IONA SEAGRASS ENHANCEMENT AND MONITORING PLAN

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Acronyms

Acronym	Description
BoSS	Bags of Seagrass Seeds
BuDS	Buoy-Deployed Seed bags
CEMP	Construction Environmental Management Plan
cSAC	Candidate Special Area of Conservation
DDC	Drop-Down Camera
EBS	Environmental Baseline Survey
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
IMO	International Maritime Organization
INNS	Invasive Non-Native Species
OEL	Ocean Ecology Limited
PMF	Priority Marine Feature
SMEEF	Scottish Marine Environmental Enhancement Fund
UAV	Unmanned Aerial Vehicle

1 EXECUTIVE SUMMARY

Argyll & Bute Council (the Licensee) have been granted two Marine Licences (MS-00010432 and MS-00010433) by Marine Directorate Scotland for the construction of a new rock armour breakwater at Iona (the Proposed Development). Seagrass beds, a Priority Marine Feature (PMF), are present in the area and will be impacted by the Proposed Development. A total area of 2,024m² of seagrass habitat will be permanently lost within the development footprint. There is potential for a further 3,755.17m² of seagrass habitat loss within the working area, however this is a worst-case scenario as the Environmental Impact Assessment Report concluded only minor impacts on seagrass outside of the footprint of the Proposed Development. This gives a total of 5,779.17m² of potential seagrass habitat loss.

As a worst-case, precautionary estimate, the 5,779.17m² of potential seagrass habitat loss represents **at most 0.048% of the national extent of the seagrass bed PMF** due to the Proposed Development. This means it can be concluded that **the Proposed Development will not result in a significant impact on the national status of seagrass beds as a PMF**, as stipulated in Scotland's National Marine Plan. Using data of subtidal seagrass habitat distribution in the Argyll Marine Region, the 2,024m² of permanent habitat loss represents 3.72% of the known habitat in this region. The impact of the Proposed Development is not considered to be contrary to the National Marine Plan policies or objectives, however, the enhancement and monitoring outlined in this plan is proposed to avoid further loss of seagrass bed habitat.

Due to the predicted seagrass bed loss, conditions have been introduced within the marine licences to minimise damage and for the enhancement of seagrass beds within the Argyll marine planning region, to replace seagrass habitat lost as a result of the Proposed Development. To address these conditions, this Seagrass Enhancement and Monitoring Plan (SEMP) has been developed in consultation with NatureScot.

Embedded mitigation measures relevant to seagrass will limit the impacts as far as possible to the footprint of the breakwater and dredge area, to avoid wider disturbance to seagrass beds in the adjacent areas. These include micrositing, a Construction Environmental Management Plan, an Environmental Management Plan and an Invasive Non-Native Species Management Plan.

The SEMP aims to increase the extent of seagrass beds by the equivalent area of potential habitat loss (5,779.17m²) plus a 10% buffer (577.92m²). **This 10% buffer is to allow for any uncertainty in the extent of habitat loss due to the Proposed Development and in the success of enhancement measures**. Additionally, for the Proposed Development to give an overall net gain to the environment, a further 3% of the area of seagrass habitat to be potentially lost (173.37m²) may also be restored elsewhere, to give a total area of seagrass restoration of 6,530.46m² (0.65 ha).

Post-construction monitoring will show the true extent of habitat loss within the working areas of the Proposed Development. The total area of seagrass enhancement required will then be updated from the predicted areas of habitat loss to the actual extent of habitat loss, in consultation and agreement with NatureScot and the Licensing Authority.

A desktop study will be completed in collaboration with Expert Seagrass Advisors to determine the most appropriate location(s) for the seagrass enhancement, with consideration for improving seagrass bed connectivity in the Argyll region. The study will also identify the most appropriate donor seagrass beds for collection of plants or seeds for further enhancement works. The detailed enhancement methodology will be determined by an assessment of cost, potential risks and previous outcomes in similar environments. Options for consideration include replanting, reseeding and the use of a seagrass nursery. Although detailed methodologies have not yet been developed, there are many examples of successful seagrass restoration and enhancement projects, outlined in Section 7.1.3.4.

Objectives will be set, in collaboration with Expert Seagrass Advisors, to measure the success of the enhancement measures, to include a variety of metrics including extent of seagrass beds, density of seagrass beds, percentage cover and biodiversity. The enhancement will be subject to a monitoring strategy which is designed to quantify impacts compared to those predicted in the Environmental Impact Assessment Report and to provide data to measure the success of the enhancement measures in achieving the objectives.

If monitoring shows a failure to meet threshold progress, then a revised plan for enhancement may be required. This may include further studies to determine the reason for failure, followed by a further restoration attempt or financial support of other established seagrass restoration projects. The approach to the revised plan will be discussed and subject to approval by NatureScot and the Licensing Authority.

The timelines for completion of the desk-based study, enhancement method identification (including identification of sites, identification of donor locations and seagrass planting methodology), objective setting,

production of a monitoring strategy and indicative timelines for the seagrass restoration project will be subject to approval by the Licensing Authority and NatureScot.

The next stage in the execution of this SEMP will be to appoint an expert advisor for seagrass to input and provide detail for the methodologies outlined herein, noting that the SEMP will be a live document which will be periodically updated to reflect the status of the Seagrass Enhancement work. Each iteration of the SEMP will be submitted to the Licensing Authority and NatureScot for approval.

2 PROJECT BACKGROUND

2.1 Seagrass Enhancement and Monitoring Plan

The Iona Ferry Terminal's slipway is vulnerable to waves, making it difficult for the ferry to hold its position, which negatively impacts service provision and poses risks to passengers and vehicles. The solution is the development of a new rock armour breakwater at Iona (the Proposed Development). The outcome, as a result of this infrastructure, will be a much-improved ferry service, improved ability for lifeline services to travel to and from Iona and the facilitation of wider forms of economic development on both sides of the Sound.

As direct, permanent seagrass habitat loss is predicted to occur as a result of the Proposed Development, enhancement measures and monitoring are required.

This SEMP sets out the current known baseline conditions of the seagrass habitat in the vicinity of the Proposed Development, and the expected impacts of the Proposed Development on the seagrass habitat. The monitoring strategy for the Proposed Development area post-construction will be addressed, as well as mitigation and enhancement options for the areas of habitat loss. Monitoring of enhancement measures to assess success based on set objectives and adaptive management are also detailed.

2.2 Project Area

Iona is a small island located west of Mull, on the west coast of Scotland. Iona Ferry Terminal consists of a slipway and pier jutting out into the Sound of Iona. The slipway is vulnerable to waves from north, east and south, which impacts upon slipway users. The ferry is particularly vulnerable to waves at the slipway, resulting in the ramp of the ferry rising and falling from the deck of the slipway, which affects crossings. The lack of berthing structure also makes the holding of the ferry in place difficult, presenting a risk to foot passengers and vehicles. The ferry holds its position at Iona using the weight of the ramp and the friction between the ramp and the slipway deck. This current berthing practice, combined with recent repair works involving steel shuttering, means it is difficult for the ferry to grip the pier and this has a negative impact on service provision. The solution is a new rock armour breakwater at Iona.

2.3 Project Description

The Proposed Development consists of the construction of a new rock armour breakwater (185m crest length) approximately 70m south of the existing slipway. The overall footprint of the breakwater is approximately 10,037m^2. Minor overburden dredging (2,017m^2 area, 1,225m^3 dredge volume) will be required to accommodate the new navigation channel requirements. It is proposed that this is carried out by a backhoe dredger.

2.4 Requirement for and purpose of the SEMP

Argyll & Bute Council (the Licensee) have been granted two Marine Licences by Marine Directorate Scotland for this Proposed Development. The first is a Licence to construct, alter or improve works in the Scottish Marine Area (Licence Number: MS-00010432), which is valid from the 21st of September 2024 until the 20th of September 2034, with a 52-week construction programme anticipated within this timeframe. The second is a Licence to carry out any form of dredging and deposit any substance or object in the Scottish Marine Area (Licence Number: MS-00010433), which is valid from the 21st of September 2024 until the 20th of September 2027.

The conditions of relevance to seagrass habitats within these Licences are provided below, along with how these conditions are addressed within this SEMP and the accompanying Habitat Management Plan.

Condition 3.1.16 of Marine Licence MS-00010432

"*The Licensee must submit a Seagrass Mitigation and Monitoring Plan ("SMMP") which the Licensee must submit prior to the commencement of works for the written approval of the Licensing Authority. The SMMP must take an adaptive management approach and be submitted no later than 2 months prior to the commencement of the Licensed Activity, or at such a time as agreed with the Licensing Authority. In the event that the Licensee wishes to update or amend the SMMP, the Licensee must submit, in writing, details of*

proposed updates or amendments to the Licensing Authority for its written approval, no later than one month prior, or at such a time as agreed with the Licensing Authority, to the changes being implemented. The SMMP can be presented in two parts, 1) Habitat Management and Mitigation plan and 2) Enhancement and Monitoring plan and must include, but is not limited to:

- *An assessment of the maximum potential loss of seagrass, adopting a worst-case approach as a direct result of the Licensed Activities.*
- *Details as to how the seagrass habitats within the area affected by the Licensed Activities will be monitored throughout the course of the Licensed Activities.*
- *Mitigation measures to be taken to minimise the loss of seagrass anticipated as a result of Licensed Activities.*
- *Restoration and enhancement measures to be taken in the event that loss of seagrass is anticipated as a result of Licensed Activities.*

All Licensed Activities must be undertaken in line with the SMMP once it has been approved."

This condition and the equivalent condition in Marine Licence MS-00010433 (condition 3.1.8) have been addressed in the following ways:

- This SEMP and the accompanying Habitat Management Plan will be submitted to the Licensing Authority no later than 2 months prior to the commencement of the Licensed Activity, or at such a time as agreed with the Licensing Authority.
- Adaptive management is outlined in Section 10.
- The Licensee will submit, in writing, details of proposed updates or amendments to this SEMP or the accompanying Habitat Management Plan to the Licensing Authority for approval, no later than one month prior, or at such a time as agreed with the Licensing Authority, to the changes being implemented.
- An assessment of the maximum potential loss of seagrass is outlined in Section 4.6.1, which adopts a worst-case approach as a direct result of the Licensed Activities.
- Monitoring of seagrass habitats within the area affected by the Licenced Activities is outlined in Section 9.1 and 9.3. Monitoring will be carried out 1 year following the completion of construction, at the end of the following summer. This will allow the extent of effects of the Licenced Activities on the seagrass habitat to be detected.
- Mitigation measures to be taken to minimise the loss of seagrass anticipated as a result of Licensed Activities are outlined in the Habitat Management Plan and in Section 6.
- Restoration and enhancement measures to be undertaken due to the anticipated loss of seagrass as a result of Licensed Activities are outlined in Section 7.1.
- Regular consultation will be maintained with NatureScot and the Licensing Authority to ensure continuous alignment and to address any concerns promptly. The consultation will remain open and regular discussions (at an agreed frequency) will be arranged, related to the Iona project.

Condition 3.1.17 of Marine Licence MS-00010432

"*The Licensee must make every effort to minimise working within seagrass habitat and must employ best practice measures at all times throughout the Licensed Activities to prevent loss or damage to seagrass habitats, directly or indirectly, resulting from any Licensed Activities*."

This condition and the equivalent condition in Marine Licence MS-00010433 (condition 3.1.9) have been addressed via the mitigation measures outlined in the Habitat Management Plan and in Section 6.

Condition 3.1.18 of Marine Licence MS-00010432

"*The Licensee must ensure that, where seagrass habitat loss as a result of the Licensed Activity is deemed unavoidable as outlined by the SMMP, the Licensee must mitigate the impact on this Priority Marine Feature using restoration and enhancement measures. Any restoration and enhancement measures must be carried out within the Argyll Marine Planning Area and be agreed with the Licensing Authority. The Licensee must*

ensure that any restoration and enhancement carried out is at least equivalent to any seagrass lost, and ensuring that there is no overall effect on the national status of the seagrass Priority Marine Feature."

This condition and the equivalent condition in Marine Licence MS-00010433 (condition 3.1.10) have been addressed via the restoration and enhancement measures to be undertaken due to the anticipated loss of seagrass as a result of Licensed Activities outlined in Section 6.2.

Condition 3.1.19 of Marine Licence MS-00010432

"*The Licensee must monitor any seagrass restoration and enhancement measures throughout the duration of the Licence*."

This condition and the equivalent condition in Marine Licence MS-00010433 (condition 3.1.11) have been addressed via the enhancement site monitoring outlined in Section 9.2, which is in line with guidance by Kent *et. al* (2021).

Condition 3.1.20 of Marine Licence MS-00010432

"*Any damage to the seagrass that is detected and was not anticipated or outlined in the SMMP must be reported to the Licensing Authority as soon as reasonably practicable and the Licensee must produce measures to mitigate or restore any damage caused, which must be submitted to the Licensing Authority for its written approval*."

This condition and the equivalent condition in Marine Licence MS-00010433 (condition 3.1.12) have been addressed in Section 9.3.

2.4.1 Consideration of Scotland's National Marine Plan

This SEMP has been developed with consideration of Scotland's National Marine Plan. The below text highlights the relevant objectives as outlined in Scotland's National Marine Plan and how they have been addressed in this SEMP.

General Policy 9 addresses natural heritage and states that the development and use of the marine environment must:

a. Comply with legal requirements for protected areas and protected species;

b. Not result in significant impact on the national status of PMFs;

c. Protect and, where appropriate, enhance the health of the marine area.

Part a of General Policy 9

As seagrass beds are a PMF, there is no legal requirement for their protection as there would be for European Protected Species or as protected features of a Marine Protected Area, beyond providing adequate consideration for Scotland's National Marine Plan.

Part b of General Policy 9

As noted below in Section 4, the permanent seagrass habitat loss associated with the Proposed Development is 2,024m^2 as well as the potential for the loss of seagrass within the 3,755.17m^2 of seagrass habitat (Littoral *Zostera marina* / *angustifolia* beds on lower shore or infralittoral clean or muddy sand, EUNIS A5.5331) within the Iona working area (5,779.17m^2 in total).

There are currently no official estimates for the area of seagrass beds in Scotland, however, certain areas have been mapped, such as the Eden Estuary, where seagrass was found to cover 558,800m^2 as of August 2015 (SEPA, 2018). For context, the permanent loss associated with the Proposed Development would represent 0.4% of the area of seagrass in the Eden Estuary alone. However, it should be noted that the seagrass present within the Eden Estuary is predominantly *Zostera noltii* beds in littoral muddy sand (EUNIS A2.6111) with small patches of *Zostera marina* present. Whilst not directly comparable with the seagrass habitat present within the Proposed Development, it does give some indication of the extent of seagrass habitat affected.

The area of seagrass across Scotland will be much larger than the area estimated for the Eden Estuary, as seagrass beds are present at many other locations (Figure 2-1), with extensive beds present in areas including Montrose Bay, the Forth Estuary and Loch Ryan. Polygon data for seagrass bed extent is available for seagrass beds in the Marine Scotland National Marine Plan Interactive (NMPi) Maps (NMPi, 2025). This gives an extent of mapped beds (excluding beds with only point data available) of 20.78km^2 across Scotland.

The permanent loss associated with the Proposed Development would represent 0.01% of the area of the mapped extent of Scottish seagrass beds. This figure increases to 0.048% if the potential loss associated with the working area is included, however it is anticipated that not all of the seagrass habitat with the working area will be lost, therefore this is a worst-case scenario (see Section 4).

These calculations do not include all known seagrass beds, and it is likely that there are further unrecorded seagrass beds around Scotland. In addition, these sources contain mostly extensive and widely distributed intertidal seagrass beds, compared to the subtidal seagrass which is likely to be present at the Proposed Development (see section 3).

Using data from the Argyll Marine Region from NMPi seagrass shapefile layers, approximately 54,396m^2 of recorded subtidal seagrass habitat (EUNIS A5.5331) as polygon data has been calculated, and 59 points of seagrass sighting records of unknown area size were described (NMPi, 2025). The Proposed Development has the potential to affect 10.62% of this known seagrass extent. Focusing on the 2,024m^2 of permanent habitat loss, this would represent 3.72% of known seagrass extent. Whilst the area affected is still above the 1% stated by NatureScot, there may be more subtidal seagrass present within the Argyll Marine Region, as demonstrated by the 59 qualitative seagrass sighting records.

A conservative worst-case estimate indicates that a loss of 0.048% of the national extent of the seagrass bed PMF, indicates that the Proposed Development would not result it in a significant impact the national status of seagrass beds as a PMF. However, UK seagrass beds are currently considered degraded, so further loss should be avoided. When looking at the extent in the Argyll Marine Region, the conservative worst-case estimate indicates a potential permanent habitat loss of 3.72% of known seagrass extent. Therefore, although the extent of potential seagrass bed loss is not considered to be contrary to the National Marine Plan policy, the enhancement and monitoring outlined in this SEMP is proposed to avoid further loss of seagrass bed habitat.

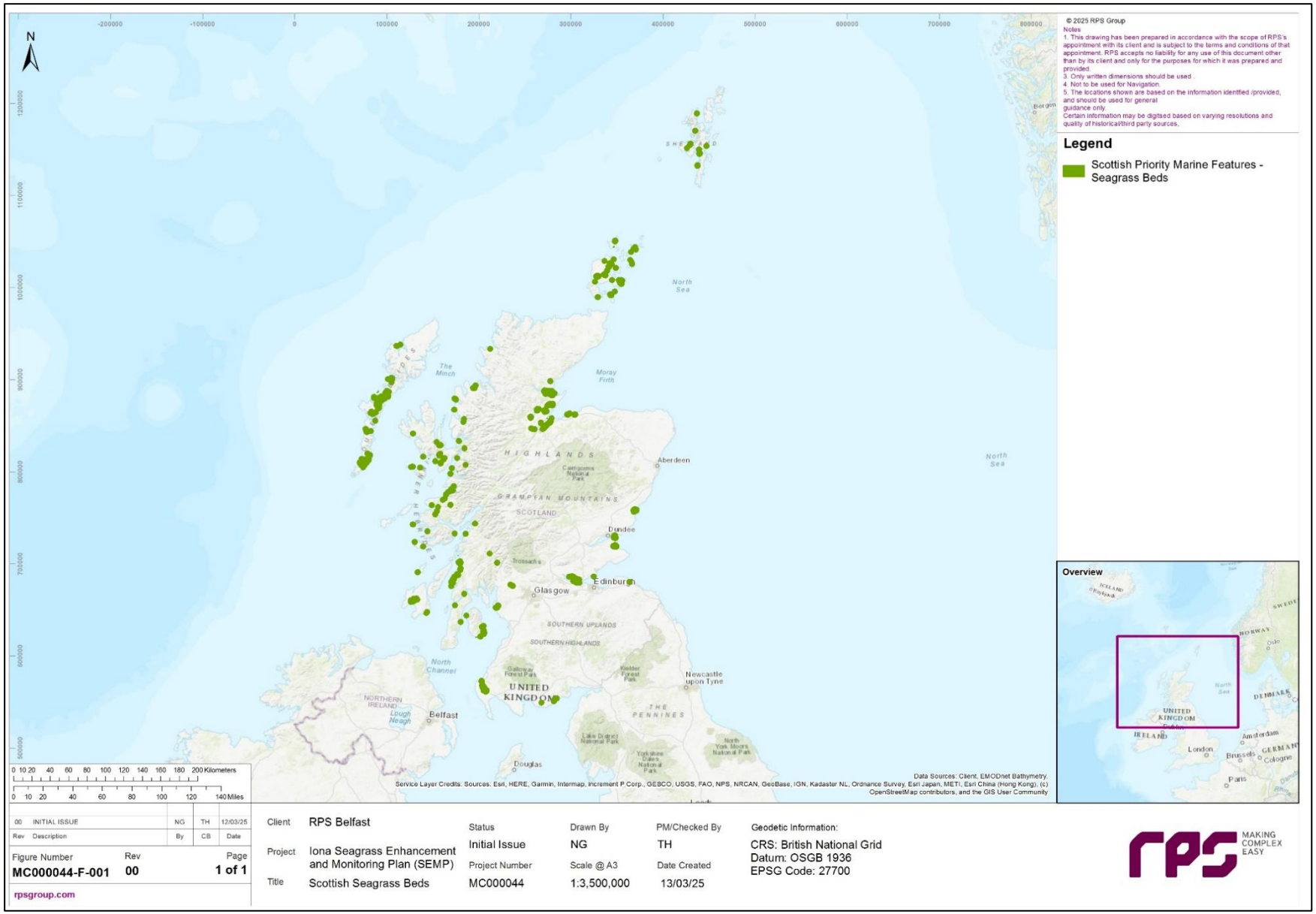

Figure 2-1: Distribution of seagrass beds (PMF) across Scotland (NMPi, 2025)

Part c of General Policy 9

Section 6 outlines the embedded mitigation which has been included as part of the Proposed Development and Section 7 outlines the measures that will be taken to enhance seagrass in the Argyll Marine Planning Area. This includes the aim to increase the extent of seagrass beds by the equivalent area of potential habitat loss plus a buffer of 10%, resulting in an enhancement area of 6,357.09m^2 (see Section 4.6.1 Area of potential seagrass habitat loss). Additionally, for the Proposed Development to give an overall net gain to the environment, a further 3% of the area of seagrass habitat that may be lost (173.37m^2) may also be restored elsewhere, to give a total of 6,530.46m^2 (0.65 ha) of seagrass bed restoration.

The strategic objectives set out in Scotland's National Marine Plan also highlight the importance of living within environmental limits. This includes the following objectives:

- Biodiversity is protected, conserved and, where appropriate, recovered, and loss has been halted (HLMO 11);
- Healthy marine and coastal habitats occur across their natural range and are able to support strong, biodiverse biological communities and the functioning of healthy, resilient and adaptable marine ecosystems (HLMO 12); and
- Our oceans support viable populations of representative, rare, vulnerable and valued species (HLMO 13).

As noted above in relation to the seagrass bed PMF, Section 6 of this report outlines the embedded mitigation which has been included as part of the Proposed Development and Section 7 outlines the measures that will be taken to enhance seagrass in the Argyll Marine Planning Area. These mitigation measures and the enhancement works will help to ensure that loss of seagrass beds is minimised and replaced where necessary, allowing for the protection and recovery of the biodiversity associated with these habitats. Furthermore, as the Proposed Development will have a highly localised impact, there will be no pathway for it to impact upon the natural range of marine and coastal habitats, or for it to affect the viability of populations of species.

As provided in Section 7, the methodology for the enhancement works have been trialled before and shown to have high success rates when undertaken correctly and in the right conditions. As a result, these works will support the health of local seagrass bed habitats.

Strategic Objectives

The National Marine Plan strategic objectives are split into the following categories:

- Good Environmental Status Descriptors;
- Achieving a sustainable marine economy;
- Ensuring a strong, healthy and just society;
- Living within environmental limits;
- Promoting good governance; and
- Using sound science responsibly.

The Proposed Development is considered to be in line with the Good Environmental Status Descriptors and the strategic objective of 'living within environmental limits', as the only significant effect predicted in the Environmental Impact Assessment Report (RPS, 2023) was permanent habitat loss for seagrass beds, and this impact is mitigated in this SEMP to ensure biological diversity and food webs are maintained.

The Proposed Development contributes positively to the strategic objective of 'achieving a sustainable marine economy' and 'ensuring a strong, healthy and just society' as the improved ferry service will positively impact the local community and economy and make the local marine environment safer to traverse. The Proposed Development is also considered to be in line with the 'promoting good governance' strategic objective.

Finally, the Proposed Development contributes positively to the 'using sound science responsibly' strategic objective and General Policy 19, as this SEMP represents an opportunity to progress the field of seagrass restoration on a national level.

3 BASELINE

The species of seagrass present in Scotland are *Zostera marina* (common eelgrass) and *Zostera noltii* (dwarf eelgrass). The morphological characteristics of *Z. marina* vary due to environmental conditions, resulting in phenotypes across the range of this species being incorrectly misinterpreted as a separate and distinct species, namely *Z. angustifolia* (Becheler *et al.,* 2010; de Heij and Neinhuis, 1992). The two species of seagrass found within Scotland vary in distribution along the shore. *Z. marina* occurs in muddy to relatively coarse, fully marine sediment in the intertidal to sublittoral zones. *Z. noltii* occurs higher on the shore and up to the high tide mark, on mud, sand and muddy sands. *Z. noltii* is able to withstand full exposure at low tide due to a higher tolerance to desiccation (Natural Resources Wales, 2019).

Seagrass beds are featured on the OSPAR List of threatened and/or declining species and habitats and recognised by NatureScot as PMFs. Approximately 20% of the seagrass beds within north-west Europe are found in Scotland. On the west coast of Scotland, beds of *Z. marina* are widely recorded, as well as around the Orkney Isles and Shetland. Intertidal seagrass beds of *Z. marina* and *Z. noltii* occur in a number of firths and estuaries on the east coast of Scotland (Kent *et al.,* 2021).

The Argyll region is one of the most important for the national distribution of subtidal seagrass beds (NatureScot, 2024). The largest subtidal seagrass beds in Argyll are present within the Sound of Iona, Loch Sween, Loch Indaal and Loch Graignish. The Sound of Iona has been identified as a candidate PMF fisheries management area as it is considered to be of national importance for seagrass outside of protected areas where seagrass is a designated feature (NatureScot, 2024).

The biotope *'Zostera marina/angustifolia* which beds on infralittoral clean or muddy sand' (A5.5331) was recorded 1 km east of Iona in 2016 (Seagrass Spotter, 2024). This was described as many large patches located in subtidal sandy habitat at 4-6 m depth, no further information on extent is given. Additionally, seagrass (Zostera marina) has also been recorded further north (approximately 18 km) during the 'Biotope Mapping and Survey of the Treshnish Isles Candidate Special Area of Conservation (cSAC)', undertaken by ERT (Scotland) Ltd in 2004 (ERT, 2004).

Consultation undertaken with the local community provided further local knowledge on the extent of seagrass beds in and around the Isle of Iona (RPS, 2023; RPS, 2024). It is important to note that this information is subjective and from visual observation. From these visual observations, seagrass beds were found to be present at Martyr's Bay, St Ronan's Bay and Traighmor to the south, all on the east coast of Iona (Figure 3-1).

Intertidal walkover surveys were carried out by Ocean Ecology Limited (OEL) on behalf of RPS for Iona between the 22nd and 24th of August 2021. The intertidal surveys covered the area extending from Mean Low Water Springs to Mean High Water Springs at each location. An Unmanned Aerial Vehicle (UAV) survey was also undertaken to collect high-resolution imagery across the intertidal survey area at low water, to accurately map the extent of each biotope (OEL, 2021a).

A subtidal Environmental Baseline Survey (EBS), carried out by OEL on behalf of RPS, took place at Iona between the 20th and 23rd of August 2021 and involved the completion of a total 21 Drop-Down Camera (DDC) stations and 21 DDC transects across both areas (OEL, 2021b). As the results of these surveys are classed as current (within the last 5 years) they will form the baseline against which to assess the impacts of both the construction works, as outlined in Section 9. It should be noted that if there is a delay to the implementation of enhancement, an updated baseline survey may be required to ensure a current baseline.

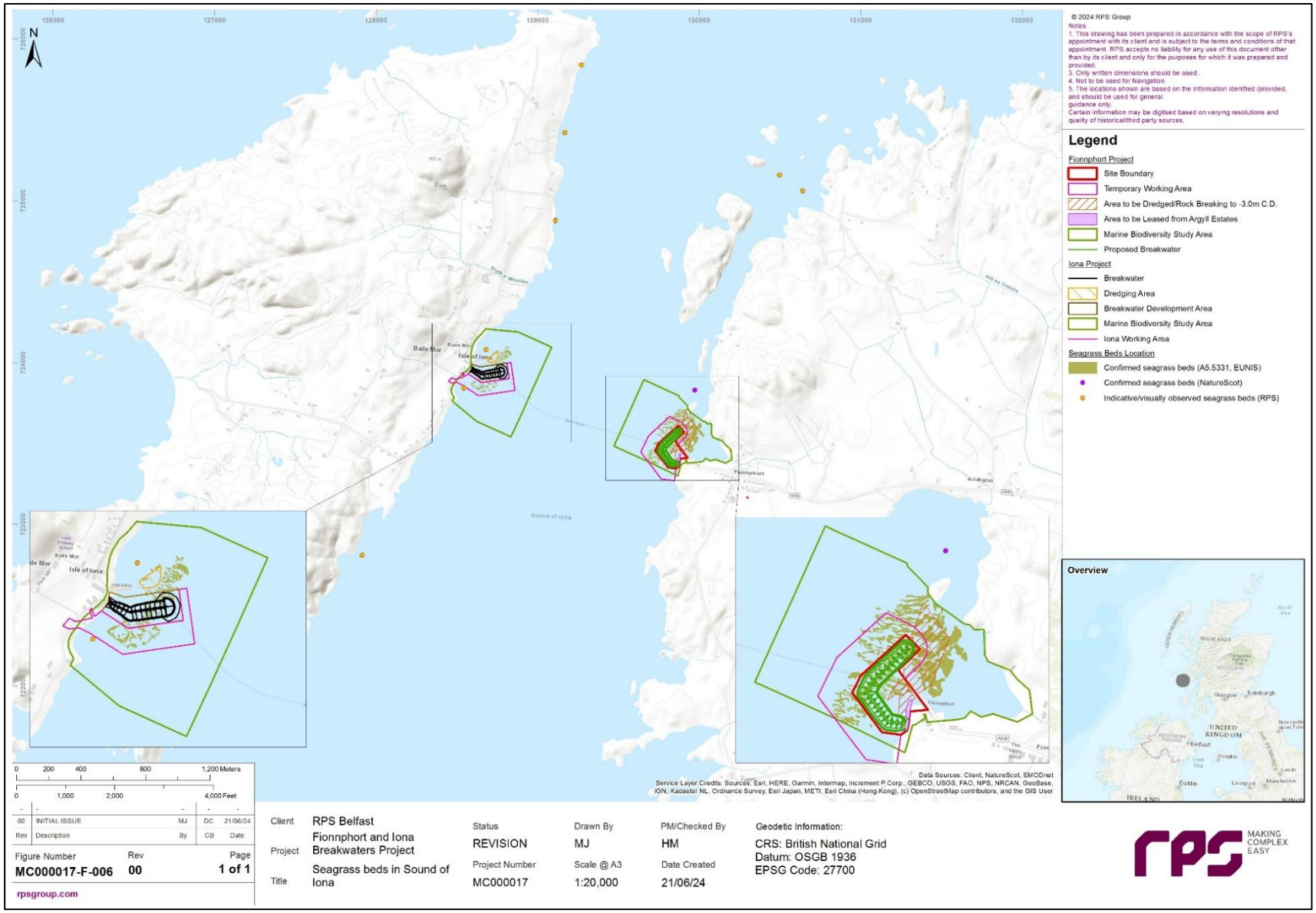

Figure 3-1: Locations of confirmed and indicative seagrass beds within the sound of Iona

3.1 Intertidal and Subtidal Survey Results

There were no observations of seagrass or seagrass beds within the 86 quadrats sampled during the intertidal walkover survey.

The subtidal EBS revealed the '*Zostera marina/angustifolia* beds on lower shore or infralittoral clean or muddy sand' (A5.5331) biotope within the study area (Figure 3-2). Survey results confirmed the presence of extensive seagrass beds representative of the PMF "seagrass beds". Seagrass beds with at least 5% coverage were identified across 23% of all DDC stations and 25% of DDC transects. Areas of high seagrass coverage (76-100% coverage) were mostly observed in the near-shore areas across 9.5% and 17.8% of all DDC stations and transects, respectively. In total, seagrass habitats (A5.5331) covered 5.1% of the surveyed area (circa 9,422m^2) and were confined to the shallow subtidal zone towards the southern extent of the survey area, perpendicular to the shoreline and typically co-located with kelp habitat (A5.52). Aerial imagery results suggest that the seagrass beds observed are very likely to extend along the coast beyond the areas mapped.

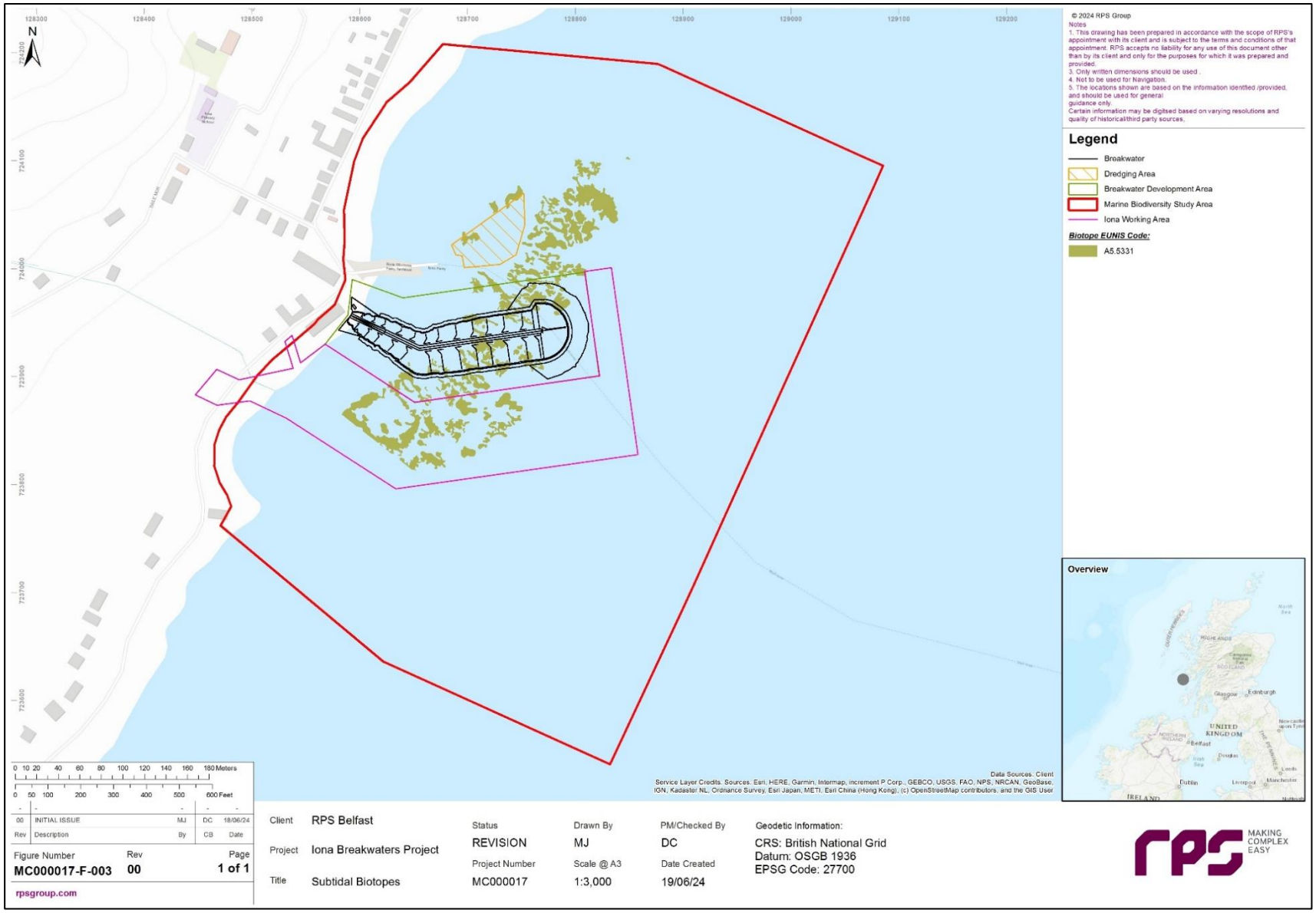

Figure 3-2: Distribution of the A5.5331 biotope within the Iona Marine Biodiversity Study Area

4 IMPACTS OF THE PROPOSED DEVELOPMENT ON SEAGRASS BEDS

The following potential impacts of relevance to seagrass beds are assessed in the Environmental Impact Assessment Report (RPS, 2023):

- temporary disturbance/loss of habitat arising from capital and maintenance dredging activity;
- temporary disturbance/loss of habitat arising from the displacement/compaction of the seabed by anchors and jack-up barge spud legs;
- effects of increased suspended sediment concentrations and sediment deposition;
- permanent habitat loss arising from placement of material on the seabed for the breakwater; and
- changes in the hydrodynamic regime due to the presence of the breakwater.

4.1 Temporary disturbances/loss of habitat arising from capital and maintenance dredging activity

The root systems of *Zostera* spp. are typically located within the top 20 cm of sediment, therefore, activities such as dredging can uproot and disturb seagrass beds, leading to a loss of seagrass cover. *Z. marina* plants are restricted to the horizontal growth of roots and rhizomes. This makes the recolonisation of adjacent bare patches difficult, particularly with depressions in the seabed. Recolonisation and recovery of seagrass beds after the dredging activity is unlikely; dredging will be a recurring activity and will limit the extent of recoverability i.e., no recovery. However, it is important to note that as there are records of many areas of seagrass bed within the Argyll region (NatureScot, 2024), loss of seagrass within the dredging footprints of the Proposed Development represents a small proportion of seagrass beds within the wider area.

4.2 Temporary disturbances/loss of habitat arising from the displacement/compaction of the seabed by anchors and jack-up barge spud legs

Anchoring may damage seagrass beds through removal of plants, breakage of rhizomes and burial of seeds too deeply to allow germination. Due to the typically small spatial scale of anchoring and the horizontal growth of *Zostera* spp. roots and rhizomes, seagrass beds may be more resilient to physical damage caused by anchors, and recolonisation of these areas may be possible (d'Avack *et al.*, 2014).

The compaction events from vessel mooring anchors will be short term and not repeated often following construction, with recolonisation likely to occur following removal of anchors. Additionally, through embedded mitigation (Section 6), sensitive features, such as seagrass, can be avoided through the careful placement of anchors and jack-up barge legs via visual direction (i.e., direct instruction of anchors and jack-up legs by members of the crew, or via the presence of sensitive features polygons on the shipboard navigation system, derived from the subtidal surveys).

4.3 Effects of increased suspended sediment concentrations and sediment deposition

The '*Zostera marina/angustifolia* which beds on infralittoral clean or muddy sand' (A5.5331) biotope is known to have high vulnerability and medium recoverability to light smothering from dredge bucket overspill, giving medium sensitivity to this impact. This biotope also has high sensitivity to increases in fine suspended solids, although this impact is less likely to occur. It is known that, globally, dredging and port construction activities can have significant negative effects on seagrass bed coverage and ecological stability (Grech *et al*., 2012). Significant increases in turbidity from dredge overspill can cause reductions in seagrass bed coverage, due to a reduction in light availability. Despite these vulnerabilities to construction effects, seagrass is known to have a medium level of recoverability, with post-dredging recovery being seen after a small-scale harbour installation within two years in New England (Sabol *et al*., 2005). The ongoing maintenance dredging is likely to resuspend sediments however, similar to the capital dredging works, sediments are expected to dissipate following the cessation of works.

4.4 Permanent habitat loss arising from placement of material on the seabed for the breakwater

A change to another seabed type (from sediment to hard rock) will result in a permanent loss of suitable habitat for seagrass beds. d'Avack *et al.* (2022) assessed the resistance as 'None', as this pressure represents a permanent change; recovery is impossible as a suitable substrate for seagrasses growth will not be present.

4.5 Changes in the hydrodynamic regime due to the presence of the breakwater

Hard coastal defence structures, such as a breakwater, are designed to alter/change the hydrodynamic regime of an area. The breakwater will reduce the intensity of wave action in inshore waters providing a safe area for the ferry to moor up against. This change in hydrodynamic regime may result in seagrass beds being directly affected (either positively or negatively), by leading to increases or decreases in sediment disposition, currents and/or water flow within the protected area. However, Chapter 13: Coastal Processes of the Environmental Impact Assessment (EIA) Report (RPS, 2023) identified no significant changes to the hydrodynamic regime of the area due to the presence of the breakwater.

4.6 Summary of potential impacts

The assessment of Likely Significant Effects in the EIAR deemed the effect of each of these impacts to be **minor**, which is not significant in EIA terms, apart from for permanent habitat loss arising from placement of material on the seabed for the breakwater. This impact is predicted to be **moderate**, which is significant in terms of EIA (RPS, 2023).

4.6.1 Area of potential seagrass habitat loss

4.6.1.1 Permanent habitat loss

The area of permanent habitat loss arising from placement of material on the seabed for the breakwater was calculated by measuring the total area of the A5.5331 biotope as shown on Figure 3-2 laying within the footprint. The same was done for the dredge area. The results were a total of **2,024m^2** of permanent seagrass habitat loss (1,900m^2 within the breakwater footprint and 124m^2 within the dredge area).

4.6.1.2 Potential habitat loss

Although the EIAR concluded a minor effect for temporary disturbances/loss of habitat, increased suspended sediment concentrations and changes in hydrodynamic regime (RPS, 2023), the extent of these potential impacts extends across the working area of the Proposed Development (Figure 3-2). The working area extends slightly beyond the area surveyed for the EBS, therefore the extent of the A5.5331 biotope in these areas was predicted via extrapolating the percentage cover of this biotope within the adjacent surveyed areas to the unmapped regions, as shown in Figure 4-1.

The percentage cover was calculated as 38.37% and the unmapped portion of the working area is 2,264.51m^2, to give an assumed area of 868.89m^2 of seagrass within this area. Within the mapped region of the working area, there is 2,886.28m^2 of seagrass habitat, to give a total of mapped and assumed seagrass habitat of **3,755.17m^2** within the Iona working area.

4.6.1.3 Total worst-case habitat loss

This gives a total of **5,779.17m^2** of potential seagrass habitat loss across the breakwater footprint, dredge area and working area of the Proposed Development. Although seagrass in the Argyll region is important at a national level, the Proposed Development is not considered likely to have a significant impact on the national status of the seagrass bed PMF, due to the small area potentially adversely affected in relation to the known extent of Scottish seagrass beds (Section 2.4.1).

Figure 4-1: Area of the Iona working area with assumed percentage coverage of the A5.5331 biotope.

5 CONSULTATION WITH STAKEHOLDERS

5.1 Previous Consultation

As described in Section 3, consultation was undertaken with the local community as part of the EIA process, in order to provide local knowledge on the extent of seagrass beds in and around the Isle of Iona.

As part of the EIA process, NatureScot were contacted to ascertain if they held records of seagrass which had yet to be published. There were no additional records of seagrass. NatureScot were invited to comment on the baseline survey plans and were informed of their progress.

5.2 Seagrass Enhancement and Monitoring Plan Consultation

Formal consultation has been held to determine effective enhancement and monitoring measures to include in the SEMP. Details of consultations can be found in Table 5.1 below. In addition, NatureScot and the Licensing Authority were contacted on 3 April 2025 to seek views on the suitability of the management plans submitted by the conditions of Marine Licences MS-00010432 and MS-00010433, including on the Iona Seagrass Enhancement and Monitoring Plan (Rev07). The detailed responses to consultation and associated updates to the SEMP have been provided in Table 5.2. Regular consultation will be maintained with NatureScot throughout the implementation of the SEMP to ensure continuous alignment and to address any potential concerns promptly. The consultation will remain open with regular discussions (at an agreed frequency) related to the Iona project between NatureScot, the Seagrass Advisors and the Applicant. As such, Table 5.2 will be updated regularly to ensure meeting comments are captured and addressed in the SEMP, which will remain a live document.

Table 5.1: Consultation

Organisation	Meeting Date	Summary
Email: NatureScot	16/07/2024	NatureScot reviewed the Iona and Fionnphort Seagrass Compensation and Monitoring Plan (Rev04, dated 21 June 2024) and advised that the terminology be amended to "Enhancement and Monitoring" to more accurately reflect the mitigation objectives. They welcomed the inclusion of adaptive management and confirmed that the plan was progressing in the right direction, though further detail was still required on methods, site selection, donor beds, and monitoring. Key actions identified included appointing a project manager and seagrass experts, addressing marine licensing and biosecurity requirements, and acting promptly to collect seagrass seeds within the seasonal window. NatureScot expressed satisfaction with the revised plan and anticipated continued collaboration with the Council and RPS to refine the mitigation approach.
Meeting: Marine Directorate, NatureScot, Richard Unsworth (independent), SeaWilding, Argyll and Bute Council, and RPS	20/01/2025	The meeting was held to discuss the seagrass restoration project, focusing on the development and approval of the SEMP for the Iona and Fionnphort sites. The goal was to ensure that the restoration efforts are realistic, well-planned, and meet the licensing conditions set by the Marine Directorate. Discussion with NatureScot after issue of the draft Seagrass and Enhancement Monitoring Plan. The meeting discussed the SEMP, whilst concerns were raised about the feasibility and realism of the restoration efforts, emphasising the need for detailed planning. Discussions also covered the timeline for the Fionnphort site, licensing conditions, and the potential trial of the Van Ord mechanical grab for seagrass translocation. The meeting concluded with the need for further engagement with seagrass restoration experts to refine the plan and ensure it meets the necessary conditions for approval.
Email: Marine Directorate	13/03/2025	The Marine Directorate reviewed the Habitat Management Plan and the SEMP (Rev06), expressing general satisfaction with the former and its conclusion that habitat loss was unavoidable in seagrass areas, with estimated losses aligning with expectations. However, they advised that the SEMP required significant revision to comply with conditions 3.1.16

Organisation	Meeting Date	Summary
		to 3.1.20 of the construction marine licence and equivalent dredge licence conditions. They requested the removal of all references to Fionnphort, as no marine licences had been granted for that site, and emphasised that the Iona-specific measures must demonstrate equivalence to the seagrass lost and ensure no adverse effect on the national status of the PMF. Concerns were raised about the lack of detail, absence of specialist input, and reliance on future studies, which limited confidence in the plan's effectiveness. The Marine Directorate also requested removal of the clause limiting adaptive measures to two attempts, as it conflicted with the National Marine Plan. They advised that the proposed March start date for marine works was likely unachievable and recommended a meeting to agree on a more realistic timeline and milestones.

Table 5.2: Reponses to detailed consultation on the Iona Seagrass Enhancement and Monitoring Plan (Rev 07)

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
NatureScot				
16 April 2025	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: General comments	We welcome the Argyll and Bute Councils commitment to undertake (or fund) enhancement work to offset the predicted loss of subtidal seagrass habitat arising from the Iona ferry terminal development. We support the proposed inclusion of a 10% buffer and the initial extent estimate of 0.64 ha of subtidal seagrass habitat to be restored. We also note the potential for an additional 3% (by area of the total impacted habitat) to ensure an overall Net Gain, although understand that this commitment (linked primarily to NPF4) may be delivered through alternative mechanisms (e.g. by funding research, community education and outreach etc.).	RPS/ABC welcomes this response.	No update.
		The SEMP does briefly explore three potential enhancement 'options' (replanting, reseeding and growing seagrass plants in a nursery) and mentions some successful restoration projects in other parts of the UK and Europe. The 'solution' for this project will likely come from the listed options and if this, and the proposed monitoring (of the total area of development impact as well as restoration and donor areas) are adequately resourced then the project has the potential to achieve successful enhancement outcomes.	RPS/ABC welcomes this response.	No update.
		It is difficult to assign a monetary value to subtidal seagrass restoration activities, but it is our understanding, based on current projects that estimates for restoration are in the order of ~£100-200K per hectare. This should help give some quantification and perspective of the resource required for seagrass bed restoration.	RPS/ABC welcomes this information and NatureScot's experience in this area.	No update.
		On the basis of previously discussing our concerns regarding the seagrass beds and the Iona Breakwater proposal with the council and RPS as far back as 2021 and having started discussions with the developer in May 2024 on this iteration of the breakwater, multiple meetings and email discussions since and in July 2024 providing detailed bullet points on the additional work still required (see Annex B), we had hoped the SEMP would identify a preferred method and outline potential enhancement locations within the Argyll marine region. We also anticipated seeing options for sourcing donor 'seagrass' material that might also have enabled use of existing seagrass material from the development footprint etc. Unfortunately, this information is still 'to come' via a future desktop study and the appointment of an expert seagrass advisor which is disappointing given the discussions outlined.	The submitted SEMP outlines the steps to be taken by ABC to deliver the seagrass project; the SEMP is considered a live document and will be developed further, with support from Seagrass Advisors, advice by stakeholders, and the consenting authority. Ultimately, the SEMP must contain a strategy and methodology to a sufficient detail that satisfies all key parties involved. To reassure the Licencing Authority and NatureScot, RPS and ABC confirm that they are committed to delivering the SEMP in full detail, to the standard expected. RPS are in the process of onboarding Seagrass Advisors. Once the Seagrass Advisors are onboard, the development of a comprehensive SEMP to address the points laid out by NatureScot can continue.	These comments will be addressed in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		As per our original consultation response, and as highlighted above and in Section 3 of the SEMP, the works at Iona are only the first phase of this transport project and we recommend that the developer progresses the proposed enhancement works in such a way as to meet the needs of the more sizeable seagrass impacts anticipated at Fionnphort.	RPS/ABC are in agreement with the approach outlined by NatureScot. However, we were previously advised by the Licencing Authority to remove all references to Fionnphort from the SEMP, given that it currently relates only to the Iona Marine Licence, we believe that the mitigation	The approach to consider mitigation for both Iona and Fionnphort together will be refined and decided in consultation

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
			measures for both projects should be included in the plan and commenced together as essentially one project. If Fionnphort does not proceed, the Project can revisit and refine the approach accordingly.	with NatureScot, Licensing Authority and the Seagrass Advisors. The SEMP will be updated with this agreed refined approach.
		Despite a lack of detail, the SEMP could be considered to meet the wording of the monitoring and enhancement terms of licence conditions 3.1.16 & 3.1.19 of Marine Licence MS-00010432 (and equivalent condition 3.1.8 & 3.1.11 in licence MS-00010433), should you feel there are suitable controls in place to ensure satisfactory delivery of the enhancement commitments outlined, but we defer to MD-LOT in this regard.	RPS/ABC welcomes the support of NatureScot and recognises the need for additional process and sign-off steps beyond discharge of the SEMP to ensure suitable controls are in place for satisfactory delivery of the enhancement commitments outlined. This includes built-in commitments and requirements for approval at specific phases of the delivery of the seagrass mitigation project, which have been included throughout Revision 08 of the SEMP. These phases align with the comments raised by NatureScot i.e. agreement of timelines for the desk-based study, method identification, enhancement and donor locations, and monitoring prescriptions.	Additional commitments and requirements for approval by NatureScot and the Licensing Authority have been added throughout the SEMP (Rev08). A summary of the additional commitments and sign-off steps is provided in **section 11**.
		With a view to helping resolve this situation we offer a series of finer resolution comments on the SEMP which you may wish to consider and pursue with the developer as part of finalising your position on this issue. These are detailed in Annex C.	The SEMP has been updated (Revision 08) in response to the detailed comments provided by NatureScot where possible, noting the SEMP is a live document which will be developed further with support from Seagrass Advisors, advice from stakeholders, and the consenting authority. The responses to the detailed comments on the SEMP are provided in the following rows.	Refer to the detailed responses to consultation in the rows below.
	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Concluding remarks	If you concur with our view in paragraph 2.3.6 above, we feel that there are additional process and sign-off steps are necessary beyond the consenting phase which would allow progression of the development whilst retaining the necessary safeguards. This should include the discussion and agreement of timelines for the desk-based study, expert appointment, method identification, enhancement and donor locations, and monitoring prescriptions, as well as establishing clarity on the status of enhancement works for Iona in relation to licensing for the subsequent Fionnphort phase of the development. We are happy to discuss this further and if necessary or appropriate review the conditions associated with the SEMP if this was a viable option.	RPS/ABC welcomes the support of NatureScot and recognises the need for additional process and sign-off steps beyond the consenting phase to retain necessary safeguards. This includes built-in commitments and requirements for ongoing consultation and approval at specific phases of the delivery of the seagrass mitigation project, which have been described within the updated SEMP (Rev08). These phases align with those described in the above paragraph i.e. agreement of timelines for the desk-based study, method identification, enhancement and donor locations, and monitoring prescriptions. Regarding the status of enhancement works for Iona in relation to the licensing for the Fionnphort phase, whilst previously advised by the Licensing Authority to remove all references to Fionnphort from the SEMP, we believe that the mitigation measures for both projects should be included in the plan and commenced together as essentially one	Additional commitments and requirements for approval by NatureScot and the Licensing Authority have been added throughout the SEMP. A summary of the additional commitments and sign-off steps is provided in **section 11**.

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
			project. If Fionnphort does not proceed, the Project can revisit and refine the approach accordingly.	
16 April 2025	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Annex C - Detailed comments on the SEMP (Rev07) **Section 1 Executive Summary**	In relation to the scale of expected impacts, the developer compares more extensive and widely distributed intertidal seagrass habitats with the subtidal seagrass present and likely to be impacted at Iona, despite no intertidal seagrass being reported from surveys undertaken in this location. Based on currently available information, we believe that the Argyll marine region is likely to support 10's of hectares of subtidal seagrass which would make the potential loss from Iona greater than 1% (and >2.5% minimum with Fionnphort) of the regional resource.	The Licencing Authority required that there be *"…no effect on the national status of the seagrass PMF as a result of the enhancement and restoration measures undertaken in order to ensure that we are not falling afoul of the objectives of the National Marine Plan*" (20th January 2025). The revised SEMP considered the total national extent of the seagrass habitat PMFs using the NMPi seagrass shapefile layer. The calculation has now been refined to only consider the PMF biotope A5.5331 '*Zostera marina/angustifolia* beds on lower shore or infralittoral clean or muddy sand', showing a total loss of 5,779.17 m^2 (both permanent and temporary loss) from Iona would result in an estimated PMF habitat loss of 0.048%. Using data from the Argyll Marine Region, approximately 54,396m² of recorded subtidal seagrass habitat as polygon data has been calculated, and 59 points of seagrass sighting records of unknown area size were described. The project could potentially affect up to 10.62% of this known seagrass extent. The 2,024 m² permanent loss represents 3.72% of the known habitat in the Argyll Marine Region. There may be more subtidal seagrass present within the Argyll Marine Region, as demonstrated by the 59 qualitative seagrass sighting records.	The calculations in relation to the scale of expected impacts have been updated in **sections 1 and 2.4.1.**
	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Detailed comments on the SEMP (Rev07) **Section 7 Enhancement Plan**	**Identification of donor and enhancement site(s)** This states a desktop study will be completed to identify the most appropriate locations within the Argyll marine region for both the donor and enhancement sites. This section is limited in detail and does not include the requirement for a seabed survey to determine the suitability of sites identified from the desktop study, or consider the advice provided by Seawilding and Project Seagrass. In section 9.2 Enhancement site monitoring, it does state "A survey of the baseline conditions at the enhancement and reference sites, with extent and percentage cover recorded as a minimum, but other parameters such as shoot density and maximum blade length may be utilised." However, there is a lack of detail on any pre-site selection survey, site suitability survey for either enhancement or donor site(s) or follow up monitoring to ensure the donor sites are not affected by the proposal. There is no mention of the discussions with other organisations about potential trials, techniques or methodology which would demonstrate that this background work is taking place. As highlighted by seagrass restoration experts, Seawilding and Project Seagrass, to locate a viable restoration area there are a number of requirements; a) you need to establish seagrass was once there in the first place; b) the negative pressures resulting in its loss are no longer present;	The SEMP (Rev08) has been updated to include some additional details, taking into consideration the potential need for site-specific seabed surveys and considering site suitability (including points a to c and f). However, these points will be addressed fully in a further iteration of the SEMP with input from the Seagrass Advisors. Once onboard, the Seagrass Advisors will update the SEMP to provide a comprehensive plan as to how seagrass donor and enhancement sites will be identified. RPS has been engaging with other organisations to support in the delivery of the SEMP, including Van Oord, SAMS and other potential survey/technology companies. Information on this engagement has been provided to NatureScot and the Licensing Authority in the form of a project update (MC000044 – Iona – SEMP – Project Update – Rev01) provided on 30/04/2025.	Some additional detail has been added to **section 7.1.1** to take into consideration NatureScot's comments. These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
		c) the seabed substrate and surrounding environmental conditions are suitable; d) there is sufficient donor material close by to allow for restoration; e) licences are procured; f) trials take place.		
		Seagrass restoration This section outlines options for enhancement methodologies, but it lacks detail. It does not provide enough information on the feasibility of each methodology for the scale of enhancement planned, provide detail on the time taken, effort involved, if infrastructure is in place and viable (e.g. seed processing and storage), costs and if these costs have been considered and budget permitted. It also does not provide information on the donor sites or consider the risk to the donor site, for which NatureScot would be required to undertake a separate PMF assessment. In the development of the enhancement plan, the applicant should have consideration of the information provided in NatureScot Research Report 1286 - Seagrass restoration in Scotland - handbook and guidance.	The SEMP has been updated to include some additional text, noting that the following will be taken into consideration in a revised SEMP: the feasibility of each methodology, details on the time taken, effort involved, cost considerations and other logistical considerations (e.g. seed processing and storage). The Seagrass Advisors will input to the SEMP to determine the most appropriate methodologies for full-scale restoration and will advise on the identification process for the seagrass donor and restoration sites. 'NatureScot Research Report 1286 - Seagrass restoration in Scotland - handbook and guidance', plus other handbooks and guidance documents, will be consulted throughout the restoration process, and these have been referenced in the current iteration of the SEMP.	Some additional detail has been added into **section 7.1.3** to take into consideration the points raised by NatureScot. These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		Enhancement examples The enhancement examples appear to have a clear positive bias towards enhancement successes with limited consideration of the high variance of success experienced in general with seagrass restoration. The examples provide a simplified, optimistic approach and include no Scottish projects. In a 2016 analysis of seagrass restoration, the review found that the majority of the seagrass restoration trials have experienced lower overall survival rate (i.e. estimated 37% in small trials). This is supported by a recent 2025 review assessing the success of marine ecosystem restoration which used 50% as a threshold value for survival of the re-introduced seagrass to discriminate between successful (survival ≥50%) and unsuccessful (survival <50%) restoration effort and found restoration projects for seagrass had an average survival 56% but with high variance in success. We suggest it would be prudent to take a more pragmatic approach and view the given examples with some caution.	Additional detail and examples have been added into the SEMP to consider the variance in success rate between restoration projects. A pragmatic, realistic approach will be taken to the delivery of the SEMP, informed by the Seagrass Advisors to take into consideration the risks associated with the works, whilst utilising the best emerging evidence and expert advice to increase the chance of a successful restoration project. The input from the Seagrass Advisors will be essential in defining what success looks like, and this will also feed into the SEMP. Danovaro *et al* (2025), plus other literature, may inform the definition of success for this project. Due to the uncertainty surrounding seagrass success, the SEMP includes an additional 10% area buffer allow for any uncertainty in the extent of habitat loss and any uncertainty in the success of the enhancement measures.	Some additional detail has been added into **section 7.1.3.4** to take into consideration the points raised by NatureScot. These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Detailed		**Objectives to measure the success of enhancement (1)** The objectives are simplified and do not provide a time scale for when these objectives should be achieved, and if there are short term, medium term and long term objectives. If monitoring is only proposed up to 5 years following the restoration project, then this should be the timescale to achieve these objectives. If 5 years is deemed too short to achieve the objectives, then monitoring should be proposed for the required time frame.	The timeline for monitoring will be informed by the Seagrass Advisors, in consultation with the licensing Authority and NatureScot. An additional sign-off step has been added into the updated SEMP (Rev08) to require the approval of NatureScot and the Licensing Authority on the timescales for delivery of objectives.	Additional sign-off steps have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
	comments on the SEMP (Rev07) **Section 8 Objectives to measure the success of enhancement**		The input from the Seagrass Advisors will be essential in providing a more detailed success criteria for the updated SEMP.	the appointment of the Seagrass Advisors.
		Objectives to measure the success of enhancement (2) Extent of seagrass bed: at least 6,357.09 m^2 of new seagrass bed to be created through funding of an enhancement project. This figure excludes the +3% net gain (173.37 m^2). This figure should be a minimum of 6,530.46 m^2 or an additional objective relating to the net gain achieved by research or community education and outreach should be added.	Agreed, 6,530.46 m^2, or 0.65 ha has been referenced throughout the document. However, the 3% net gain contribution may be delivered via other means, as described in section 1.4.	Addressed throughout.
		Objectives to measure the success of enhancement (3) Density of the seagrass beds: comparable density to the seagrass habitat that will be lost should be aimed for. This should include a timescale and detail the current density. The 2021 subtidal survey found that the majority of beds detected were between 5-50 % coverage/density and more than half were considered to be in a favourable condition (>30% density).	The input from the Seagrass Advisors will be essential in defining what success looks like, and this will feed into the SEMP. Minimum target seagrass habitat will be of the same quality as the habitat lost. The SEMP has been updated to include the 2021 survey as an indicative density target. Additional sign-off steps have been added into the updated SEMP (Rev08) to require the approval of NatureScot and the Licensing Authority on the timescales for delivery of objectives.	Additional sign-off steps and detail have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		Objectives to measure the success of enhancement (4) Percentage cover: the target for this would likely be 5%, to match the PMF criteria. The OSPAR definition of a Zostera 'bed' is having plant densities that provide at least 5% cover (OSPAR, 2009). A minimum area of 5 m x 5 m with at least 5% cover of seagrass is required to qualify as a seagrass bed PMF. Typically, Zostera spp. plant densities provide greater than 30% cover. 5% cover of seagrass should be viewed as a success criterion only in-so-far as this level of seagrass in a location would enable it to be considered to be forming part of a bed. 5% is the minimum threshold for PMF identification. The % cover of habitat created should reflect that which has been lost - so variable from >5-100 %.	RPS agree that a 5% coverage is the established minimum for defining a PMF. The input from the Seagrass Advisors will be essential in defining what success looks like, and this will feed into the SEMP. Minimum target seagrass habitat will be of the same quality as the habitat lost; indicative percentage cover has been added into the SEMP. Additional sign-off steps have been added into the updated SEMP to allow for approval with NatureScot and the Licensing Authority on the timescales for delivery of objectives.	Additional sign-off steps and detail have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		Objectives to measure the success of enhancement (5) Biodiversity. We would expect to see this expanded upon in future iterations of the SEMP to determine what aspects and levels of associated flora and fauna might be considered as part of monitoring. This should include looking at indicator species as a measure of overall biodiversity as well as considering the provision of biodiversity/ecosystem services equivalent to or greater than the impacted bed.	Consultation between ABC/RPS, the Seagrass Advisors the Licensing Authority and NatureScot will be undertaken to ensure that there is agreement on what biodiversity indicators should be included for monitoring. Additional sign-off steps have been added into the updated SEMP (Rev08) to allow for approval by NatureScot and the Licensing Authority.	Additional sign-off steps and detail have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors
	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Detailed	UAV/drone coverage should be a requirement not a possible option.	RPS has been engaging with survey organisations which have high-resolution side scan sonar capabilities that can map cover and density of seagrass habitat. The SEMP now includes the use of UAV/drone technology.	Updated in **section 9.1**.
		NatureScot would rather see a focus on the basic restoration works rather than too much emphasis being placed on blue carbon assessment works if the costs are being met by the developer. However, if the proposed works are	RPS acknowledges and welcomes the comment. The primary focus of the detailed SEMP will be on seagrass restoration.	Updated in **section 9.2**

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
	comments on the SEMP (Rev07) **Section 9 Monitoring Strategy**	delivered as part of wider academic studies (or funded via other mechanisms) then work on blue carbon is welcome.	The exact methodology and scope for the monitoring of the enhancement site(s) will be determined by the appointed Seagrass Advisors and subject to approval by NatureScot and the Licensing Authority.	
		A table would be useful here, summarising timelines and commitment. From year 1 through to +5 years. Clarifying when the full-scale of impact is 'set' (summer after build complete) and how this feeds into the agreed scale of enhancement. Also, confirming that any donor beds need to be surveyed before and after source material is removed.	The exact methodology and scope for the monitoring of the enhancement site(s) will be determined by the appointed Seagrass Advisors and subject to approval by NatureScot and the Licensing Authority. The subsequently updated SEMP will outline all necessary timescales associated with the seagrass restoration activities and commitments. Surveys at donor beds will be undertaken as necessary and according to advice of Seagrass Advisors. The SEMP will remain a live document and will be periodically updated throughout the Project.	These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Detailed comments on the SEMP (Rev07) **Section 10 Adaptive Management**	Clarification on the scale of an 'attempt' is required, as it currently appears subjective; it should encompass a commitment to make the best efforts on each occasion whilst accepting that a maximum of two tries is reasonable and proportionate.	ABC/RPS welcomes the comment. Agreement will be sought between all parties, as advised by Seagrass Advisors, as to what appropriate adaptive steps should be taken. Ongoing and open communication on adaptive management measures will be important to the delivery of the detailed SEMP.	These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
MD-SEDD				
MD-SEDD	Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: General comments	MD-SEDD welcome the 10% buffer and further 3% 'net gain' for the total target of 0.65 ha of seagrass bed restoration. The mapped seagrass area shows a patchy distribution, and it appears that the calculations of extent and impacted areas only consider individual seagrass patches. However, component species such as juvenile cod and crustaceans will likely use the mosaic of habitats including the bare sand in between seagrass patches as nursery areas. However, from the survey results MD-SEDD understands that a minimum cover of 5% was used to define the seagrass areas with percent cover ranging from 5-100% cover, therefore the smaller bare sand patches will be encompassed by this definition.	RPS/ABC welcomes this response.	No update.
		Post-construction monitoring is also welcome, but it is not clear to MD-SEDD how habitat "loss" will be defined. It is assumed that this would be if areas of at least 5% coverage decrease to 0%, but the spatial scale to be considered is not indicated by the Applicant. Selecting multiple suitable reference sites for the post-construction monitoring of impacted areas will be essential for determining how much loss is significant in the context of natural variation. The donor bed(s) should not be used as a reference site.	RPS/ABC welcomes this response. The SEMP has been updated to define habitat loss in line with MD-SEDDs comments and include a consideration of natural variation via the selection of suitable reference sites. RPS/ABC confirm that the donor bed(s) will not be used as reference sites.	Updated in **Section 7.** These comments will be addressed in greater detail in future iterations of the SEMP, following

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
				the appointment of the Seagrass Advisors.
		MD-SEDD advise that abiotic conditions should be monitored or sampled at the proposed "shortlisted potential enhancement sites". For example, light, temperature, turbidity, current speed to allow comparison with natural (and ideally healthy) beds and therefore suitability as an enhancement site.	RPS/ABC agree that abiotic conditions should be monitored/sampled at the proposed enhancement sites to determine site suitability.	**Section 7.** These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		The SEMP also outlines that instead of seagrass bed creation, net gain could be achieved through funding and community education opportunities to address knowledge gaps such as habitat suitability, biosecurity and interactions between sea grass beds and invasive non-native species. The SEMP states "Financial support of this kind would be to ensure the Proposed Development deliver an overall net gain to the environment, as an alternative to the additional 3% of seagrass bed creation." MD-SEDD recommend that educational, research, and/or citizen science projects would be beneficial, but should be explored in addition to the extra 3% seagrass bed creation rather than as an alternative.	The Project will target an extra 3% of seagrass habitat restoration however this commitment may be delivered via alternative means, such as contribution research funding, community education and outreach. RPS/ABC may seek and encourage additional educational, research, and/or citizen science projects if and where clear opportunities might arise, though contributions to those areas are expected to serve as an alternative to the additional 3% of seagrass habitat creation.	The commitment to 3% additional seagrass restoration or alternative mechanisms will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors.
		In general, there is a lack of detail provided on how monitoring will be done other than following Kent *et al*. (2021) which provides general guidance and options, but a specific plan will need to be refined for this case. The monitoring section has a strong focus around blue carbon, but it is not clear how this relates to the objectives listed.	RPS acknowledges and welcomes the comment. The primary focus of the detailed SEMP will be on seagrass restoration. The SEMP has been slightly amended so that the enhancement site monitoring focuses on the success of enhancement, with the blue carbon analysis included as potential additional monitoring. The exact methodology and scope for the monitoring of the enhancement site(s) will be determined by the appointed Seagrass Advisors and subject to approval by NatureScot and the Licensing Authority.	These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors. The approach to monitoring has been slightly amended in **section 9.2.**
Response to Consultation Request for Marine Licences MS-00010432 and M-00010433: Detailed comments on the SEMP (Rev07) **Section 8 Objectives to measure the**		Extent of seagrass bed: at least 6,357.09m^2 of new seagrass bed to be created through funding of an enhancement project. MD-SEDD agree that this should be an objective. There should be careful consideration of natural variation in the context of a change in extent. Density of the seagrass beds: comparable density to the seagrass habitat that will be lost should be aimed for. *As above for (1).*	RPS/ABC welcomes MD-SEDDs agreement. The SEMP objective has been updated to include consideration a change in extent in the context of natural variation. This will also be taken into consideration for the other outlined objectives, noting the objectives will be developed once a Seagrass Advisor has been appointed.	**Section 8.**
		Percentage cover: the target for this would likely be 5%, to match the PMF criteria. MD-SEDD agree this should be the minimum and perhaps suitable for the first year of monitoring, but in the long term the target should represent the same percentage cover as the existing bed, which ranges from higher density areas (76-100% coverage) which were mostly observed in the near-shore areas, to lower density areas.	RPS/ABC agree that a 5% coverage is the established minimum for defining a PMF. The input from the Seagrass Advisors will be essential in defining what success looks like, and this will feed into the SEMP. Minimum target seagrass habitat will be of the same quality as the habitat lost; indicative percentage cove has been added into the SEMP.	Additional sign-off steps and detail have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following

Date	Type of Consultation	Summary of Consultation	RPS Response	Where addressed
	success of enhancement		Additional sign-off steps have been added into the updated SEMP to allow for approval with NatureScot and the Licensing Authority on the timescales for delivery of objectives.	the appointment of the Seagrass Advisors.
		Biodiversity. Although biodiversity is clearly an important response outcome, it is not clear what the biodiversity metric would be nor how it would be monitored.	Consultation between ABC/RPS, the Seagrass Advisors the Licensing Authority and NatureScot will be undertaken to ensure that there is agreement on what biodiversity indicators should be included for monitoring. Additional sign-off steps have been added into the updated SEMP (Rev08) to allow for approval by NatureScot and the Licensing Authority.	Additional sign-off steps and detail have been added to **section 8.** These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors
		Monitoring both the impacted seagrass beds as well as the restored sites is essential and MD-SEDD welcome the proposal to monitor the impacted site a year later and the enhancement site during year 5 following the seagrass restoration as a minimum. Suitable reference sites will be critical for drawing conclusions on success, and multiple years of monitoring should be undertaken. Early monitoring will be important to identify any initial signs of success or for early intervention to modify the techniques if there are signs of failure, whilst longer term monitoring is important to ensure that the seagrass has become fully established and resembles a natural, healthy seagrass bed.	RPS/ABC welcomes this response and MD-SEDD's expertise in this area. The SEMP has been updated to include a commitment to the selection of suitable reference sites to contextualise the conclusions on success. MD-SEDDs comments will be taken into account in the development of the detailed monitoring strategy. The exact process for determining success will be informed by the appointed Seagrass Advisors and subject to approval by NatureScot and the Licensing Authority.	These comments will be addressed in greater detail in future iterations of the SEMP, following the appointment of the Seagrass Advisors

6 EMBEDDED MITIGATION

A number of embedded mitigation measures relevant to seagrass have been incorporated into the design and construction methods to manage the effect on the environment. These measures will limit the impacts as far as possible to the footprint of the breakwater and dredge area, to avoid wider disturbance to seagrass beds in the adjacent areas.

6.1 Micrositing

To minimise the damage caused by abrasion from ship anchoring, areas of seagrass bed can be avoided through the careful placement of anchors and jack-up barge legs. This will be done via visual direction (i.e. direct instruction of anchors and jack-up legs by members of the crew) or via the presence of sensitive features polygons on the shipboard navigation system, derived from the subtidal surveys.

Where it is not possible to completely avoid areas of seagrass bed via micrositing, effort will be made to limit surface abrasion to areas of low density of seagrass (<30% coverage).

6.2 Construction Environmental Management Plan (CEMP)

Control of pollution during construction will be set out in a CEMP. This will include best practice measures to prevent accidental spillage of chemicals during construction activities.

6.3 Environmental Management Plan (EMP)

The EMP will manage the risks of all operational activities, facilities and cargo handled by the port and will include best practice measures to control pollution following standard guidelines such as the Environment Agency Pollution Prevention Guidelines.

6.4 Invasive Non-Native Species (INNS) Management Plan

A document detailing how the risk of potential introduction and spread of INNS will be produced. The plan will outline measures to ensure vessels comply with the International Maritime Organization (IMO) ballast water management guidelines, it will consider the origin of vessels and contain standard housekeeping measures for such vessels as well as measures to be adopted if a high alert species are recorded. Plant, equipment and material (where required), will follow the ‘check, clean, dry method’.

7 ENHANCEMENT PLAN

As direct, permanent habitat loss is predicted to occur as a result of the Proposed Development, enhancement will be undertaken to ensure that the overall area of seagrass habitat is not permanently reduced.

To compensate for this loss of seagrass habitat, Argyll & Bute Council will provide funding to deliver this SEMP. Alternatively, the financial contribution could be to a fund such as the Scottish Marine Environmental Enhancement Fund (SMEEF)[1], however, there would need to be certainty that this funding would be used to deliver the required area of seagrass enhancement. It is therefore likely that the enhancement will be delivered as a stand-alone project.

The enhancement project will aim to increase the extent of seagrass beds by the equivalent area of potential habitat loss (5,779.17m^2) plus a 10% buffer (577.92m^2), to give a total of 6,357.09m^2 (0.64 ha). This 10% buffer is to allow for any uncertainty in the extent of habitat loss due to the Proposed Development and in the success of enhancement measures. For example, there may be more habitat loss than predicted due to changes in flow or sedimentation from the introduction of the breakwaters, although this was concluded to be unlikely in the EIARs (Section 4.5; RPS, 2023; RPS, 2024).

Additionally, for the Proposed Development to give an overall net gain to the environment, a further 3% of the area of seagrass habitat to be lost (173.37m^2) may also be restored elsewhere, to give a total of 6,530.46m^2 (0.65 ha) of seagrass bed restoration. Alternatively, net gain may be delivered through funding of research or community education and outreach (Section 7.2).

Restoration and enhancement measures will be carried out within the Argyll Marine Planning Area, in line with condition 3.1.18 of Marine Licence MS-00010432 and condition 3.1.10 of Marine Licence MS-00010433.

Post-construction monitoring will determine the actual extent of habitat loss within the working area of the Proposed Development (Section 9.1). This actual extent will be used in the adaptive management of this plan to amend the target area for enhancement to equal the extent of the realised impacts (Section 10). Habitat loss will be assumed to be any area previously characterised by at least 5% coverage of seagrass decreased to 0% coverage. To determine how much habitat loss is significant in the context of natural variation, suitable reference sites will be selected for post-construction monitoring. The target extent area will be discussed and subject to approval by NatureScot and the Licensing Authority.

Construction may commence soon, potentially during spring/summer 2025, so it will not be feasible to develop the full methodology and undertake enhancement site selection prior to the start of construction, therefore the transplantation of seagrass from the footprint of the breakwater and dredge area will not be possible. Enhancement for the Iona development is, therefore, likely to take the form of seagrass enhancement using donor beds for the collection of seeds or donor plants (Section 7.1).

Following a literature review and consultation (Section 5.2), a methodology the Proposed Development has been developed (Section 7.1). The next stage in the execution of this SEMP will be to appoint an expert advisor for seagrass to finalise the methodologies outlined below.

7.1 Seagrass enhancement methodology

The seagrass enhancement project will aim to either create new seagrass habitat or enhance an existing seagrass bed on the west coast of Scotland, equivalent to the identified 6,530.46m^2 of potential habitat loss at Iona.

7.1.1 Identification of donor and enhancement site(s)

A desktop study will be completed to determine the most appropriate location(s) for the seagrass enhancement, with consideration for improving seagrass bed connectivity in the Argyll region. The study will also identify the most appropriate donor seagrass beds for collection of plants or seeds for the enhancement works. For donor beds, site selection should consider the potential for impacts of plant or seed removal on the health of the donor bed.

[1] Home - Scottish Marine Environmental Enhancement Fund (smeef.scot)

This study will look at present and historic seagrass distribution in the region, to give an indication of where it is likely that seagrass will thrive. Enhancement site(s) will be within the Argyll marine planning region, close enough to minimise risks around biosecurity and genetic differences in the seagrass. At least one reference site will also be identified, to allow for comparisons to be made to assess the effectiveness of the enhancement activities. Consideration of negative pressures which may exist at potential enhancement sites may also affect the viability of a restoration efforts and will be explored as part of the study.

The desktop study will also consider the suitability of the environmental conditions at potential restoration sites, including the suitability of seabed substrate and other environmental conditions. Research shows that when transplanting adult plants, it is important to match the environmental conditions of the donor site and the restoration site, such as depth, exposure rate and nutrient availability (Moksnes *et al*., 2021). This would make enhancement sites within the Argyll marine planning region preferable due to consistency in conditions. However, in this scenario, the survivability of the transplanted may be hampered by the construction works happening immediately after translocation. Matching of environmental conditions between donor and enhancement sites will be less of a concern if the seed-based approach is adopted, as there is greater potential for the plants to adapt to the new conditions as they grow (Kent *et al*., 2021).

Another consideration for site selection is the length of time the seagrass plants spend out of the water. Where possible, enhancement sites should be close enough to the original location to limit time out of water to around 2 hours, to increase survivability.

It will likely be prudent to spread risk by undertaking restoration at multiple enhancement sites.

Following the desktop study, site visits of shortlisted potential enhancement sites will be conducted and site-specific surveys (including seabed surveys for environmental conditions and surveys of the seagrass extent at site) will be undertaken to shortlist potential enhancement site(s). Surveys of environmental conditions will likely include abiotic conditions including light, temperature, turbidity and/or current speed. Seagrass restoration trials will likely be required, after which preferred sites for full-scale enhancement will be identified.

The timelines for the delivery of the desktop study will be discussed and approved with NatureScot and the Licensing Authority.

7.1.2 Permits/licences

Once the donor and enhancement site(s) have been selected, the required permits and licences will need to be applied for. This will include permits/licences from the Licencing Authority and the Crown Estate Scotland for both the harvesting of seeds/plants from the donor site and the restoration work at the selected enhancement site(s).

7.1.3 Seagrass restoration

As part of the planning process, alongside the desktop study for site selection and site-specific surveys, one or more of the below options for the remaining enhancement work (including enhancement trials) will be chosen, based on an assessment of cost, potential risks and previous outcomes in similar environments. The methodology will be expanded on in collaboration with the Seagrass Advisor and timescales will be subject to approval by NatureScot and the Licensing Authority. The expanded methodology will take into account feasibility, expected timescales, effort required, cost considerations and other logistical considerations (e.g. seed processing and storage).

7.1.3.1 Option 1: replanting

Adult plants may be directly transplanted from the donor site, as small sods or cores, with care taken to minimise damage the donor bed. Potential damage to the donor bed will be considered if this methodology is decided upon. This method relies upon a suitable healthy, local donor bed existing, and may be more difficult to obtain licenses and permissions for. It may not be the most sustainable option for restoration on this scale in terms of ensuring the donor bed remains viable (Gamble *et al*., 2021).

7.1.3.2 Option 2: reseeding

Seed-based methods comprise the following stages:

- **Seed collection:** Seagrass seeds are contained within the spadices, which are generally harvested as immature fruiting shoots from donor beds, typically around August. Harvesting would either be carried out using self-contained underwater breathing apparatus or via mechanical means. Mechanical harvesting has been done in the US (Marion & Orth, 2010) and may be more cost effective for restoration on this scale, however, is not recommended by Kent *et al*. (2021) due to potential impact on the donor bed. Seed collection by hand has no known negative impacts on donor beds and is lower effort than replanting (Kent *et al*., 2021).
- **Deployment of spadices:** the spadices can be placed into Buoy-Deployed Seed bags (BuDS) to negate the need for time- and resource- heavy seed processing and storage, allowing the spadices to be taken directly from donor to restoration site (Pickerell, Schott & Wyllie-Echeverria, 2006). The BuDS system consists of an anchor line to a small buoy with an attached aquaculture pearl net filled with spadices, from which seeds drop naturally over time as they develop. No records have been found of this method being applied in the UK. Although a less labour-intensive method than the below, there is the risk of failure of seeds disperse too far on tidal currents.
- **Seed processing and storage:** if the BuDS method is not used, then seeds will need to be transported to a laboratory, processed, and stored before being deployed the following spring. Processing involves separating the seeds from the remaining mulch once they have fully developed, which is a largely manual task (Gamble *et al*., 2021). It is likely that local seagrass storage facilities would need to be set up to keep the seeds in optimal condition to avoid rotting or early germination.
- **Deployment of seeds:** there are several deployment methods such as planting, Bags of Seagrass Seeds (BoSS), or injection (Kent *et al*., 2021). The BoSS method involves planting seeds in hessian bags to limit disturbance (Kent *et al*., 2021). Each method has its own benefits and potential drawbacks, which would need to be considered in the context of this project.

7.1.3.3 Option 3: seagrass nursery

The final option is to collect seeds and grow them on, or propagate plants from a donor bed, in a nursery. This would mean fewer plants would need to be harvested from the donor bed. Nursery-grown plants have been shown to have better survival rates than seed planting or plants transplanted directly from donor beds (Gamble *et al*., 2021). There are very few seagrass nurseries in the UK, so although this option may increase chances of success, the feasibility in terms of distance to the nursery and space in the nursery will need to be considered.

7.1.3.4 Enhancement examples

Successful examples of seagrass transplantation can be found across a number of different countries. In Europe, the LIFE-TRANSFER project aimed to improve the conservation status of the Coastal lagoon habitat of the EU Habitats Directive in eight Natura 2000 network sites: 4 in Italy, 2 in Greece and 2 in Spain (European Commission, 2024). The project favoured recolonisation by transplanting small sods and rhizomes of species previously present in each area. This project had an 80% success rate transplanting seagrass sods. Now 80% of sites are covered by continuous seagrass beds and multiple natural rootings at different levels of development are spread over an area approximately 10 times greater than the initial situation (after 4 to 5 years) (European Commission, 2024).

Various studies have been conducted on the factors that influence the success of transplanted seagrass, contributing factors include the size of the transplant area with Paulo *et al*. (2019), who examined transplant sites in Portugal, reporting that for long term success an initial 6m^2 size transplant was needed to overcome the threshold of un-stability. Furthermore, proximity to donor bed was found to be positively correlated to with transplant success, as the site is likely to have similar conditions under which the seagrass can grow (van Katwijk *et al*., 2026).

There are also a number of seagrass planting projects which have trialled seagrass planting and reseeding, for example the LIFE REMEDIES project based in Plymouth sound, which aimed to restore 4 ha of lost seagrass meadows (Ocean Conservation Trust, 2024a). The project has planted 8 ha of seagrass to date (Ocean Conservation Trust, 2024a) using two main seagrass planting methods, seed broadcasting using hessian bags or injection devices as well as seedling translocation (Ocean Conservation Trust, 2024b). An earlier project in Dale, south Wales planted 2 ha of seagrass seed using 15,000 hessian bags (Unsworth *et al.*, 2021). This project had mixed success, but despite some setbacks, the seagrass within the experimental area (900m^2) where a few variations on seagrass seed planting methods were trialled, the seagrass shoot

density was recorded to be 3.91 shoots m^2, compared to an average density of 0.22 shoots m^2 in the wider area (Unsworth *et al.*, 2021).

In Scotland, Seawilding, a community-led habitat restoration company, have been trialling multiple methodologies and seen a 5-fold increase in seagrass coverage in Loch Craignish where failure rates were typically high, owing to lack of oxygen in the area. There is also ongoing work in Scotland working with how best to restore at scale and the utilisation of rhizomes to transplant plants, which may be successful in future restoration projects (Seawilding, 2025).

Despite a number of successful restoration examples, there is a high variance of success of seagrass restoration projects and it is notable that with this work comes inherent risk and that some projects have been unsuccessful (Unsworth *et al.,* 2018). As such, positive examples of restoration should be viewed with some caution. In a 2016 analysis of seagrass restoration, the review found that the majority of the seagrass restoration trials have experienced lower overall survival rate (i.e. estimated 37% in small trials; Van Katwijk *et al.,* 2016). This variance is supported by a recent 2025 review assessing the success of marine ecosystem restoration which used 50% as a threshold value for survival of the re-introduced seagrass to discriminate between successful (survival ≥50%) and unsuccessful (survival <50%) restoration effort and found restoration projects for seagrass had an average survival 56% but with high variance in success (Danovaro *et al.,* 2025).

Globally, seagrass restoration methodology is improving rapidly with an increasing chance of success and sharing of knowledge of failed restoration projects is becoming increasingly important to highlight how to increase the chance of successful projects (Van Katwijk *et al*., 2016; Unsworth *et al*., 2018). For example, Van Katwijk *et al.* (2016) highlighted that both increased restoration scale and using seeds in conjunction with adult plants has the potential to increase the chance of restoration success. Other sources of information including the NatureScot Research Report 1286 also highlight recommendations to increase the chance of a successful project, including conducting feasibility studies, understanding causes of seagrass decline and natural variation in the area, consideration of biosecurity risks (e.g. INNS), considering mixed methods of seagrass restoration, as well as others (NatureScot, 2021). Therefore, although there are risks associated with the restoration of seagrass projects, making best use of emerging evidence and expert advice will increase the chance of a successful restoration project. This, combined with the fact that the Sound of Iona was found to be suitable for seagrass by Huang (2021), means there is a reasonable level of confidence that restoration attempt(s) here will be successful, if done in a way that is well resourced an informed by the most up to date research.

7.1.4 Monitoring

Following the transplantation of seagrass plants and/or seeds, monitoring will be required in order to assess the effectiveness of the implemented restoration activities (See Section 9.2 for monitoring methods). This will include the selection of multiple suitable reference sites to determine the effectiveness of restoration in the context of natural variation. The monitoring methodology will be formed in collaboration with the Seagrass Advisors and will be subject to approval by NatureScot and the Licensing Authority.

7.2 Net gain through funding of research or community education and outreach

Funding could support ongoing or novel research projects in Scotland. Research knowledge gaps include: natural variability of seagrass beds, habitat suitability and optimal growing conditions, connectivity, biosecurity, interactions between seagrass and INNS, disease prevalence, ecosystem and societal benefits of seagrass restoration. Therefore, financial support could focus on addressing these gaps to improve all future restoration proposals in Scotland.

As well as seagrass restoration projects and research, seagrass organisations are also involved in education and community outreach. Citizen scientists and local community engagement are often used as part of their restoration and research activities and part of the funding could be used to support and increase these.

Financial support of this kind would be to ensure the Proposed Development deliver an overall net gain to the environment, as an alternative to the additional 3% of seagrass bed creation.

8 OBJECTIVES TO MEASURE THE SUCCESS OF ENHANCEMENT

The objectives that will be used to measure the success of the enhancement measures will be developed in line with the detailed methodologies once Seagrass Advisors have been appointed, including timescales for achieving each objective. These timescales will be discussed and approved with NatureScot and the Licensing Authority. These may include but not be limited to the following:

1. Extent of seagrass bed: at least 6,357.09m^2 of new seagrass bed to be created through funding of an enhancement project, taking into consideration a change in extent in the context of natural variation.
2. Density of the seagrass beds: comparable density to the seagrass habitat that will be lost should be aimed for. The 2021 subtidal survey found that the majority of beds detected were between 5-50 % coverage/density and more than half were considered to be in a favourable condition (>30% density). Therefore, it is likely that the objective will be within this number.
3. Percentage cover: the minimum target for this would likely be 5%, to match the PMF criteria for the first year of monitoring. However, in the longer term, the target will represent the same percentage cover as that determined in the baseline survey, which ranged from lower density areas (5%) out in the channel to higher density areas (76-100% coverage); largely observed in the near-shore areas.
4. Biodiversity: this will consider measurements of overall biodiversity as well as considering the provision of biodiversity/ecosystem services.

9 MONITORING STRATEGY

The monitoring strategy is designed to quantify impacts compared to that predicted in the EIAR and to provide data to measure the success of the enhancement measures in achieving the objectives. The likely parameters to be monitored are **seagrass extent, density and percentage cover**, with the parameters to be determined based the on finalised objectives and subject to approval by NatureScot and the Licensing Authority (Section 8).

The site-specific surveys conducted in 2021 will act as a baseline for monitoring of the impacts to the marine biodiversity study area. The monitoring strategy will follow best practise guidelines such as those presented within Kent *et al.* (2021), NRW (2019) and Gamble *et al.* (2021).

9.1 Monitoring of the marine biodiversity study area

A direct repeat of the 2021 DDC and transect locations should be conducted (where possible) post-construction to quantify the extent of the impacts on the seagrass beds compared to those predicted and allow for adaptive management of this plan to amend the target area for enhancement to be proportionate to the extent of the realised impacts (Section 10).

It is recommended that the post-construction monitoring survey is carried out approximately 1 year following the completion of the Proposed Development, at the end of the following summer.

The number and type of imagery stations sampled previously for Iona are detailed below (Table 9.1), with station locations detailed within the report by OEL (2021b). The area surveyed for the EBS should be extended to cover the entirety of the working area of the Proposed Development i.e. to cover the areas where seagrass cover has been assumed, shown in Figure 3-1 and Figure 4-1. Additionally, camera stations can be added *in situ* if other obvious areas of seagrass beds are evident which were not surveyed during the 2021 EBS.

Table 9.1: Type and number of previous EBS stations to be revisited pre and post-construction

	Iona EBS
DDC Stations within the marine biodiversity study area	10
Camera Transects within the marine biodiversity study area	10

UAV or drone surveys will also be utilised to assess the seagrass extent within the wider area, with photographs providing extent comparisons between years (Kent *et. al*., 2021). It should be noted that these images will not be able to be utilised for percentage cover.

9.2 Enhancement site monitoring

9.2.1 Monitoring approach

The exact methodology and scope for the monitoring of the enhancement site(s) will be determined by the appointed Seagrass Advisors and subject to approval by NatureScot and the Licensing Authority. However, it is anticipated that it will follow guidance by Kent *et. al* (2021) and focus on the objectives to measure the success of enhancement listed in section 8 (i.e. extent of seagrass bed, density of seagrass bed, percentage cover and biodiversity).

The following stages are anticipated for the enhancement site(s) monitoring:

- A survey of the baseline conditions at the enhancement site, donor beds and reference sites, with extent and percentage cover recorded as a minimum, but other parameters such as shoot density and maximum blade length may be utilised. Blue carbon samples could also be collected.
- Following transplantation/restoration, it is highly likely that there will be some die back of the seagrass plants. Transplantation should be conducted in spring/early summer, with the site revisited at the end of the following summer to assess the survival rate of the seagrass.

- Repeat monitoring surveys of enhancement and reference sites, and possible collection of blue carbon samples. At a minimum, this will be done during year 5 following the seagrass restoration, to allow the seagrass time to adapt and establish within the new site(s).

9.2.2 Potential additional monitoring

Carbon stored in coastal and marine ecosystems is referred to as blue carbon. Historically, nature-based solutions to climate change have focused on terrestrial forests containing significant carbon reservoirs, these are now being broadened to include marine and coastal ecosystems which sequester and store large quantities of blue carbon (Gamble *et al*., 2021). The loss of seagrass habitat will mean a reduced area to act as a carbon sink, however, enhancement in the form of seagrass bed restoration with an aim to enhance seagrass coverage above the area of habitat lost due to the Proposed Development, to give a net gain in blue carbon stocks. Blue carbon analysis could therefore be employed to increase the data in this emerging field, and potentially assess the effectiveness of the enhancement measures. Sampling technique involves taking cores across the enhancement and reference sites. Five cores could be taken over a transect through the central portion of the bed from the landward to the seaward extent at extreme low water (Kent *et. al*, 2021) which are subsequently frozen for analysis. This would allow for a direct comparison of the blue carbon status between the enhancement and reference sites over the monitoring programme.

9.3 Monitoring reporting schedule

Any damage to the seagrass (resulting from the licensed activities) that is detected and not anticipated as outlined in this plan (Section 4.6.1) will be reported to the Licensing Authority as soon as reasonably practicable. This plan would then be updated to include measures to mitigate or restore any potential damage caused and submitted to the Licensing Authority for written approval. This approach is in line with condition 3.1.20 of Marine Licence MS-00010432 and condition 3.1.12 of Marine Licence MS-00010433.

A survey report will then be provided within 5 months of completion of each survey to NatureScot, detailing results from each survey. Reports should include:

- a description of the survey methodology and equipment;
- timings and GPS locations of all sample data;
- detailed results including change in comparison to baseline/previous surveys; and
- progress against objectives.

10 ADAPTIVE MANAGEMENT

10.1 Target enhancement areas

The post-construction monitoring will show the extent of habitat loss within the working area of the Proposed Development. The total area of seagrass habitat to be created as enhancement will then be updated from the predicted area of habitat loss in Section 4.6.1 to the actual extent of habitat loss (taking into consideration natural variation), subject to approval by NatureScot and the Licensing Authority.

10.2 Meeting objectives

Once enhancement objectives are finalised, thresholds for progress against these objectives will be set. The adaptive management strategy for the objectives will follow the below steps:

- implementation of enhancement measures;
- monitoring of enhancement measures to assess if they are delivering the predicted outcomes; and
- if thresholds of progress are not met, this will trigger the need to implement further monitoring to inform the adaptive management changes required in the enhancement method, or to identify a different enhancement method.

If monitoring shows a failure to meet threshold progress, then a revised plan for enhancement may be required. This may include further studies to determine the reason for failure, followed by a further restoration attempt or financial support of other established seagrass restoration projects. The timescales for the production of a revised plan will be informed by the Seagrass Advisor and discussed and approved with NatureScot and the Licensing Authority.

There are limited case studies and variable success rates for seagrass restoration activities undertaken globally to date. Implementation of this SEMP will involve using novel techniques for restoration in the UK. This will provide valuable lessons learned to progress the field of seagrass restoration on a national level. However, the above factors mean that there is a high level of uncertainty in the outcomes. This has been accounted for in the 10% buffer added to the predicted extent of habitat loss due to the Proposed Development (Section 7) as an aim for the area of seagrass enhancement. Therefore, adaptive management will be limited to a second attempt should the first fail.

11 ROLES AND RESPONSIBILITIES

The following roles are required to fulfil this plan:

- a Project Manager should be assigned to manage the execution of the plan;
- a Seagrass Advisor to consult on the enhancement and monitoring technical delivery; and
- an experienced survey team to conduct seagrass monitoring and survey reporting.

Argyll & Bute Council are responsible for executing the plan and reporting results in a timely manner to the Licencing Authority and NatureScot.

Consultation with NatureScot and the Licensing Authority will continue, with regular discussions scheduled at mutually agreed intervals. To ensure NatureScot is satisfied with the seagrass mitigation approach, hold points will be set in the programme at the start of each phase. These hold points will serve as safeguards, such that phases will not commence until details and timeframes of each phase have been agreed with NatureScot and the Licensing Authority. Hold points will be set for each of the following phases (not necessarily in the order listed):

- Desktop study;
- Enhancement method identification;
- Identification of enhancement and donor locations;
- Determination of monitoring methodology;
- Finalisation of a monitoring strategy); and
- Determination of final objectives and associated timescales for these objectives to be met.

Please note that the Applicant will seek approval for the details and timeframes of each phase in advance to ensure that approval does not delay the commencement of the phase.

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