	Manage the correct disposal and reporting systems Only a licenced Controlled Waste Carrier to be used for any controlled waste discharged ashore	Contractor	• Controlled waste tracking forms to be completed as soon as possible.	• Throughout marine construction	• RIA to audit performance during construction if/as required.
	All forms of waste need to be stored in appropriately labelled drums or tanks	Contractor	• Approval certification and tracking forms to be	• Duration of construction activities.	• Vessel management plan/procedures to be reviewed

Management Targets	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
	and be correctly disposed of and not discharged to the environment		completed as soon as possible • Vessel waste management plan/procedures.		and endorsed by RIA prior to construction • RIA to audit performance during construction if/as required.
	Reporting of any type of spillage within the marine environment directly to the RIA.	Contractor	• As soon as possible, within 24 hours.	• During the duration of construction activities.	• Revise associated management plans or procedures to ensure no incident recurrence • RIA to audit performance during construction if/as required

5.9. Introduced Marine Pests

The (Tier 2) management actions proposed to minimise potential impacts that waste management may have on the environment are listed in Table 16.

Table 16: Management actions to minimise of introduced marine pests

Activity	Introduction of marine pests from vessels entering the area				
Potential Impacts	• Impacts on local marine fauna due to presence of introduced marine pests (IMPs)				
Management Targets	Management Actions	Environmental Performance			
	Actions	Responsibility	Reporting/Evidence	Timing	Contingency
No introduction or movement of IMPs	Use the WA DPIRDs 'Vessel Check' risk assessment (https://vesselcheck.fish.wa.gov.au) and submit to RIA (including supporting documentation) for all dredging and support vessels (i.e. dredge vessel and Barges) that mobilise from interstate or international waters. Risk assessment must indicate that the vessel poses a low risk of introduced marine pests (IMP(to the Proposal area. All vessels will comply with Commonwealth biosecurity requirements and complete DPIRDs 'Vessel check'. All vessels will have a ballast water management plan and ballast water exchanges will be in accordance with IMO requirements and the Commonwealth *Biosecurity Act 2015.*	Contractor	• 'Vessel Check' risk assessment report (including supporting documentation) • If pest is identified record location, date and time, size, colour, water depth, environment (e.g. beach, sand etc), and take a photo.	• Prior to vessel(s) entering the Proposal Area.	• Notify RIA and DPIRD of the identification or suspected introduction of IMPs within 12 hours (1800 815 507).

6. Reporting

A summary of the reporting requirements for the proposal are provided in Table 17. Reporting may be revised following further advice from DWER.

Table 17: Compliance reporting requirements

Report	Content	Timeframe	Responsibility	Recipient
Environmental Incidents or Environmental Risks Report	Report any environmental incident or environmental risk Detail the incident or risk, the measures taken, the success of those measures in addressing the incident or risk and any additional proposed to be taken Document any incidents involving the construction activities that result in injury or death to any marine/terrestrial fauna species, including fish kills. The date, time and nature of each incident and the species involved, if known, must be recorded (see Table 19).	Within 12 hours	Construction Contractor/s	RIA/DoT – Reportable Oil Spill/ Pollution Report form (POLREP) DBCA – Reportable wildlife incident RIA/DPIRD – Reportable IMP detected.
Non-compliance Summary Report	Identify which EPO has not been achieved Detail the monitoring results that identified the EPO was not being achieved Describe the investigation being undertaken into the cause of the EPO not being achieved Identify any corrective or contingency management actions proposed to be implemented or being implemented	Within 7 days of determining that an EPO has not been achieved	RIA	Department of Water and Environmental Regulation (DWER)
Non-compliance Investigation Report	Identify which EPO has not been achieved Detail the findings of the investigations undertaken into the cause of the EPO not being achieved	Within 30 days of determining that any EPO has not been achieved	RIA	DWER
Close-out Report	Report which evaluates the performance of monitoring and management in achieving the EPOs.	Within 12 months following completion of construction	RIA	DWER

6.1. Additional Reporting

A summary of the additional reports that are expected to inform compliance reporting commitments (Table 17) are listed in Table 18.

If injured or deceased marine fauna are sighted or introduce marine pest is identified the reporting requirements for specific marine fauna incidents are listed below in Table 19. Injury to conservation significant fauna or listed species as a result of the Proposal activities, or general observations of injured wildlife not related to the Proposal, are to be reported immediately to the Contractor site supervisor. The site supervisor is to notify RIA the appropriate recipient.

Table 18: Additional reporting requirements required to demonstrate compliance

Topic	Content	Timeframe	Responsibility	Recipient
Site and vessel inspection checklists/logs	• Vessel Environment, Safety & Health inspection – (e.g. equipment inspection, navigation equipment systems, speed, MFO personnel, bunkering log). • Construction operation log – (e.g. activity times, types of operations, Global Positioning System (GPS) location, activities undertaken). • MFO Logs – (e.g. activity times, name of observer, fauna species, distance/direction from vessel, management response).	Daily during marine construction.	Contractor	RIA
Clearing register	• Dates, locations and sizes of land clearing • Photographs • Incident reports.	Daily throughout land clearing activities.	Contractor	RIA
Pollution Incidents	Reactive pollution incident report as required. Approval Holder to coordinate state reporting requirement to DoT Maritime Environmental Emergency Response (MEER) duty officer and online Pollution Report Form (POLREP).	Within 24 hours of incident.	Contractor RIA	DoT / RIA
Complaints	Approval Holder to be notified of any complaints received in relation to the dredging activities. Notification should detail the nature of the complaint and how it was resolved.	Within 7 days of any complaint received.	Contractor	RIA

Table 19: Reporting requirements and contact details for injured marine fauna

Wildlife	Content	Timeframe	Responsibility	Recipient
Sick or injured wildlife; snake removal	• Location including GPS coordinate • Within or outside of work area • Time of observation • State/condition of individual/s • Affected species • Image (if possible).	Within 24 hours as being notified (as soon as possible)	Contractor RIA	WILDCARE Helpline (24 hr) (08) 9474 9055
Fish deaths	• Location including GPS coordinate of fish kill • Estimated number of dead fish • Species affected • Photograph.	Within 24 hours as being notified (as soon as possible)	Contractor RIA	Fish Watch (24 hr hotline) 1800 815 507
Animal or plant deaths obviously caused by pollution	• Location including GPS coordinate • Within or outside of work area • Time of observation • Cause of pollution • Condition of species and estimated number.	Within 24 hours as being notified (as soon as possible)	Contractor RIA	DWER (24 hr Pollution Watch Hotline) 1300 784 784
Possible IMP	• Location (GPS coordinate, or nearest landmark) and water depth • Date and time of detection • Size and colour of IMP • Environment (i.e. beach, sand, rock pool, in weed, water, attached to structure) • Photo.	Within 24 hours as being notified (as soon as possible)	Contractor RIA	FishWatch on 1800 815 507 Email: aquatic.biosecurity@dprid.wa.gov.au Local DPIRD office

7. Ongoing stakeholder consultation

Stakeholders are important to any development within WA, and RIA understands the stakeholders are extremely important in this process. Stakeholders will be notified of proposal developments through the Proposal website https://www.ria.wa.gov.au/projects-and-developments/significant-projects/south-thomson-barge-landing.

8. Availability of the CEMP

This CEMP will be available on the EPA and RIA websites and can be provided to the public or stakeholders upon request.

9. Audit and review

RIA are committed to continual improvement and will conduct regular review of the content and implementation of this CEMP. This includes undertaking audits of construction contractors and their operations as required throughout the proposal, to assess compliance against this CEMP. The performance of the dredging operations against these requirements will be reported.

This CEMP is a living document and will be reviewed in accordance with Table 20. Any significant changes must be documented in Appendix A. Changes to the document may also require approval from DWER, depending on the requirements of the Ministerial Statement.

Table 20: CEMP Review Schedule

Timing	Rationale
Upon receipt of approval conditions	If Regulator (DWER) approval conditions are provided for the proposal this will necessitate a comprehensive review of this CEMP to ensure all relevant commitments are covered within this Plan to ensure compliance.
Prior to commencement of action	To ensure that the contractor and approval holder implement all commitments accordingly and that no operational details are non-compliant. To confirm the most suitable monitoring locations, trigger levels and monitoring methods area appropriate.
Any time operational activities significantly alter	Operational changes to the proposal may result in an altered risk profile. Therefore, the CEMP will require a review to ensure that it remains fit-for-purpose for altered operational conditions. Any significant change in environmental risk may require the CEMP to be resubmitted to DWER for endorsement.
Following any significant incidents or non-compliance events	To ensure that the management actions and controls in place are adequate to ensure no re-occurrence of incidents or non-compliances.

During review of the CEMP, consideration will be given, but not limited to:

- Overall effectiveness of the CEMP
- Changes in schedule
- Changes to monitoring trigger values, where determined to be ineffective or inappropriate
- Any changes in methodology or equipment used.

10. References

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Appendix A. Plan Amendments

Document Change Register

Organisation	Date	Comment	Response

Appendix B. Marine Fauna Provisions

Appendix B.1. Dedicated Marine Fauna Observers

Training and qualifications

Two Dedicated Marine Fauna Observer (MFOs) will be used prior to and throughout piling works and rock dumping and excavation activities. The dedicated MFOs are a person with a degree in biology, ecology, zoology or environmental sciences and demonstrated experience with the identification and management of marine fauna. They will be suitably trained and qualified, adhering to the requirement of the Wildlife Conservation (Closed Season Marine Mammals) Notice 1998. MFOs must demonstrate a knowledge of marine wildlife species in the South-west marine bioregion, including Threatened and Migratory Species listed under the EPBC Act and BC Act and priority listing, including morphological and behavioural characteristics. The dedicated MFOs will have demonstrated knowledge and experience in marine fauna species observation, distance estimation and reporting. They will not have other duties while engaging in visual observations.

Evidence of personnel suitability will be kept on record through staff curriculum vitae, training certificates and in-field record keeping, which may be used in future audits. Information will include:

- MFO names and contact details.
- Details of MFOs training (including provider and course dates)
- Previous experience as MFOs on underwater piling surveys and/or rock dumping and excavation works.
- Other MFO experience.

Shifts

Dedicated MFO shifts will be set prior to field mobilisation to prevent observer fatigue, which can reduce the quality of observation and data recording. From a health and safety perspective, having coordinated shifts will ensure that observers have amenity breaks and reduced weather exposure.

Platform and observations

The dedicated MFOs will be on a suitably elevated platform elevated point, for example this could include from a roaming vessel, piling barge, or existing infrastructure, that provides appropriate unimpeded vantage of the Management Zones and with 360-degree views around the noise source (piling or rock dumping and excavation). This point may need to shift pending the location of the noise source on any given day (i.e. site construction activities).

Observations will be completed using both binoculars and the naked eye, switching between the two to reduce observer fatigue. The binoculars will ensure that the Management Distances can be effectively monitored.

Recording and Reporting

Field log

The dedicated MFOs will use a pre-designed datasheet to record observer effort, fauna observation and mitigation measures. All records will be sent to DBCA. Field logs will include:

- Location, date and start time of observations
- Name of the two Dedicated MFOs on shift
- Start/finish time of piling or rock dumping and excavation activities
- Other marine fauna observations within 500 m of piling operations
- Fauna behaviours, in particular any behaviours that could be attributed to piling or rock dumping and excavation activities
- Location, times and reason when observations were hampered by poor sighting conditions
- Location and time of pre-start, soft-start, and shut-down procedures for piling, and pre-start and shut-down procedures for rock dumping and excavation
- Location, time and distance of any fauna sighting and mitigation applied
- Observed cetacean in a format consistent with the National Cetacean Sighting and Stranding's Database.
- Adherence to management responses in relation to dead or injured wildlife.

Reportable incidents

All employees and contractors shall immediately report all environmental incidents as a non-conformance, whether these are reportable non-reportable incidents (i.e. performance indicators are not met, or management actions are not followed to the Contractor site supervisor who will investigate the incident). It is a requirement that all incidents follow RIA Incident Management Procedure. The employee is to report the incident immediately to the site supervisor. In every case the site supervisor is to document the incident using RIA's Incident Management System.

Reportable incidences are injury to conservation significant fauna or listed species as a result of the Proposal activities or general observations of injured wildlife not related to proposal activities to be reported to Contractor PM. The PM is to notify RIA who will notify DBCA and DWER. All environmental incidents will be reported by RIA within 24 hours of RIA being made aware.

Completion report

On completion of the program the construction program piling and rock dumping and excavation, a full report will be submitted which will allow for compliance auditing. The report will include a full summary report of operations, sightings and mitigation actions impletion for the duration of the campaign. On completion of the program, RIA will provide a full report to DBCA.

Appendix B.2. Piling provisions

Management zones

Management Zones, that will be monitored by two Dedicated MFOs during piling works, have been set for target marine fauna groups, namely:

- Observation Zones
- Exclusion Zones.

These Management Zones have been informed by results of the underwater noise modelling results (Tetra Tech 2024) (Table B1; Figure B1). The proposed piling method is to use a vibro-hammer, which produces a continuous (non-impulsive) noise reducing noise exposure. However, it is possible that the vibro-hammer may meet refusal, and in these instances, impact hammer piling will be required. Therefore, the underwater noise modelling (Tetra Tech 2024) modelled both vibro-hammer and impact hammer piling methods, and the same management zones will be implemented for both methods, using a precautionary approach. For each group, Observation Zones have been informed by the modelled Temporary Threshold Shift (TTS) onset distance and the Exclusion Zones are based on the Permanent Threshold Shift (PTS) onset distance from the underwater noise modelling. These distances adopt a precautionary approach to the management zone distances, by using management zone distances from the 'high tide' impact hammer piling approach modelled scenario where noise propagates the farthest and had the greatest potential zones. The adopted zones are broader than the model outputs, based on the inherent variability between underwater noise modelling and empirical values. Therefore, the zones need to be larger than the modelled, based on PTS and TTS distances. The observable distances are easily achievable.

Fish species were also modelled in Tera Tech (2024) noise modelling. Fish species are not surface breathers, therefore they do not bask at the surface which makes observations an ineffective mitigation measure. However, larger elasmobranchs may be present (e.g. rays and sharks) and can occasionally be viewed from the surface if weather conditions and water clarity allows for it. The noise modelling results for fish found for impact piling TTS and PTS for all fish modelled (no swim bladder, fish with a swim bladder not involved in hearing, fish with swim bladder involved in hearing, eggs and larvae, small fish, and large fish) were all <100 m and a maximum behavioural response of 348 m for small and large fish (Tera Tech 2024). For vibration piling TTS, PTS, and behavioural response were all below 50 m. As a precautionary approach, if rays or sharks are sighted within the turtle zones the procedures outlined below will be implemented.

The methods below will be implemented for both vibro-hammering and impact hammer piling

Table B1: Marine Fauna - Observation and Exclusion Zones (Based on Tetra Tech 2024, impact hammer piling scenario – worst-case scenario for PTS and TTS, Vibratory Piling for Behavioural distance)

Species	Impact TTS distance limit	Impact PTS distance limit	Impact behavioural response	Vibro-piling TTS distance limit	Vibro-piling PTS distance limit	Vibro-piling behavioural distance limit	Observation Zone	Exclusion Zone
Whales (low frequency cetaceans)	404	73	84	19	-	167	600	300
Toothed whales (mid-frequency cetaceans)	36	-	84	-	-	167	600	300
Dolphin (high-frequency cetaceans)	500	73	84	-	-	167	600	200
Australian sea lion and New Zealand furl seal (Otariids pinnipeds)	25	-	84	-	-	167	300	150
Turtles	30	3	37	-	-	-	300	150

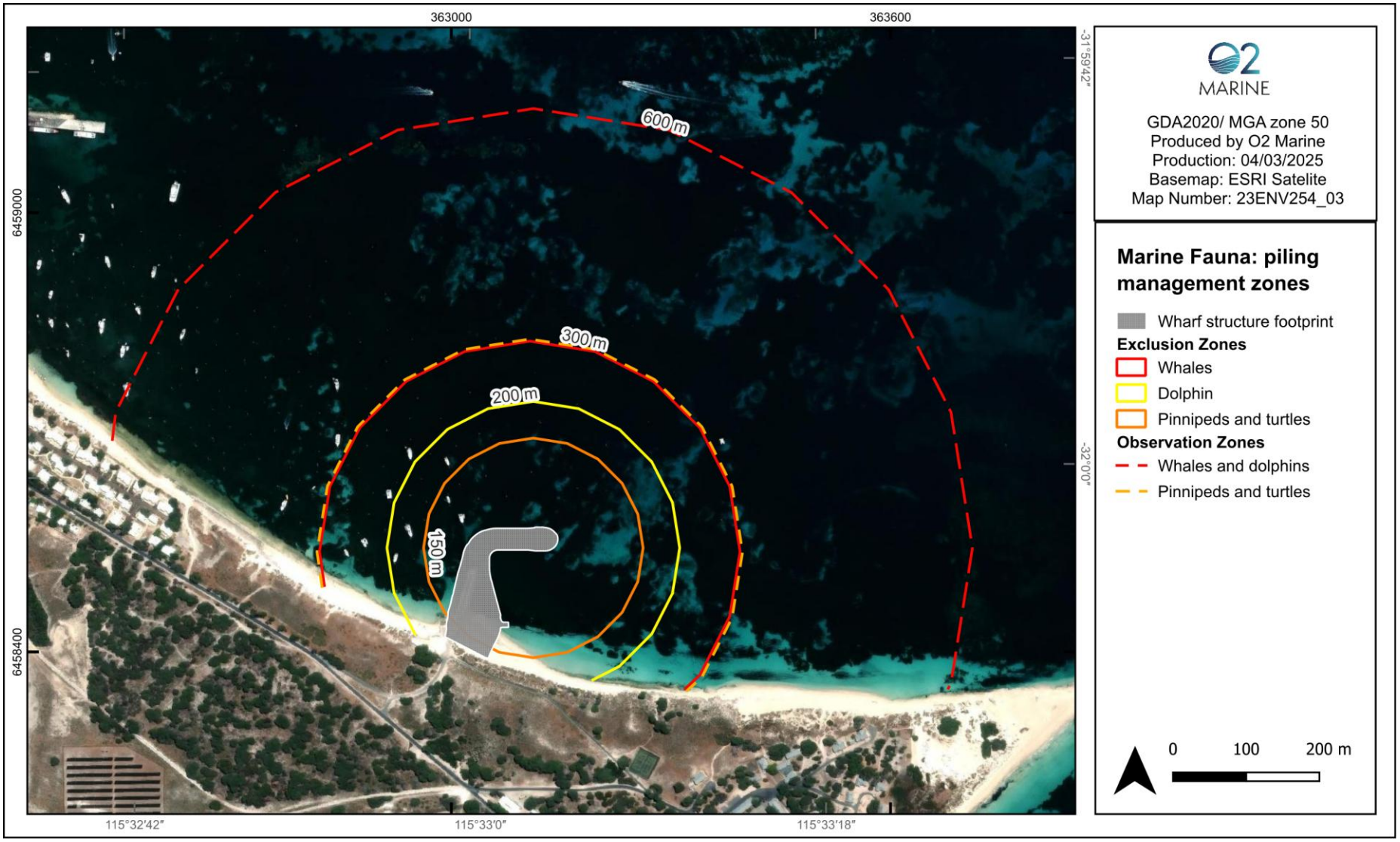

Figure B1: Fauna Piling Management Zones

Pre-start

Prior to piling works (vibration and hammer) each day and for each pile the dedicated MFOs will commence continuous visual observation within the management zones for 30-minutes. MFOs must have sight lines of the piling Observation Zone, enabling them to effectively manage the disturbance distance and species management zones. MFOs in conjunction with underwater piling contractors and PM will carry out the following duties and comply with the following protocols in regard to pre-start procedures:

- If target marine fauna is observed within the management zone, piling operations shall be delayed until target marine fauns have been observed exiting the Observation Zone or have not been seen for 30-minutes
- If target marine fauna is not observed within either the Exclusion or Observation Zones within 30-minutes, underwater piling can commence with soft-start procedures.

Soft-start piling

Soft-start procedures is required for all marine pile installation (except for piles that require dynamic load testing). Soft-start involves the commencement of impact hammer piling at low energy, where the hammer energy gradually increases but remains below 90% capacity over a continuous 30-minute period. This procedure may alert marine fauna to the presence of the piling activity and enable them to move away to distances where injury is unlikely. The dedicated MFOs will continuously monitor the management zones during soft-start procedures. Full energy may only be used after the 30-minute soft-start period, if no marine fauna are sighted within the Exclusion Zone.

- If target marine fauna are observed in the Observation Zone, soft-start procedures will continue and the MFO will continue to monitor the marine fauna
- If target marine fauna are observed in the Exclusion zone, soft-start procedures will cease until the observed target marine fauna leaves the Exclusion Zone target or have not been seen for 30 minutes, on competition of the 30 minutes duration and no animal has been observed in the exclusion zone soft-start procedures will recommence

If it is evident that the marine fauna are in distress then piling operations shall cease until marine fauna have exited the management zones or have not been seen for 30 minutes. Once target marine fauna have exited the management zone, soft start piling may recommence.

Normal piling

Where target marine fauna are not observed in Management Zones during soft-start procedures then normal piling can commence. Normal piling involves commencement of full energy piling. The dedicated MFOs will continually monitor the management zones during normal piling. If marine fauna is sighted then the shut-down procedures will be implemented.

Shut-down procedures

The dedicated MFOs will maintain continuous observations during underwater piling. They will notify the Project Manager/Piling contractor if target marine fauna is sighted within the corresponding Observation or Exclusion Zone. Where marine fauna is observed within the Observation Zone (but

outside the Exclusion Zone) during piling activities (including Soft-start procedures), then the following action shall be taken:

- If target marine fauna is sighted and is in distress then piling activities shall be suspended within two minutes of the sighting, or as soon as safely possible
- If target marine fauna is not showing signs of distress and remains within the Observation Zones (but outside the Exclusion Zones), piling activities will continue and the MFO will continue to monitor the target marine fauna
- Underwater piling works will cease if target marine fauna enters the Exclusion Zone.

Where target marine fauna is observed within the Exclusion Zone during piling activities (including Soft-start procedures), then the following actions will be taken:

- Piling works will cease when target marine fauna is identified within, or about to enter, the Exclusion Zone
- Piling activities that have been suspended must not recommence until the target marine fauna has exited the corresponding Exclusion Zone and Observation Zone of its own accord or has not been seen by the MFO within these zones for a period of 30-minutes
- Once able to resume, piling will recommence following soft-start procedures.

Low-visibility conditions

Piling will be restricted to daylight hours only, these hours will vary depending on the time of year piling is undertaken (unless in the case of a safety/emergency). During periods of low visibility (i.e. where a distance of 600 m cannot be clearly viewed), then piling operations may commence with soft-start procedures provided that during the preceding 24-hour period:

- There have not been three or more circumstances where marine fauna have been observed which resulted in ceasing of piling operations
- There have not been three or more whale instigated shut-down situations
- A 2-hour period of continual observations was undertaken in good visibility within the 24-hour period prior to proposed piling and no marine fauna sighted
- If marine fauna are sighted, the shut-down procedures will apply.

Appendix B.3. Rock dumping and excavation

Management zones

Two Management Zones; Observation Zone and Exclusion Zones will be monitored by two Dedicated MFOs (see Appendix B.1) during rock dumping and excavation works, have been set for target marine fauna groups. These Management Zones are presented in Table B2.

Table B2: Marine Fauna - rock dumping and excavation zones

Marine Fauna Group	Observation Zone (m)	Exclusion Zone (m)
Whales	500	300
Dolphins	300	150
Sea lions and seals	500	300

Marine Fauna Group	Observation Zone (m)	Exclusion Zone (m)
Turtles	500	300

To mitigate the potential impacts of rock dumping and excavation on conservation significant marine fauna two dedicated MFOs must implement the following management and monitoring protocols.

Pre-start

Prior to rock dumping and excavation works the dedicated MFOs will commence continuous visual observation within the Management Zones (Table B2) for 30-minutes. MFOs must have sight lines of the rock dumping and excavation Observation Zone, enabling them to effectively manage the disturbance distance and species management zones. MFOs in conjunction with contractors and PM will carry out the following duties and comply with the following protocols in regard to pre-start procedures:

- If target marine fauna is observed within the management zone, rock dumping and excavation shall be delayed until target marine fauns have been observed exiting the Observation Zone or have not been seen for 30-minutes
- If target marine fauna is not observed within either the Exclusion or Observation Zones within 30-minutes, rock dumping and excavation can commence.

Rock dumping and excavation

Rock dumping and excavation work may commence following the 30-minutes, if the requirements above are met, and the dedicated MFOs must maintain continuous observation around the rock dumping and excavation work, if the dedicated MFOs observe a target marine fauna species within the Exclusion Zones then shut-down procedures will be implemented.

Shut-down procedures

Where target marine fauna is observed within the Exclusion Zone during rock dumping and excavation activities, then the following actions will be taken:

- Rock dumping and excavation activities will cease with 2-minutes or as soon as safely possible when target marine fauna of when target marine fauna is identified within, or about to enter, the Exclusion Zone
- Rock dumping and excavation activities that have been suspended must not recommence until the target marine fauna has exited the corresponding Exclusion Zone and Observation Zone of its own accord or has not been seen by the MFO within these zones for a period of 30-minutes rock dumping and excavation activities can recommence
- Where marine fauna is observed within the Observation Zone (but outside the Exclusion Zone) during rock dumping and excavation activities (including Soft-start procedures), then the following action shall be taken:
- If target marine fauna is sighted and is in distress then rock dumping and excavation activities shall be suspended within two minutes of the sighting, or as soon as safely possible
- If target marine fauna is not showing signs of distress and remains within the Observation Zones (but outside the Exclusion Zones), rock dumping and excavation activities will continue and the MFO will continue to monitor the target marine fauna
- Rock dumping and excavation works will cease if target marine fauna enters the Exclusion Zone.

Low-visibility conditions

Rock dumping and excavation will be restricted to daylight hours only, these hours will vary depending on the time of year piling is undertaken (unless in the case of a safety/emergency). During periods of low visibility (i.e. where a distance of 500 m cannot be clearly viewed), then rock dumping and excavation activities may commence with soft-start procedures provided that during the preceding 24-hour period:

- There have not been three or more circumstances where marine fauna have been observed which resulted in ceasing of rock dumping and excavation activities operations
- There have not been three or more whale instigated shut-down situations
- A 2-hour period of continual observations was undertaken in good visibility within the 24-hour period prior to rock dumping and excavation activities and no marine fauna sighted
- Rock dumping and excavation activities will be restricted to daylight hours only, these hours will vary depending on the time of year the work is undertaken (unless in the case of a safety/emergency)
- If marine fauna are sighted, the shut-down procedures will apply.

Appendix B.4. Vessel strike provisions

Vessel approach distances

The distances have considered the Australian National Guidelines for Whale and Dolphin Watching (DoEE 2017), the National Strategy for Reducing Vessel Strike on Cetaceans and other Marine Megafauna (CoA 2017), and the WA Biodiversity Conservation Regulations 2018 (Table B3).

The speed limit with the proposal's Development Envelope (DE) are already below 6 knots and therefore are consistent with vessel speed restriction for marine fauna of 6 knots. Caution zones cannot be entered into by a vessel if the animal is injured, stranded, entangled, or distressed or if a single calf or pod of calves are present. No more than three vessels are permitted to be in a caution zone at the same time. Should a travelling dolphin enter the no approach zone, including with an attempt to 'bow ride', the vessel shall either maintain its course and speed, or maintain its course and gradually slow down.

Table B3: Marine fauna - vessel approach distances (DoEE 2017)

Marine fauna group	Caution zone	No approach zone (metres)	Distress/disturbance
Adult whales	300	100 m to the side of the whale 300 m in front or to rear of the whale	Withdraw from caution zone at speed less than 6 knots
Whale calf* present	-	300 m	Withdraw from No approach zone at speed less than 6 knots
Adult dolphins	150	50 m to the side of the dolphin	Withdraw from caution zone at speed less than 6 knots

Marine fauna group	Caution zone	No approach zone (metres)	Distress/disturbance
		150 m in front or to rear of the dolphin with the exception of animals bow-riding	
Dolphin calf* present	-	150 m	Withdraw from No approach zone at speed less than 6 knots
Sea lion	300 m	100 m	Withdrawn from No approach zone at a speed less than 6 knots
**A calf is defined as half the length of the mother/nearest adult*			

Trained MFO

Trained MFOs are typically crew members trained in marine fauna species observations and mitigation measures, consistent with the Proposals environmental management plans. Trained MFOs will be on duty on Proposal vessel during construction. There will be always at least one Trained MFO on duty during vessel transits within the Proposal area.

All vessel crews engaged for the marine construction phase of the Proposal will attend a minimum of one marine fauna induction to become familiar with the range of conservation significant marine fauna that could be present in the Proposal area and the risks that construction activities may present to this fauna. This marine fauna induction can be combined with other crew inductions that may be required. All commitments made by RIA to manage construction activities with conservation significant marine fauna will be included in the induction. The content of the induction will be updated as required to ensure it remains current and reflects the marine fauna being observed in the Proposal area and any vessel interactions with marine fauna that has occurred.

Evidence of personnel and training certificates will be kept on record which may be used in future audits. Information will include:

- MFO name and contact details
- Details of MFO training.

Platform

Trained MFO observations will be undertaken from a suitably elevated point that provides appropriate vantage of cautions zones during vessel transit and provides unimpeded views.

Recording and reporting

Trained MFOs onboard vessels are to maintain detailed daily records of all sightings of target marine fauna and other notable observations. Trained MFOs will use a pre-designed datasheet to record observer effort, fauna observations and mitigation measures, tailored to vessel operations. All records will be provided to RIA and sent to DBCA. Field logs will include:

- Location, date and start time of observations
- Name of MFO involved in the observations

- Finish time of MFO shift on transiting vessel
- Location, times and distance of any fauna sightings including species where possible
- Location, times and reason of when observation were hampered by poor sighting conditions
- Management responses including any vessel response to avoid marine fauna, and dead and injured wildlife
- Observed cetacean in a format consistent with the National Cetacean Sighting and Stranding's Database.

Reportable incidences are injury to conservation significant fauna or listed due to the Proposal activities or general observations of injured wildlife not related to the Proposal activities are to be reported to the Contractor PM. The Contractor PM is to notify RIA PM who will notify DBCA. All environmental incidents will be reported by RIA to DWER within 24 hours of RIA being made aware.