Hunterston Construction Yard
Environmental Impact Assessment Addendum

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CONTROL SHEET

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1 INTRODUCTION

EnviroCentre Ltd were appointed by Arch Henderson on behalf of Clydeport Operations Ltd., to produce an Environmental Impact Assessment (EIA) report in relation to the upgrade of the existing Hunterston Construction Yard (HCY) into a harbour facility with a large working platform suitable for renewable industries.

The Environmental Impact Assessment Report (EIAR) comprised the written findings of the EIA process undertaken under both the Town & Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 ('the EIA Regulations') and the Marine Works (Environmental Impact Assessment (Scotland) Regulations 2017 ('the Marine EIA Regulations').

The EIAR was submitted to North Ayrshire Council in support of a planning application for the upgrade of the Hunterston Construction Yard in May 2024. The EIAR was also submitted to the Marine Directorate in support of Marine Construction and Dredging Licence applications in June 2024.

The following documents were included in the previous submission:

Environmental Impact Assessment Report (EIA Report), comprising:

- Non-technical Summary;
- Volume 1 – Main Report;
- Volume 2 – Figures;
- Volume 3 – Technical Appendices; and
- Pre-Application Consultation Report.

Section 5.1 of the EIAR confirmed that further subtidal survey work was being carried out and would be provided as an addendum document to the EIAR.

On the 4th of September 2024 the Marine Directorate issued the following request for further information:

Following a review of the EIA Report and supporting documents, the Scottish Ministers request that in order to ensure the completeness and quality of the EIA Report, supplementary information is submitted in relation to your EIA application in line with Regulation 21 of the 2017 MW Regs. The requested additional information is directly relevant to reaching a reasoned conclusion on the significant effects of the works on the environment and without it, we will be unable to make a determination on your application. We have outlined the additional information requested below:

- *Consideration of native oysters.*
- *Subtidal benthic habitat and species surveys of the dredge pocket and wider potentially impacted area, including the Southannan Sands SSSI, including macrofaunal analysis.*

You are directed to the NatureScot scoping consultation response for further details.

The information should be supplied to MD-LOT as an addendum to the EIA Report already submitted.

In addition to the above Marine Directorate provided responses from the EIAR Consultation on 7th November 2024. Copies of the consultation responses are provided in Appendix C. The following table provides a summary of the responses received and the relevant section of this Addendum that relates to the comments.

Consultee	Comment	EIAR Addendum Section	Summary of Response
MOD	The MOD has no objection regarding this activity.	N/A	N/A
Fairlie Community Council	The application fails to demonstrate through a geotechnical report what proportion of the dredged material is unsuitable for infill.	Section 2	Geotechnical assessment is ongoing in relation to the suitability of the dredged material for infill.
Fairlie Community Council	The application fails to address the environmental and amenity impact of any alternative source and transport of suitable infill material, particularly if land source(s) and road transport take place.	Section 2	The infill of the dry dock will utilise dredge arisings that will be brought to the site via sea vessel.
Fairlie Community Council	If the infill material, in total or in part, is to be sourced from capital dredging elsewhere, the application provides no information about such locations.	Section 2	At the time of writing alternative sources of dredged material are to be confirmed.
Northern Lighthouse Board	Northern Lighthouse Board note the content of the Navigational Risk Assessment and Aids to Navigation (AtoN) are a major mitigating factor for all phases of the construction works and operation of the new facility. NLB also note that Notice to Mariners and marine safety information will be issued as needed throughout the works. It is also noted that it is proposed to utilise the Birch point (MA17), Brodick (MA19) and Cloch Point (MA21) spoil grounds for the disposal of dredged material. Northern Lighthouse Board have no objections to the construction works and advise the following: • Clydeport Operations Ltd liaise with Northern Lighthouse Board regarding temporary AtoN provision through the various construction phases, and permanent AtoN on completion of the works. • The statutory sanction of the NLB should be sought prior to the establishment, alteration or discontinuation of any Aid to Navigation. • Upon completion of the works, as-built drawings (including permanent AtoN) should be provided to the UK Hydrographic Office to enable the update of navigational publications	N/A	The requirements noted by NLB will be addressed at the relevant project stages.
Office for Nuclear Regulation	ONR does not advise against this development, however, there is potential for EDF's decommissioning project and the Hunterston Construction Yard project to temporally overlap, therefore the applicant should consider the inter-project cumulative effects of Hunterston B with both its projects.	N/A	Consultation was held with Hunterston B to inform the EIAR production. Further engagement will be held with Hunterston B post consent to review and provide an update on the project programmes and consider any associated cumulative impacts.
Peel Ports	Peel Ports have no objections.	N/A	
RYA Scotland	RYA Scotland has no objections to this application.	N/A	
Scottish Fishermen's Federation	Nil return response from SFF on this particular consultation.	N/A	
Transport Scotland	Transport Scotland is satisfied with the submitted EIAR and has no objection to the development in terms of environmental impacts on the trunk road network.	N/A	

Maritime and Coastguard Agency	The MCA confirms we have no objections to a licence being granted on this occasion.	N/A	
NatureScot (ML 00010868) – Marine Construction Licence	Currently, our existing information shows that this proposal is unlikely to have a significant impact on the national status of a PMF(s) given the limited footprint of the works and the highly modified nature of the habitat present. The subtidal assessment should provide sufficient detail to determine the distribution and extent of habitats present within the survey area creating broadscale habitat maps and permitting the quantification of areas/habitat types/PMFs which may be impacted by the proposal. The report should also detail mitigation and enhancement measures as appropriate. We will comment further once the additional information is available	Section 7	Detail is provided on the subtidal habitats present and the associated areas of impact including quantification of the area, habitat type and PMFs present.
NatureScot (ML 00010868)	We advise that this mitigation should be revisited following the results of the Phase 2 survey and then approved by the Regulatory Authority in consultation with SEPA and NatureScot and fully implemented as part of any consent granted for the application. This is particularly relevant as the EIAR states (section 9.7.2.2) that: *(i) Impact of a spillage or concrete runoff would be particular detrimental if a spillage was to enter into the SSSI Southannan Sands which borders the site to the south, east and north. The effect of the potential pollution incidences during construction on water quality would be dependent on the scale and nature of the incident, therefore the magnitude of impact may range from low to high prior to mitigation which would give rise to a potential effect of minor to major significance.* Project elements that may result in concrete spillage include dolphin construction and Installation of sub-surface revetments for the new quay wall.	Section 7 and 8	Section 7 and 8 incorporates consideration of the impact to the subtidal intertidal habitat associated with spillages
NatureScot (ML 00010868)	In summary, based on our experience with previous coastal infrastructure developments, we believe that the proposed activities could go ahead, with appropriate mitigation measures being fully implemented, without causing injury or significant disturbance to marine mammals. Some residual disturbance may still occur, which is likely to need an EPS licence which will require consultation with the Marine Directorate.	Section 4	EPS Licence Applications have been issued to MD Lot in conjunction with the Marine Construction and Dredging Licence Applications,
NatureScot (ML 00010868)	The key activity of concern is the installation of the five dolphin structures, using impact driven piles. This activity has the potential to cause auditory injury and disturbance to marine mammal species. Underwater noise modelling has been carried out and an assessment made of the risks to marine mammals. The assessment does not give sufficient assurance that the risks will be mitigated as proposed. We do not agree that an extended soft start/ramp up procedure will provide appropriate mitigation, as injury can still occur even at reduced piling levels, and by extending the duration of the soft start additional noise is entering the environment. Therefore, we advise that, if the development is consented, the applicant should provide a piling noise management plan, to be submitted and approved prior to any works commencing. The piling noise management plan should include, for example: – Details of the number of piles to be driven, the duration of piling, impact hammer energy. – Details of timing of piling (e.g. seasonal, diurnal, tidal cycle). – A quantitative assessment of the number of animals likely to experience auditory injury (PTS) and disturbance, for both an individual piling event and the full piling schedule (for those species where density estimates exist). – An assessment of the magnitude of these impacts relative to the population of each species, in order to determine the effect on favourable conservation status (for those species where population estimates exist). – A detailed, comprehensive mitigation plan, based on the JNCC guidance2 (2010). – Consideration of noise abatement systems to further reduce underwater noise levels, if needed.	Section 5	It is confirmed that following consent a Piling Noise Management Plan will be provided in relation to the mooring dolphin construction.

NatureScot (ML 00010868)	We advise that a Species Protection Plans should be prepared for otter. Species protection plans should be produced whether a specific species licence is required or not and included with the Construction Environmental Management Plan (CEMP) to be submitted for the approval of the regulatory authority. Species protection plans should incorporate the full range of protection measures identified in the EIAR and updated as required by the pre-construction surveys.	Section 6	It is confirmed that prior to construction an otter Species Protection Plan will be produced and agreed with the regulators. This will be informed by a further pre-construction survey.
NatureScot (ML 00010868)	Preconstruction surveys should be carried out to include the site and sufficient buffer of the Gill Burn and other key ecological habitats to ensure that the proposed development will not affect protected species. We note that pre-construction surveys are proposed in EIAR Table 4.1. We welcome this approach but advise that our current guidance is followed. The timing of pre-construction surveys depends on whether it is possible to survey a species at any time of year (e.g. otter) For species that can be surveyed at any time of year, pre-construction surveys should be undertaken as close to the construction period as possible, and no more than 3 months before the start of works.	Section 6	It is confirmed that pre-construction surveys will be carried out in line with the current guidance.
NatureScot (ML 00010868)	Whilst limited, there are suitable habitats for small scale breeding opportunities within and adjacent to the proposal footprint, in the absence of current breeding bird survey data, we recommend that the following ornithology mitigation should be implemented: – Any vegetation clearance or clearance of manmade materials should be scheduled for outside the nesting bird season (March to August). If this is not possible, a suitably experienced ecologist should check the development site before work commences to determine the presence of any nesting birds. – Additionally, we advise that if nesting birds are found, a suitably sized buffer zone should be set up around the nest and no work within this zone should commence until the young have fledged or the nest is no longer in use. This will ensure that no nests are destroyed during the site construction works and no offences are committed under the Wildlife and Countryside Act 1981 (as amended). We also recommend that should consent be granted the applicant should follow our guidance on Dealing with construction and breeding birds, March 2016	Section 6	It is confirmed that the recommended ornithological mitigation measures will be implemented.
NatureScot (ML 00010868)	In line with the important ornithological features identified in EIA Report (section 5.6.4), we agree with the proposed mitigation. However, in addition we advise that mitigation, including the following is included in a Wintering Bird Protection Plan and implemented in full: – Additional screening fencing to be erected along main disturbance routes to help reduce noise, light and dust pollution and hide people moving round (in line with mitigation proposed for the XLCC factory). – Work should avoid winter periods, or at least stop before dark and during particularly cold weather, when disturbance will have far greater consequences. There is no obvious replacement roosting habitat for these species so every effort to retain them on the SSSI should be designed into the project. We would be happy to have further dialogue with the applicant to provide a workable framework to detail working arrangements that would maintain the conditions required of roosting birds in this area. particularly the definition of work practices in relation to “particularly cold weather”. – Additional restrictions on winter working hours to reduce disturbance to roosting birds to be overseen by an Ornithological Clerk of Works (OCOW) – All relevant personal on the site should be made aware of the environmental sensitivities of the site (proximity to designated sites and species of conservation concern) via the site induction and additional task and species-specific toolbox talks.	Section 6	It is confirmed that a Wintering Bird Protection plan will be produced including the recommended mitigation.
NatureScot (ML 00010868)	if the approved XLCC factory project and the current proposal begin work simultaneously we advise that the impacts on roosting waders will require a coordinated approach to mitigate to acceptable levels.	Section 6	It is confirmed that post consent consultation will be held with XLCC to confirm project programmes and identify where co-ordinate protect mitigation is required to be implemented.

NatureScot (ML 00010868)	We note that technical appendices 5.8 and 5.10 contain detail relating to biodiversity net gain (BNG) assessment (terrestrial) and biodiversity enhancement management plans BEMP (terrestrial) respectively. We note that Section 1.2 of the BEMP states that "The proposed development will also aim to deliver enhancements in the marine environment, however, further baseline data is required to inform marine management plans". We will advise on this when the Subtidal and Phase II intertidal surveys have been completed. . Whilst the current BEMP (TA5.10) does contain some good proposals, it would benefit from additional mapping detail and for the prescriptions within section 2.6.3 to provide quantifiable data as to what will be delivered and where.	Section 7 and 8	Section 7 details further information in relation to the subtidal and intertidal surveys including enhancement proposals.
NatureScot (ML 00010872)	It is not clear if the EIAR or Technical Appendix 5.42 considered disposal of dredged material at sea and the importation of a similar volume of dredged material to the proposed development site. Both these operations have the potential to disturb cetaceans and our advice, given the volumes of material to be dumped, and the intensity of vessel movements and dumping operations, is that mitigation measures to reduce and avoid the potential disturbance impact of dredging and dumping on marine mammals are recommended. The most effective way of mitigating the potential effects of disturbance is through the provision of a qualified Marine Mammal Observer ensuring no marine mammals are present within an agreed buffer zone.	Section 9	In relation to the dredge movements (either to disposal site(s)or from potential sediment source locations) it is considered that the associated noise levels within the waterbody are akin to regular vessels, as such during the transport stage of the works it is not considered that an MMO will be required. It is confirmed that an MMO on the dredge vessel(s) will undertake observations ahead of each discharge at the disposal site(s) and prior to the restart of any dredging activity at the potential source site(s).

This Addendum has been produced to provide further subtidal and intertidal information and a response to the EIAR consultation. It is not a stand-alone document and should be read in conjunction with the original EIAR.

2 INFILL MATERIAL

At the time of writing the source of the infill material for the dry dock is still to be confirmed. As identified in the supporting BPEO report (Technical Appendix 9.2, Volume 3 of the EIAR), where possible beneficial reuse of the dredge arisings associated with the dredging activity at the site will be undertaken. Where this is not possible dredge arisings from another appropriately licensed location will be utilised.

It is confirmed, as detailed in the EIAR, that the dry dock at the site will be infilled utilising dredge arisings which will be brought to the site via sea vessel.

3 NATIVE OYSTERS

The Marine Directorate request for information in September 2024 required consideration of native oysters.

The NatureScot Scoping Response incorporated the following request (Section 1.21 of the NatureScot response):

An assessment of the potential impacts on the Southannan Sands SSSI and its notified features should also consider project specific and cumulative impacts on the recently discovered mussel reef, supporting a native oyster bed, as well as the other Priority Marine Features identified in section 6.2.3 of the scoping report.

Technical Appendix 5.3 (Volume 3 of the EIAR) details the Phase I Intertidal Survey undertaken by Seastar Survey Ltd in accordance with Common Standards Monitoring guidance (JNCC, 2004) and procedural guidelines outlined in the Marine Monitoring Handbook (Davies et al., 2001) and the CCW Handbook for Marine Intertidal Phase I Survey and Mapping (Wyn, et al., 2006). The surveys were undertaken from the 8th – 10th April 2024.

With respect to native oysters, none were identified within the Southannan Sands SSSI during the survey. As no native oysters were identified within the intertidal survey they were subsequently not taken forward for impact assessment.

Section 7 of this report details the findings of the subtidal benthic survey carried out in the dredge pocket and surrounding areas in July 2024. No native oysters were observed within the survey area.

Section 8 of this report details the findings of the intertidal Phase II benthic survey carried out in September 2024. No native oysters were observed within the survey area.

Chapter 9 of the EIAR incorporates coastal modelling and assessment of impact to coastal processes as a result of the development.

The assessment concluded the following:

- Deposition of ‘spilled’/disturbed sediment from dredging activity would be very largely within the dredge area, with suspended sediment deposition from the dredging ‘plume’ predicted to be negligible within the SSSI.
- Increase in tidal flow as a result of the newly dredged bathymetry would be relatively minor and limited to the dredge area and immediate surrounds, with no change at the SSSI.
- Increase in wave heights as a result of the newly dredged bathymetry would be largely limited to the waters between the dredge area and the SSSI.
- Any resulting changes to sediment transport with regard to the SSSI would not be significant.

As such the impact to coastal processes is not considered to impact the current site condition with respect to potential future establishment of native oysters in the SSSI.

The mitigation measures detailed in the EIAR with respect to minimising indirect impacts on the SSSI and its notified features from water and airborne pollution would also be suitable with regards to protecting future establishment of native oysters in the SSSI.

4 EPS AND BASKING SHARK LICENCE APPLICATIONS

It is confirmed that EPS and Basking Shark Licence applications have been issued to Marine Directorate in November 2024. [Redacted]

5 PILING NOISE MANAGEMENT PLAN

It is confirmed that post consent and pre-construction a Piling Noise Management Plan will be produced with respect to the construction of the mooring dolphins and submitted to the regulators for agreement. The plan will incorporate the following requested information

- Details of the number of piles to be driven, the duration of piling, impact hammer energy.
- Details of timing of piling (e.g. seasonal, diurnal, tidal cycle).
- A quantitative assessment of the number of animals likely to experience auditory injury (PTS) and disturbance, for both an individual piling event and the full piling schedule (for those species where density estimates exist).
- An assessment of the magnitude of these impacts relative to the population of each species, in order to determine the effect on favourable conservation status (for those species where population estimates exist).
- A detailed, comprehensive mitigation plan, based on the JNCC guidance2 (2010).
- Consideration of noise abatement systems to further reduce underwater noise levels, if needed.

6 PRE-CONSTRUCTION PROTECTION PLANS AND SURVEYS

It is confirmed that prior to construction the following protection plans will be produced and provided to the regulators for agreement:

- Otter Species Protection Plan
- Wintering Bird Plan

The otter Species Protection Plan will be incorporated into an updated version of the CEMP. There will be a pre-construction survey undertaken that will inform the production of this plan.

Following the NatureScot comments we can confirm that the following will be undertaken and incorporated as part of the Wintering Bird Plan.

- Consultation will be undertaken with NatureScot in relation to proposed winter working programme and activities. The Wintering Bird Plan will be informed by this consultation and detail mitigation measures to be incorporated during the construction phase. The
- Details of additional screening fencing to be erected along main disturbance routes to help reduce noise, light and dust pollution and hide people moving round.
- All relevant personal on the site will be made aware of the environmental sensitivities of the site (proximity to designated sites and species of conservation concern) via the site induction and additional task and species-specific toolbox talks.
- The works and wintering bird mitigation requirements will be overseen by an Ornithological Clerk of Works (OCOW).

It is also confirmed that the following NatureScot recommendations will be included as part of an updated CEMP and the implementation will be overseen by the OCOW.

- Any vegetation clearance or clearance of manmade materials will be scheduled for outside the nesting bird season (March to August). If this is not possible, a suitably experienced ecologist will check the development site before work commences to determine the presence of any nesting birds.
- If nesting birds are found during the clearance or site works, a suitably sized buffer zone will be set up around the nest and no work within this zone will commence until the young have fledged or the nest is no longer in use.

Prior to construction Clydeport Operations will engage with the XLCC Project Team to review the construction phase programmes for each project with a view to identifying any requirements for co-ordination of mitigation requirements for wading roosters. The CEMP will be updated to reflect these requirements.

Pre-construction surveys will be carried out to include the site and sufficient buffer of the Gill Burn and other key ecological habitats. For species that can be surveyed at any time of year, pre-construction surveys will be undertaken as close to the construction period as possible, and no more than 3 months before the start of works. The CEMP will be updated to reflect the findings of the preconstruction surveys.

7 SUBTIDAL HABITATS AND FAUNA

Seastar Survey Limited carried out a subtidal benthic survey of the dredge pocket and surrounding potentially impacted areas in order to identify and map the habitats present. The survey works were undertaken in July 2024.

The survey incorporated:

- Bathymetry and sidescan sonar survey;
- Targeted drop down camera transects informed by review of the bathymetry and sonar survey;
- Infaunal macrobenthic invertebrate analysis.

A copy of Technical Appendix 5.11 Subtidal Benthic Assessment is provided in Appendix A of this report.

The NatureScot scoping consultation response (dated 21st December 2023 and provided in Technical Appendix 3.3 of the EIAR) requested the following information with respect to the subtidal benthic environment:

Our advice is that surveys will be required both in the footprint of development site and in the zone of influence of site e.g. the dredge plumes, areas predicted changes to hydrodynamics

Chapter 9 of the EIAR detailed the Water Environment and Coastal Processes impact assessment including hydrodynamic and dredge plume modelling.

Section 3.6 of the NatureScot consultation response (CLC177438-ML 00010872 – Capital Dredge and Sea Deposit provided in Appendix C) states the following in relation to the findings of the Chapter 9 assessment.

We note and agree with the assessment in Chapter 9 of the EIA about the following core findings of the Coastal Modelling Study:

- Deposition of 'spilled'/disturbed sediment from dredging activity would be very largely within the dredge area, with suspended sediment deposition from the dredging 'plume' predicted to be negligible within the SSSI.
- Increase in tidal flow as a result of the newly dredged bathymetry would be relatively minor and limited to the dredge area and immediate surrounds, with no change at the SSSI.
- Increase in wave heights as a result of the newly dredged bathymetry would be largely limited to the waters between the dredge area and the SSSI.
- When wind and waves are both from due south, part of the MLWS edge of the SSSI could experience an increase of <0.2m in wave height. We agree that any effect on the SSSI would be negligible because this change is minor, and the dredging would re-instate bathymetry to which the SSSI sandflats have previously adjusted.
- Any resulting changes to sediment transport with regard to the SSSI would not be significant.

On this basis it is considered that the area of concern with respect to impact to the benthic sediment is the proposed dredge footprint itself. In addition a 100m buffer zone has been defined beyond the

dredge pocket which represents a zone of potential light siltation defined as changes related to those over natural siltation and up to 5 cm (more than this depth is covered by different pressure)[1].

With respect to future drainage from the site outfalls are to be installed on the western edge of the site, as such this same area is considered to be appropriate with respect to consideration of potential impact to subtidal habitats from potential pollution events during construction and operation of the site.

Figure 176482-GIS023 provided in Appendix B details the identified area of concern with respect to subtidal habitats.

It is noted that the Seastar survey was carried out prior to completion of the coastal modelling assessment, as such it extends beyond the area of concern.

7.1 Habitats and Biotopes

Generally, the southern and central sections of the survey area were characterised by coarse and mixed sediments, while the inshore area just north of the construction yard comprised sands, muddy sands and sandy muds. The seabed in the vicinity of the jetty between Southannan and Fairlie Sands was found to be composed of muddy sediments, while the northern section of the survey area featured muds and muddy mixed sediments.

Biological communities in the survey area were found to be dominated by macroalgal communities on soft sediments. The most common macroalgal taxa recorded included the kelps *Saccharina latissima* and *Chorda filum*. These kelps generally coincided with a variety of filamentous and finely branching brown seaweeds and filamentous and foliose red algae.

7.2 Priority Marine Features (PMFs)

It is noted that no PMFs linked to the SSSIs (e.g. seagrass, blue mussel beds or native oysters) were identified in the subtidal survey area, however there were PMFs identified which are not linked to the SSSIs as detailed below.

The distribution of assigned PMFs across the greater survey area is shown in Figure 1. For all video segments and still images where any *Saccharina latissima* and red seaweeds on infralittoral sediments (SS.SMp.KSwSS) biotopes were identified, the PMF habitat ‘kelp and seaweed communities on sublittoral sediment’ was flagged. This PMF was therefore recorded on a total of 15 video segments from 11 different transects, primarily located in the southern section of the survey area, offshore of Hunterston Sands and in the inshore area around Southannan Sands, just north of the construction yard. It is noted that the quality of PMF habitat is relatively low, with the kelps and seaweed communities throughout the survey area being comparatively sparse/impoverished. This PMF was identified as being present within the area of concern with respect to the development proposals.

The PMF ‘burrowed mud’ was assigned to all records where the biotope Seapens and burrowing megafauna in circalittoral fine mud (SS.SMu.CFiMu.SpnMeg) was recorded. This PMF was recorded at three transects, located around the existing jetty between Southannan and Fairlie Sands, and at the northern edge of the survey area. This PMF was outwith the area of concern with respect to the development proposals.

[1] feature-activity-sensitivity-tool.scot/search-pressure (11th November 2024)

Two other PMFs were flagged as being possibly present within the survey area from the video assessment.

Coarse shelly and/or gravelly mobile sands, likely home to burrowing bivalves, were observed on several video transects, particularly HC_04, HC_05, HC_12 and HC_17, all of which are wholly or partially located within the sediment settlement plume extent. As there was insufficient data to assign imagery records beyond the biotope complex level, the biotope SS.SCS.ICS.MoeVen, which is the sole biotope component of the PMF 'tide swept coarse sands with burrowing bivalves,' could not be assigned. None of the 'priority' grab samples were found to contain the characterising taxon *Moerella* spp.; it can therefore be said with some certainty that the component biotope has not been identified within the sediment settlement plume extent. However, all of the grab samples analysed to date were found to contain high numbers of tellinid and venerid bivalves and the biological communities observed are very similar to that of the biotope SS.SCS.ICS.MoeVen. In addition, the biotope SS.SSa.IMuSa.FfabMag, which was assigned to two of the grab samples, is closely related to SS.SCS.ICS.MoeVen and the two are collectively considered to comprise the 'shallow Venus community,' with SS.SSa.IMuSa.FfabMag occurring in less exposed, more stable fine and muddy sands and SS.SCS.ICS.MoeVen in slightly coarser sediments where brittle-shelled species such as *F. fabula* are less likely to be found. Uncertainty therefore remains as to whether the biotope SS.SCS.ICS.MoeVen and the associated 'tide swept coarse sands with burrowing bivalves' PMF is present within the area of concern. For the basis of this assessment a conservative approach has been taken and this PMF has therefore been included as being present in the dredge pocket and dredge plume buffer.

. Biotope *Brissopsis lyrifera* and *Amphiura chiajei* in circalittoral mud (SS.SMu.CFiMu.BlyrAchi), which is a component of the PMF 'inshore deep mud with burrowing heart urchins,' was assigned for an area on the far north of the survey area. This it outwith the area of concern.

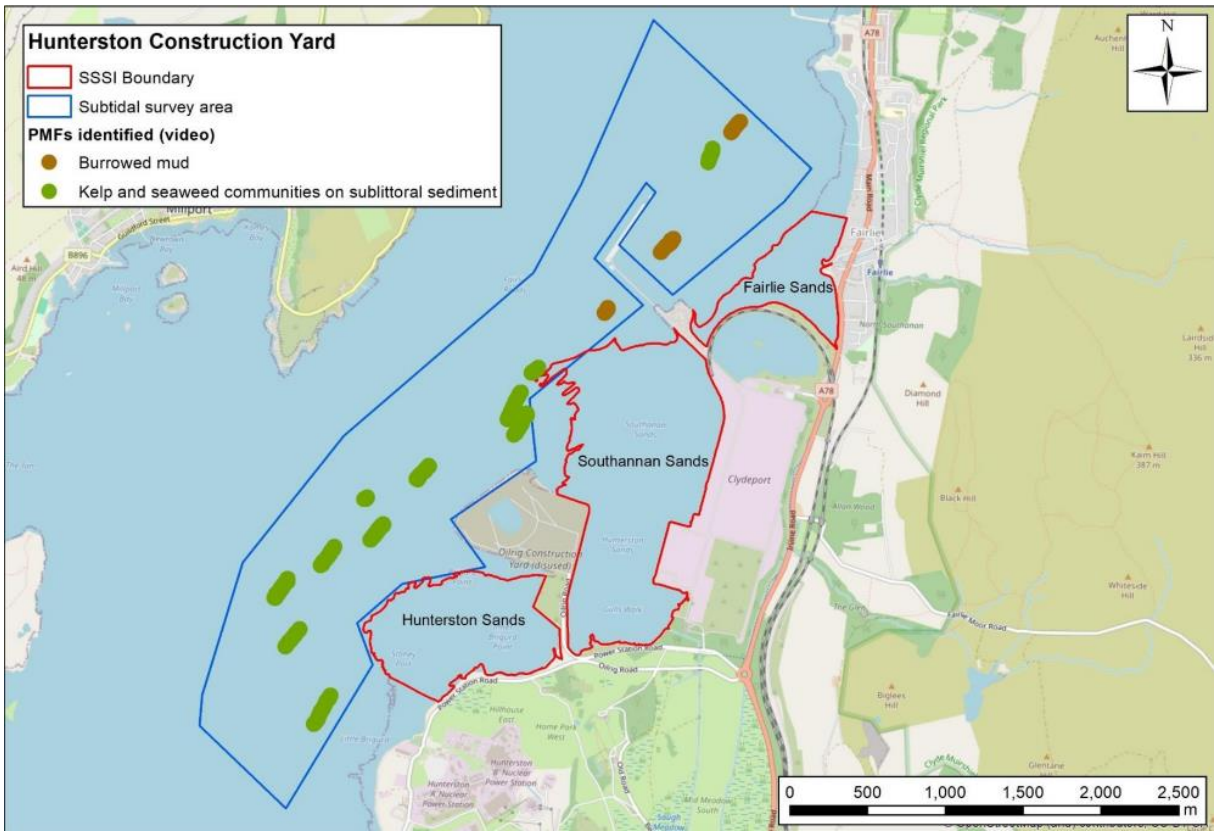

Figure 1 Distribution of PMFs Assigned to Drop Down Video Records, Seastar Survey 2024

Figure 176482-GIS022 provided in Appendix B details locations of PMFs within the dredge and buffer areas along with draft habitat types interpolated from the from both video survey and grab sample collection.

On the basis of the above there is not considered to be an impact to the PMFs, 'burrowed mud' and 'inshore deep mud with burrowing heart urchins' due to the distribution of these PMFs which are located a significant distance from the dredge pocket and area of deposition of solids as a result of the dredging activity.

The green and brown area is considered to be representative of PMF habitat 'kelp and seaweed communities on sublittoral sediment' and the pink area considered to be representative of 'tide swept coarse sands with burrowing bivalves' based on existing survey data and interpretation of side scan sonar information.

Figure 2 below shows the known distribution of these habitat types[2] within the wider surrounding area. It is noted that Kelp and seaweed communities on sublittoral sediment are the dominant habitat types within the wider marine area where surveys have been conducted.

[2] https://marinescotland.atkinsgeospatial.com/nmpi/ (reviewed 9th September 2024)

3

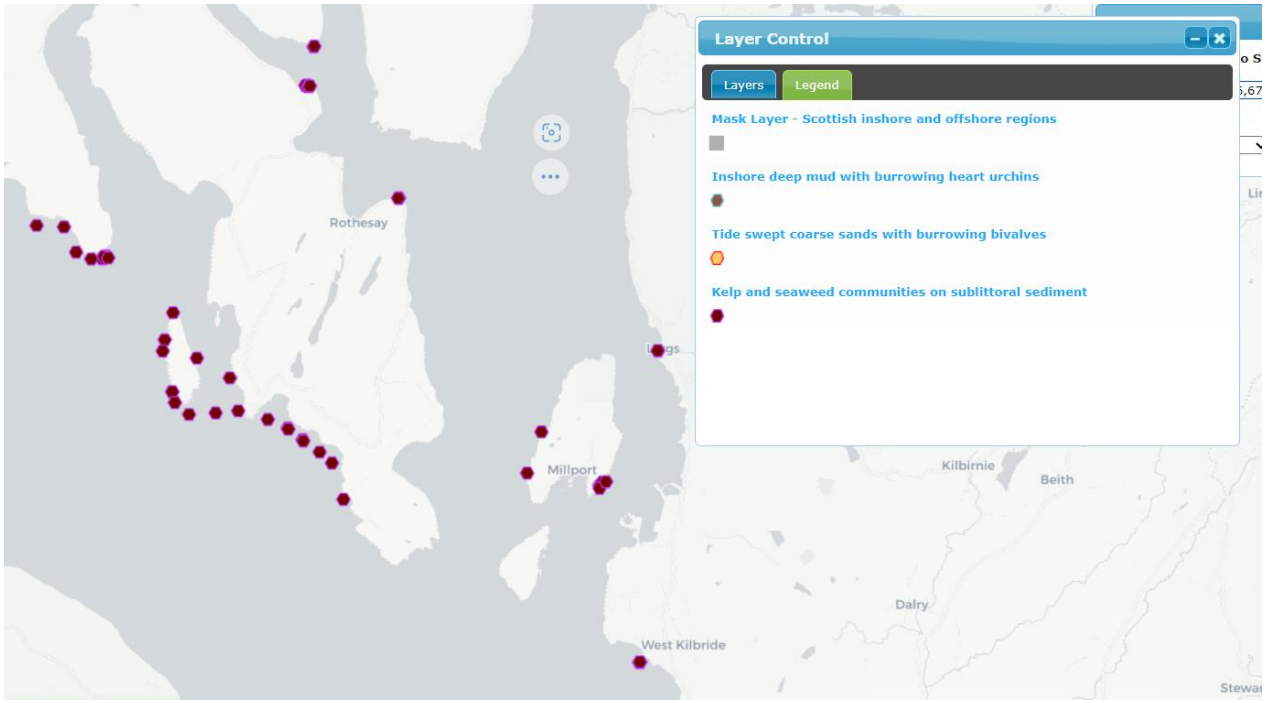

Figure 2 Distribution of Identified PMFs in Surrounding Area

7.3 Impact Assessment

7.3.1 Kelp and Seaweed Communities on Sublittoral Sediment

Construction Impacts

The subtidal survey has identified an area of 'kelp and seaweed communities on sublittoral sediment' is present within the dredge pocket, these will be lost as a result of the dredging activity. The survey identified that the PMF was sparse and impoverished. There are areas of the kelp PMF in the wider survey area which will be retained but may be temporarily damaged as result of sediment deposition and turbidity from dredging works or a pollution incident. There is also a risk of introduction of mINNS through construction activities which could result in longer term damage or degradation of the retained kelp PMF with INNS outcompeting the native flora or fauna.

The sensitivity of the PMF identified in the survey area to different pressures associated with the construction phase (as listed by FeAST, 2023) is detailed below:

Table 1 Sensitivity of Kelp and Seaweed Communities From Construction Activity

Pressure	Sensitivity
Physical Change to Another Seabed Type	Low
Siltation Rate Change (Heavy)	Low
Surface Abrasion	Low

[3] https://feature-activity-sensitivity-tool.scot (reviewed on 9th September 2024)

Physical Removal (Extraction of Substratum)	Medium
Removal of Non Target Species (Including Lethal)	Medium
Removal of Target Species (Including Lethal)	Medium
Sub-surface Abrasion/Penetration	Medium
Siltation Rate Changes (Light)	Not Sensitive (Negligible)
Hydrocarbon and PAH Contamination	Sensitive (Medium)
Water Clarity Changes (turbidity)	Low
Introduction or spread of non-indigenous species & translocations (competition)	Medium

For habitats lost (i.e. the habitat within the dredge pocket), the impact is considered to be of **major magnitude** with the receptor being of **medium sensitivity**.

As detailed in Drawing 176482-GIS-021 the identified overall area of the kelp and seaweed communities in the dredge pocket has been calculated. It should be noted that the accuracy of habitat area measurements is limited by the form of baseline data collection. As noted from the subtidal survey the presence of the kelp and seaweed was patchy across the survey area as such the overall area allocated is a significant overestimate of the actual PMFs present in the dredge pocket. It is considered that he impact of habitat loss will not have an impact on the national status of the PMF given the area of kelp that will be retained in the surrounding surveyed areas and the wider abundance of the PMF in the vicinity of the site.

As detailed in the figure the areal extent of the subtidal zone in the dredge pocket that recorded presence of kelp and seaweed was 217,597m^2.

It is noted that ‘kelp and seaweed communities on sublittoral sediment’ have been identified outwith the dredge pocket both within the dredge plume buffer area (where impact from deposition is considered to be low) extending to the north and across the majority of the southern portion of the survey area (Figure 1 details the camera drop locations that identified the spread of this feature). On the basis of the larger survey area this would equate to approximately 1,750,000m2 of residual area that contains the PMF that would not be impacted as a result of the works.

For retained habitats the impact is considered to be of **low magnitude** with the receptor being of **low to medium** sensitivity.

Confidence in both the assessments is high.

Operational Impacts
Operational impacts to retained habitats may arise through a pollution incident occurring. This could result in the death of key floral and faunal species. Impacts relating to a pollution incident will be temporary and reversable. Increased vessel movements may result in introduction of mINNS which could result in longer term damage or degradation of the retained kelp PMF with INNS outcompeting the native flora or fauna.

There is potential for impact associated with maintenance dredging (i.e. temporary period of higher siltation and increased turbidity). It is considered that these would not result in an impact to the national status of the PMF.

The sensitivity of the PMF identified in the survey area to different pressures associated with the operational phase (as listed by FeAST, 2023) is detailed below:

Table 2 Sensitivity of Kelp and Seaweed Communities From Operational Activity

Pressure	Sensitivity
Siltation Rate Change (Heavy)	Low
Siltation Rate Changes (Light)	Not Sensitive (Negligible)
Hydrocarbon and PAH Contamination	Sensitive (Medium)
Water Clarity Changes	Low
Introduction or spread of non-indigenous species & translocations (competition)	Medium

The impact is of **low magnitude** with the receptor being of **medium sensitivity**. Confidence in the assessment is high.

7.3.2 Tide Swept Coarse Sands with Burrowing Bivalves Construction Impacts

The subtidal survey has identified a potential area that cannot be conclusively ruled out as being 'tide swept coarse sands with burrowing bivalves' is present within the dredge pocket and surrounding buffer zone.

There are areas of this potential PMF located adjacent to the proposed dredge pocket which will be retained but may be temporarily as result of sediment deposition and increased turbidity from dredging works or a pollution incident. There is also a risk of introduction of mINNS through construction activities which could result in longer term damage or degradation of the retained PMF.

The sensitivity of the potential PMF identified in the survey area to different pressures associated with the construction phase (as listed by FeAST, 2023) is detailed below:

Table 3 Sensitivity of Tide Swept Coarse Sands with Burrowing Bivalves Communities From Construction Activity

Pressure	Sensitivity
Physical Change to Another Seabed Type	High
Siltation Rate Change (Heavy)	Low
Surface Abrasion	Low
Physical Removal (Extraction of Substratum)	Medium

Removal of Non Target Species (Including Lethal)	Low
Removal of Target Species (Including Lethal)	Medium
Sub-surface Abrasion/Penetration	Medium
Siltation Rate Changes (Light)	Not Sensitive (Negligible)
Hydrocarbon and PAH Contamination	Sensitive (Medium)
Water Clarity Changes (turbidity)	Not Sensitive (Negligible)
Introduction or spread of non-indigenous species & translocations (competition)	Not Assessed

For habitats lost (i.e. the habitat within the dredge pocket), the impact is considered to be of **major magnitude** with the receptor being of **medium to high sensitivity**.

The area of identified associated habitat (Rippled sand and shell material with Synarachnactis lloydii and hydroids) calculated to be lost within the dredge pocket is 21,191m2.

In relation to this potential PMF it is noted to extend outwith the dredge pocket into the dredge plume buffer where impact is considered to be low. For context the area of identified potential PMF in the wider dredge plume buffer is 243,573m2. For retained habitats the impact is considered to be of **low magnitude** with the receptor being of **low sensitivity**. Confidence in both the assessments is high.

Operational Impacts

Operational impacts to retained habitats may arise through a pollution incident occurring. This could result in the death of key floral and faunal species. Impacts relating to a pollution incident will be temporary and reversable.

Increased vessel movements may result in introduction of mINNS which could result in longer term damage or degradation of the retained potential PMF with INNS outcompeting the native flora or fauna.

The sensitivity of the potential PMF identified in the survey area to different pressures associated with the operational phase (as listed by FeAST, 2023) is detailed below:

There is potential for impact associated with maintenance dredging (i.e. temporary period of higher siltation and increased turbidity) The sensitivity of the potential PMF identified in the survey area to different pressures associated with the operational phase (as listed by FeAST, 2023) is detailed below:

Table 4 Sensitivity of Tide Swept Coarse Sands with Burrowing Bivalves Communities From Operational Activity

Pressure	Sensitivity
Siltation Rate Change (Heavy)	Low
Siltation Rate Changes (Light)	Not Sensitive (Negligible)

Hydrocarbon and PAH Contamination	Sensitive (Medium)
Water Clarity Changes	Not Sensitive (Negligible)
Introduction or spread of non-indigenous species & translocations (competition)	Not Assessed

The impact is of **low magnitude** with the receptor being of **medium sensitivity**. Confidence in the assessment is high.

Cumulative Impacts

A review of potential cumulative impact was undertaken incorporating consideration of the following projects.

Planning/Application Ref	Address	Description of Development	Status
N/23/00606/PP	Hunterston Construction Yard, Fairlie, North Ayrshire	Site preparation works, establishment of compound area and initial groundworks including landscaping and other required infrastructure for Bakkafrost facility.	Planning permission granted
N/22/00979/PP	Hunterston Construction Yard, Fairlie, Largs, Ayrshire	Temporary consent for the establishment of a Fastrig Wind Sail Test Facility Yard to include all temporary buildings (including workshop, storage, office, canteen and WC), access, parking and other required infrastructure	Planning permission granted
N/23/00744/PP	Former Coal Terminal Hunterston, West Kilbride, Ayrshire	Development and operation of a grid stability facility	Planning permission granted
N/22/00133/PPPM & N/22/00712/MSCM	Former Coal Terminal Hunterston, West Kilbride, Ayrshire	The erection of a high voltage cable manufacturing facility (XLCC), including detailed planning permission for the construction of a 185m high tower with associated factories, research and testing laboratories, offices with associated stores, transport, access, parking and landscaping with on-site generation and	Planning permission in principle granted and approval of reserved matters

Planning/Application Ref	Address	Description of Development	Status
		electrical infrastructure and cable delivery system	
0010510	Largs Lifeboat Slipway	Construction of new slipway	Marine Construction Licence Approved
SC0060	Cumbrae Ferry Slipway	Screening for construction of a new ferry slipway	Screening for Marine Licence
00010300	Fairlie	Construction of a new coastal path	Marine Construction Licence Approved

Given the scale of the marine and coastal developments and the distance from the proposed development site these projects would likely have no cumulative impacts to the Hunterston project in relation impact to biodiversity.

With respect to the terrestrial projects, the Fastrig and Bakkafrost projects are also located on the wider HCY area. The Fastrig project has temporary permission ending within 24 months from 24th January 2023. . It understood that the Bakkafrost facility may utilise the existing northern quayside at the HCY for vessels as part of their operation, as such the impacts associated with increased vessel movements are expected to be similar in the operational phases of the projects. The development associated with the Bakkafrost facility relates to the enabling works phase for the development and as such does not incorporate operational elements. It is recognised that as part of the future operation there may be a requirement for a discharge consent from the facility which may result in a cumulative impact to the subtidal benthic receptors in conjunction with the discharge requirements from the HCY. Any discharge consents will be regulated by SEPA under Controlled Activity Regulations (CAR) which will incorporate specific discharge consent parameters to appropriately mitigate this impact.

For the receptors the magnitude of impacts are considered to be of low – negligible in magnitude and affecting a small area of the relative PMFs and so even with cumulative effects, alterations to the overall conservation status of the features is not considered likely.

7.4 Mitigation and Monitoring

Following the subtidal benthic survey and subsequent impact assessment it is considered that the construction and operational mitigation and monitoring measures detailed in Section 5.8 of Volume 1 of the EIAR are considered to include appropriate best practice measures to avoid and minimise the negative impacts highlighted in Section 3.3.

Table 5 details additional proposed mitigation measures that are specific to the subtidal habitats.

Table 5 Schedule of Mitigation

Feature / Topic	Mitigation	Timing
Chapter 5 – Biodiversity Addendum		
Subtidal Habitats	A biosecurity plan has been developed for the project and is provided as Technical Appendix 5-5 (Volume 3 of the EIAR). Prior to works commencing on site Construction Environment Management Plan (CEMP) detailing site specific mitigation and monitoring will be agreed with the Marine Directorate and implemented to avoid and reduce negative impacts. The following good practice guidelines shall be adhered to and incorporated into the CEMP: • GGP 5: Works and maintenance in or near water; • PPG 6: Working at construction and demolition sites; • PPG 7: Safe Storage – The safe operation of refuelling facilities; • GPP 21: Pollution and incident response planning; and • PPG 22: Incident response – dealing with spills. An independent Ecological/Environmental Clerk of Works (ECoW) will be employed to audit and report on adherence to the CEMP as well as any other relevant planning consents, environmental permits, legislation and mitigation. All personal on the site should be made aware of the environmental sensitivities of the site (proximity to designated sites) via the site induction and additional task specific toolbox talks as required. A Pollution Incident Response Plan will be developed relating to the construction of the proposed development, statutory requirements and identification of areas of highest sensitivity. This will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times. Mitigation measures will be delivered by the principal contractor through detailed Construction Environment Management Plans (CEMPs) that will be produced following appointment. The location of the dewatering outfall will also be chosen to avoid sensitive areas and have minimal impact on the coastal environment. The discharge will be regulated by SEPA under the Controlled Activities Regulation which will detail the specific quality parameters which the discharge will require to meet. Specific water processing measures may be required to meet these discharge parameters. The principal contractor will update (as required) and implement the biosecurity plan throughout the duration of works. This will include the cleaning of equipment and plant machinery prior to deployment and at regular intervals throughout to reduce risk of transmitting non-native and invasive species. The plan will be submitted to the planning authority and other relevant consultees for approval prior to works commencing and implementation would be audited by the ECoW. In the case that concrete batching was to be undertaken on-site the following mitigation measures would be implemented to minimise the potential impact of concrete batching on the water environment in line with GPP6: • Concrete batching will take place on an impermeable designated area and at least 10m from any waterbody. • Equipment and vehicles will be washed out in a designated area that has been specifically designed to contain wet concrete/ wash water. • A closed loop system will be used for wash waters. Wash waters will be stored in a contained lined pond for settlement before being reused (e.g. for mixing and washing). • No discharge of wash waters will occur on-site. All excess wash water that cannot be reused will be disposed of off-site. The following mitigation is proposed for concrete handling and placement: • Pouring of concrete will take place within well shuttered pours to prevent egress of concrete from the pour area; • Pouring of concrete during adverse weather conditions will be avoided. Concrete acidity (pH) will be as close to neutral (or site-specific pH) as practicable as a further precaution against spills or leakage. The storage of oil is considered a Controlled Activity which will be deemed to be authorised if it complies with the Regulations. The mitigation measures to minimise any risk of contaminant release are in line with SEPA GPP and PPG documents and include the following: Storage: • Storage for oil and fuels on site will be designed to be compliant with GPP2 and GPP8; • The storage and use of loose drums of fuel on site will not be permitted; and • Bunded tanks will provide storage of at least 110% of the tank's maximum capacity.	Construction and operation

Feature / Topic	Mitigation	Timing
	Refuelling and maintenance: • Fuelling and maintenance of vehicles and machinery, and cleaning of tools, will be carried out in a designated area where possible in line with PPG7; • Multiple spill kits will be kept on site; • Drip trays will be used while refuelling; and • Regular inspection and maintenance of vehicles, tanks and bunds will be undertaken. An Operational Environmental Management Document (OEMD) will be in place throughout the operational phase. Best practice will be followed throughout the operational phase, with reference to the SEPA Guidance for Pollution Prevention (GPPs), and best practice guidance. With respect to the areas of PMF lost as a result of the dredging activity these will be compensated for via appropriate compensation and enhancement.	

7.5 Compensation and Enhancement

Currently there is no specific guidance that details appropriate compensation and enhancement measures in relation to subtidal habitats.

Between July and September 2021, Defra issued a consultation document , *Best practice guidance for Developing Compensatory Measures in Relation to Marine Protected Areas*[4]. To date an updated version of the report has not been issued following the consultation.

This document incorporated the following statement in relation to compensation:

"As a general rule, compensation should be delivered at a ratio higher than 1:1."

The Welsh Government issued Mitigation and Compensation Opportunity in Marine Consenting[5] in March 2020.

This document stated:

"The range of opportunities to compensate for subtidal habitat impacts is limited, particularly in delivering like-for-like habitat. Consequently, examples of implemented subtidal compensatory schemes are rare, and no implemented schemes are known in the UK."

As detailed in Drawing 176482-GIS021 the overall area that contains the PMF Kelp and Seaweed Communities on Sublittoral Sediment and potential PMF Tide Swept Coarse Sands with Burrowing Bivalves is 238,796m^2. The quality of the PMF habitat was considered to be relatively low with the kelp and seaweed community being impoverished.

It is considered that a like for like compensation approach in relation to the PMFs identified in the dredge pocket at Hunterston would be impractical on the basis of identifying and obtaining a suitable subtidal zone for introduction of the PMF species and the likely associated environmental impacts that may result from this activity (i.e. the act of producing suitable substrate for a like for like compensation may have a greater environmental impact and associated licensing requirements than the dredging activity itself).

Given that the wider subtidal survey has identified that there will be a significant proportion of residual PMFs present in the wider Hunterston area it is therefore considered that alternative biodiversity enhancement would provide more value as an appropriate mitigation measure.

Given the site location in immediate proximity to the Southannan Sands SSSI (which covers an area of 255,680m^2).it is considered that the most appropriate enhancement measures would incorporate development of a long term enhancement, management and monitoring plan for the SSSI. Given that this is a designated site with associated sensitivity it is proposed that a detailed enhancement plan is developed through consultation and agreement with NatureScot, North Ayrshire Council and the Marine Directorate.

There are potential enhancement activities for evaluation, development and agreement with the regulators that could be taken forward within the SSSI. These potential options would include the following (either individually or as a combined activity dependent on the findings of the design stage):

[4] Best practice guidance for developing compensatory measures in relation to Marine Protected Areas
[5] Mitigation and Compensation Opportunity in Marine Consenting

- Development and implementation of restoration proposals for the blue mussel beds identified in the SSSI.

- Ongoing monitoring of the Seagrass beds with the potential for enhancement projects within the SSSI. The proposals will be informed by NatureScot Research Report 1286 - Seagrass restoration in Scotland - handbook and guidance[6]. As part of these proposals consideration will be made as to the potential for seeding of seagrass within the Southannan Sands SSSI.

- Native oyster restoration opportunities within the SSSI. This would incorporate consideration for appropriate enhancement of the site suitability for oyster establishment and re-introduction of a healthy and viable oyster population, capable of long term survival and recruitment.

Due to the scale and nature of the project, it is anticipated that it will be delivered in phases, over a number of years. An adaptive management approach is recommended, where the details of future phases are regularly reviewed and updated based on the outcomes of monitoring and consultation feedback. The actions below cover a proposed initial five years of the project but may be subject to change as the project progresses.

7.6 Phase 1 – Project Design

As part of the design stage there will be engagement with regulators including the local Council, Marine Directorate and NatureScot, along with other interest groups such as environmental or community groups, educational institutes, commercial and recreational fisheries and local tourism businesses (as required).

This phase will seek to refine the project aim and objectives to be site specific and set out indicators by which success may be measured against. During this phase a specific enhancement and restoration plan will be developed for the SSSI and agreed with the regulators.

A project communication plan will be created. The plan will set out communication goals, identify the target audience, key messages and methods for delivery.

During this stage any permissions and licences required for the enhancement project should be identified and applied for.

If volunteers are likely to be required to assist with the enhancement plans, monitoring and/or re-introduction they will be recruited and trained (if required) within this period.

7.7 Phase 2 – Enhancement and Monitoring

This phase will incorporate the implementation of the enhancement and restoration plan developed in Phase I.

Monitoring would be undertaken at suitable intervals (Year 2 and Year 5) to confirm the SSSI condition enhancement success and continue/ alter management techniques accordingly.

Monitoring methods will be determined in Phase 1 of the project however it will be informed by the Intertidal Phase I and II studies undertaken as part of this EIAR.

[6] NatureScot Research Report 1286 - Seagrass restoration in Scotland - handbook and guidance | NatureScot

Additional monitoring requirements may be desirable depending on final project goals and capacity for undertaking the monitoring.

7.8 Project Timeline

The table below set out the proposed timeline for the plan to be implemented in.

Table 7-6: Project timeline

Phase	Year 1	Year 2	Year 3	Year 4	Year 5
1	Project design				
2		Finalisation of enhancement plans and obtaining agreement and licences	Updated Monitoring Assessment of SSSI prior to enhancement wo	Enhancement activities progress	Further enhancement and restoration activities /Monitoring and plan review

7.9 Residual Effects

The significance of residual effects considered to be likely, once mitigation has been taken into consideration are summarised in Table 6 below.

7.10 Statement of Significance

Once mitigation has been taken into consideration, the only significant effect is the loss of areas of PMF and Scottish Biodiversity List (SBL) habitats within the dredge pocket. It is noted that these PMFs are identified in the wider survey area (i.e. there are large areas of residual PMFs which will have no significant impact as a result of the development) and the proportion being impacted in the dredge pocket in relation to the wider residual PMFs are considered to be small.

This impact is therefore considered to be significant at a site level only as the habitats are relatively widespread within the wider surrounding area and the loss will not affect the overall conservation status. No significant effects on other Important Ecological Features are predicted.

Table 7 Residual Effects Summary

IEF	Importance of IEF	Type of impact	Nature	Source	Duration	Magnitude	Sensitivity	Significance of effect following mitigation	Confidence	Success of mitigation
Subtidal Habitats	International/National (Scotland)	Construction negative	Habitat loss	Dredging	Permanent	Major	Medium to High	**Significant at the site level**	High	Probable
Subtidal Habitats	International/National (Scotland)	Construction negative	Damage	Pollution, sediment deposition during dredging, mINNS	Temporary	Low	Low	Not significant at any geographic level	High	Near certain
Subtidal Habitats	International/National (Scotland)	Operational negative	Damage	Pollution, sediment deposition during dredging, mINNS	Temporary	Low	Low	Not significant at any geographic level	High	Near certain

8 INTERTIDAL PHASE II

In September 2024 Seastar Surveys Ltd undertook a Phase II Intertidal Assessment at Hunterston Sands, Fairlie Sands and Southannan Sands SSSI, the assessment follows on from a Phase I Intertidal Assessment undertaken in April 2024.

It is noted that North Ayrshire Council have applied a pre-construction condition in relation to the Intertidal Phase II as detailed below.

Condition 1. Prior to any works commencing on site a Phase II Intertidal Survey will be completed and provided to North Ayrshire Council, as Planning Authority, and NatureScot. The Construction Environment Management Plan (CEMP) will be updated to reflect the findings of this survey including details of the approach to ongoing assessment of the identified PMFs during and post works. Following completion of the works a Project Completion report will be provided detailing the PMF condition recorded during and post work completion. This report will also detail any remedial work required to be carried out on the basis of the monitoring results, to be agreed with the Council, as Planning Authority, in consultation with NatureScot. Thereafter all works are to be carried out in accordance with any CEMP as may be approved, to the satisfaction of the Council, as Planning Authority.

8.1 Survey Aims

The aims of the Phase II survey included:

- Assess for the presence of a seagrass bed in the southwest corner of Southannan Sands, which was documented in 2016 but not in the April 2024 assessment.. If seagrass is there then we will treat as 2 and 3 below.
- Accurately map seagrass beds in Hunterston Sands, Southannan Sands and Fairlie Sands, including the mapping of any within-bed patches (if present) to gain an understanding of bed patchiness as well as distribution and extent.
- Undertake a quantitative survey of the seagrass beds present via a transect/quadrat survey. A minimum of 30 quadrats per bed were to be conducted, using 5-6 transects with random placement of quadrats along these transects, to assess the following:
    - Percentage cover (whole 0.25 m2 quadrat);
    - Shoot density (count the no. shoots in one quarter of the quadrat);
    - Leaf length (measure the longest five fronds in one quarter of the quadrat);
    - Epiphytes (record species and percentage cover);
    - Browning/wasting disease (% infection);
- Provide greater level of information regarding the mussel bed identified at Southannan Sands by;
    - Documenting the patchiness of mussels within the bed using photographs and measurements of the gaps between patches of mussels;
    - Undertaking a quadrat survey to assess the density and size class of mussels.

8.2 Survey Findings

The live mussel bed was remapped and 21 quadrats were completed. Within each quadrat all mussels were measured and counted.

The area of *Mytilus edulis* n littoral mixed substrata (LS.LBR.LMus.Myt.Mx) was not a contiguous bed, but rather a series of small patches of mussels. Throughout the bed, mussels were present as small (5 - 15 cm across) clumps of a few (<10) mussels bound together by byssus threads with pebbles and shell material. In the densest part of the bed (at the eastern edge of the bed), the gaps between clumps were in the order of 10 - 30 cm, while at the western edge of the bed (the area closest to the freshwater input) where mussels were at their lowest densities, the gaps were larger, in the order of 1 - 2 m. The southern area of the mussel 'bed' (which had not been mapped as part of the Phase I survey) was found to be composed of smaller mussels (mean length = 2.2 cm) than elsewhere (mean = 3.7 cm). Throughout the bed the mixed sediment was present as a veneer over underlying soft sediments with a shallow (1 - 2 cm depth) anoxic layer. It should be noted that the vast majority of the fucoids visible in the photos were not attached and appeared to have washed in on the tide and become snagged on the mussel patches.

The extents of the seagrass beds were mapped in more detail during the Phase II survey than they were during the Phase I survey, with the surveyors marking the edge of each bed using the track function in the handheld GPS. The more accurately mapped beds cover a smaller area than originally estimated during the Phase I survey at Hunterston Sands and Fairlie Sands, while at Southannan Sands the bed was found to be larger than originally estimated. Furthermore, two additional beds were mapped which were not observed during the Phase I survey, both in Southannan Sands; one in the southwest corner (which was previously identified during the 2016 SEPA survey) and one in the central eastern area. The area in the southwest corner of Southannan Sands was thoroughly investigated during the Phase I survey however no seagrass was recorded; it is therefore likely that this bed in particular is subject to significant seasonal fluctuations in size and density. The bed in the central eastern area (Phase II Survey Area 6) was mapped but there wasn’t time in the survey to undertake any quadrats. The seagrass in this area was similar to the seagrass in the southwest corner. Patchy seagrass with filamentous green algae and sparse fucoids on soft sediment (sands and muddy sands) with standing water.

A summary table of the quadrats is provided in Appendix D.

Drawings summarising the findings of the Phase II Intertidal Survey are provided in Appendix B.

8.3 Further Assessment

Following the Phase II Intertidal Survey it is considered that the impact assessment detailed in of Section 5.6.5 of the EIAR does not require to be altered and is reproduced below.

Construction Impacts

The sea grass beds could be impacted during the construction phase of the works through increased suspended solids within the water column as a result of dredging.

Any increase in turbidity arising from suspended solids from construction activities would be temporary. The dredge plume modelling detailed in Chapter 9 of the EIAR identified the increase in suspended solids occurred over a period of 8 weeks within the 130 day modelling period. This is considered to be reflective of a short term acute change as defined by the Marine Life Information Network (Marlin)[7]. Dredge plume modelling indicates that the area of impact is focussed to the portion of the SSSI north of the HCY where dwarf eelgrass was identified as being present in the intertidal survey.

[7] https://www.marlin.ac.uk/species/detail/1409 (checked 5/5/24)

Intertidal dwarf eelgrass is known to able to take advantage of the high light intensities available at low tide[8] and as such the impact from short term turbidity increases is not expected to have negative effects on the growth or survival of individual plants. .

Seagrasses are not tolerant of smothering and typically bend over with addition of sediment and are buried in a few centimetres of sediment[9]. Dredge plume modelling indicates the depth of sediment deposition outside of the dredge pocket is likely to be <0.001m within the SSSI (Chapter 9 of the EIAR). Although deposition depth may vary from those predicted they are well below the levels which would be considered necessary to have negative effects on the growth and survival of individual plants[10].

The habitat could also be affected by pollution events such as fuel or oil spills or materials such as cement entering the water either during the construction phase or operation of the quay. The magnitude would vary depending on the severity of the pollution event and could range from low to high. The impact would be temporary but effects range in duration depending on the type of pollutant and the magnitude of the impact.

Seagrass could be impacted by mINNS, which could be introduced or spread as a result of vessel movements and plant used during construction. Effects will vary depending on the species of mINNS. Japanese wireweed (*Sargassum muticum*) was recorded rarely during the intertidal survey, however it is intolerant of aerial exposure with growth retarded and competitiveness reduced where it is exposed for prolonged periods. It is unlikely therefore that it would have negative effects on the dwarf eelgrass. Other species could be introduced which could over-graze dwarf eelgrass or outcompete it, which could result in a reduced population size and/or fitness and increased fragmentation.

Most impacts during the construction phase will be temporary, although mINNS could be longer term. Overall the impacts are considered to be of **negligible to medium** in magnitude with the receptor being of **negligible to high sensitivity.** The confidence level for the assessment is considered to be high.

Operational Impacts

Operational impacts to dwarf seagrass beds are largely similar to the construction impacts, other than there being a shorter period of turbidity arising suspended solids from dredging (max 2 weeks).

The impacts are of **negligible to medium** magnitude with the with the receptor being of **negligible to high sensitivity.**. The confidence level for the assessment is medium.

8.3.1.1 Blue Mussel Beds

Construction Impacts

The blue mussel beds could be impacted during the construction phase of the works through increased suspended solids within the water column as a result of dredging. Any increase in turbidity arising from suspended solids from construction activities would be temporary . The dredge plume modelling detailed in Chapter 9 of the EIAR identified the increase in suspended solids occurred over a period of 8 weeks within the 130 day modelling period. Dredge plume modelling indicates that the

[8] Vermaat et al The capacity of seagrasses to survive increased turbidity and siltation: the significance of growth form and light use. (1997)
[9] feature-activity-sensitivity-tool.scot/search-feature (checked 24/5/24)
[10] Information available on the MARLIN website. Available at: https://www.marlin.ac.uk/habitats/detail/318/zostera_noltii_beds_in_littoral_muddy_sand (Accessed 15/05/2024)

area of impact is focussed to the portion of the SSSI north of the HCY where the mussel beds are present.

An indirect effect of increased turbidity and reduced light penetration may be reduced phytoplankton productivity resulting in a reduction of the food However, blue mussels use a variety of food sources so the effect is likely to be minimal. This species and the biotopes it forms are therefore not sensitive to changes in water clarity that refer to light penetration and are often found in areas with high levels of turbidity[11]. The short term increase in turbidity is therefore considered unlikely to effect the growth or fitness of the population. .

Dredge plume modelling indicates the depth of sediment deposition outside of the dredge pocket is likely to be <0.001m across all areas (Chapter 9 of the EIAR). Mytilus edulis has a low sensitivity to smothering as defined by Marlin[12] as all of the species being smothered by sediment to a depth of 5 cm above the substratum for one month. The predicted depth of deposition is well below that which would be likely to affect the growth and survival of individual mussels.

Release of toxic materials during dredging is not considered to be an issue as sediment sampling found no contaminants at levels likely to significantly affect water quality or pose a hazard to marine life.

The habitat could also be affected by pollution events such as fuel or oil spills or materials such as cement entering the water either during the construction phase. The magnitude would vary depending on the severity of the pollution event and could range from low to high. The impact would be temporary but effects range in duration depending on the type of pollutant and the magnitude of the impact. Blue mussels have some tolerance to environmental pollutants as they can close their valves, in effect isolating themselves from the environment for several days, however there may knock on effects of reduced growth and fitness due to reduced feeding.

Mussels could also be impacted through the introduction and/or spread of mINNS. Carpet sea squirt (*Didemnum vexillum*) is of particular concern as it can smoother mussels and is known to be present within the Firth of Clyde and has been recorded at Farlie quay c.3km north of the Proposed Development[13].

Impacts during the construction phase will be temporary and are considered to be of **negligible to moderate magnitude** with the receptor being of **negligible to medium sensitivity.** The confidence level for the assessment is considered to be high.

Operational Impacts

Operational impacts to blue mussel beds are largely similar to the construction impacts, other than there being a shorter period of turbidity arising suspended solids from dredging (max 2 weeks).

Impacts during the operational phase will be temporary and are considered to be of **negligible to moderate magnitude** with the receptor being of **negligible to medium sensitivity.** The confidence level for the assessment is considered to be high.

[11] JNCC Assessing the sensitivity of blue mussels (Mytilus edulis) to pressures associated with human activities (2014)
[12] https://www.marlin.ac.uk/species/detail/1421 (checked 5/5/24)
[13]Information available on the Marine Directorate website: https://marine.gov.scot/sma/assessment/case-study-carpet-sea-squirt (Accessed 15/05/2024)

8.4 Mitigation Measures

On the basis of the impact assessment remaining consistent with the EIAR, the mitigation measures detailed in Chapter 14 of the EIAR are considered to remain appropriate in relation to addressing potential impacts to the intertidal habitats.

As required under the North Ayrshire Council Planning Condition the Intertidal Phase II information will be utilised to update the CEMP and provided to the regulators for approval prior to construction works commencing.

9 MARINE MAMMAL OBSERVER REQUIREMENTS

In relation to the dredge movements (either to disposal site(s)or from potential sediment source locations) it is considered that the associated noise levels within the waterbody are akin to regular vessels, as such during the transport stage of the works it is not considered that an MMO will be required.

It is confirmed that an MMO on the dredge vessel(s) will undertake observations ahead of each discharge at the disposal site(s) and also prior to the restart of any dredging activity at the potential source site(s).

APPENDICES

A TECHNICAL APPENDIX 5.11 SUBTIDAL BENTHIC REPORT

EnviroCentre

2024 Hunterston Construction Yard video and stills analysis and priority grab sample analysis

28th November 2024

Seastar Survey Ltd. Project Number – J/24/582

For further information please contact Steven Dewey at Seastar Survey Ltd.,
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1 INTRODUCTION

1.1 Background

In order to provide evidence to support an environmental impact assessment (EIA) of the proposed redevelopment of the Hunterston construction yard, Seastar Survey Ltd ('Seastar') was commissioned by EnviroCentre to undertake a subtidal survey around the proposed dredge area in order to identify and map the benthic habitats present.

In addition, since the survey was conducted, numerical modelling has been undertaken to determine the extent of the sediment settlement plume resulting from dredging operations to be conducted as part of the proposed redevelopment.

This report details the drop-down camera aspect of the subtidal habitat mapping survey, including subsequent imagery analysis and results, the methods used to collect and process benthic grab samples, and the results of particle size analysis (PSA) and macrobenthic invertebrate analysis of eight 'priority' grab samples which were collected from within the sediment settlement plume extent.

1.2 Purpose of report

The purpose of this report is to provide information of the range of benthic habitats and communities present in the survey area (with a specific focus on the sediment settlement plume) to inform the EIAR for the Hunterston Construction Yard Project.

This report is a summary of the analysis of the underwater imagery data across the full survey area and of the grab samples collected within the sediment settlement plume extent as part of the 2024 Hunterston construction yard subtidal habitat mapping survey. Data derived from the other aspects of the survey, comprising bathymetry and sidescan sonar, as well as the results from grab samples yet to be analysed, are not provided here and will be detailed in a future survey report following completion of all data processing and sample analysis.

While analysis of the imagery data has been completed, without additional data derived from the other aspects of the survey, the analysis results should only be considered indicative for the purposes of assessment of likely significant impacts (LSE) of the identified habitats and features within certain sections of the survey area. For example, some of the biotopes assigned to the imagery records are preliminary and will be finalised based on the results of the infaunal macrobenthic invertebrate analysis. Similarly, until the bathymetry and sidescan sonar data have been fully processed, the habitat maps provided in this report should be treated as preliminary. That stated, it is not expected that analysis of the remaining data collected to date will significantly alter the findings of this report with regard to the type, distribution or extent of the benthic habitats present within the sediment settlement plume extent.

This report should not be distributed without prior consultation with Seastar.

2 METHODOLOGY

2.1 Survey overview

Survey work was conducted from SV *Valkyrie VI*, an 11 m SouthBoats catamaran equipped with an A-frame and winch and suitable for carrying out all aspects of the survey. For the duration of the survey, SV *Valkyrie VI* worked out of Largs Yacht Haven and transited to and from the survey area each day. Grab sampling operations were conducted on 22nd – 23rd July 2024. Drop-down camera operations were conducted on 24th – 27th July 2024.

Camera transect locations and grab sampling stations were selected based on assessment of the bathymetry and sidescan sonar data collected prior to the start of the ground-truthing survey, aiming to sample of all the potential habitat types identified at a range of depths whilst ensuring a good geographical spread within the survey area. In addition, sampling locations were selected with reference to the expected dredge footprint, with higher levels of replication undertaken outside of this area in order to enable future post-development monitoring (which would not be possible within the dredge footprint).

Several areas, particularly in the north of the survey area, could not be sampled due to the presence of obstructions; just offshore of Fairlie Sands an area of swinging moorings was present, whilst further offshore, in the northern 'corner' of the survey area, a number of fishing pots and buoys were present, preventing camera operations due to risk of entanglement.

2.2 Drop-down camera survey

2.2.1 Camera system

An Imenco camera system, comprising a SubVIS Orca high-definition (HD) video camera and an OE14-408 underwater digital stills camera, was used for the camera survey. The video and stills cameras were mounted obliquely on the drop-down camera frame, with the high-powered OE11-442 underwater flashgun mounted opposite. A SeaLED-300 high-output lumen lamp was also mounted on the frame in such a manner so as to evenly illuminate the field of view and to minimise backscatter. The cameras, flashgun and lamp were linked to the surface using a 50 m soft umbilical.

The video camera was controlled using Imenco SubVIS SmartView software, and digital video files were saved via the software directly onto the survey laptop. The stills camera was controlled via a surface control unit and Graphic User Interface (GUI) software. Various camera settings (e.g., focal length, shutter speed) could be manually adjusted via the GUI. Still images were saved on an onboard memory card and uploaded periodically throughout each survey day. All imagery data files were backed up onto external hard drives at the end of each survey day.

Survey navigation was achieved using a Leica GX1230 RTK GPS. The GPS was used in full RTK mode; within the GPS, satellite derived positions (WGS84 latitude and longitude) were updated in real-time with pseudo-range corrections from Leica Smartnet, via a GSM receiver. Used in full RTK mode, GPS positions were accurate to ± 0.03 m in three dimensions. The GPS antenna was mounted inboard and offsets between the antenna and the vessel's A-frame measured and entered into Hypack survey management software prior to the survey. The position of the camera was calculated in Hypack as a lay-back from the vessel's A-frame,

and was based on vessel speed and heading, height of the A-frame, water depth, and the amount of towing cable deployed. Positional data were recorded in WGS84 latitude and longitude in Hypack and backed up onto external hard drives at the end of each survey day.

2.2.2 Data acquisition

Good quality underwater imagery data is best achieved by steaming the survey vessel into the current (i.e. against the tide), enabling the camera to be towed behind the vessel at a steady speed and at a controlled height above the seabed. Due to the highly variable currents present in the survey area, two concentric target rings (50 m and 100 m radius) were drawn around each sampling station to act as a visual aid for the vessel skipper during the survey. During the drop-down camera survey, the vessel skipper selected the best transect bearing for the state of tide and prevailing weather conditions, then set the vessel up on the outer ring and follow the bearing in order to sample the central target position. During data acquisition the speed of the vessel was maintained at approximately 0.5 knots.

Prior to each deployment, a 'clapperboard' displaying the job number and survey title together with the date, station number and transect number was photographed and videoed as a quality assurance record. The camera frame was deployed from the stern of the vessel using the vessel winch and A-frame. The camera system was controlled from within the vessel's wheelhouse, and constant communications were maintained throughout each deployment between the camera operator, skipper, winch operator, and personnel on the back deck managing the camera frame and umbilical.

Each camera deployment aimed to acquire approximately 10 minutes of seabed video footage. The camera frame was towed at a height of ~1 m above the seabed in order to reduce the impact on the benthic environment whilst maintaining a good view of the seabed. The height of the camera above the seabed was maintained by adjusting the amount of winch-wire out. The digital video feed was monitored throughout the deployment and still images were taken at approximately 30 second intervals, providing that the seabed was visible and that good image quality could be reasonably ensured. Photographs were taken by landing the camera frame on the seabed (by paying out winch wire), in order to reduce the effects of currents and turbidity on image quality, to minimise the chance of obtaining blurred images, and to achieve a consistent field of view.

The camera system and navigation system were time synchronised at the start of each survey day, and the times were checked at the end of each day to ensure there was no drift. Navigation data were recorded throughout each transect, from when the camera system was deployed to when it was recovered back to deck. Camera deployment logs recorded the GPS time (in GMT, to the second) of the start and end of each video recording and the time each photograph was taken so that the position of each image could be extracted from the navigation data following the survey.

2.3 Benthic grab sampling

Grab sampling was attempted at 14 sampling stations, with 6 of these stations falling within the sediment settlement plume extent.

At each sampling location the vessel set up on the proposed position and a 0.1 m^2 Day grab sampler was deployed over the side of the vessel. A 'fix' of GPS position and time was recorded in Hypack and manually logged in the logbook when the grab was determined to be on the seabed. The grab was recovered to deck and the sample inspected for quality.

Samples were to be rejected on the grounds of poor quality for the following reasons:

- Uneven surface indicative of striking the seabed at an angle;
- Washed out sample;
- Disturbed surface sediment;
- Contamination of the sediment (e.g. hagfish, paint chips, oil etc.);
- Sample touching the top of the grab;
- Sample <50 % of the grab's capacity.

If the sample was not acceptable the vessel was repositioned on the sample location and the grab was redeployed. If after three attempts at a location a successful grab was not collected a new location was chosen close to the original station. If the sample was acceptable a brief description of the sediment was recorded (including appearance, texture, odour, etc.) and a labelled photograph taken.

A sub-sample for PSA was collected from each acceptable grab sample following the NMBAQC's Best Practice Guidance for PSA to support biological analysis (Mason, 2016). The PSA sub-sample was collected using a metal scoop to remove a 5 cm deep core from the grab sample, ensuring that at least 100 ml of sediment was collected. Any conspicuous biota was noted in the logbook and removed from the sub-sample before storing the sediment in labelled plastic bags.

Following sub-sampling for PSA the rest of the grab sample was processed for macrobenthic invertebrate analysis. The sediment in the grab was transferred to a dump tray and washed gently over a 0.5 mm field sieve. The sediment retained in the sieve was photographed before being transferred to a labelled plastic bucket and fixed using a 4 % buffered formaldehyde-seawater solution for subsequent laboratory analysis.

2.4 Achieved survey

2.4.1 Drop-down camera survey

A total of 21 camera transects were successfully surveyed on 24th – 27th July 2024. A summary of each camera transect is given in Table 2.1 and the locations of the successful transects are given in Figure 2.1. Full camera survey logs are provided in Appendix I.

Table 2.1: Summary of achieved drop-down camera transects from the 2024 Hunterston construction yard subtidal habitat mapping survey.

Transect name	Transect number	Date	Minutes of video data	Number of still images
HC_01	582_33	24/07/2024	14:32	16
HC_02	582_34	24/07/2024	11:47	20
HC_03	582_35	24/07/2024	12:31	18
HC_04	582_36	24/07/2024	12:57	15
HC_05	582_37	24/07/2024	12:25	15
HC_06	582_38	24/07/2024	12:24	15
HC_07	582_39	24/07/2024	13:04	18
HC_08	582_40	24/07/2024	10:39	15
HC_09	582_41	24/07/2024	02:53	0
HC_09_A2	582_53	27/07/2024	10:44	16
HC_10	582_42	24/07/2024	10:42	15
HC_11	582_43	26/07/2024	11:54	15
HC_12	582_44	26/07/2024	11:27	17
HC_13	582_45	26/07/2024	10:44	14
HC_14	582_47	26/07/2024	12:08	15
HC_15	582_46	26/07/2024	13:46	16
HC_16	582_48	26/07/2024	12:18	18
HC_17	582_49	26/07/2024	12:08	15
HC_18	582_50	26/07/2024	12:27	15
HC_19	582_51	27/07/2024	11:53	16
HC_20	582_52	27/07/2024	10:52	16

HC_09 was run twice as data collection was stopped early on the first run due to technical lighting issues. This transect was re-run and successfully completed (as HC_09_A2) on 27th July 2024.

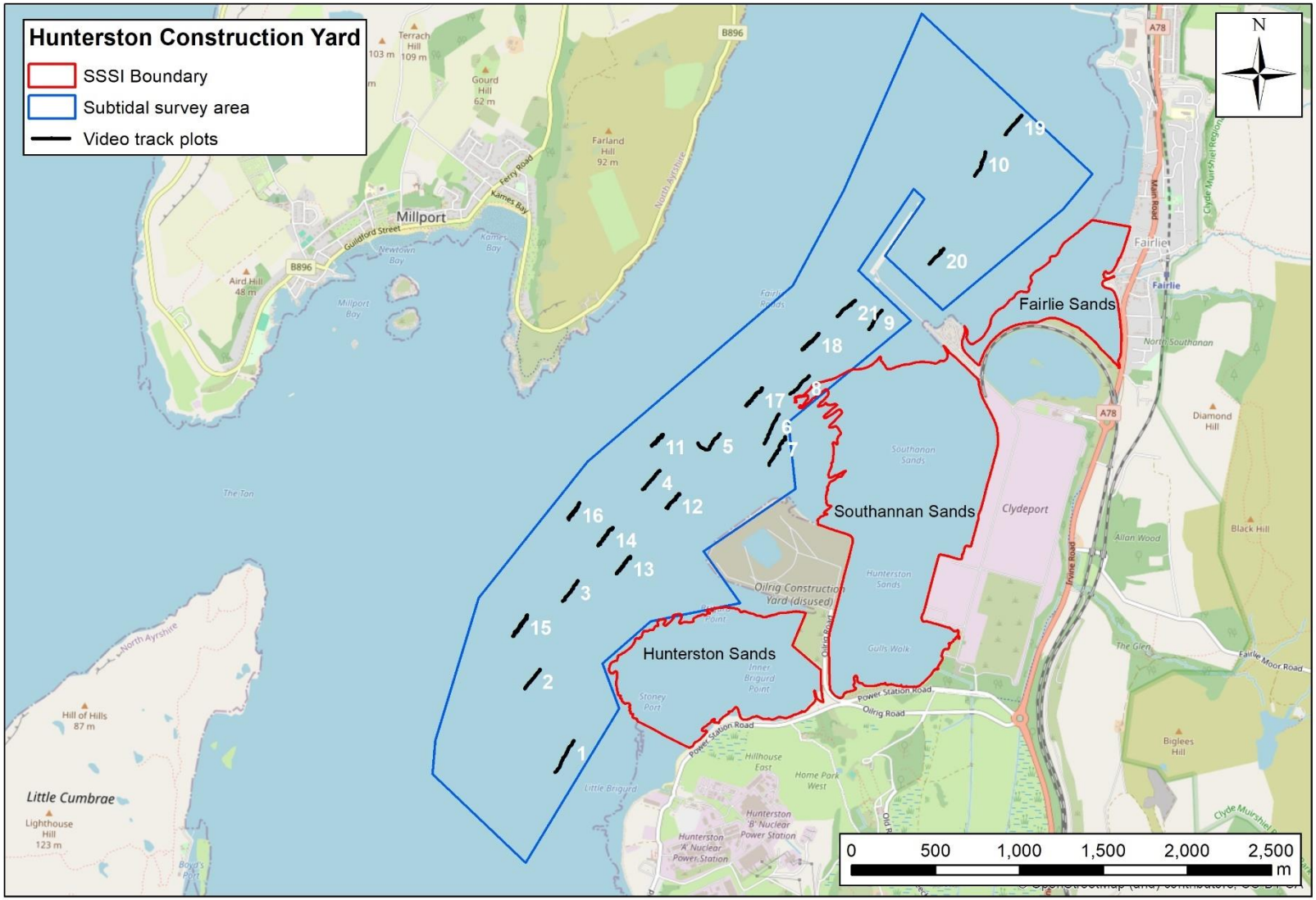

Figure 2.1: Locations of the achieved video transects conducted as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

2.4.2 Grab survey

Samples were successfully collected from all 14 planned stations, with three replicates collected at stations 1 – 9, while single replicates were taken at stations within the dredge footprint (stations 10 – 14). A summary of the grab samples collected is given in Table 2.2 and the locations of the successful grab samples are given in Figure 2.2. Full benthic grab sampling field logs are provided in Appendix II.

Table 2.2: Summary of benthic grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

Station Number	Sample Number	Date	Samples collected
DG_01	582_12#01	22/07/2024	PSA and macrobenthic invertebrates
DG_01	582_13#01	22/07/2024	PSA and macrobenthic invertebrates
DG_01	582_14#01	22/07/2024	PSA and macrobenthic invertebrates
DG_02	582_09#01	22/07/2024	PSA and macrobenthic invertebrates
DG_02	582_10#01	22/07/2024	PSA and macrobenthic invertebrates
DG_02	582_11#01	22/07/2024	PSA and macrobenthic invertebrates
DG_03	582_15#01	22/07/2024	PSA and macrobenthic invertebrates
DG_03	582_16#01	22/07/2024	PSA and macrobenthic invertebrates
DG_03	582_17#01	22/07/2024	PSA and macrobenthic invertebrates
DG_04	582_06#01	22/07/2024	PSA and macrobenthic invertebrates
DG_04	582_07#01	22/07/2024	PSA and macrobenthic invertebrates
DG_04	582_08#01	22/07/2024	PSA and macrobenthic invertebrates
DG_04	582_08#02	22/07/2024	PSA and macrobenthic invertebrates
DG_05	582_18#01	23/07/2024	PSA and macrobenthic invertebrates
DG_05	582_19#01	23/07/2024	PSA and macrobenthic invertebrates
DG_05	582_20#01	23/07/2024	PSA and macrobenthic invertebrates
DG_06	582_21#01	23/07/2024	PSA and macrobenthic invertebrates
DG_06	582_22#01	23/07/2024	PSA and macrobenthic invertebrates
DG_06	582_23#01	23/07/2024	PSA and macrobenthic invertebrates
DG_07	582_24#01	23/07/2024	PSA and macrobenthic invertebrates
DG_07	582_25#01	23/07/2024	PSA and macrobenthic invertebrates
DG_07	582_26#01	23/07/2024	PSA and macrobenthic invertebrates
DG_08	582_27#01	23/07/2024	PSA and macrobenthic invertebrates
DG_08	582_28#01	23/07/2024	PSA and macrobenthic invertebrates
DG_08	582_29#01	23/07/2024	PSA and macrobenthic invertebrates
DG_09	582_30#01	23/07/2024	PSA and macrobenthic invertebrates
DG_09	582_31#01	23/07/2024	PSA and macrobenthic invertebrates
DG_09	582_32#01	23/07/2024	PSA and macrobenthic invertebrates
DG_10	582_03#01	22/07/2024	PSA and macrobenthic invertebrates
DG_11	582_02#01	22/07/2024	PSA and macrobenthic invertebrates
DG_12	582_05#01	22/07/2024	PSA and macrobenthic invertebrates
DG_13	582_04#01	22/07/2024	PSA and macrobenthic invertebrates
DG_14	582_01#01	22/07/2024	PSA and macrobenthic invertebrates

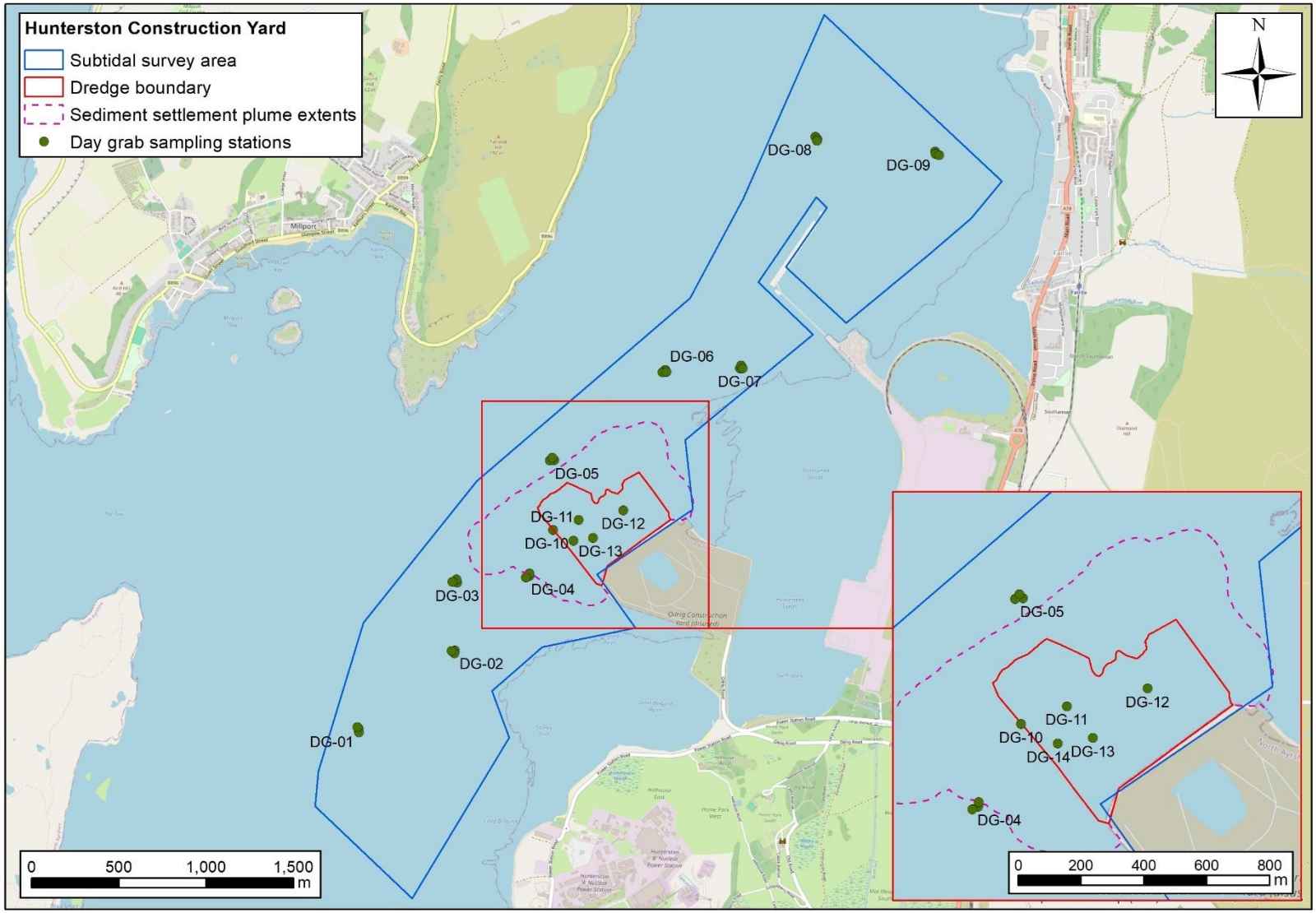

Figure 2.2: Locations of the achieved grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey. 'Priority' grabs are those located within the sediment settlement plume extents (dashed line).

2.5 Laboratory analysis

2.5.1 Imagery analysis

2.5.1.1 Video analysis

The video analysis of each camera transect started with an initial assessment to gain a broad understanding of the substrates and biota present. The analysis was carried out using a personal computer and VLC software which allowed slow-motion, freeze frame and standard play analysis. During the initial assessment, video footage was viewed at 2x - 4x normal speed in order to divide the footage into segments representing different habitat types and/or biological communities. Brief changes (considered to be less than 25 m^2) were treated as incidental patches and were not recorded as separate segments, but were recorded as part of the habitat description. Transition times and positions were recorded. A video quality assessment according to Turner *et al*. (2016) was carried out for each video segment. Segments with zero visibility, or segments showing deployment/recovery, were not analysed.

A more detailed assessment of the video segments was then performed. A description of the abiotic (i.e. substrate) and biotic (i.e. characterising species) features of the observed habitat was recorded and any features of interest, such as trawl marks or litter, were noted. The sediment type was recorded and a broadscale habitat (BSH) type was assigned to each video segment.

Due to issues related to lighting, and to the dense macroalgal coverage present throughout the survey areas, video quality was generally poor. Abundance data were therefore not recorded for the video records. However, for each video segment a list of the encountered taxa, including species of conservation interest, priority marine feature (PMF) species, and invasive non-native species (INNS), was recorded. Taxa were recorded using species reference numbers as cited in the Marine Conservation Society Species Directory (Howson and Picton, 1997) with additional reference to the World Register of Marine Species (WoRMS Editorial Board, 2024) to avoid problems in species nomenclature.

2.5.1.2 Stills analysis

The analysis of the still photographs was similar to the video analysis methodology and began with an assessment of image quality as per Turner *et al*. (2016) and a description of the habitat and biota present. The sediment type was recorded and a broadscale habitat (BSH) type was assigned to each image, though in some cases the seabed was not always visible due to the high density of macroalgae present. Any features of interest, such as trawl marks or litter, were noted.

Species data were recorded in two ways; the abundance of any encrusting and/or massive/turf taxa were estimated and recorded using the semi-quantitative SACFOR[1] scale, while discrete/individual taxa were recorded as counts. These counts were then converted to SACFOR based on the field of view of the still images (~0.12 m^2 when landed). A list of the encountered fauna was produced for each still image using species reference numbers as cited in the Marine Conservation Society Species Directory (Howson and Picton, 1997) with

[1] **S**uper-abundant, **A**bundant, **C**ommon, **F**requent, **O**ccasional, **R**are.

additional reference to the World Register of Marine Species (WoRMS Editorial Board, 2024) to avoid problems in species nomenclature.

2.5.1.3 Biotope assignment

Both video segments and still images were assigned an MNCR biotope according to JNCC (2022) and following guidance outlined in Turner *et al*. (2016) and Parry (2019), using both the BSH and the species information to assign the most appropriate MNCR biotope. Wherever possible biotopes were assigned at the biotope (level 5) or sub-biotope (level 6) level. However, where taxa were very sparse (e.g., barren soft sediments with little to no epibiota), biotopes were recorded at the habitat complex (level 3) or broad habitat type (level 2) level. Where a still image was assigned a different biotope to the parent video segment, the discrepancy was noted.

2.5.1.4 Assignment of PMFs

Following assignment of biotope(s) to each video segment and still image, PMFs were assigned. PMFs were determined using PMF descriptions and thresholds given in Tyler-Walters *et al*. (2016). If PMF components were found to be present within a video segment or still image (i.e., if a relevant biotope had been assigned, or if a component species had been identified) the PMF was assigned.

2.5.2 Grab sample analysis

2.5.2.1 Particle size analysis

Samples were visually assessed and all marine biota (>1 mm) that was alive at the time of sampling were removed. A brief sediment description was noted in the PSA log, together with details of any biota removed, and any other pertinent sediment characteristics (e.g. presence worm tubes, shell fragments).

Particle size analysis (PSA) was carried out at half-phi intervals by Kenneth Pye Associates Ltd in accordance with NMBAQC guidance using a combination of dry sieving (for fractions >1 mm) and laser diffraction (<1 mm) techniques.

The results of the analysis were assessed to determine the proportions of gravel, sand, and mud within the samples and sediment names were assigned as per the modified Folk classification (1954).

2.5.2.2 Macrobenthic invertebrate analysis

In the laboratory, the macrobenthic invertebrate samples were washed through a 0.5 mm sieve in order to remove the fixative and any fine sediments remaining in the sample. The sample retained on the sieve was then washed through a stack of sieves of different sizes (0.5 mm, 1.0 mm and 5.0 mm) in order to create uniform size fractions in order to improve sorting effectiveness. To further aid sorting, light organic matter and biota were floated off (elutriated) at an early stage and sorted separately. The retained contents of each sieve were then washed into a pot or sorting tray, with enough water to cover the sample. The sieve was checked to ensure no animals are left in the mesh, and then cleaned to prevent cross-contamination.

Larger fractions were examined by eye in sorting trays, searched in a methodical manner to minimise the risk of missing any biota. The finer residue fractions and elutriated material were sorted under a microscope. All quantitative taxa were extracted, while representative examples of qualitative taxa (e.g. colonial epifauna) were also extracted. The picked taxa were split by phyla and stored in glass vials in 80 % industrial methylated spirit (IMS) ready for identification.

All taxa were identified to the lowest possible taxonomic level (usually species) according to the NMBAQC Taxonomic Discrimination Protocol (TDP) and using the appropriate taxonomic keys and literature with reference to WoRMS (WoRMS Editorial Board, 2024) for species nomenclature. Epifaunal taxa were identified and recorded when clearly attached to substrate.

2.5.2.3 Assignment of biotopes

In order to assist the assignment of biotopes to each grab sample, multivariate statistical analysis of the macrobenthic invertebrate data was undertaken using Primer (Plymouth Routines in Multivariate Ecological Research) v.7 (Clarke and Warwick, 2001). Taxon data were rationalised prior to analysis. This involved the examination of the dataset to identify and rectify any duplication of species data (e.g. occurrence of both adults and juveniles of the same taxon) and inclusion of different data types (e.g. presence vs actual count).

The rationalised dataset was square root transformed and a resemblance matrix was constructed using the Bray Curtis similarity index. Cluster analysis was then undertaken, using group-averaged cluster mode, and the SIMPROF test applied (at 5% significance level) in order to illustrate evidence of structure within the groupings. The resultant dendrogram was then examined, and groups assigned to samples based on the pattern of clustering. Sediment PSA results were used as a factor to aid detection of trends in the clustering pattern. MDS ordination was also undertaken to examine the strength of the station grouping assigned from the dendrogram clusters. The SIMPER routine in PRIMER was then undertaken to assess which taxa were characteristic of the sample groups defined from the cluster analysis.

The characteristic taxa identified for each group were checked against MNCR biotope descriptions (JNCC, 2022) with additional reference to sediment type, location and depth. Any biotopes that approximately matched the habitats and biological communities identified from the samples were noted. A more in-depth assessment of the faunal abundance data was then undertaken. This process was more subjective, relying on the experience of the analyst to identify trends in the faunal data. These trends were used to refine the number of initially selected possible biotopes to the most appropriate fit to each sample.

2.5.2.4 Assignment of PMFs

Following assignment of biotopes to grab samples, PMFs were assigned. PMFs were determined using PMF descriptions and thresholds given in Tyler-Walters *et al*. (2016). If PMF components were identified (i.e., if a relevant biotope had been assigned, or if a component species had been identified) the PMF was assigned.

3 RESULTS

3.1 Underwater imagery

3.1.1 Habitats and biotopes

A total of 21 videos and 328 still images were analysed. The videos were split into a total of 37 segments representing different habitats and/or biological communities. A total of 19 biotopes (including sub-biotopes, biotope complexes and broad habitat types) were identified. A summary of the habitats observed is given in Appendix III. The distribution of the observed broad substrate types in shown in Figure 3.1, and the distribution of assigned MNCR biotopes is shown in Figures 3.2 and 3.3.

A range of sediment types were recorded in the survey area, varying from pebbles and cobbles to sands and gravels to fine muds. Where epibiota was very sparse, biotopes were assigned at the biotope complex level. These included gravels, pebbles and coarse shelly sands (**SS.SCS.ICS**; 'Infralittoral coarse sediment'), fine rippled sands (**SS.SSa.IFiSa**; 'Infralittoral fine sand'), muddy sands (**SS.SSa.IMuSa**; 'Infralittoral muddy sand'), sandy muds (**SS.SMu.ISaMu**; 'Infralittoral sandy mud') and mixed sediments (**SS.SMx.CMx**; 'Circalittoral mixed sediment'). Generally, the southern and central sections of the survey area were characterised by coarse and mixed sediments, while the inshore area just north of the construction yard comprised sands, muddy sands and sandy muds. The seabed in the vicinity of the jetty between Southannan and Fairlie Sands was found to be composed of muddy sediments, while the northern section of the survey area featured muds and muddy mixed sediments.

Biological communities in the survey area were found to be dominated by macroalgal communities on soft sediments. The most common macroalgal taxa recorded included the kelps *Saccharina latissima* and *Chorda filum*. These kelps generally coincided with a variety of filamentous and finely branching brown seaweeds and filamentous and foliose red algae. Due to the general difficulty of identifying these kinds of macroalgae from imagery records, most observations were recorded using morphological information, however some more robust species were identified. These included the brown seaweeds *Desmarestia ligulata*, *D. aculeata* and *Dictyosiphon foeniculaceus* and the red seaweed *Dilsea carnosa*.

Where *S. latissima* was recorded on sediment together with red and brown seaweeds, the biotope **SS.SMp.KSwSS.SlatR** ('*Saccharina latissima* and red seaweeds on infralittoral sediments') was recorded. This was the most commonly recorded (primary) biotope, being assigned to 10 segments from 7 different transects. In rare cases the kelps and seaweeds were very dense (particularly on transect HC_01), obscuring the underlying substrate. However, where the seabed was visible, sediments were found to vary, with coarse gravels, shelly sands and mixed gravelly muddy sands all observed. On three transects (HC_02, HC_03 and HC_10), clumps of the sea squirt *Ascidiella aspersa* were present in very high densities (up to superabundant) on sandy and gravelly mixed sediments. In most cases, these clumps acted as substrate, locally increasing the density of *S. latissima* and red seaweeds.

Where stands of *C. filum* were observed, generally on more muddy sediments (including muddy sands, sandy muds and muddy mixed sediments), the biotope **SS.SMp.KSwSS.SlatCho** ('*Saccharina latissima* and *Chorda filum* on sheltered upper infralittoral muddy sediment') was recorded, though in some cases *S. latissima* was only present in very low quantities (rare). This biotope was assigned on a total of five transects.

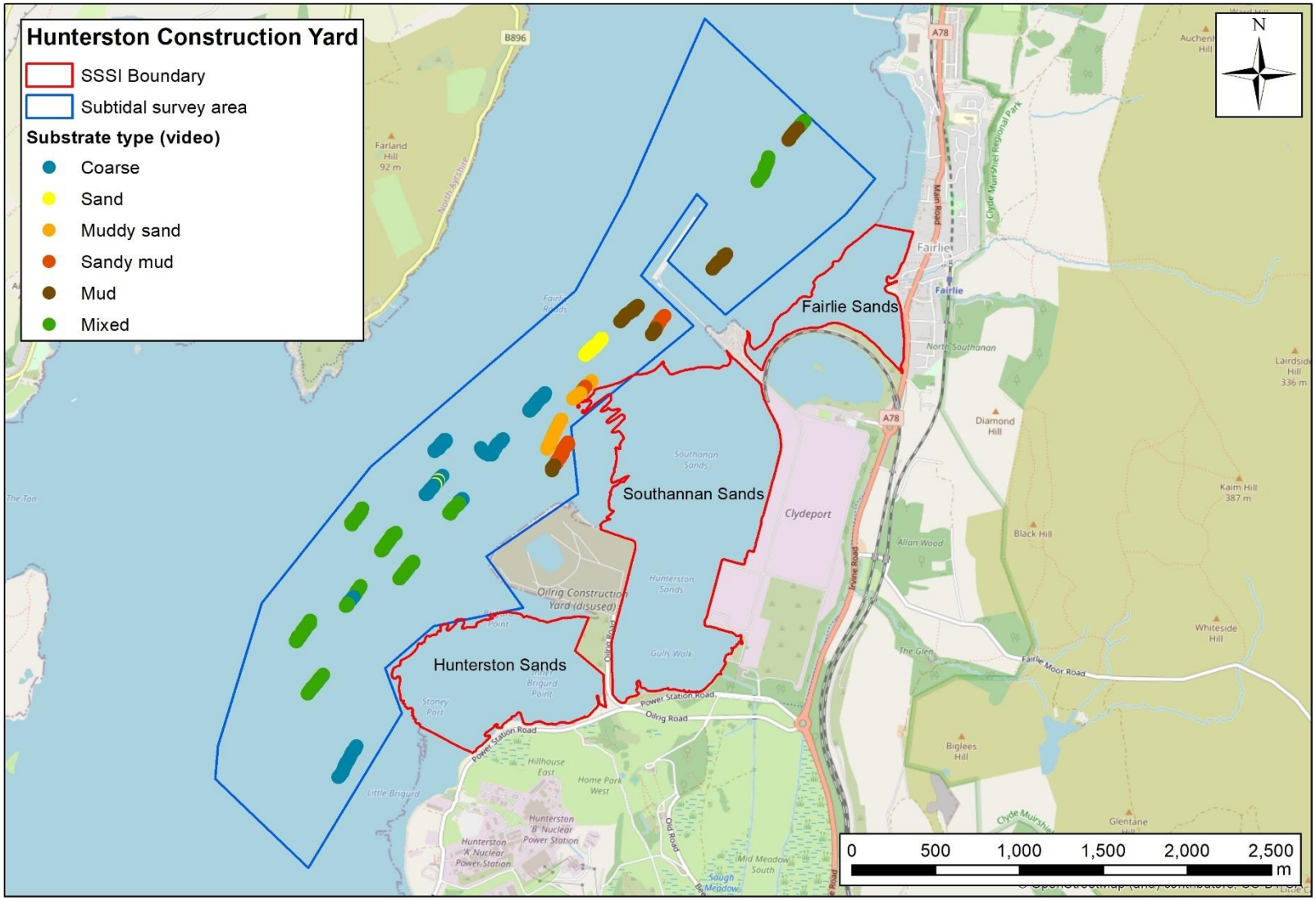

Figure 3.1: Distribution of broad substrate types identified using drop-down video records collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

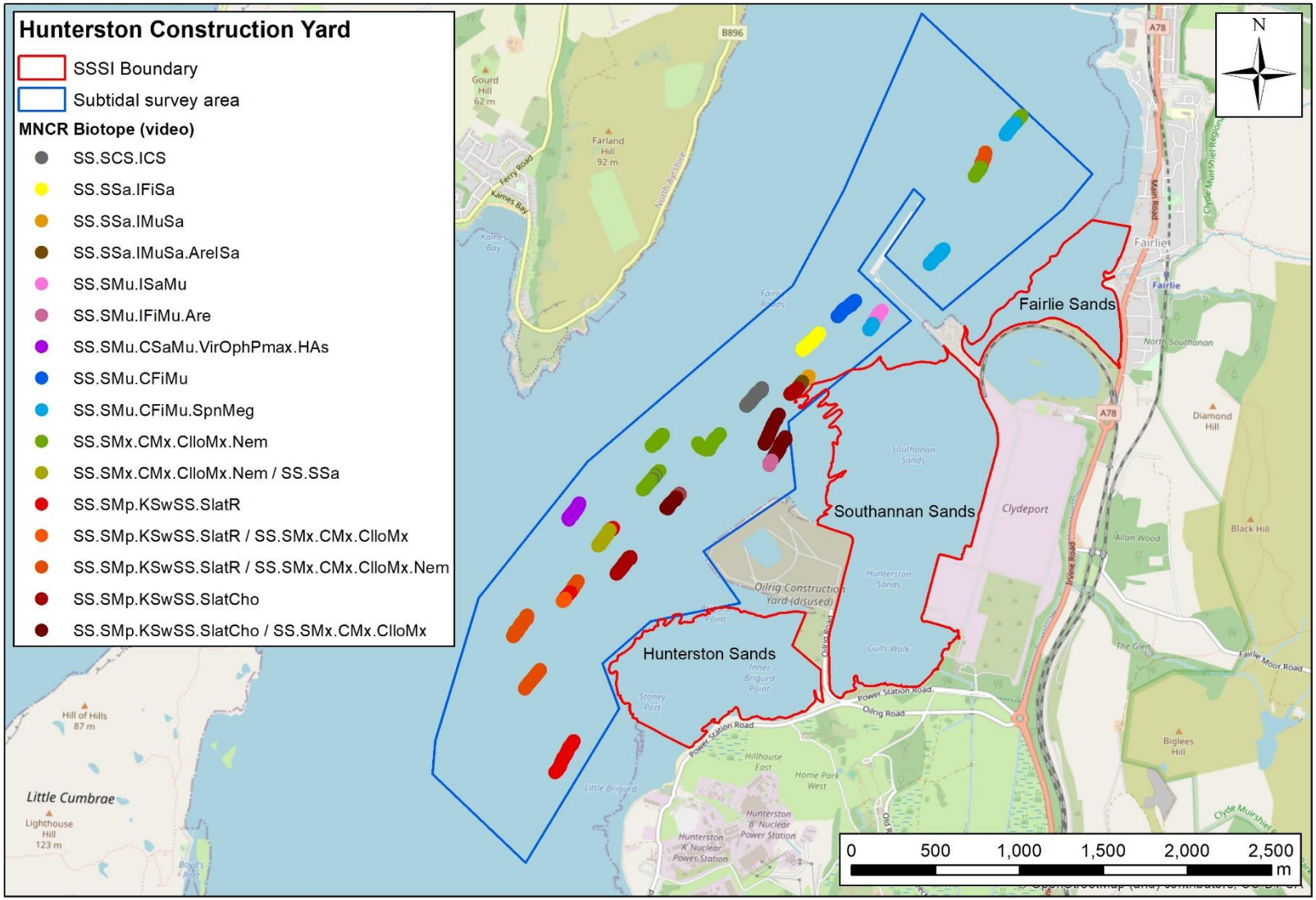

Figure 3.2: Distribution of MNCR biotopes assigned to drop-down video records collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

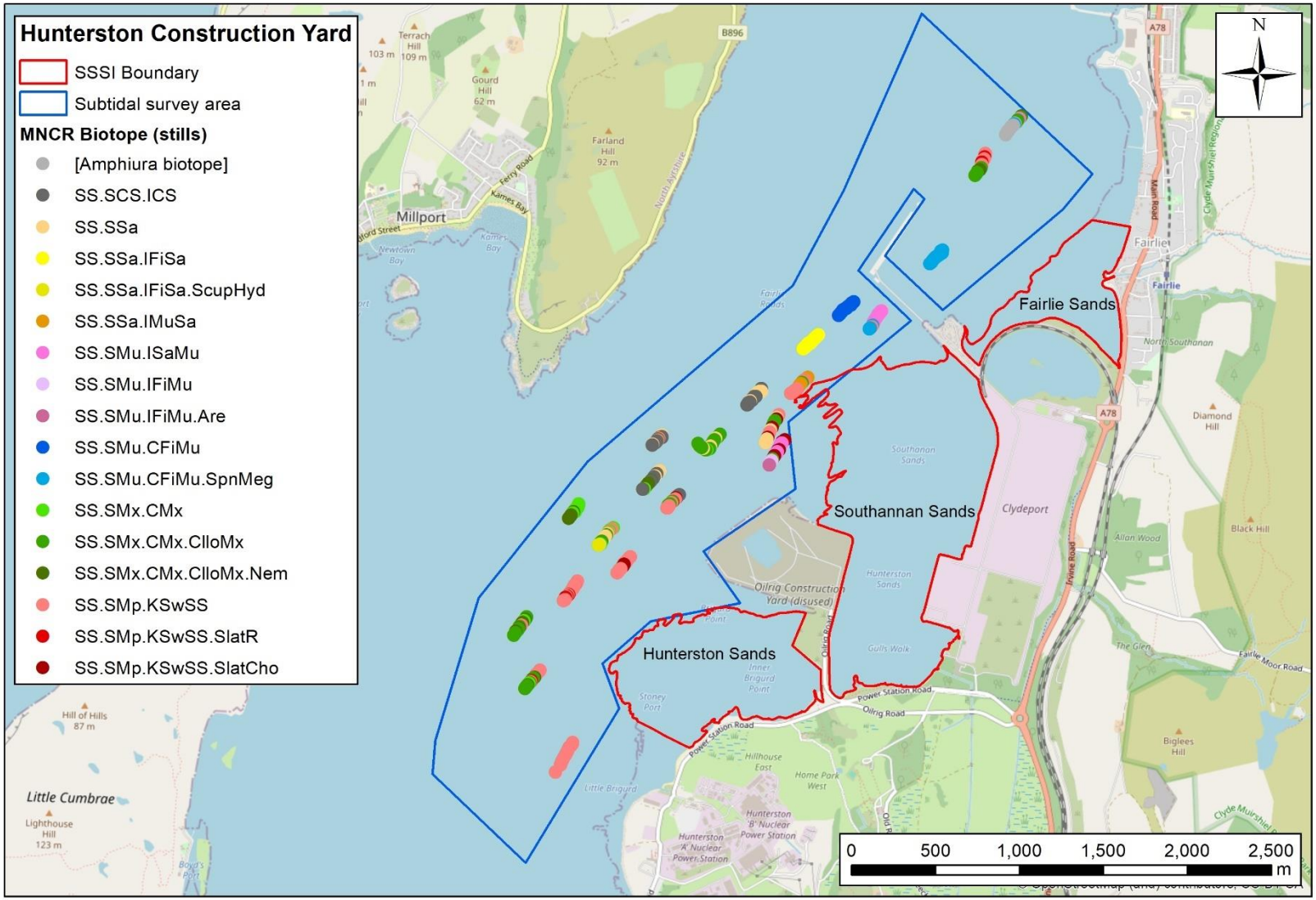

Figure 3.3: Distribution of MNCR biotopes assigned to still images collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

Often, both areas of **SS.SMp.KSwSS.SlatR** and **SS.SMp.KSwSS.SlatCho** were found in conjunction with high densities (common to abundant) of the tube anemone *Synarachnactis lloydii* (formerly *Cerianthus lloydii*). Due to the very high numbers of *S. lloydii* observed, it was deemed appropriate to assign the biotope **SS.SMx.CMx.ClloMx** ('*Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediment') as a secondary biotope, with the SS.SMp.KSwSS biotopes present as an epibiotic overlay. Where clumps of robust hydroids, such as *Nemertesia antennina*, *N. ramosa*, and other non-identifiable plumularioids (thought to be either *Kirchenpaueria* or *Plumularia*), were present, the sub-biotope **SS.SMx.CMx.ClloMx.Nem** ('*Cerianthus lloydii* with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment') was assigned instead. Both these biotopes were also assigned to video records as a primary biotope, generally in areas of muddy mixed sediment where kelps and seaweeds were either absent or too sparse to warrant the assignment of a SS.SMp.KSwSS biotope. A total of 16 video segments from 12 different transects were assigned a SS.SMx.CMx.ClloMx biotope.

Areas of mud were identified within the survey area, both around the jetty located between Southannan and Fairlie Sands and in the very north of the survey area. Some areas (HC_21) consisted of featureless fine mud (**SS.SMu.CFiMu**; 'Circalittoral fine mud') with sparse mobile fauna such as the squat lobster *Munida rugosa* and the swimming crab *Polybius depurator*, however on transects HC_09_A2, HC_19 and HC_20 burrowed mud was recorded with both simple and complex burrows present at densities of frequent or higher. The biotope **SS.SMu.CFiMu.SpnMeg** ('Seapens and burrowing megafauna in circalittoral fine mud') was therefore assigned to these areas, and the seapen *Virgularia mirabilis* recorded on transects HC_19 and HC_20. This species was also observed on transects HC_02, HC_05 and HC_11 in shelly sand and on transect HC_16 in muddy mixed substrate. The seapens observed were generally healthy in appearance, however some light fouling was observed on a very few seapens on transect HC_20.

Other areas of muddy sediments were also present on transects HC_07 and HC_16. At HC_16, located in the offshore-most part of the survey area, mixed gravelly sandy shelly muds were present together with occasional cobbles. The presence of hard substrate meant that a diverse range of epifaunal taxa was recorded, including the soft coral *Alcyonium digitatum*, the plumose anemone *Metridium senile*, the sea squirt *A. aspersa*, robust hydroids such as *Abietinaria abietina*, and a range of encrusting biota including barnacles, serpulid worms and sponges. In the surrounding sediment, fauna recorded included *V. mirabilis*, *S. lloydii*, and the king scallop *Pecten maximus*. Despite the lack of obvious brittlestars, the biotope **SS.SMu.CSaMu.VirOphPmax.HAs** ('*Virgularia mirabilis* and *Ophiura* spp. with *Pecten maximus*, hydroids and ascidians on circalittoral sandy or shelly mud with stones') was selected as the best fit for the observed community.

At HC_07, an area of mud was observed featuring dense (common to abundant) mounds and casts produced by the lugworm *Arenicola marina* as well as an organic film (a microbial mat or diatom layer) on the sediment surface. The biotope **SS.SMu.IFiMu.Are** ('*Arenicola marina* in infralittoral mud') was therefore assigned to this segment. A similar habitat was present at HC_08, albeit in sandier sediment (**SS.SSa.IMuSa.AreISa**; '*Arenicola marina* in infralittoral fine sand or muddy sand').

One habitat was observed that has yet to be assigned a biotope. At HC_19, an area of either mud or sandy mud was present with dense (up to superabundant) brittlestar arms, very likely *Amphiura* sp., protruding from the sediment. Given the very high abundance of brittlestar

arms observed, this habitat is likely to represent one of the following biotopes: **SS.SMu.CSaMu.AfilKurAnit** ('*Amphiura filiformis*, *Kurtiella bidentata* and *Abra nitida* in circalittoral sandy mud'); **SS.SMu.CSaMu.AfilEten** ('*Amphiura filiformis* and *Ennucula tenuis* in circalittoral and offshore sandy mud'), or; **SS.SMu.CFiMu.BlyrAchi** ('*Brissopsis lyrifera* and *Amphiura chiajei* in circalittoral mud'). The biotope assigned will depend on the exact sediment type (i.e. sandy vs fine mud), the species of *Amphiura* present, and the associated infaunal community present, none of which can be determined from the imagery records alone. The results of the macrobenthic invertebrate analysis of the collected grab samples (particularly those from stations DG_08 and DG_09) should however provide the information necessary to assign a biotope, however until this has been completed this habitat has been flagged as '[*Amphiura* biotope]'.

3.1.2 Priority Marine Features

Two PMFs were identified following the imagery analysis. The distribution of PMFs assigned to the video records is shown in Figure 3.4.

For all video segments and still images where any **SS.SMp.KSwSS** biotopes were identified, the PMF habitat 'kelp and seaweed communities on sublittoral sediment' was flagged. This PMF was therefore recorded on a total of 15 video segments from 11 different transects, primarily located in the southern section of the survey area, offshore of Hunterston Sands and in the inshore area around Southannan Sands, just north of the construction yard.

The PMF 'burrowed mud' was assigned to all records where the biotope **SS.SMu.CFiMu.SpnMeg** was recorded. This PMF was recorded at three transects, located around the existing jetty between Southannan and Fairlie Sands, and at the northern edge of the survey area. While both simple and complex burrows were present in densities of at least frequent in all three cases, seapens were only present at HC_19 and HC_20, both located north of the jetty.

Two other PMFs were flagged as being possibly present within the survey area, although their presence cannot be confirmed from imagery data alone.

Coarse shelly and/or gravelly sands were present on several transects, particularly HC_04, HC_05, HC_12 and HC_17, all located in the vicinity of the proposed dredge area. In addition, bivalve siphons in sandy sediments were observed throughout the survey area. It is therefore possible that the PMF 'tide swept coarse sands with burrowing bivalves' is present, particularly in those areas assigned the biotope **SS.SCS.ICS**, as the biotope **SS.SCS.ICS.MoeVen** ('*Moerella* spp. with venerid bivalves in infralittoral gravelly sand') is a component biotope of this PMF.

Similarly, at HC_19 in the area of *Amphiura* biotope (TBD), there is the potential that the biotope **SS.SMu.CFiMu.BlyrAchi**, which is a component of the PMF 'inshore deep mud with burrowing heart urchins,' will be assigned following analysis of the grab samples, although no urchins were observed in the imagery data.

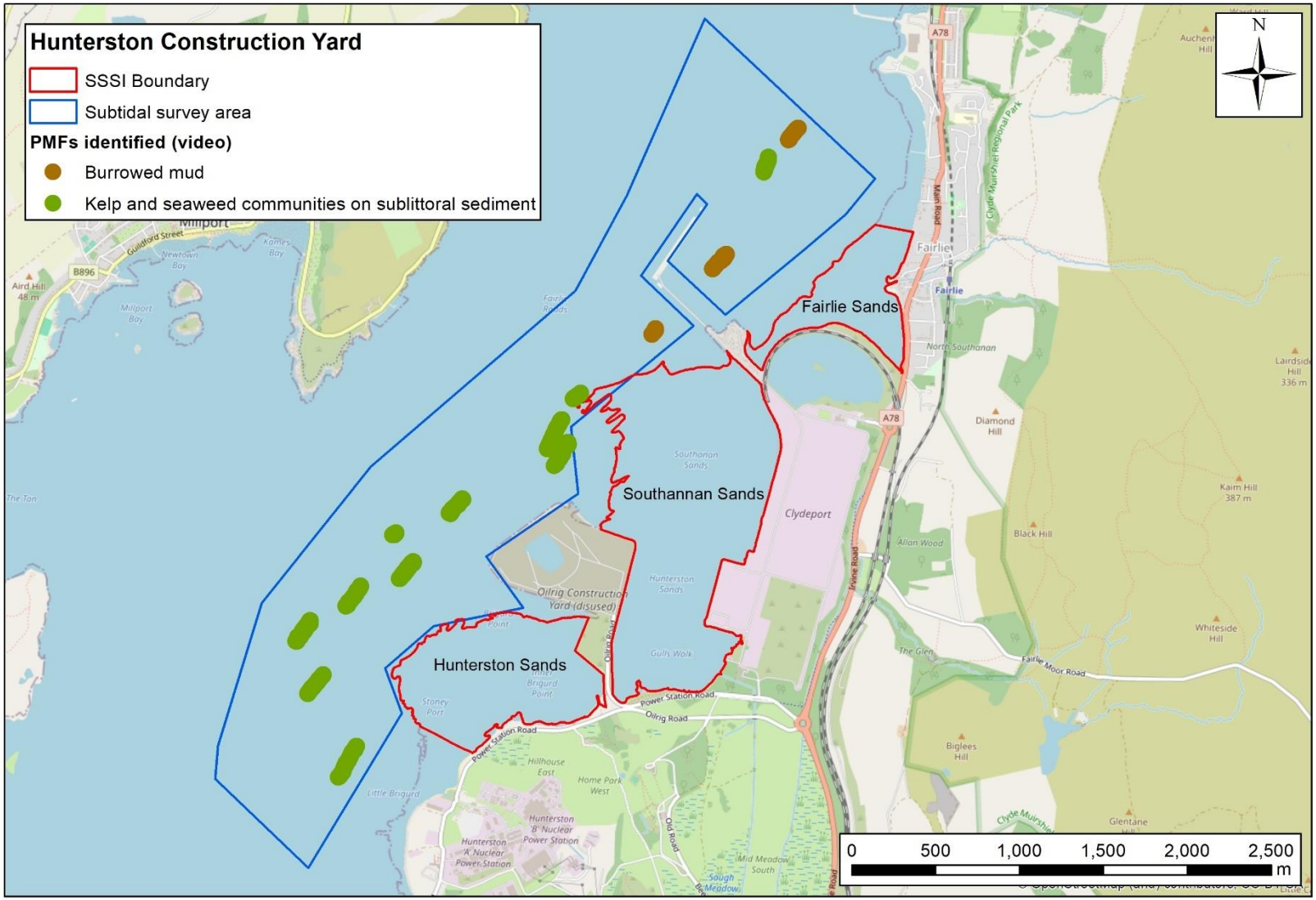

Figure 3.4: Distribution of Priority Marine Features (PMFs) assigned to drop-down video records collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

3.2 Sediment analysis results

3.2.1 Particle size analysis

A summary of the results of the PSA for the 'priority' grab samples is given in Table 3.1. Full results are provided in Appendix IV. The distribution of sediment types identified is shown in Figure 3.5.

Table 3.1: Summary of the particle size analysis results of the 'priority' grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

Station no.	Sample no.	% Gravel	% Sand	% Mud	Classification	Mean sediment grain size (µm)
DG_04	582_06#01	0.51	97.01	2.47	Sand	360.4
DG_04	582_07#01	0.24	97.47	2.29	Sand	300.9
DG_04	582_08#02	0.46	97.51	2.03	Sand	449.5
DG_10	582_03#01	1.18	95.38	3.44	Slightly gravelly sand	336.6
DG_11	582_02#01	2.94	93.41	3.65	Slightly gravelly sand	325.5
DG_12	582_05#01	0.00	86.37	13.63	Muddy sand	305.6
DG_13	582_04#01	0.04	92.29	7.67	Sand	211.8
DG_14	582_01#01	0.08	97.02	2.90	Sand	224.0

The sediments at the six stations located within the sediment settlement plume extent were generally characterised by clean sands, although mud fractions in excess of 5 % were present at stations 12 and 13. Medium (250-500 µm) to fine (125-250 µm) sands dominated at stations 10, 11 and 14, while the sediments at stations 12 and 13 were characterised by fine to very fine (63-125 µm) sands. The samples taken at station 04, located on the southwestern edge of the sediment settlement plume extent, were more heterogeneous, with significant proportions of fine, medium and coarse (500-1000 µm) sands present in all three replicates.

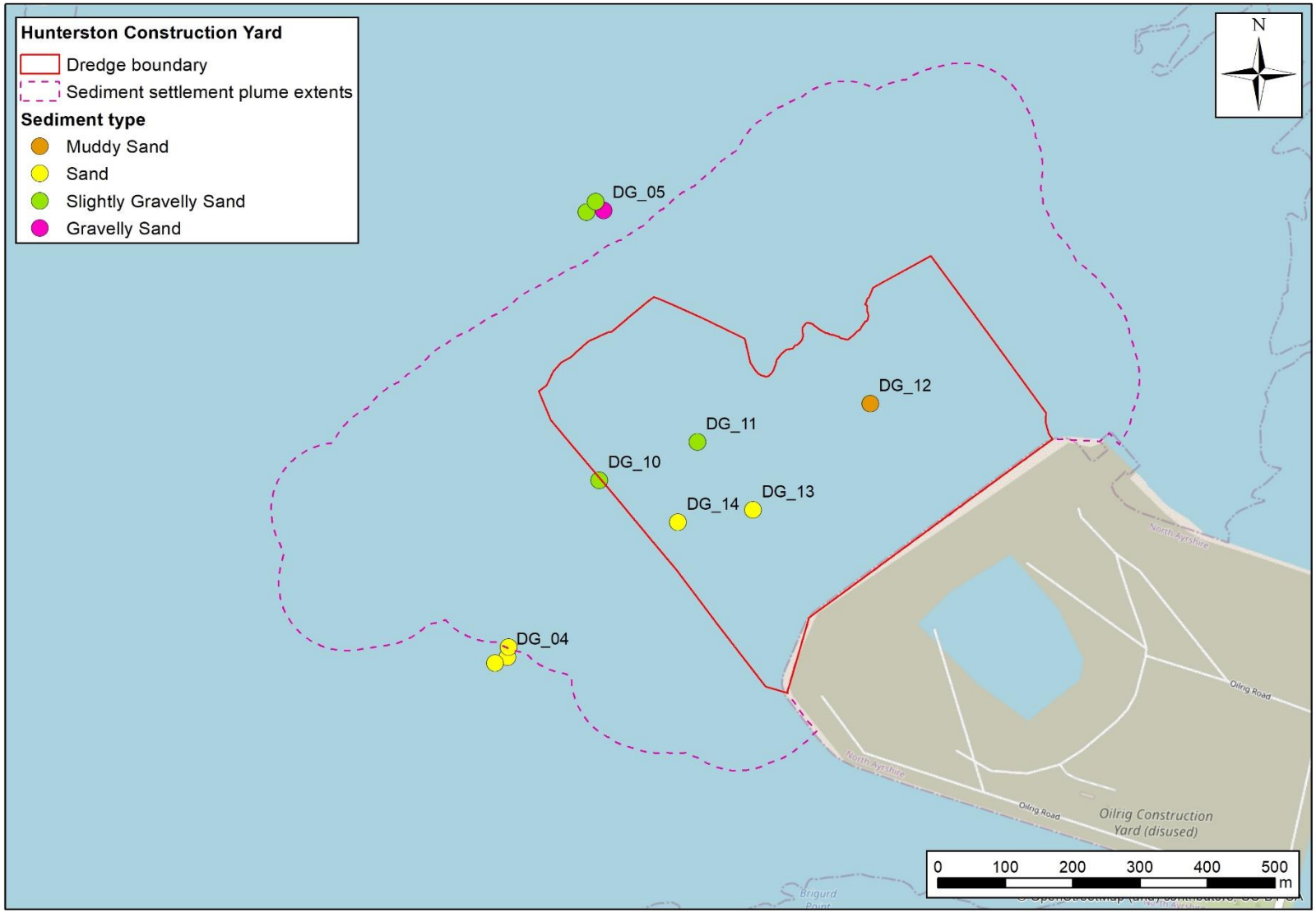

Figure 3.5: Results of the sediment particle size analysis (PSA) of 'priority' grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

3.3 Macrobenthic invertebrate analysis

3.3.1 Macrofaunal abundance

The macrobenthic invertebrate analysis of the 'priority' grab samples identified a total of 7917 individuals and 140 taxa (including non-countable epifaunal taxa). A summary of the most abundant taxa present in the samples is given in Table 3.2 and the full results of the macrobenthic invertebrate analysis have been appended separately to this report.

Table 3.2: Total abundance of macrofaunal taxa identified in the 8 'priority' grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey. Taxa shown comprise ~80 % of total individuals identified.

Taxon	Qualifier	Abundance (total no. in all samples)
NEMATODA	spp. indet.	4173
Grania	spp. indet.	590
Macomangulus tenuis		578
Amphipoda	spp. indet. juv./dam.	259
Spio symphyta		186
BIVALVIA	spp. indet. juv.	185
Fabulina fabula		164
Polititapes rhomboides		153
Tubificoides pseudogaster	agg.	139
Thracia phaseolina		101
Streptosyllis websteri		83
Mytilidae	spp. indet. juv.	80
NEMERTEA	spp. indet.	70
Clausinella fasciata	juv.	68
Kurtiella bidentata		57
Phtisica marina		56
Ensis	spp. indet. juv.	51
Isaeidae	spp. indet.	45
Ampelisca typica		43
Lysianassidae	spp. indet.	42
Perioculodes longimanus		35
Pariambus typicus		32
Iphinoe trispinosa		32

By far the most abundant taxon was Nematoda, with 4173 individuals present, accounting for ~52.7 % of all countable individuals. Of these, 3135 (75 %) were present in a single sample from station 4 (sample 582_08#02). To avoid skewing the data, nematodes (which are generally considered part of the meiofauna) were removed from the dataset as part of the data rationalisation process prior to any statistical analyses being undertaken.

Excluding nematodes, the macrofauna was found to be dominated by Mollusca (42.5 %), Annelida (35.8 %) and Crustacea (19.4 %), with the remaining 2.3 % of individuals comprising Nemertea (1.9 %), Actinaria, Ophiuroidea, Ascidiacea, Phoronida and Pycnogonida (all <0.2 %).

The samples were generally characterised by high numbers of a variety of bivalve taxa, particularly the tellinid clam *Macomangulus tenuis*, a species often associated with intertidal fine sand biotopes. This species was present in all eight of the 'priority' samples, though was less frequent at stations 12 and 13 (range 2 – 7 individuals) compared to other stations (range 40 – 305). Other commonly identified bivalves included another tellinid, *Fabulina fabula*, which was present in 6 of the samples (range 1 – 55), *Thracia phaseolina*, the venerid bivalves *Polititapes rhomboides* and *Clausinella fasciata*, and *Kurtiella bidentata*, although this species was only present in samples from stations 11 – 14. Several bivalve species were identified only as juveniles, including indeterminate mussels (Mytilidae) and cockles (Cardiidae), the razor clam *Ensis* spp., and the venerids *Dosinia* spp. and *Chamelea striatula*.

In terms of number of individuals, the annelids were dominated by oligochaetes, particularly *Grania* spp. and *Tubificoides pseudogaster*, however these taxa were not present consistently across the samples. *Grania* spp. was present at just two stations (4 and 11), with 94.6 % (n = 558) of individuals of this species present in a single sample replicate at station 4 (582_08#02), while *T. pseudogaster*, which is generally associated with muddy sediments, was only present at stations 12 (n = 119) and 13 (n = 20). The most commonly identified polychaetes included the spionid *Spio symphyta*, which was present in all samples (range 6 – 80), and the syllid *Streptosyllis websteri*, also present in all samples (range 3 – 23).

The most commonly identified crustaceans were amphipods, including *Phtisica marina*, *Ampelisca typica*, *Perioculodes longimanus*, *Pariambus typicus* and *Urothoe* spp., however a range of cumaceans were also present, the most common of which were *Iphinoe trispinosa* and *Pseudocuma (Pseudocuma) longicorne*.

3.3.2 Statistical analysis results

The cluster analysis of the rationalised, square root transformed macrobenthic invertebrate data indicated the presence of two main groups of samples ('a' and 'b') separated at 35 % similarity, while samples within each group were at least ~50 % similar (Figure 3.6).

The 2D MDS plot of the cluster analysis (Figure 3.7) broadly supported the conclusions drawn from the dendrogram, with two main groups of samples present with no overlap. The MDS plot had a very low stress value of 0.01.

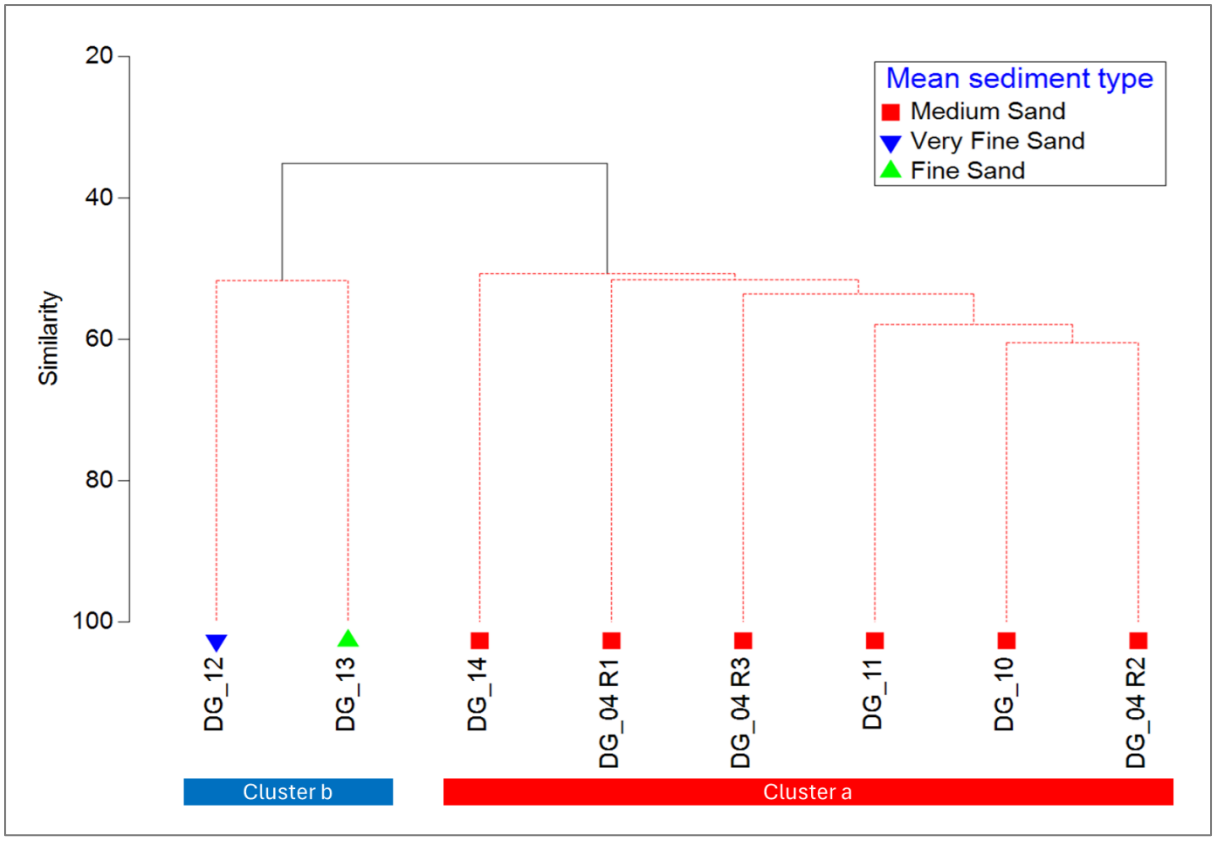

Figure 3.6: Dendrogram plot following cluster analysis of macrobenthic invertebrate abundance counts of 'priority' grab samples taken as part of the 2024 Hunterston construction yard subtidal habitat mapping survey. Dotted red lines indicate a SIMPROF significance of 5 %.

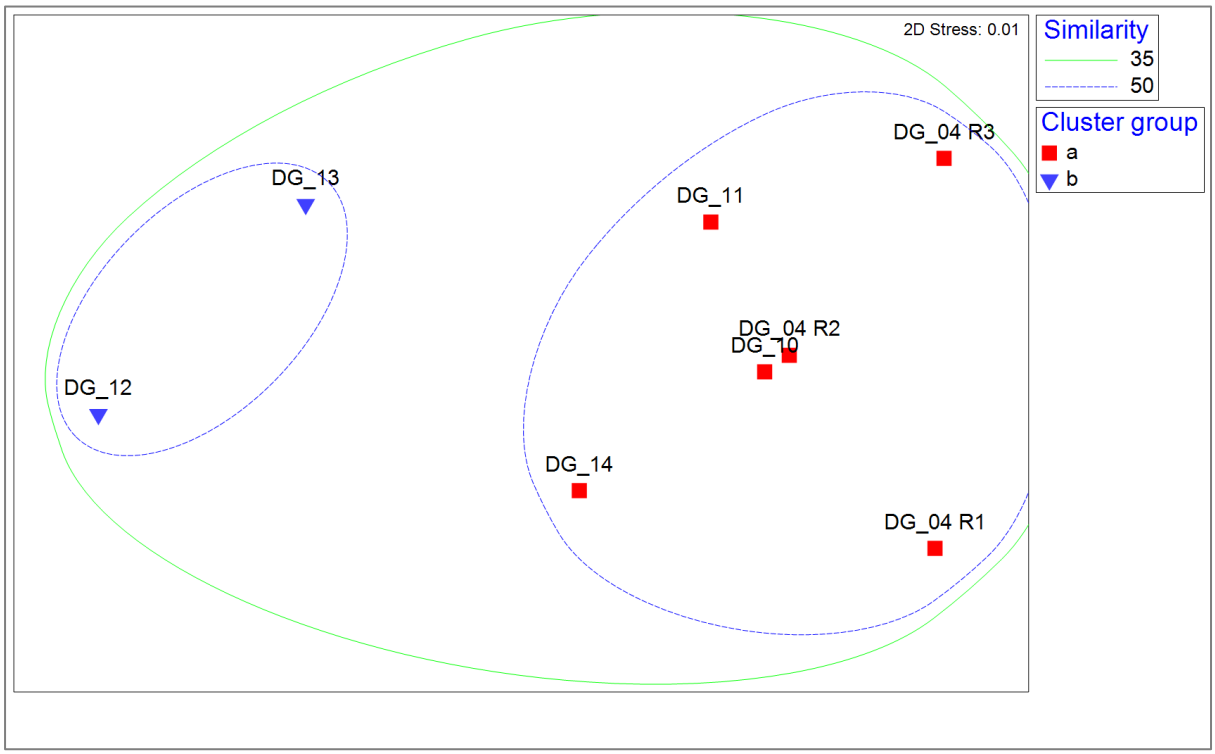

Figure 3.7: 2D MDS plot following cluster analysis of macrobenthic invertebrate abundance counts of 'priority' grab samples taken as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

A summary of the SIMPER analysis results is given in Table 3.3, listing the characteristic taxa for each cluster group. Group (a) was characterised by *M. tenuis* and *T. phaseolina* together with amphipods and juvenile bivalves, while group (b) was characterised by *F. fabula* and *T. pseudogaster* together with the bivalve *Nucula nitidosa*. The polychaete *S. symphyta* contributed to similarity within both groups, a species that likely contributed to the high base of similarity across all samples. The main taxa contributing to dissimilarity between groups included the characterising species of each group, i.e. *M. tenuis*, *F. fabula* and *T. pseudogaster*, as well as *Grania* spp., *K. bidentata* and *P. rhomboides*.

Table 3.3: Results of SIMPER analysis of the groups identified following cluster analysis of macrobenthic invertebrate abundance counts of 'priority' grab samples taken as part of the 2024 Hunterston construction yard subtidal habitat mapping survey. Taxa listed contributed at least 70 % similarity for each group.

Cluster group	% Contribution of characterising species	
	Taxon	Contribution (%)
a	*Macomangulus tenuis*	24.63
	Amphipoda spp. indet.	11.61
	Bivalvia spp. indet. juv.	11.11
	Spio symphyta	7.23
	Thracia phaseolina	4.78
	Streptosyllis websteri	4.30
	Nemertea	3.26
	Polititapes rhomboides	3.16
b	*Fabulina fabula*	26.24
	Tubificoides pseudogaster	14.18
	Spio symphyta	8.51
	Nemertea	5.67
	Nucula nitidosa	4.26
	Exogone naidina	3.55
	Ophryotrocha spp. indet.	3.55
	Galathowenia oculata	3.55
	Mytilidae spp. indet. juv.	3.55

3.3.3 Biotopes

Due to the high level of similarity of samples within clusters, it was deemed appropriate to assign a single biotope to each cluster group.

Samples in cluster group (a) were generally characterised by high numbers of bivalve molluscs, particularly the tellind bivalve *M. tenuis* and venerid bivalves including *P. rhomboides* and *C. fasciata*, and diverse range of amphipod and cumacean taxa as well as low numbers of polychaete worms. The community identified was very similar to the intertidal biotope **LS.LSa.FiSa.Po.Mten** ('Polychaetes and *Macomangulus tenuis* in littoral fine sand'), however, given the location and depth of the sampling stations, this was not deemed an appropriate biotope assignment. Similarly, the biotope **SS.SCS.ICS.MoeVen** ('*Moerella* spp. with venerid bivalves in infralittoral gravelly sand') was considered due to the prevalence of

venerid species, however the lack of the characterising species *Moerella* spp. meant that this was also deemed an inappropriate assignment.

Given the sediment type (clean, likely mobile medium sand) and the shallow water depths (3.1 – 4.4 m) of the samples, the biotope complex **SS.SCS.ICS** ('Infralittoral coarse sediment') was assigned. Within this biotope complex, the best fit for the data was the biotope **SS.SCS.ICS.CumCset** ('Cumaceans and *Chaetozone setosa* in infralittoral gravelly sand'), however, as the numbers of the characterising taxa *I. trispinosa* and *Chaetozone* spp. were generally low, the assignment of this biotope should be considered tentative.

The samples within cluster group (b) were taken at slightly greater depths than the other 'priority' samples (5.5 – 7.5 m below chart datum), and were found to have significant fractions of mud present (7.7 – 13.6 %). The macrobenthic invertebrate communities at these stations were characterised by the tellind bivalve *F. fabula*, with only low numbers of *M. tenuis* present compared to samples in cluster group (a). Due to the sediment type (muddy sand) and the presence of *F. fabula* as well as low numbers of the polychaete *Magelona filiformis*, the biotope **SS.SSa.IMuSa.FfabMag** ('*Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand') was assigned to these samples.

A summary of the biotopes assigned to each sample, including relevant data used to assign biotopes, is given in Table 3.4, and the distribution of assigned biotopes is show in Figure 3.8.

Table 3.4: MNCR biotopes assigned to 'priority' grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

Station	Sample no.	Cluster group	Depth below chart datum (m)	Sediment type (Folk)	MNCR biotope code
DG_04	582_06#01	a	3.5	Sand	SS.SCS.ICS.CumCset
DG_04	582_07#01	a	3.5	Sand	SS.SCS.ICS.CumCset
DG_04	582_08#02	a	3.5	Sand	SS.SCS.ICS.CumCset
DG_10	582_03#01	a	4.1	Slightly gravelly sand	SS.SCS.ICS.CumCset
DG_11	582_02#01	a	4.2	Slightly gravelly sand	SS.SCS.ICS.CumCset
DG_12	582_05#01	b	7.5	Muddy sand	SS.SSa.IMuSa.FfabMag
DG_13	582_04#01	b	5.5	Sand	SS.SSa.IMuSa.FfabMag
DG_14	582_01#01	a	3.1	Sand	SS.SCS.ICS.CumCset

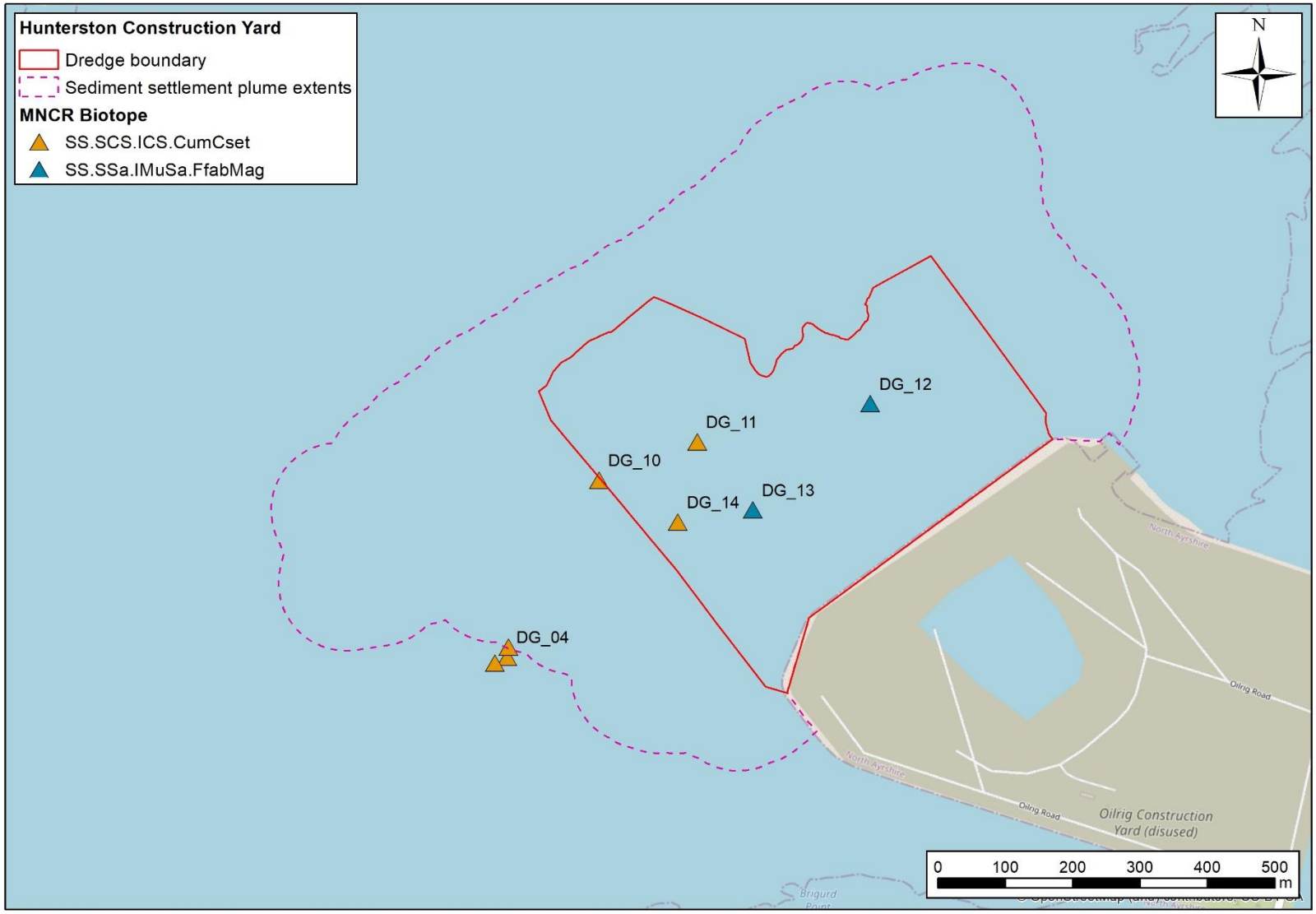

Figure 3.8: MNCR biotopes (JNCC, 2022) assigned to 'priority' grab samples collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

3.4 Non-indigenous species

One NIS was identified during the survey; Japanese wireweed, *Sargassum muticum*, an invasive species originating from the Pacific which first appeared in the UK on the Isle of Wight in 1973 (Pizzolla, 2008). This NIS was recorded on a total of four video transects (HC_01, HC_06, HC_07 and HC_13), however was generally only observed in very low quantities (rare) and in no area was the density of *S. muticum* sufficient to assign the biotope **IR.LIR.K.Sar** ('*Sargassum muticum* on shallow slightly tide-swept infralittoral mixed substrata').

Despite the presence of the oyster farm at Fairlie Sands, no escaped *Magallana gigas* (or indeed native oysters, *Ostrea edulis*) were observed within the survey area.

4 DISCUSSION

4.1 PMFs within the sediment settlement plume extent

A preliminary habitat map of the seabed within the sediment settlement plume extent based on the results of the ground-truthing analyses undertaken thus far is shown in Figure 4.1.

The majority of the inshore section of the sediment settlement plume extent was mapped as an area of patchy *Saccharina latissima* with mixed seaweeds (green polygon). Two main biotopes within the **SS.SMp.KSwSS** biotope complex are represented by this habitat description; **SS.SMp.KSwSS.SlatR** and **SS.SMp.KSwSS.SlatCho**. The area is therefore likely to represent the PMF 'kelp and seaweed communities on sublittoral sediment.' However, as the original aims of the survey were to map a large area around the proposed dredge footprint rather than to characterise the area of seabed to be dredged, a low number of camera transects were conducted in this area and there is therefore considerable uncertainty as to the exact distribution and extent of this feature. More confidence can be placed in the small area at the northeast edge of the sediment settlement plume extent (blue polygon), which was sampled by two transects, and which represents the biotope **SS.SMp.KSwSS.SlatCho** and therefore the 'kelp and seaweed communities on sublittoral sediment' PMF. It should be noted however that where kelps and seaweeds on sediment were observed within the sediment settlement plume extent (i.e. transects HC_06, HC_07, HC_12 and HC_14), these were often sparse and/or patchy (i.e. present only in low densities) and the areas indicated may therefore not represent a high-quality version of the PMF. By contrast, to the south of the plume extent some areas of very dense kelp were recorded (e.g. transects HC_01, HC_03 and HC_13).

The offshore section of the sediment settlement plume extent, which was subject to higher levels of replication in terms of number of transects conducted, was mapped as an area of rippled sand and shell with *Synarachnactis lloydii* and hydroids (**SS.SMx.CMx.CIloMx.Nem**).

Coarse shelly and/or gravelly mobile sands, likely home to burrowing bivalves, were observed on several video transects, particularly HC_04, HC_05, HC_12 and HC_17, all of which are wholly or partially located within the sediment settlement plume extent. As there was insufficient data to assign imagery records beyond the biotope complex level, the biotope **SS.SCS.ICS.MoeVen**, which is the sole biotope component of the PMF 'tide swept coarse sands with burrowing bivalves,' could not be assigned. None of the 'priority' grab samples were found to contain the characterising taxon *Moerella* spp.; it can therefore be said with some certainty that the component biotope has not been identified within the sediment settlement plume extent. However, all of the grab samples analysed to date were found to contain high numbers of tellinid and venerid bivalves and the biological communities observed are very similar to that of the biotope SS.SCS.ICS.MoeVen. In addition, the biotope **SS.SSa.IMuSa.FfabMag**, which was assigned to two of the grab samples, is closely related to SS.SCS.ICS.MoeVen and the two are collectively considered to comprise the 'shallow Venus community,' with SS.SSa.IMuSa.FfabMag occurring in less exposed, more stable fine and muddy sands and SS.SCS.ICS.MoeVen in slightly coarser sediments where brittle-shelled species such as *F. fabula* are less likely to be found. Furthermore, due to the sediment settlement plume extent being determined only after the habitat mapping survey was conducted, there is a low level of grab replication in this area, with no grabs taken in the vicinity of video transects HC_04, HC_05 or HC_17. Uncertainty therefore remains as to whether the biotope SS.SCS.ICS.MoeVen and the associated 'tide swept coarse sands with burrowing bivalves' PMF is present within the survey area.

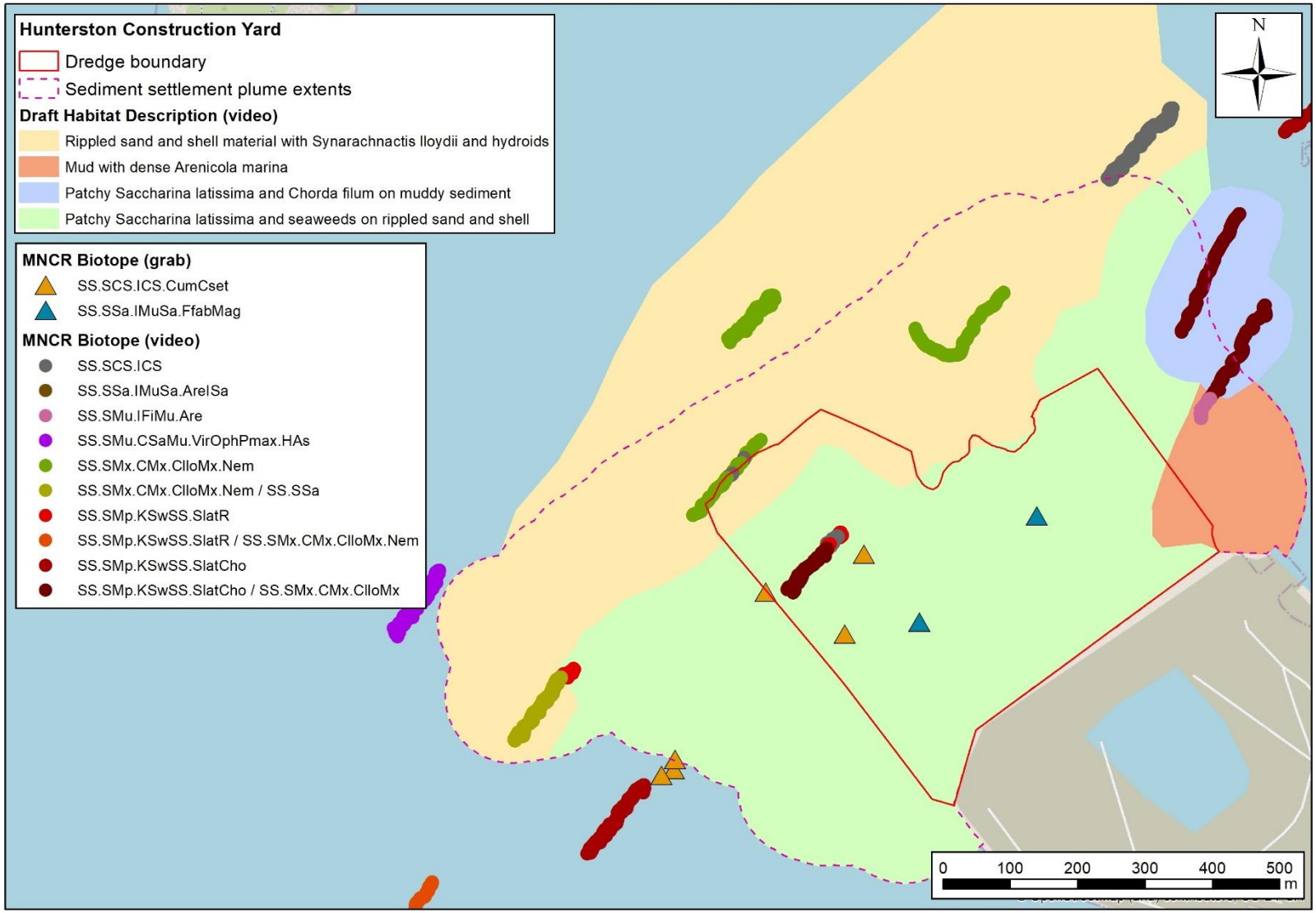

Figure 4.1: Distribution of observed habitats in the sediment settlement plume extent, based on analysis of underwater imagery and 'priority' grab sample data collection as part of the 2024 Hunterston construction yard subtidal habitat mapping survey.

4.2 Sensitivity of identified PMFs

The sensitivity of the PMFs identified as present (and potentially present) in the survey area to different pressures associated with capital and maintenance dredging (as listed by FeAST, 2023) is given in Table 4.1.

Table 4.1: Summary of the sensitivities of PMFs identified from ground-truthing data collected as part of the 2024 Hunterston construction yard subtidal habitat mapping survey to pressures associated with capital and maintenance dredging (derived from FeAST, 2023).

Pressure	Kelp and seaweed communities on sublittoral sediment	Burrowed mud (inc. seapens)	Tide swept coarse sands with burrowing bivalves	Inshore deep mud with burrowing heart urchins
Physical change (to another seabed type)	Low	High	Low	Low
Physical removal (extraction of substratum)	Low	Medium	High	Low
Removal of non-target species (including lethal)	Low	Medium	Medium	Medium
Removal of target species (including lethal)	Low	Medium	Medium	Low
Siltation rate changes (heavy - 5 - 30 cm)	Low	Medium	Medium	Low
Siltation rate changes (light - <5 cm)	Low	Low	Low	Low
Sub-surface abrasion/penetration	Low	Medium	Medium	Low
Surface abrasion	Low	Medium	Low	Low
Water clarity changes	Low	Low	Low	Low

The PMF ‘kelp and seaweed communities on sublittoral sediment’ is considered to have low sensitivity to all associated pressures. However burrowed mud is considered to have medium to high sensitivity to pressures associated with the physical act of sediment removal (physical change, physical removal, removal of species, surface and sub-surface abrasion), but low sensitivity to secondary effects (siltation rate changes – light and water clarity changes), unless siltation rate changes exceed 5 cm (siltation rate changes – heavy).

The PMF ‘tide swept coarse sands with burrowing bivalves,’ potentially present in and around the proposed dredge footprint, is considered to be highly sensitive to physical removal of substrate and have medium sensitivity to removal of species, heavy siltation rate changes and sub-surface abrasion/penetration, but low sensitivity to light siltation rate changes, surface abrasion and water clarity changes. The second potential PMF, ‘inshore deep mud with burrowing heart urchins’ however is considered to have low sensitivity to dredging-related pressures, with the exception of removal of non-target species, which given the (potential) distribution of this PMF is unlikely to occur as part of the proposed development.

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6 APPENDICES

Appendix I: Drop-down camera survey field logs

Logs for completed camera transects. Times in GMT. 'SOL' = start of line, 'EOL' = end of line. Positions are in WGS84 Latitude and Longitude.

Transect name	Sample no.	Date	SOL Time	EOL Time	Video start position		Video end position		Number of Stills
					Lat	Lon	Lat	Lon	
HC_01	582_33	24/07/2024	10:11:57	10:26:33	55.726111	-4.908120	55.724413	-4.909794	16
HC_02	582_34	24/07/2024	10:55:30	11:06:28	55.729887	-4.911485	55.728843	-4.912894	20
HC_03	582_35	24/07/2024	11:23:45	11:35:08	55.734689	-4.908163	55.733581	-4.909521	18
HC_04	582_36	24/07/2024	11:54:48	12:06:28	55.740707	-4.900682	55.739677	-4.902238	15
HC_05	582_37	24/07/2024	12:16:10	12:27:44	55.742759	-4.895043	55.742250	-4.897109	15
HC_06	582_38	24/07/2024	12:49:39	13:01:42	55.743896	-4.889518	55.742297	-4.890813	15
HC_07	582_39	24/07/2024	13:07:17	13:20:12	55.742687	-4.888857	55.741154	-4.890299	18
HC_08	582_40	24/07/2024	13:40:44	13:51:14	55.745987	-4.886772	55.745001	-4.888509	15
HC_09_A2	582_53	27/07/2024	11:59:51	12:10:06	55.749593	-4.880032	55.748568	-4.881184	16
HC_10	582_42	24/07/2024	14:25:56	14:36:33	55.758234	-4.870601	55.756931	-4.871571	15
HC_11	582_43	26/07/2024	13:40:50	13:51:48	55.742634	-4.900473	55.742040	-4.901465	15
HC_12	582_44	26/07/2024	13:59:12	14:09:54	55.739484	-4.898778	55.738720	-4.899969	17
HC_13	582_45	26/07/2024	14:17:07	14:27:32	55.736061	-4.903215	55.735166	-4.904469	14
HC_14	582_47	26/07/2024	14:56:16	15:07:48	55.737587	-4.904960	55.736604	-4.906304	15
HC_15	582_46	26/07/2024	14:34:58	14:48:10	55.732769	-4.912847	55.731621	-4.914111	16
HC_16	582_48	26/07/2024	15:17:52	15:29:04	55.738847	-4.908196	55.738019	-4.909171	18
HC_17	582_49	26/07/2024	15:42:25	15:54:00	55.745280	-4.891197	55.744342	-4.892579	15
HC_18	582_50	26/07/2024	16:09:22	16:20:17	55.748286	-4.885964	55.747403	-4.887475	15
HC_19	582_51	27/07/2024	11:12:07	11:23:20	55.760242	-4.867255	55.759190	-4.868751	16
HC_20	582_52	27/07/2024	11:34:49	11:45:27	55.752983	-4.874332	55.752166	-4.875627	16
HC_21	582_54	27/07/2024	12:20:40	12:32:12	55.750091	-4.882580	55.749236	-4.884248	13

Appendix II: Benthic grab sampling field logs

Logs showing details for successful grab samples. Times in GMT. Positions are in WGS84 Latitude and Longitude.

Station Number	Sample Number	Date	Time	Water Depth (m)	Latitude	Longitude
DG_14	582_01#01	22/07/2024	09:38:01	11.40	55.73814	4.898581
DG_11	582_02#01	22/07/2024	10:01:03	6.24	55.73922	4.898179
DG_10	582_03#01	22/07/2024	10:23:12	6.53	55.73867	4.900474
DG_13	582_04#01	22/07/2024	10:39:53	7.59	55.73833	4.896819
DG_12	582_05#01	22/07/2024	10:58:19	9.75	55.73979	4.894119
DG_04	582_06#01	22/07/2024	11:13:19	5.80	55.73628	4.902524
DG_04	582_07#01	22/07/2024	11:39:17	6.10	55.73641	4.902506
DG_04	582_08#02	22/07/2024	12:01:13	6.10	55.73620	4.902818
DG_02	582_09#01	22/07/2024	12:44:29	7.56	55.73234	4.909115
DG_02	582_10#01	22/07/2024	12:59:49	7.38	55.73220	4.909139
DG_02	582_11#01	22/07/2024	13:13:16	8.69	55.73231	4.909402
DG_01	582_12#01	22/07/2024	13:29:42	38.61	55.72819	4.917702
DG_01	582_13#01	22/07/2024	13:49:14	38.23	55.72799	4.917644
DG_01	582_14#01	22/07/2024	14:12:35	39.44	55.72826	4.917807
DG_03	582_15#01	22/07/2024	14:39:10	13.97	55.73584	4.909058
DG_03	582_16#01	22/07/2024	14:52:22	15.33	55.73600	4.909168
DG_03	582_17#01	22/07/2024	15:06:10	15.86	55.73586	4.909511
DG_05	582_18#01	23/07/2024	09:03:12	22.97	55.74227	4.900541
DG_05	582_19#01	23/07/2024	09:18:59	23.80	55.74225	4.900943
DG_05	582_20#01	23/07/2024	09:36:23	23.25	55.74239	4.900738
DG_06	582_21#01	23/07/2024	09:56:39	29.36	55.74708	4.890656
DG_06	582_22#01	23/07/2024	10:10:10	28.80	55.74694	4.890893
DG_06	582_23#01	23/07/2024	10:23:12	28.85	55.74696	4.890535
DG_07	582_24#01	23/07/2024	10:48:04	15.61	55.74726	4.883854
DG_07	582_25#01	23/07/2024	11:07:22	16.41	55.74739	4.883746
DG_07	582_26#01	23/07/2024	11:21:48	14.12	55.74727	4.883576
DG_08	582_27#01	23/07/2024	11:42:23	44.37	55.75927	4.877531
DG_08	582_28#01	23/07/2024	12:09:52	44.19	55.75914	4.877347
DG_08	582_29#01	23/07/2024	12:57:11	44.42	55.75907	4.877384
DG_09	582_30#01	23/07/2024	13:34:56	13.92	55.75867	4.866595
DG_09	582_31#01	23/07/2024	13:57:27	14.04	55.75856	4.866548
DG_09	582_32#01	23/07/2024	14:56:21	14.00	55.75850	4.866224

Appendix III: Underwater imagery analysis results summary

A summary of the habitats and species identified from video and still photography data collected as part of the 2024 Hunterston construction yard habitat mapping survey.

Video segment	General habitat description	Biotope(s) identified	PMF(s) identified	Species of interest identified
HC_01_S1	*Saccharina latissima* and *Chorda filum* on shelly sands and gravels, pebbles and cobbles with red and brown seaweeds.	SS.SMp.KSwSS.SlatR	Kelp and seaweed communities on sublittoral sediment	*Sargassum muticum*
HC_02_S1	Patchy *Saccharina latissima* and seaweeds on shelly sand with *Synarachnactis lloydii*, *Ascidiella aspersa* and erect hydroids.	SS.SMp.KSwSS.SlatR SS.SMx.CMx.ClloMx.Nem	Kelp and seaweed communities on sublittoral sediment	
HC_03_S1	Patchy *Saccharina latissima* and seaweeds on shelly sand with *Synarachnactis lloydii* and erect hydroids.	SS.SMp.KSwSS.SlatR SS.SMx.CMx.ClloMx.Nem	Kelp and seaweed communities on sublittoral sediment	
HC_03_S2	*Saccharina latissima* and red seaweeds on shelly sands and gravels with dense clumps of *Ascidiella aspersa.*	SS.SMp.KSwSS.SlatR	Kelp and seaweed communities on sublittoral sediment	
HC_03_S3	Patchy *Saccharina latissima* and seaweeds on shelly sand with *Synarachnactis lloydii* and *Ascidiella aspersa.*	SS.SMp.KSwSS.SlatR SS.SMx.CMx.ClloMx	Kelp and seaweed communities on sublittoral sediment	
HC_04_S1	*Synarachnactis lloydii* in rippled sand and shell with hydroids and sparse/patchy seaweeds	SS.SMx.CMx.ClloMx.Nem		
HC_04_S2	Rippled shelly sand with sparse biota	SS.SCS.ICS		
HC_04_S3	*Synarachnactis lloydii* in rippled sand and shell with hydroids and sparse/patchy seaweeds	SS.SMx.CMx.ClloMx.Nem		
HC_04_S4	Rippled shelly sand with sparse biota	SS.SCS.ICS		
HC_04_S5	*Synarachnactis lloydii* in rippled sand and shell with hydroids and sparse/patchy seaweeds	SS.SMx.CMx.ClloMx.Nem		

Video segment	General habitat description	Biotope(s) identified	PMF(s) identified	Species of interest identified
HC_05_S1	*Synarachnactis lloydii* in rippled sand and shell with hydroids and sparse/patchy seaweeds.	SS.SMx.CMx.ClloMx.Nem		
HC_06_S1	Patchy *Saccharina latissima* and brown seaweeds including Chorda filum on slightly muddy shelly sand with *Synarachnactis lloydii*.	SS.SMp.KSwSS.SlatCho SS.SMx.CMx.ClloMx	Kelp and seaweed communities on sublittoral sediment	*Sargassum muticum*
HC_07_S1	Sparse/patchy *Chorda filum* and *Saccharina latissima* with brown seaweeds on shelly sandy mud with *Synarachnactis lloydii*	SS.SMp.KSwSS.SlatCho SS.SMx.CMx.ClloMx	Kelp and seaweed communities on sublittoral sediment	*Sargassum muticum*
HC_07_S2	Dense *Arenicola marina* casts and mounds in mud with microbial mats / diatom films.	SS.SMu.IFiMu.Are		
HC_08_S1	Slightly shelly muddy sand with sparse seaweeds.	SS.SSa.IMuSa		
HC_08_S2	Rippled muddy sand with sparse *Arenicola marina* casts and patchy microbial mats /diatom films.	SS.SSa.IMuSa.AreISa		
HC_08_S3	Sparse *Chorda filum* and brown seaweeds on muddy sand and shell.	SS.SMp.KSwSS.SlatCho	Kelp and seaweed communities on sublittoral sediment	
HC_09_A2_S1	Sandy mud with very sparse seaweeds.	SS.SMu.ISaMu		
HC_09_A2_S2	Burrowed mud with sparse seaweeds.	SS.SMu.CFiMu.SpnMeg	Burrowed mud	
HC_10_S1	Dense clumps of *Ascidiella aspersa* on mixed sediment with *Synarachnactis lloydii* and erect hydroids and patchy *Saccharina latissima* and seaweeds.	SS.SMp.KSwSS.SlatR SS.SMx.CMx.ClloMx.Nem	Kelp and seaweed communities on sublittoral sediment	
HC_10_S2	*Synarachnactis lloydii* in mixed sediment with erect hydroids and *Ascidiella aspersa*.	SS.SMx.CMx.ClloMx.Nem		
HC_11_S1	*Synarachnactis lloydii* in rippled sand and shell with patchy fauna in association with scattered pebbles.	SS.SMx.CMx.ClloMx.Nem		
HC_12_S1	Sparse/patchy *Saccharina latissima* and seaweeds on rippled shelly sand.	SS.SMp.KSwSS.SlatR	Kelp and seaweed communities on sublittoral sediment	

Video segment	General habitat description	Biotope(s) identified	PMF(s) identified	Species of interest identified
HC_12_S2	Rippled shelly sand with sparse biota.	SS.SCS.ICS		
HC_12_S3	Patchy *Saccharina latissima* and seaweeds on rippled sand and shell.	SS.SMp.KSwSS.SlatR	Kelp and seaweed communities on sublittoral sediment	
HC_12_S4	*Chorda filum* and *Saccharina latissima* with brown seaweeds on muddy shelly sand with *Synarachnactis lloydii*.	SS.SMp.KSwSS.SlatCho SS.SMx.CMx.ClloMx	Kelp and seaweed communities on sublittoral sediment	
HC_13_S1	*Saccharina latissima* and *Chorda filum* on slightly muddy shelly sand with mixed seaweeds.	SS.SMp.KSwSS.SlatCho	Kelp and seaweed communities on sublittoral sediment	*Sargassum muticum*
HC_14_S1	Sparse/patchy *Saccharina latissima* and seaweeds on shelly sand with *Metridium senile* on scattered pebbles.	SS.SMp.KSwSS.SlatR	Kelp and seaweed communities on sublittoral sediment	
HC_14_S2	*Synarachnactis lloydii* in rippled muddy sand with erect hydroids and sparse seaweeds with patches of barren rippled shelly sand.	SS.SMx.CMx.ClloMx.Nem SS.SSa		
HC_15_S1	Patchy *Saccharina latissima* and seaweeds on slightly muddy sand and shell with dense *Synarachnactis lloydii* and erect hydroids.	SS.SMp.KSwSS.SlatR SS.SMx.CMx.ClloMx.Nem	Kelp and seaweed communities on sublittoral sediment	
HC_16_S1	Patchy *Alcyonium digitatum*, *Ascidiella aspersa*, hydroids and sponges on mixed substrate with *Virgularia mirabilis*, *Pecten maximus* and *Synarachnactis lloydii*.	SS.SMu.CSaMu.VirOphPmax.HAs		
HC_17_S1	Rippled slightly gravelly sand and shell material with sparse biota.	SS.SCS.ICS		
HC_18_S1	Slightly shelly sand with sparse biota.	SS.SSa.IFiSa		
HC_19_S1	*Synarachnactis lloydii* in muddy sand/sandy mud with hydroids on occasional pebbles/cobbles.	SS.SMx.CMx.ClloMx.Nem		
HC_19_S2	Burrowed mud with *Amphiura* sp. and Virgularia mirabilis.	SS.SMu.CFiMu.SpnMeg	Burrowed mud	
HC_20_S1	*Virgularia mirabilis* in burrowed mud with *Ophiura* spp.	SS.SMu.CFiMu.SpnMeg	Burrowed mud	

Video segment	General habitat description	Biotope(s) identified	PMF(s) identified	Species of interest identified
HC_21_S1	Slightly shelly soft mud with sparse fauna.	SS.SMu.CFiMu		

Appendix IV: Particle size analysis results

Percentages of the distribution in each half-phi size interval, expressed in µm (sieving for >1 mm fraction, laser diffraction for <1 mm fraction). NB. Only 'priority' grab samples are shown.

Sed fraction (µm)	DG_04 582_06#01	DG_04 582_07#01	DG_04 582_08#02	DG_10 582_03#01	DG_11 582_02#01	DG_12 582_05#01	DG_13 582_04#01	DG_14 582_01#01
>63000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31500	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11200	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8000	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00
5600	0.06	0.00	0.03	0.18	0.80	0.00	0.00	0.00
4000	0.02	0.09	0.05	0.24	0.27	0.00	0.00	0.00
2800	0.13	0.10	0.17	0.40	0.39	0.00	0.02	0.00
2000	0.30	0.05	0.20	0.36	0.46	0.00	0.02	0.08
1400	0.70	0.18	0.58	0.49	0.91	0.01	0.02	0.23
1000	1.03	0.32	1.01	0.54	0.93	0.01	0.02	0.46
710	7.66	3.00	13.59	2.54	1.98	0.70	0.00	2.12
500	18.00	8.69	30.70	5.67	5.52	1.77	0.96	4.56
355	22.87	21.08	26.92	17.73	18.95	2.39	1.52	13.12
250	24.29	32.78	13.88	33.78	30.61	2.15	4.86	31.49
180	16.85	24.42	7.68	26.52	23.74	13.83	27.96	33.25
125	4.47	6.00	2.46	6.73	8.38	31.19	35.94	10.46
90	0.83	0.65	0.49	1.00	1.85	25.29	16.70	0.95
63	0.31	0.34	0.20	0.38	0.54	9.04	4.33	0.37
44.19	0.22	0.17	0.16	0.23	0.26	2.75	1.29	0.16
31.25	0.25	0.20	0.19	0.30	0.29	1.57	0.79	0.25
22.097	0.23	0.18	0.19	0.29	0.30	1.24	0.67	0.24
15.625	0.23	0.18	0.20	0.30	0.33	1.14	0.62	0.26
11.049	0.25	0.20	0.22	0.36	0.40	1.30	0.71	0.29
7.813	0.23	0.19	0.19	0.35	0.39	1.20	0.69	0.27
5.524	0.19	0.16	0.16	0.31	0.34	1.07	0.62	0.23
3.906	0.14	0.12	0.11	0.24	0.26	0.86	0.49	0.18
2.762	0.10	0.09	0.07	0.16	0.18	0.56	0.33	0.13
1.953	0.08	0.07	0.05	0.12	0.12	0.37	0.23	0.10
1.381	0.09	0.08	0.06	0.12	0.12	0.34	0.23	0.10
0.977	0.09	0.10	0.07	0.12	0.12	0.33	0.23	0.12
0.691	0.09	0.10	0.07	0.12	0.12	0.28	0.21	0.12
0.488	0.08	0.10	0.07	0.11	0.11	0.21	0.17	0.11
0.345	0.07	0.09	0.06	0.09	0.09	0.15	0.13	0.10
0.244	0.05	0.08	0.05	0.08	0.08	0.10	0.09	0.08
0.173	0.04	0.06	0.04	0.06	0.06	0.07	0.06	0.07
0.122	0.03	0.05	0.03	0.05	0.04	0.05	0.05	0.05
0.086	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.04
0.061	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.02
0.043	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

V Coarse Gravel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coarse Gravel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medium Gravel	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00
Fine Gravel	0.08	0.09	0.08	0.42	1.08	0.00	0.00	0.00
V Fine Gravel	0.43	0.15	0.37	0.76	0.85	0.00	0.04	0.08
V Coarse Sand	1.73	0.51	1.59	1.03	1.84	0.02	0.03	0.69
Coarse Sand	25.66	11.69	44.29	8.20	7.50	2.46	0.96	6.69
Medium Sand	47.15	53.86	40.80	51.51	49.56	4.54	6.38	44.61
Fine Sand	21.33	30.42	10.13	33.25	32.13	45.02	63.90	43.71
V Fine Sand	1.14	0.99	0.70	1.38	2.39	34.33	21.02	1.32
Mud	2.47	2.29	2.03	3.44	3.65	13.63	7.67	2.90

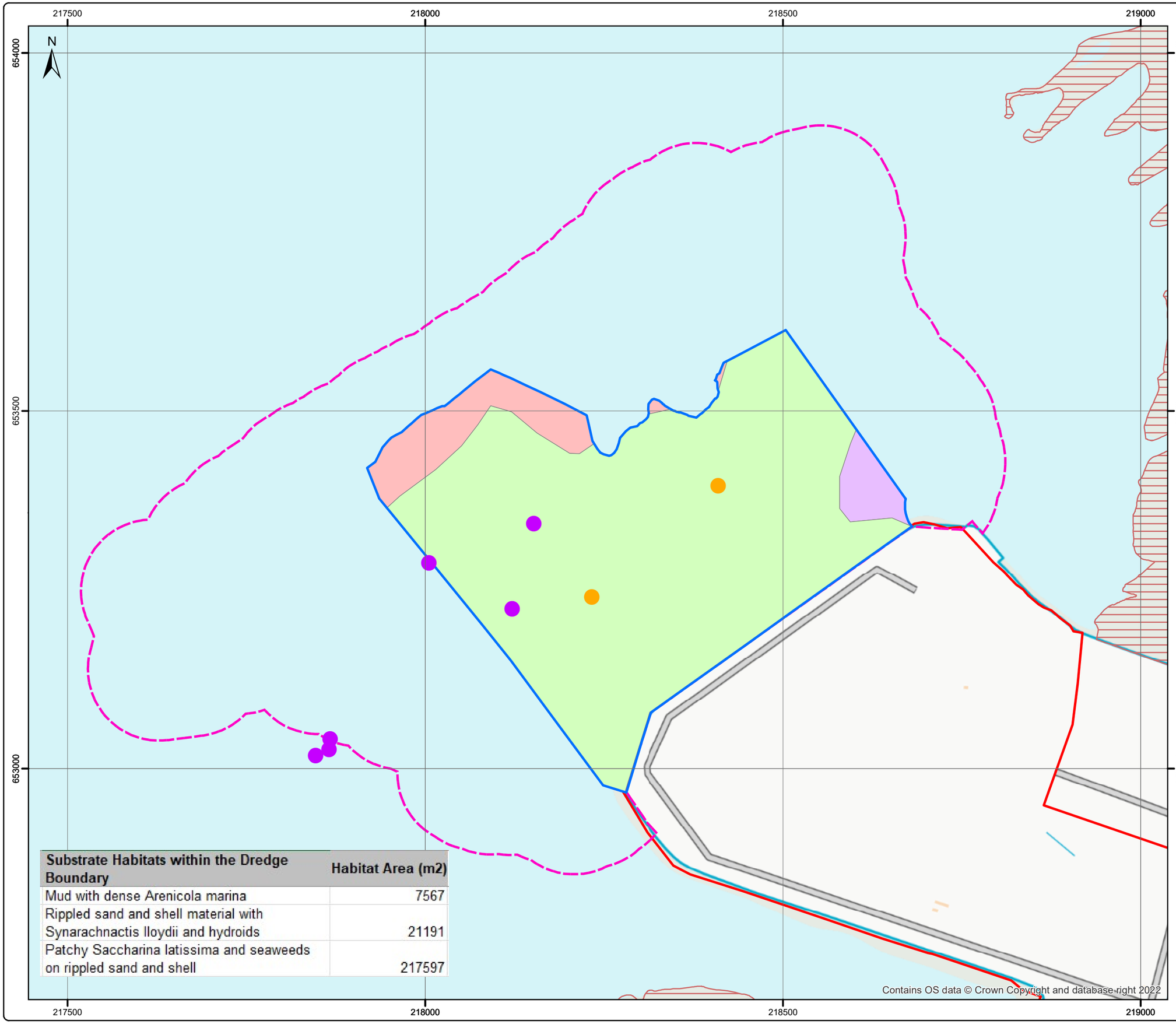
MCSA	MCSN	AphiaID	Phylum	Taxon	Qualifier	Authority	DG_04 582_06#01	DG_04 582_07#01	DG_04 582_08#02	DG_10 582_03#01	DG_11 582_02#01	DG_12 582_05#01	DG_13 582_04#01	DG_14 582_01#01	Occurrence frequency (*f*)	N
-	-	113262	Foraminifera	Elphidium crispum		(Linnaeus, 1758)			1						**1**	**1**
-	-	118100	Arthropoda	Chironomidae	sp. pupa						1				**1**	**1**
D	491	1606	Cnidaria	Campanulariidae	spp. indet.	Johnston, 1836		P							**1**	**0**
D	508	117377	Cnidaria	Gonothyraea loveni		(Allman, 1859)			P						**1**	**0**
D	662	1360	Cnidaria	Actiniaria	spp. indet.	Hertwig, 1882	3			1	2				**3**	**6**
G	1	152391	Nemertea	NEMERTEA	spp. indet.		4	4	12	7	14	8	8	13	**8**	**70**
HD	1	799	Nematoda	NEMATODA	spp. indet.		48	314	3135	2	21	15	17	621	**8**	**4173**
P	52	130770	Annelida	Harmothoe impar	agg.	(Johnston, 1839)					2				**1**	**2**
P	53	863197	Annelida	Malmgrenia darbouxi		(Pettibone, 1993)						1	1		**2**	**2**
P	54	147008	Annelida	Malmgrenia andreapolis		McIntosh, 1874						1			**1**	**1**
P	92	130601	Annelida	Pholoe inornata		Johnston, 1839			1				2		**2**	**3**
P	104	131072	Annelida	Sigalion mathildae		Audouin & Milne Edwards, 1832					1	1	1	2	**4**	**5**
P	116	129443	Annelida	Eteone	spp. indet. juv.	Savigny, 1822							1		**1**	**1**
P	136	130683	Annelida	Pseudomystides limbata		(Saint-Joseph, 1888)		1	1						**2**	**2**
P	142	334508	Annelida	Phyllodoce lineata		(Claparède, 1870)		1							**1**	**1**
P	145	334512	Annelida	Phyllodoce mucosa		Örsted, 1843	5	4	2	5	4	1	3		**7**	**24**
P	151	130623	Annelida	Eulalia aurea		Gravier, 1896					1				**1**	**1**
P	163	129446	Annelida	Eumida	spp. indet.	Malmgren, 1865	1								**1**	**1**
P	259	336908	Annelida	Glycera fallax		Quatrefages, 1850	1		1	1					**3**	**3**
P	260	130123	Annelida	Glycera lapidum	agg.	Quatrefages, 1866		1	1		3				**3**	**5**
P	265	130130	Annelida	Glycera tridactyla		Schmarda, 1861							1	1	**2**	**2**
P	268	130136	Annelida	Glycinde nordmanni		(Malmgren, 1866)				1					**1**	**1**
P	271	130140	Annelida	Goniada maculata		Örsted, 1843						1			**1**	**1**
P	311	130185	Annelida	Nereimyra punctata		(Müller, 1788)							1		**1**	**1**
P	321	130198	Annelida	Syllidia armata		Quatrefages, 1866					1				**1**	**1**
P	405	131402	Annelida	Streptosyllis websteri		Southern, 1914	18	13	10	23	6	3	5	5	**8**	**83**
P	420	757970	Annelida	Parexogone hebes		(Webster & Benedict, 1884)	1					1	3		**3**	**5**
P	422	327985	Annelida	Exogone naidina		Örsted, 1845				1	1	9	5		**4**	**16**
P	430	131394	Annelida	Sphaerosyllis taylori		Perkins, 1981					1				**1**	**1**
P	434	129659	Annelida	Myrianida	spp. indet.	Milne Edwards, 1845		4	1	1					**3**	**6**
P	458	22496	Annelida	Nereididae	spp. indet. juv.	Blainville, 1818		2	2		5		2		**4**	**11**
P	466	130380	Annelida	Micronereis variegata		Claparède, 1863							1		**1**	**1**
P	494	129370	Annelida	Nephtys	spp. indet. juv.	Cuvier, 1817						4	1	1	**3**	**6**
P	496	130355	Annelida	Nephtys caeca		(Fabricius, 1780)	1		2	2	2				**4**	**7**
P	498	130357	Annelida	Nephtys cirrosa		Ehlers, 1868	5	6	1		1				**4**	**13**
P	499	130359	Annelida	Nephtys hombergii		Savigny in Lamarck, 1818		2		2		7	3	1	**5**	**15**
P	613	129266	Annelida	Ophryotrocha	spp. indet.	Claparède & Mecznikow, 1869						16	5		**2**	**21**
P	672	130537	Annelida	Scoloplos armiger	agg.	(Müller, 1776)		1	2	4	2	2	4		**6**	**15**
P	677	730747	Annelida	Aricidea (Aricidea) minuta		Southward, 1956				6					**1**	**6**
P	718	130711	Annelida	Poecilochaetus serpens		Allen, 1904				1					**1**	**1**
P	723	131107	Annelida	Aonides paucibranchiata		Southern, 1914	2		3						**2**	**5**
P	736	129614	Annelida	Malacoceros	spp. indet.	Quatrefages, 1843			3						**1**	**3**
P	754	129611	Annelida	Dipolydora	spp. indet.	Verrill, 1881			1	1					**2**	**2**
P	756	131117	Annelida	Dipolydora coeca	agg.	(Örsted, 1843)					3				**1**	**3**
P	765	131157	Annelida	Prionospio fallax		Söderström, 1920				1		12	4	1	**4**	**18**
P	766	146532	Annelida	Aurospio banyulensis		(Laubier, 1966)								1	**1**	**1**
P	772	1521915	Annelida	Pseudopolydora nordica		Radashevsky, 2021						1			**1**	**1**
P	790	596189	Annelida	Spio symphyta		Meißner, Bick & Bastrop, 2011	17	18	6	80	17	12	22	14	**8**	**186**
P	794	131187	Annelida	Spiophanes bombyx	agg.	(Claparède, 1870)				1			1		**2**	**2**
P	805	130268	Annelida	Magelona filiformis		Wilson, 1959						3	1	2	**3**	**6**
P	834	336485	Annelida	Chaetozone zetlandica	agg.	McIntosh, 1911		2	1	2	9	2			**5**	**16**
P	834	152217	Annelida	Chaetozone christiei	agg.	Chambers, 2000						2	3		**2**	**5**
P	839	129964	Annelida	Cirriformia tentaculata		(Montagu, 1808)							2		**1**	**2**
P	906	129211	Annelida	Capitella	spp. indet.	Blainville, 1828						1	1		**2**	**2**
P	919	129892	Annelida	Mediomastus fragilis		Rasmussen, 1973	1			1	2				**3**	**4**
P	944	130327	Annelida	Praxillura longissima		Arwidsson, 1906					2				**1**	**2**
P	961	129347	Annelida	Euclymene	spp. indet.	Verrill, 1900		1	1						**2**	**2**
P	964	130294	Annelida	Euclymene oerstedii	agg.	(Claparède, 1863)				1					**1**	**1**
P	1093	146950	Annelida	Galathowenia oculata		(Zachs, 1923)						17	5		**2**	**22**
P	1097	129427	Annelida	Owenia	spp. indet.	Delle Chiaje, 1844	1	1	5	1	2	10	4	1	**8**	**25**
P	1124	129808	Annelida	Melinna palmata		Grube, 1870						3			**1**	**3**
P	1195	131495	Annelida	Lanice conchilega	juv.	(Pallas, 1766)		1	2	1					**3**	**4**
P	1264	155473	Annelida	Dialychone acustica		Claparède, 1868				1					**1**	**1**
P	1340	560033	Annelida	Spirobranchus lamarcki		(Quatrefages, 1866)		1	20		7				**3**	**28**
P	1498	137582	Annelida	Tubificoides pseudogaster	agg.	(Dahl, 1960)						119	20		**2**	**139**
P	1500	137584	Annelida	Tubificoides swirencoides		Brinkhurst, 1985						1			**1**	**1**
P	1524	137349	Annelida	Grania	spp. indet.	Southern, 1913	26	4	558		2				**4**	**590**

P 1579	2041	Annelida	HIRUDINEA	spp. indet.	Savigny, 1822				1						**1**	**1**
Q 15	134599	Arthropoda	Achelia echinata		Hodge, 1864							1			**1**	**1**
R 785	1102	Arthropoda	Harpacticoida	spp. indet.	Sars G.O., 1903		2	1					4		**3**	**7**
R 2413	2104	Arthropoda	Myodocopida	spp. indet.	Sars, 1866					2					**1**	**2**
S 97	1135	Arthropoda	Amphipoda	spp. indet. juv./dam.	Latreille, 1816	12	36	54	29	93	4	10	21		**8**	**259**
S 118	101400	Arthropoda	Oedicerotidae	sp. indet.	Lilljeborg, 1865	1									**1**	**1**
S 131	102915	Arthropoda	Perioculodes longimanus		(Spence Bate & Westwood, 1868)	13		1	1	5		3	12		**6**	**35**
S 246	101789	Arthropoda	Urothoe	spp. indet.	Dana, 1852	3	3	2	3	10					**5**	**21**
S 396	102483	Arthropoda	Liljeborgia kinahani		(Spence Bate & Westwood, 1862)		2								**1**	**2**
S 409	101497	Arthropoda	Atylus	spp. indet.	Leach, 1815			8		2		3			**3**	**13**
S 422	101364	Arthropoda	Ampeliscidae	spp. indet. juv.	Krøyer, 1842	12						1			**2**	**13**
S 427	101891	Arthropoda	Ampelisca brevicornis		(A. Costa, 1853)						8				**1**	**8**
S 442	101933	Arthropoda	Ampelisca typica		(Spence Bate, 1857)	11	10	1	14	3		1	3		**7**	**43**
S 522	101679	Arthropoda	Melita	spp. indet.	Leach, 1814			4				4			**2**	**8**
S 537	101388	Arthropoda	Isaeidae	spp. indet.	Dana, 1852					29		14	2		**3**	**45**
S 552	102383	Arthropoda	Photis longicaudata		(Spence Bate & Westwood, 1862)		1	1		2		11			**4**	**15**
S 558	101389	Arthropoda	Ischyroceridae	spp. indet.	Stebbing, 1899					2		4			**2**	**6**
S 561	101567	Arthropoda	Ericthonius	spp. indet.	H. Milne Edwards, 1830		3								**1**	**3**
S 568	101571	Arthropoda	Jassa	spp. indet.	Leach, 1814		1			7		3			**3**	**11**
S 577	101368	Arthropoda	Aoridae	spp. indet.	Stebbing, 1899	3	1		4	8					**4**	**16**
S 579	102012	Arthropoda	Aora gracilis		(Spence Bate, 1857)							5			**1**	**5**
S 604	101376	Arthropoda	Corophiidae	sp. indet.	Leach, 1814				2						**1**	**2**
S 614	148592	Arthropoda	Monocorophium insidiosum		(Crawford, 1937)					7					**1**	**7**
S 641	101822	Arthropoda	Caprella acanthifera		Leach, 1814			3				8			**2**	**11**
S 651	101857	Arthropoda	Pariambus typicus		(Krøyer, 1845)	4	8	2	7	6	2	2	1		**8**	**32**
S 653	101858	Arthropoda	Parvipalpus capillaceus		(Chevreux, 1888)	1			1						**2**	**2**
S 657	101864	Arthropoda	Phtisica marina		Slabber, 1769		6	13	13	6	1	13	4		**7**	**56**
S 1202	110461	Arthropoda	Iphinoe tenella		Sars, 1878		1								**1**	**1**
S 1203	110462	Arthropoda	Iphinoe trispinosa		(Goodsir, 1843)	12	8	2	1	1			8		**6**	**32**
S 1236	110627	Arthropoda	Pseudocuma (Pseudocuma) longicorne		(Bate, 1858)		5		2	2	3	1	11		**6**	**24**
S 1254	110488	Arthropoda	Diastylis rugosa		Sars, 1865					1					**1**	**1**
S 1472	107150	Arthropoda	Galathea intermedia	juv.	Lilljeborg, 1851							1			**1**	**1**
S 1577	106925	Arthropoda	Liocarcinus	spp. indet. juv.	Stimpson, 1871					2		1			**2**	**3**
S 271	101395	Arthropoda	Lysianassidae	spp. indet.	Dana, 1849		8	11	8	14			1		**5**	**42**
W 292	140170	Mollusca	Lacuna vincta		(Montagu, 1803)							2			**1**	**2**
W 381	120	Mollusca	Hydrobiidae	spp. indet. juv.	W. Stimpson, 1865					2		2			**2**	**4**
W 1080	141138	Mollusca	Retusa truncatula		(Bruguière, 1792)	2		4	6	1		1	2		**6**	**16**
W 1118	139686	Mollusca	Elysia viridis		(Montagu, 1804)				1						**1**	**1**
W 1354	140830	Mollusca	Limacia clavigera		(O. F. Müller, 1776)							1			**1**	**1**
W 1560	105	Mollusca	BIVALVIA	sp. siphons	Linnaeus, 1758				P						**1**	**0**
W 1560	105	Mollusca	BIVALVIA	spp. indet. juv.	Linnaeus, 1758	31	27	46	35	35		4	7		**7**	**185**
W 1569	140589	Mollusca	Nucula nitidosa		Winckworth, 1930						10	6	1		**3**	**17**
W 1691	211	Mollusca	Mytilidae	spp. indet. juv.	Rafinesque, 1815	2	8	33	2	6	7	5	17		**8**	**80**
W 1721	140472	Mollusca	Musculus discors		(Linnaeus, 1767)					10					**1**	**10**
W 1776	236715	Mollusca	Talochlamys pusio	juv.	(Linnaeus, 1758)	1									**1**	**1**
W 1779	236719	Mollusca	Mimachlamys varia	juv.	(Linnaeus, 1758)							1			**1**	**1**
W 1805	214	Mollusca	Anomiidae	spp. indet. juv.	Rafinesque, 1815					1					**1**	**1**
W 1906	345281	Mollusca	Kurtiella bidentata		(Montagu, 1803)					5	1	49	2		**4**	**57**
W 1938	229	Mollusca	Cardiidae	spp. indet. juv.	Lamarck, 1809	2	1	2	1	1		1			**6**	**8**
W 1996	138333	Mollusca	Ensis	spp. indet. juv.	Schumacher, 1817	13	9	16	4	4			5		**6**	**51**
W 2012	878470	Mollusca	Macomangulus tenuis		(da Costa, 1778)	51	305	43	85	45	7	2	40		**8**	**578**
W 2019	146907	Mollusca	Fabulina fabula		(Gmelin, 1791)		1		33	21	37	55	17		**6**	**164**
W 2046	140869	Mollusca	Gari depressa	juv.	(Pennant, 1777)			6							**1**	**6**
W 2059	141433	Mollusca	Abra alba		(W. Wood, 1802)	20			1						**2**	**21**
W 2061	141435	Mollusca	Abra nitida		(O. F. Müller, 1776)	6			3		2				**3**	**11**
W 2098	141908	Mollusca	Chamelea striatula	juv.	(da Costa, 1778)				3	13					**2**	**16**
W 2100	141909	Mollusca	Clausinella fasciata	juv.	(da Costa, 1778)	2	3	9	23	7	8	1	15		**8**	**68**
W 2113	745846	Mollusca	Polititapes rhomboides		(Pennant, 1777)		20	54	1	37		31	10		**6**	**153**
W 2126	138636	Mollusca	Dosinia	spp. indet. juv.	Scopoli, 1777	1		2	3	1			1		**5**	**8**
W 2147	140431	Mollusca	Mya truncata	juv.	Linnaeus, 1758				1	2					**2**	**3**
W 2227	138549	Mollusca	Thracia	spp. indet.	Blainville, 1824		1		8	15	1	2			**5**	**27**
W 2231	152378	Mollusca	Thracia phaseolina		(Lamarck, 1818)	6	26	6	30	14		10	9		**7**	**101**
W 2239	181373	Mollusca	Cochlodesma praetenue		(Pulteney, 1799)								1		**1**	**1**
Y 170	111411	Bryozoa	Membranipora membranacea		(Linnaeus, 1767)			P		P					**2**	**0**
Y 178	111355	Bryozoa	Electra pilosa		(Linnaeus, 1767)			P				P	P		**3**	**0**
Y 307	110892	Bryozoa	Cribrilina	spp. indet.	Gray, 1848		P	P		P	P	P	P		**6**	**0**
Y 337	111397	Bryozoa	Celleporella hyalina		(Linnaeus, 1767)							P	P		**2**	**0**
ZA 3	128545	Phoronida	Phoronis	spp. indet.	Wright, 1856			1	1						**2**	**2**
ZB 165	123084	Echinodermata	Ophiuroidea	fragments	Gray, 1840			frag.	frag.	frag.	frag.	frag.			**5**	**0**

ZB 165	123084	Echinodermata	Ophiuroidea	spp. indet. juv.	Gray, 1840		1			1		1		**3**	**3**
ZB 291	123449	Echinodermata	Leptosynapta	spp. indet.	Verrill, 1867	frag.								**1**	**0**
ZD 82	103443	Chordata	Ascidiidae	sp. indet.	Herdman, 1882							2		**1**	**2**
ZM 194	143691	Rhodophyta	Corallinaceae		Lamouroux, 1812		P							**1**	**0**

Abundance (N)	343	878	4097	474	535	344	389	857	**7917**
No. taxa (S)	38	48	54	57	66	41	68	38	**140**

B DRAWINGS



Substrate Habitats within the Dredge Boundary	Habitat Area (m2)
Mud with dense Arenicola marina	7567
Rippled sand and shell material with Synarachnactis lloydii and hydroids	21191
Patchy Saccharina latissima and seaweeds on rippled sand and shell	217597

Legend

- Terrestrial Site Boundary
- Updated Dredge Boundary 003
- Dredge Buffer (100m)
- SSSI

MNCR Biotopes (Grab)

- SS.SCS.ICS.CumCset
- SS.SSa.IMuSa.FfabMag

Substrate Habitats within the Dredge Boundary

- Mud with dense Arenicola marina
- Patchy Saccharina latissima and seaweeds on rippled sand and shell
- Rippled sand and shell material with Synarachnactis lloydii and hydroids

Do not scale this map

Client
Clydeport Operations Limited

Project
Hunterston Construction Yard

Title
Marine Habitats within the Dredge Boundary Plan

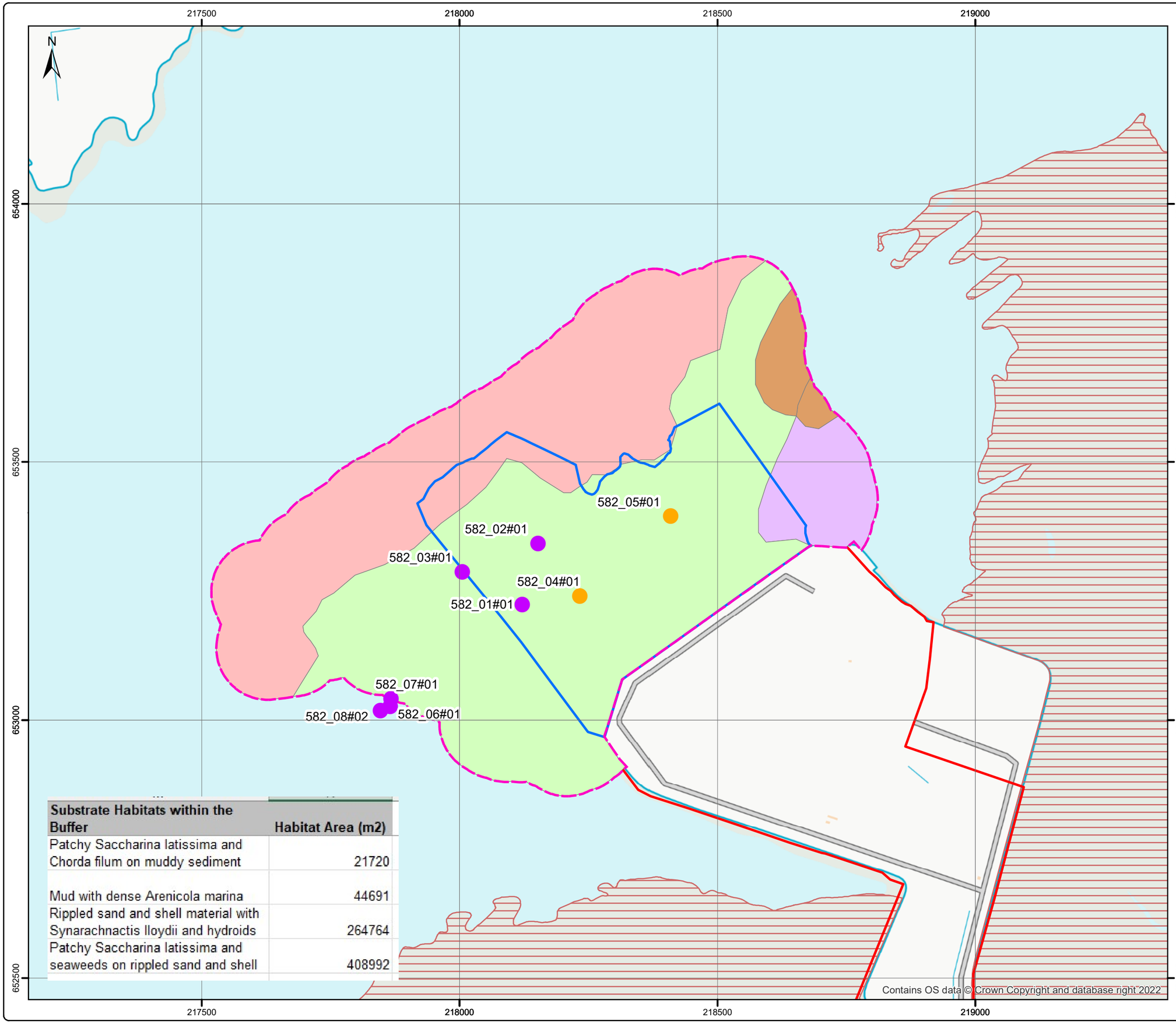
Status
FINAL

Drawing No.	Revision	Date
176482-GIS021	-	27 Nov 2024
Drawn	**Checked**	**Approved**
MMF	CCAS	GD

Scale
1:5,000 @A3
0 25 50 100 150 Metres

Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Substrate Habitats within the Buffer	Habitat Area (m2)
Patchy Saccharina latissima and Chorda filum on muddy sediment	21720
Mud with dense Arenicola marina	44691
Rippled sand and shell material with Synarachnactis lloydii and hydroids	264764
Patchy Saccharina latissima and seaweeds on rippled sand and shell	408992

Legend

- Terrestrial Site Boundary
- Updated Dredge Boundary 003
- Dredge Buffer (100m)
- SSSI

MNCR Biotopes (Grab)

- SS.SCS.ICS.CumCset
- SS.SSa.IMuSa.FfabMag

Substrate Habitats within the Dredge Buffer

- Mud with dense Arenicola marina
- Patchy Saccharina latissima and Chorda filum on muddy sediment
- Patchy Saccharina latissima and seaweeds on rippled sand and shell
- Rippled sand and shell material with Synarachnactis lloydii and hydroids

Do not scale this map

Client
Clydeport Operations Limited

Project
Hunterston Construction Yard

Title
Marine Habitats within the Dredge Buffer Plan

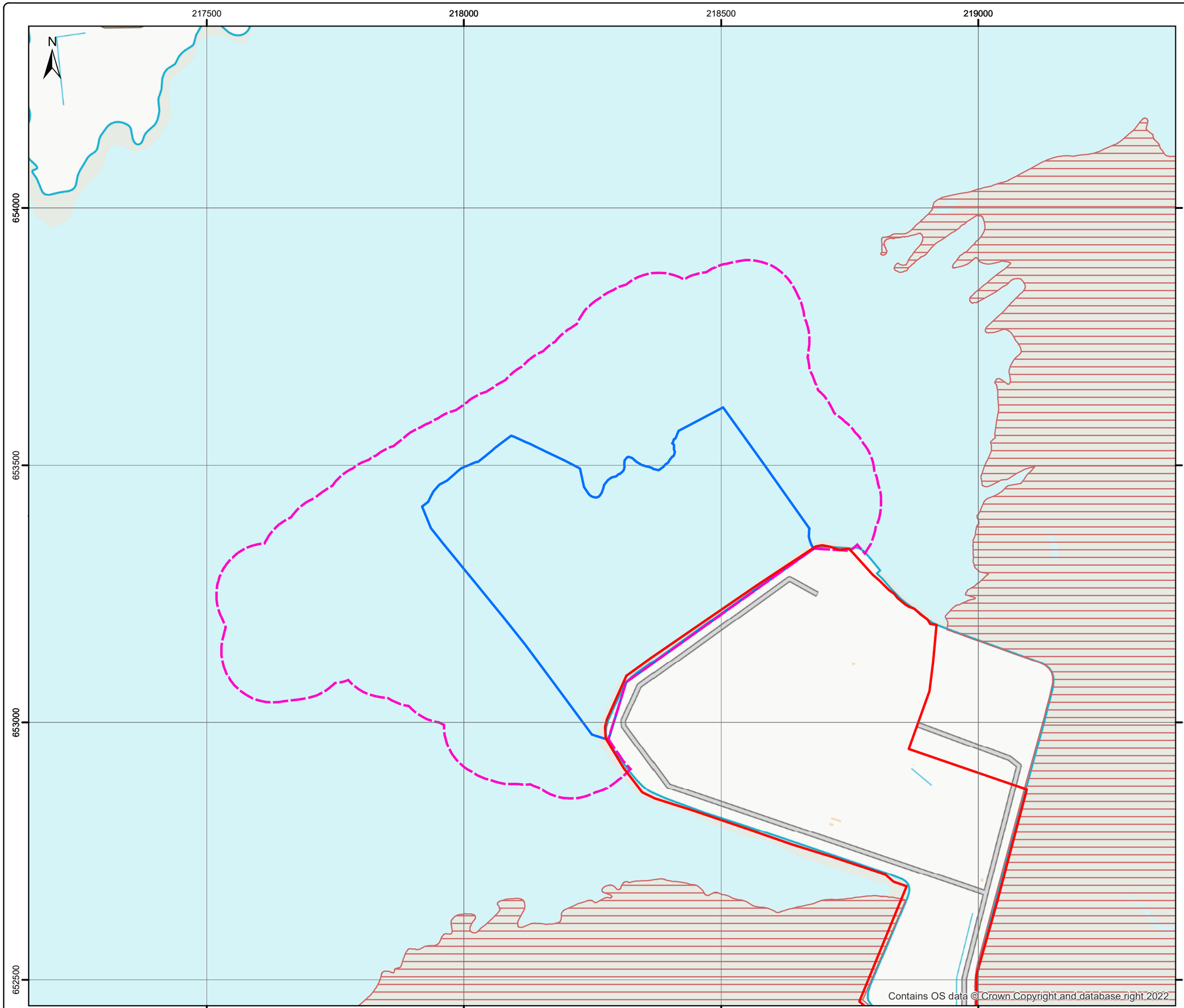
Status
FINAL

Drawing No.	Revision	Date
176482-GIS022	A	17 Oct 2024
Drawn	**Checked**	**Approved**
MMF	CCAS	GD

Scale
1:6,935 @A3
0 30 60 120 180 Metres

Rev	Date	Amendment	Initials
A	27/11/24	Add MNCR Biotopes	MMF

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk



Legend

- Terrestrial Site Boundary
- Updated Dredge Boundary 003
- Dredge Buffer (100m)
- SSSI

Do not scale this map

Client
Clydeport Operations Limited

Project
Hunterston Construction Yard

Title
Hunterston Dredge Boundary and Buffer Plan

Status
FINAL

Drawing No.	Revision	Date
176482-GIS023	A	27 Nov 2024
Drawn	**Checked**	**Approved**
MMF	CCAS	GD

Scale
1:7,000 @A3
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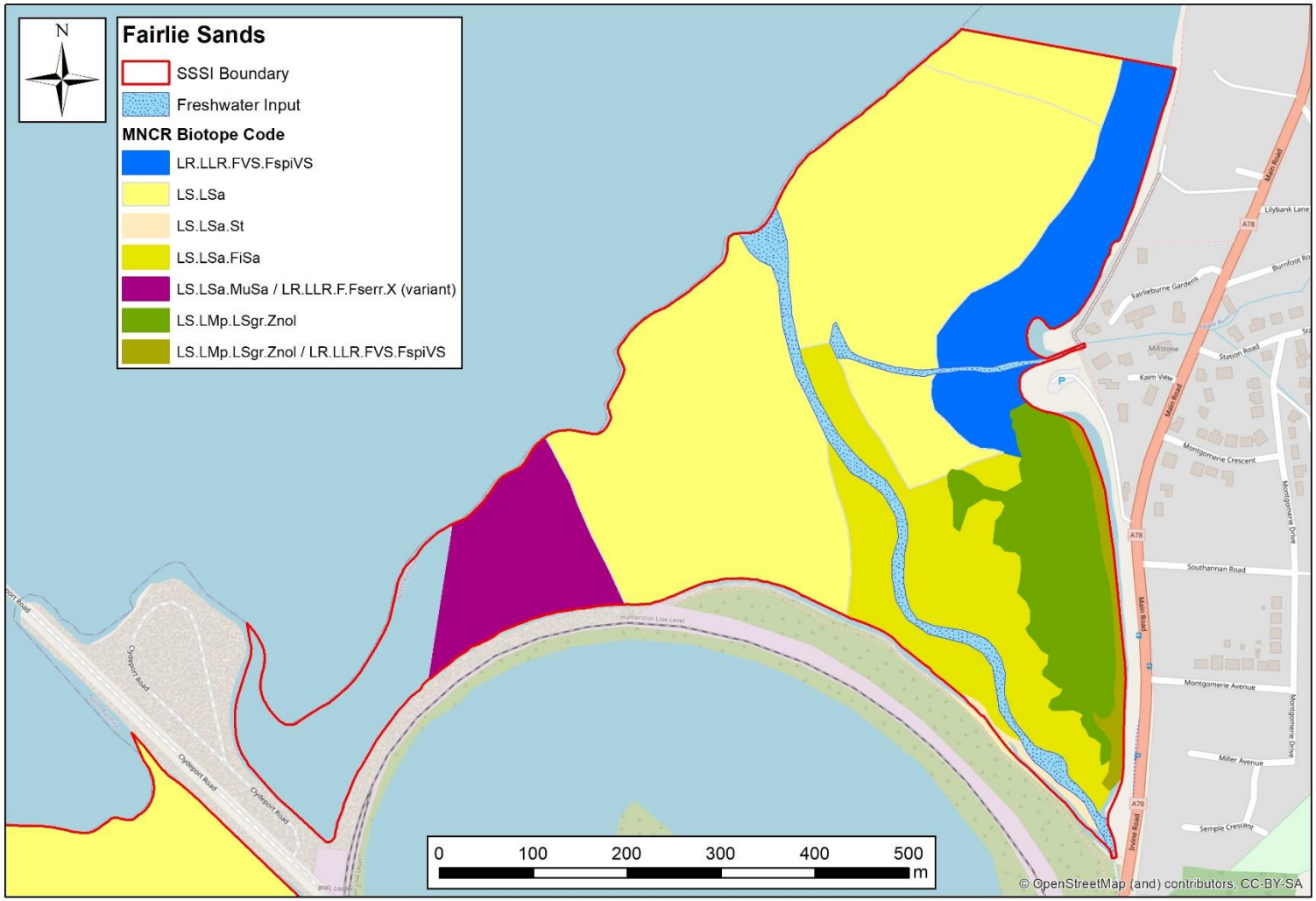
Rev	Date	Amendment	Initials
-	-	-	-

envirocentre
8 Eagle Street, Craighall Business Park, Glasgow, G4 9XA.
T: 0141 341 5040 E: info@envirocentre.co.uk
W: www.envirocentre.co.uk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Fairlie Sands
SSSI Boundary
Freshwater Input
MNCR Biotope Code
LR.LLR.FVS.FspiVS
LS.LSa
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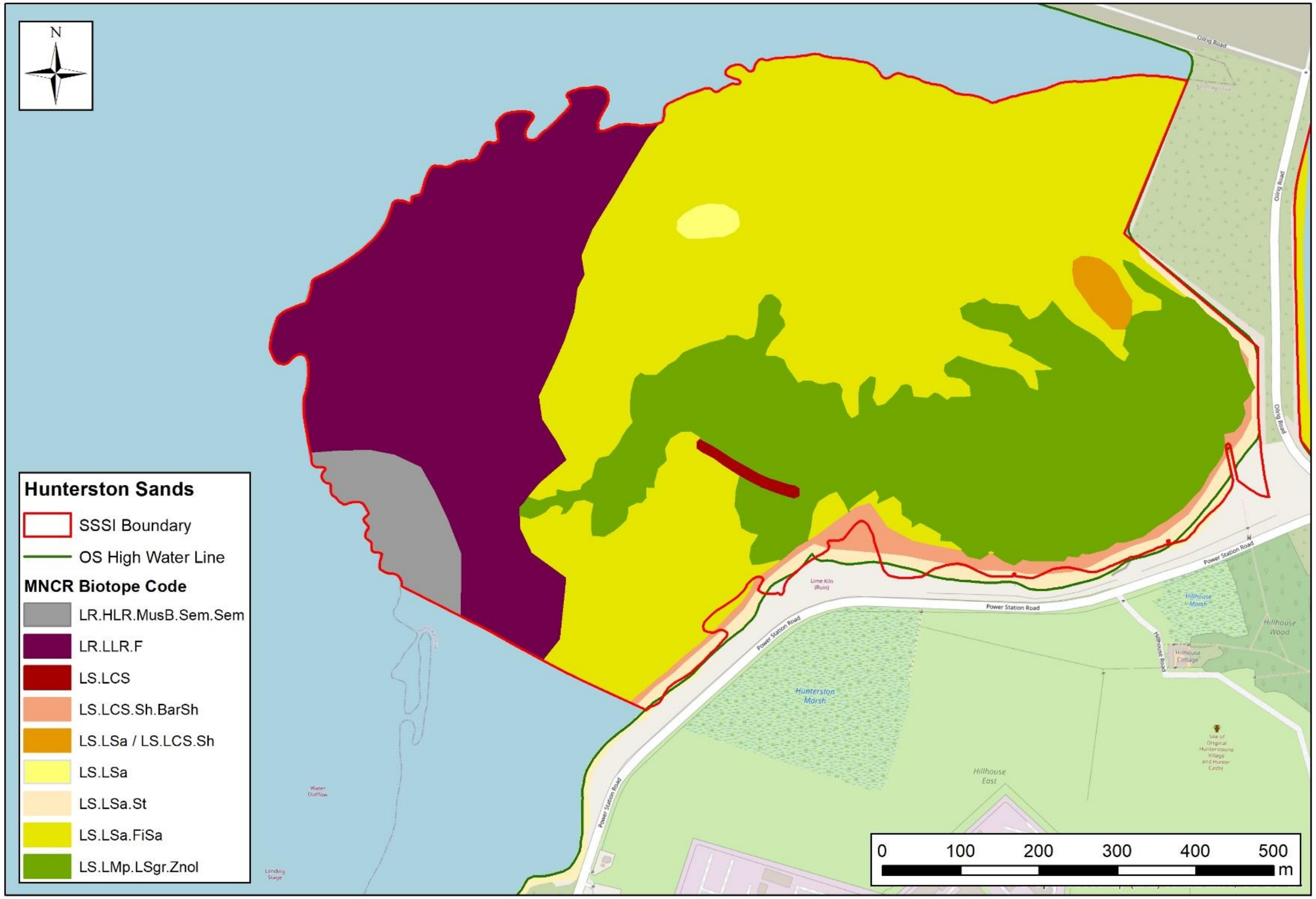
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SSSI Boundary
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LR.LLR.F
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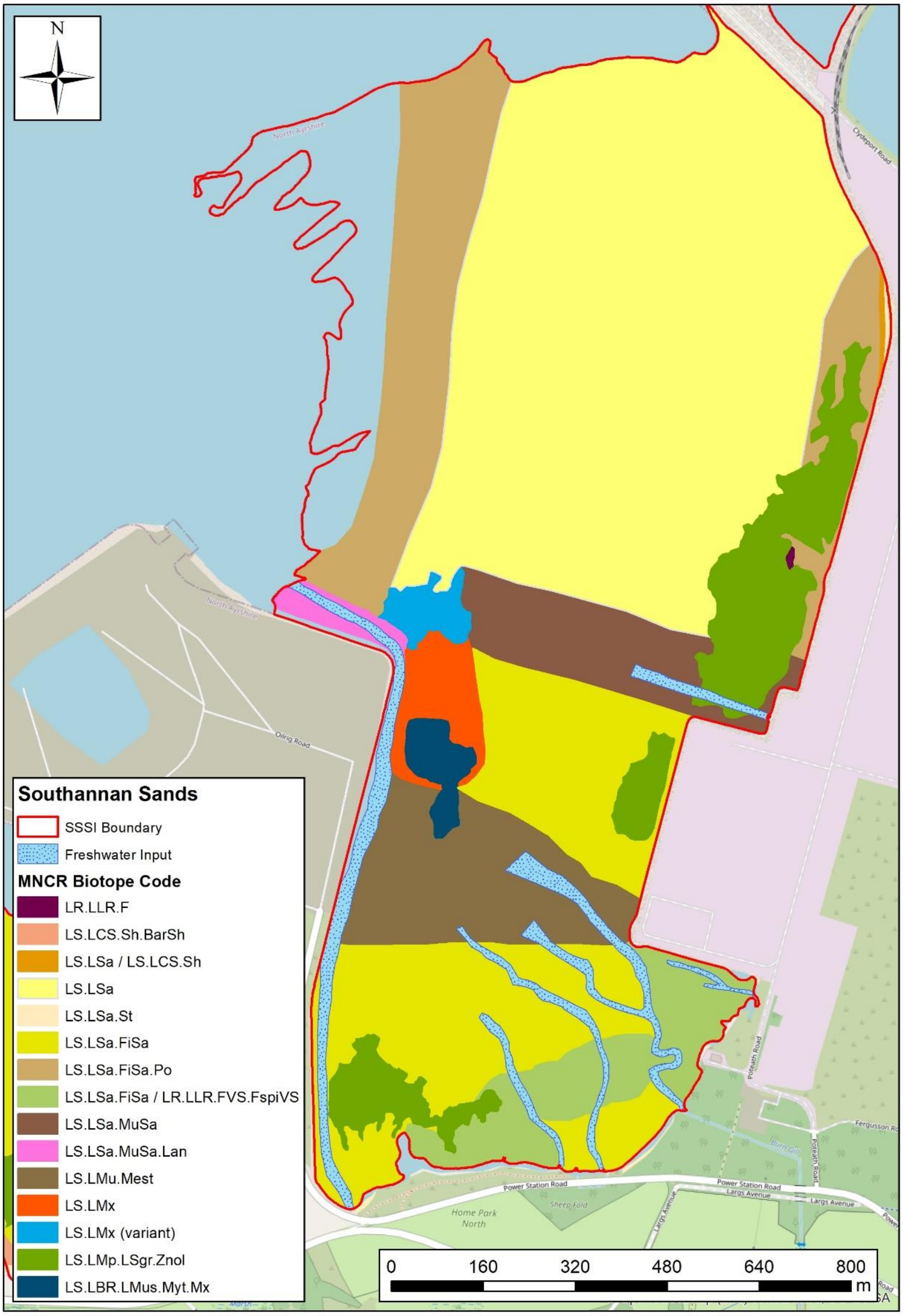
LS.LCS.Sh.BarSh
LS.LSa / LS.LCS.Sh
LS.LSa
LS.LSa.St
LS.LSa.FiSa
LS.LMp.LSgr.Znol
Oiling Road
Power Station Road
Lime Kiln (Ruin)
Hunterston Marsh
Hillhouse Marsh
Hillhouse Wood
Hillhouse Road
Hillhouse Cottage
Hillhouse East
Site of Original Hunterstoune Village and Hunter Castle
0 100 200 300 400 500 m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Southannan Sands
SSSI Boundary
Freshwater Input
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LS.LSa.St
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LS.LSa.FiSa.Po
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LS.LMp.LSgr.Znol
LS.LBR.LMus.Myt.Mx
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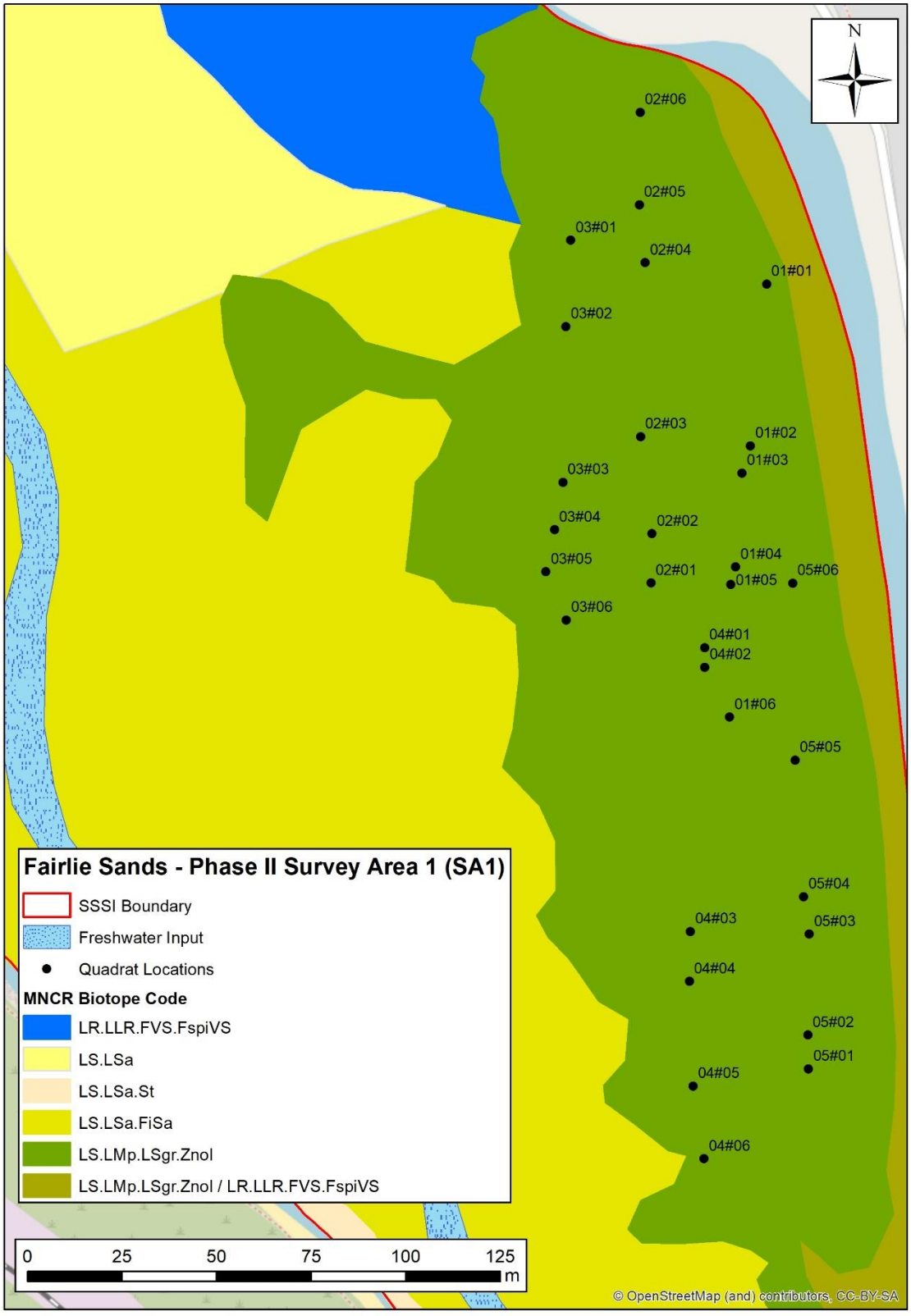
Largs Avenue
Home Park North
Poteath Road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Fairlie Sands - Phase II Survey Area 1 (SA1)
SSSI Boundary
Freshwater Input
Quadrat Locations
MNCR Biotope Code
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LS.LSa.St
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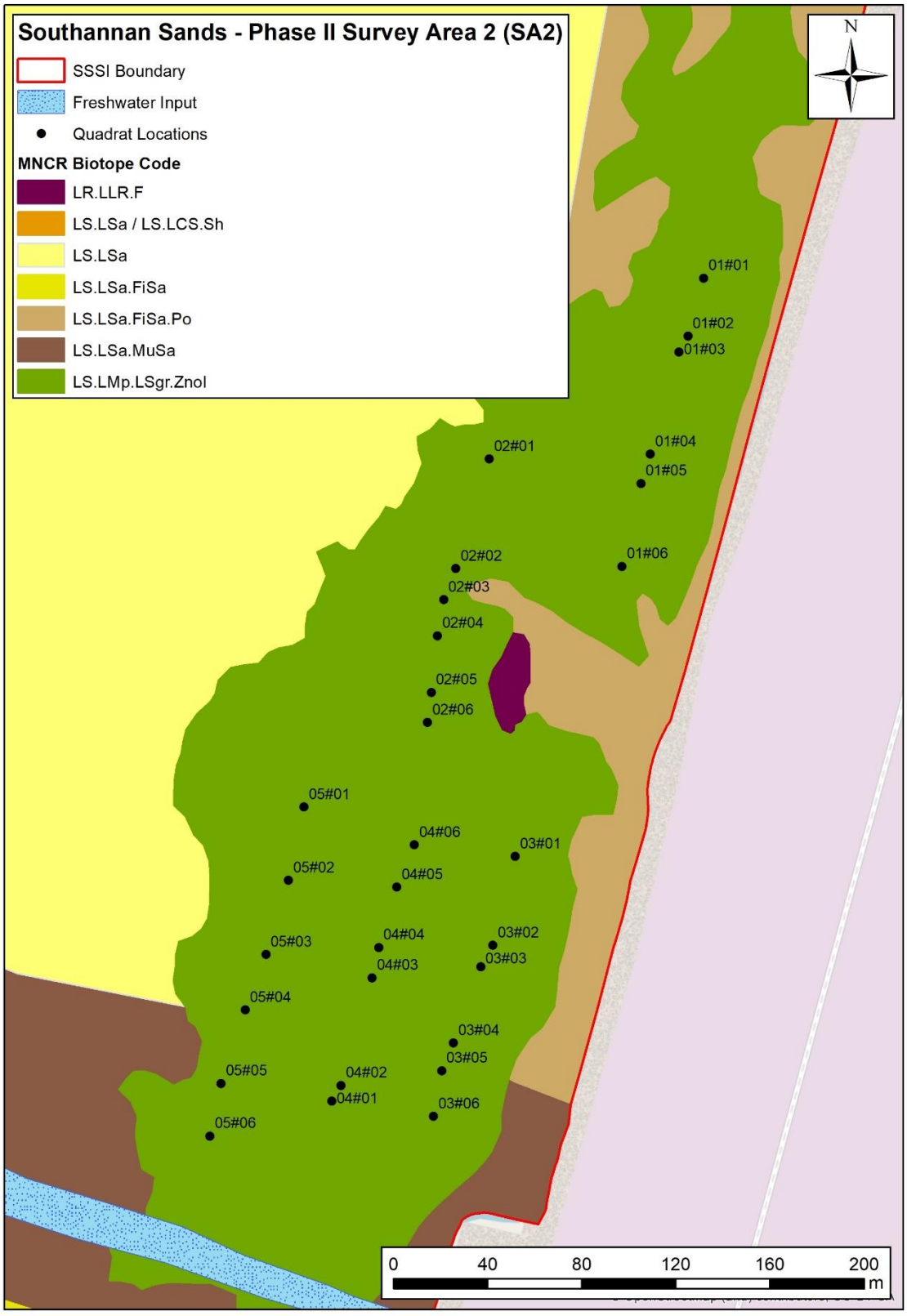
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Freshwater Input
Quadrat Locations
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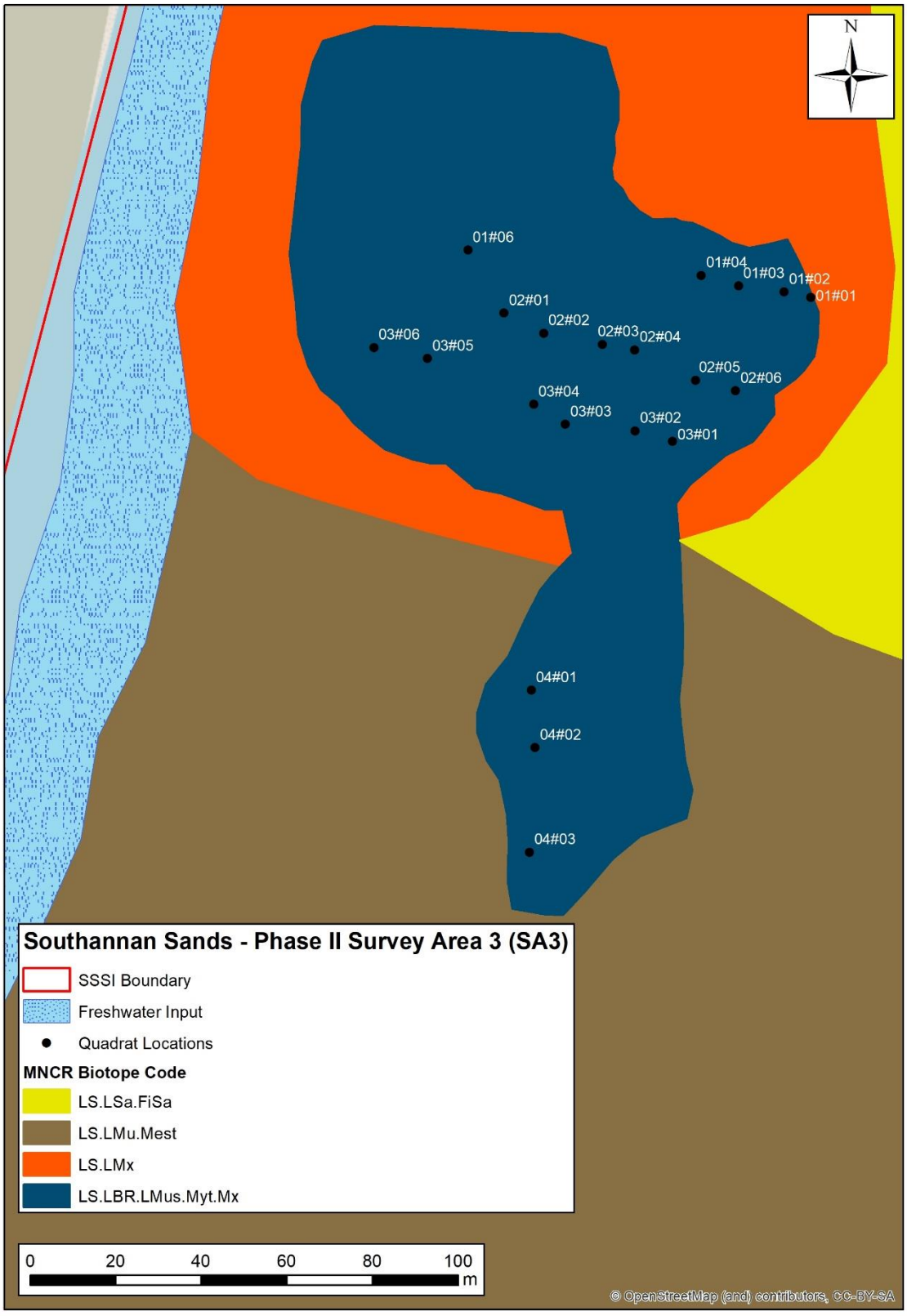
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Southannan Sands - Phase II Survey Area 3 (SA3)
SSSI Boundary
Freshwater Input
Quadrat Locations
MNCR Biotope Code
LS.LSa.FiSa
LS.LMu.Mest
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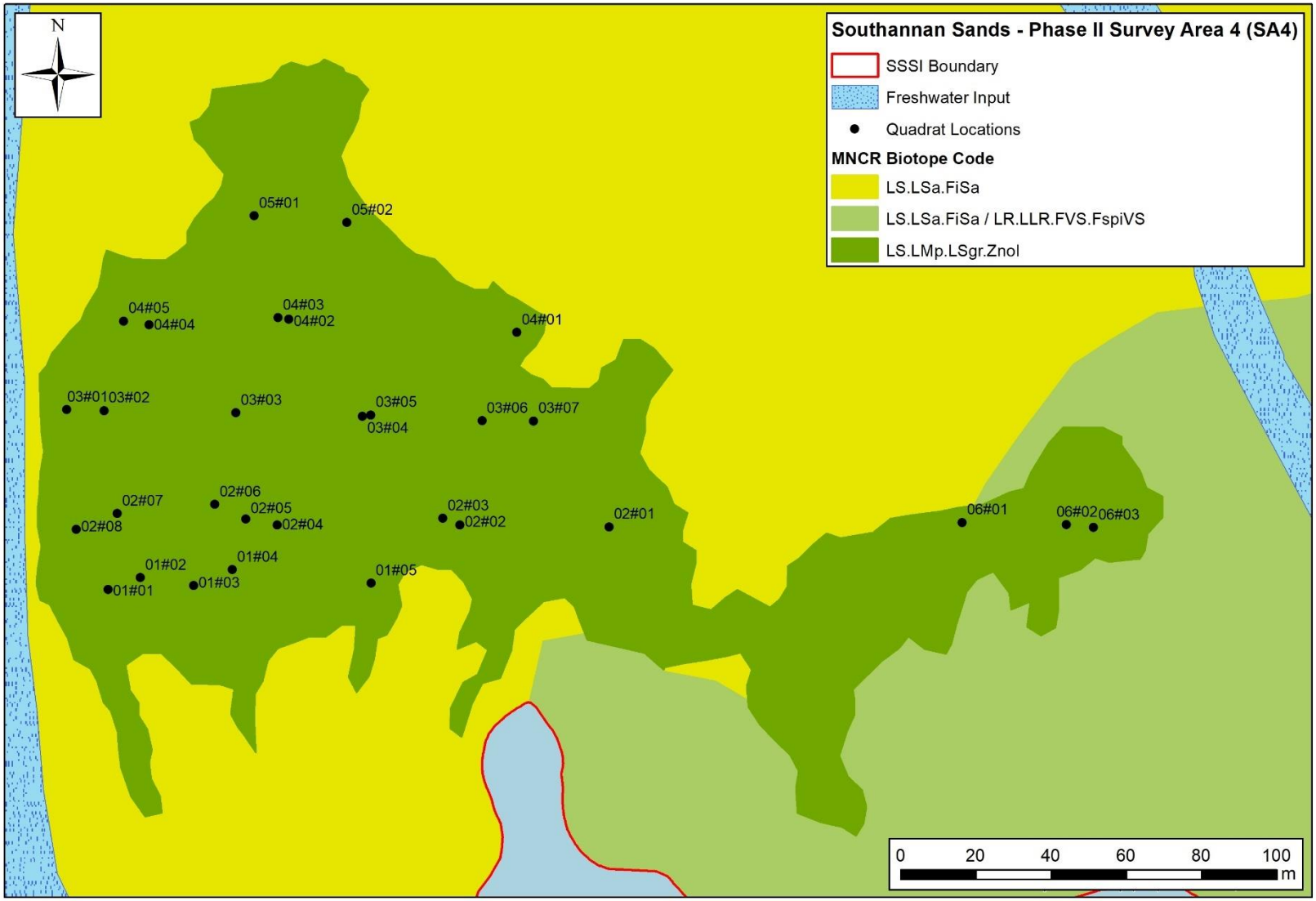
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Southannan Sands - Phase II Survey Area 4 (SA4)
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Freshwater Input
Quadrat Locations
MNCR Biotope Code
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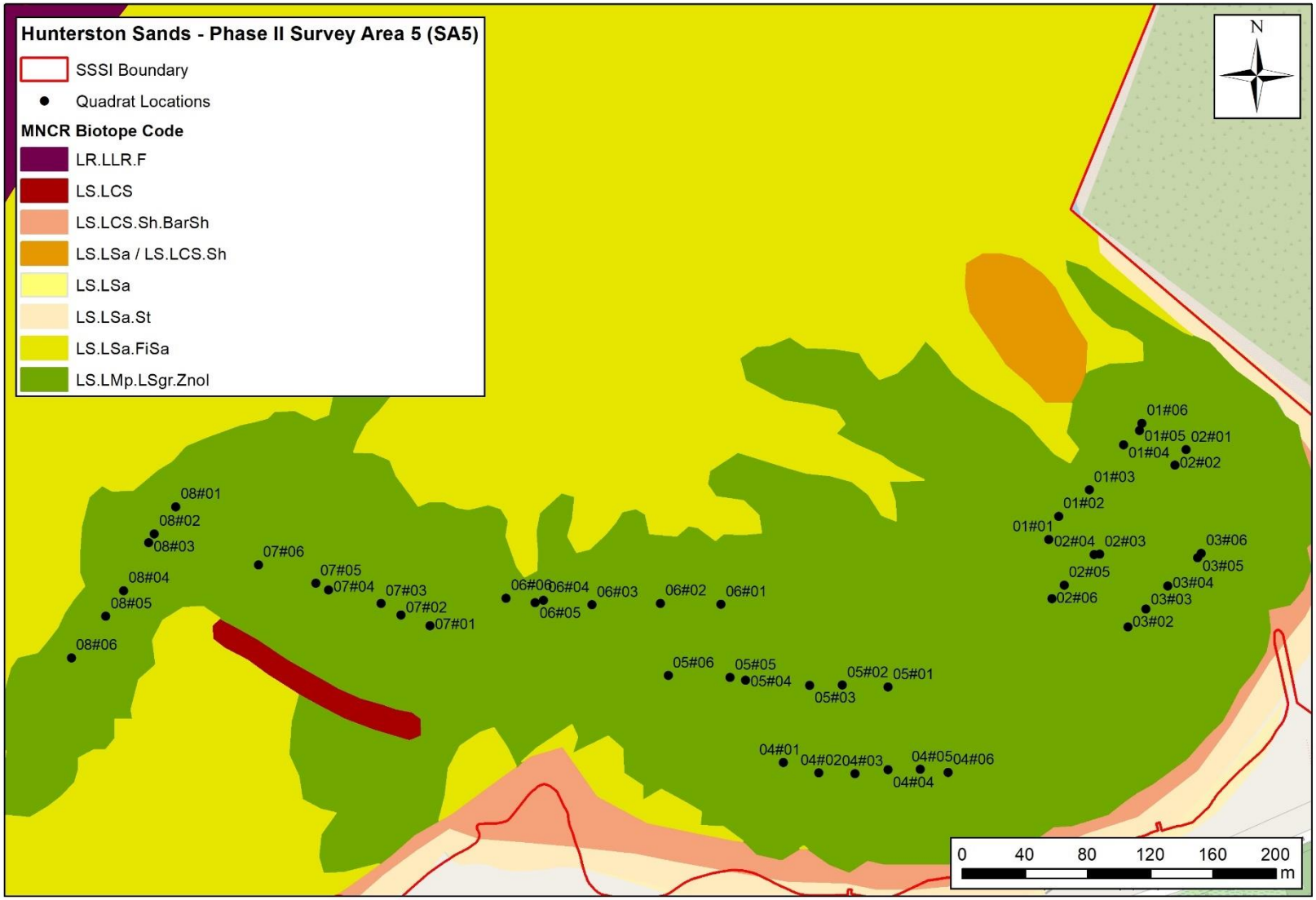
Hunterston Sands - Phase II Survey Area 5 (SA5)
SSSI Boundary
Quadrat Locations
MNCR Biotope Code
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LS.LSa.St
LS.LSa.FiSa
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C MARINE DIRECTORATE CONSULTATION RESPONSES

From:	DIO-Safeguarding-Offshore (MULTIUSER)
To:	MD Marine Licensing
Subject:	20241030_00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston - Consultation
Date:	30 October 2024 15:01:41
Attachments:	[Redacted]

FAO Louise Treble.

Good afternoon,

Thank you for your email below regarding Marine Licence Applications:

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

I can confirm that from the information provided, the MOD has no objection regarding this activity.

Kind regards,

Joanne Moore | Safeguarding Officer

Defence Infrastructure Organisation
Estates | Safeguarding
DIO Head Office | St George's House | DMS Whittington | Lichfield | Staffordshire | WS14 9PY
Email: joanne.moore243@mod.gov.uk

From: MD.MarineLicensing@gov.scot <MD.MarineLicensing@gov.scot>
Sent: Wednesday, October 2, 2024 9:23 AM
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

Marine licences have been requested under the Marine (Scotland) Act 2010 in regards to the proposed construction of a quay wall and capital dredge and sea deposit at Hunterston, North Ayrshire. An Environmental Impact Assessment ("EIA") report has also been submitted under the Marine Works (Environmental

Impact Assessment) (Scotland) Regulations 2017 along with supporting documentation. The licence applications, EIA report and supporting documentation can be accessed via the following link: Hunterston Marine Construction Yard | marine.gov.scot

You should note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. MD-LOT acknowledge that this may affect your ability to respond fully to the consultation request. A consultation request on the additional information will be forwarded to you once the information has been received. We appreciate your patience in this matter.

Please forward your comments on the proposals as submitted at this time via electronic communication to MD.MarineLicensing@gov.scot by 1 November 2024 (30 days from date of consultation email).

Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

The Scottish Government

necessarily reflect those of the Scottish Government.
****
*****

Fairlie Community Council Response to M.S. Consultation on Hunterston Marine Construction Yard
Capital dredging and Sea Disposal Marine Scotland ref:00010872 28/10/24

An application for planning consent has been submitted to North Ayrshire Council on behalf of Peel Ports for a major development at the Hunterston Marine Construction Yard. The application shows the proposed works comprise three main features (i) the construction of a new quay wall, (ii) infilling of the existing drydock with approximately 1.3 million cu metres of material, and (iii) capital dredging of the berth and approach to the new quay wall to the extent of about 1.5 cu metres of material.

An application for the dredging and disposal of the dredged material has been submitted to Marine Scotland (MS ref:00010872). In support of the application, a best practicable environmental option (BPEO) study has been undertaken to determine the preferred disposal option for the dredged material. After detailed review of all realistic options the BPEO identified the preferred option as being beneficial use as infill for the existing drydock.

That option was caveated as being dependent upon the dredged material being suitable for infill, and the programming of the quay construction, the dredging and the infilling. As a result of concern with regard to these potential dependency issues, the `preferred disposal option` was changed to `sea disposal`at a licensed marine site. This has resulted in the application to Marine Scotland for marine disposal of up to a million cubic metre tonnes.

At no point in the application is there any reference to how the drydock is to be infilled, if it is not by the material dredged nearby. Nor is there any reference in the Planning Application to North Ayrshire Council.

The local community is therefore unaware of how much, if any,of the 1.5 million cubic metres of dredged material is to be used to provide the 1.3 million cubic metres of infill, the nature of any additional material, from where that material will be sourced, and , most importantly, how it will be transported to the infill site.

Fairlie Community Council thus **objects** to the application for a Marine Disposal Licence for the reasons:

(1) the application fails to demonstrate through a geotechnical report what proportion of the dredged material is unsuitable for infill.

(2) the application fails to address the environmental and amenity impact of any alternative source and transport of suitable infill material, particularly if land source(s) and road transport take place.

(3) if the infill material, in total or in part, is to be sourced from capital dredging elsewhere, the application provides no information about such locations.

Northern Lighthouse Board

84 George Street
Edinburgh EH2 3DA

Tel: 0131 473 3100
Fax: 0131 220 2093

Website: www.nlb.org.uk
Email: enquiries@nlb.org.uk

Your Ref: MDL 00010868 & 00010872
Our Ref: AL/OPS/ML/C1_01_342

Ms Louise Treble
Licensing Operations Team – Marine Directorate
Scottish Government
Marine Laboratory
375 Victoria Road
Aberdeen
AB11 9DB

4 October 2024

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING

00010868 & 00010872 – Clydeport Operations Ltd (per EnviroCentre Limited) – Hunterston – Quay Wall Construction & Capital Dredge and Sea Disposal

Thank you for your e-mail correspondence dated 2nd October 2024 relating to the application submitted by **Clydeport Operations Ltd** for consent to undertake quay wall construction and a capital dredge campaign at Hunterston, North Ayrshire.

Northern Lighthouse Board note the content of the Navigational Risk Assessment and Aids to Navigation (AtoN) are a major mitigating factor for all phases of the construction works and operation of the new facility. NLB also note that Notice to Mariners and marine safety information will be issued as needed throughout the works.

It is also noted that it is proposed to utilise the Birch point (MA17), Brodick (MA19) and Cloch Point (MA21) spoil grounds for the disposal of dredged material.

Northern Lighthouse Board have no objections to the construction works and advise the following:

- **Clydeport Operations Ltd** liaise with Northern Lighthouse Board regarding temporary AtoN provision through the various construction phases, and permanent AtoN on completion of the works.

- The statutory sanction of the NLB should be sought prior to the establishment, alteration or discontinuation of any Aid to Navigation.

- Upon completion of the works, as-built drawings (including permanent AtoN) should be provided to the UK Hydrographic Office to enable the update of navigational publications (sdr@ukho.gov.uk).

Yours sincerely

[Redacted]

Peter Douglas
Navigation Manager

From: ONR Land Use Planning
To: MD Marine Licensing
Subject: ONR Land Use Planning - Application Marine Licence Hunterston Construction Yard - 00010868 & 00010872
Date: 30 October 2024 16:06:39
Attachments: [Redacted]

Dear Sir/Madam,
I have consulted with the emergency planners within SCOTTISH GOVERNMENT, which is responsible for the preparation of the Hunterston B off-site emergency plan required by the Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR) 2019. They have provided adequate assurance that the proposed development can be accommodated within their off-site emergency plan arrangements.
The proposed development does not present a significant external hazard to the safety of the nuclear site.

ONR does not advise against this development, however, there is potential for EDF's decommissioning project and the Hunterston Construction Yard project to temporally overlap, therefore the applicant should consider the inter-project cumulative effects of Hunterston B with both its projects.
Kind regards,

Land Use Planning
Office for Nuclear Regulation
ONR-Land.Use-planning@onr.gov.uk

----Original Message----
From: MD.MarineLicensing@gov.scot <md.marinelicensing@gov.scot >
To:
Cc:
Sent: 02/10/2024 09:23
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

Marine licences have been requested under the Marine (Scotland) Act 2010 in regards to the proposed construction of a quay wall and capital dredge and sea deposit at Hunterston, North Ayrshire. An Environmental Impact Assessment

("EIA") report has also been submitted under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 along with supporting documentation. The licence applications, EIA report and supporting documentation can be accessed via the following link: Hunterston Marine Construction Yard | marine.gov.scot

You should note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. MD-LOT acknowledge that this may affect your ability to respond fully to the consultation request. A consultation request on the additional information will be forwarded to you once the information has been received. We appreciate your patience in this matter.

Please forward your comments on the proposals as submitted at this time via electronic communication to MD.MarineLicensing@gov.scot by 1 November 2024 (30 days from date of consultation email).

Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team, Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

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****

From:	Caroline Baxter
To:	MD Marine Licensing
Subject:	RE: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston - Consultation – Response Required by 01 November 2024
Date:	09 October 2024 11:34:22
Attachments:	[Redacted]

Good morning

This is a Clydeport project so we have no objections.

Kind Regards,

Caroline

Caroline Baxter
Marine Compliance Officer

Peel Ports - Clydeport

0147 588 6318
[Redacted]
Caroline.Baxter@peelports.com

Peel Ports Group Ltd
Greenock Ocean Terminal
Patrick Street
Greenock
PA16 8UU

From: MD.MarineLicensing@gov.scot <MD.MarineLicensing@gov.scot>
Sent: Wednesday, October 2, 2024 9:23 AM
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston

– Capital Dredge and Sea Deposit

Marine licences have been requested under the Marine (Scotland) Act 2010 in regards to the proposed construction of a quay wall and capital dredge and sea deposit at Hunterston, North Ayrshire. An Environmental Impact Assessment ("EIA") report has also been submitted under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 along with supporting documentation. The licence applications, EIA report and supporting documentation can be accessed via the following link: Hunterston Marine Construction Yard | marine.gov.scot

You should note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. MD-LOT acknowledge that this may affect your ability to respond fully to the consultation request. A consultation request on the additional information will be forwarded to you once the information has been received. We appreciate your patience in this matter.

Please forward your comments on the proposals as submitted at this time via electronic communication to MD.MarineLicensing@gov.scot by 1 November 2024 (30 days from date of consultation email).

Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

The Scottish Government

From: Pauline McGrow
To: MD Marine Licensing
Subject: RE: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024
Date: 07 October 2024 10:31:03
Attachments: [Redacted]

Hi Louise,

I write to inform you that RYA Scotland has no objections to this application.

Kind Regards

Pauline

Pauline McGrow
Senior Administrator
Mob: [Redacted]

Royal Yachting Association Scotland
T: 0131 317 7388
E: pauline.mcgrow@ryascotland.org.uk

-

From: MD.MarineLicensing@gov.scot <MD.MarineLicensing@gov.scot>
Sent: Wednesday, October 2, 2024 9:23 AM
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

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Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

The Scottish Government

From:	Mohammad Fahim Hashimi
To:	MD Marine Licensing
Cc:	Elspeth Macdonald
Subject:	RE: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024
Date:	07 October 2024 17:03:22
Attachments:	[Redacted]

Dear Louise,

Thank you for sharing this consultation opportunity for SFF's comment.

Please file a 'nil return' response from SFF on this particular consultation.

Best wishes

Fahim Mohammad Hashimi
Offshore Energy Policy Manager

Scottish Fishermen's Federation (SFF)
24 Rubislaw Terrace | Aberdeen | AB10 1XE
T: +44 (0) 1224 646944 | M: [Redacted]
E: f.hashimi@sff.co.uk | sff.co.uk
Follow us: Facebook | Twitter

From: MD.MarineLicensing@gov.scot <MD.MarineLicensing@gov.scot>
Sent: 02 October 2024 09:23
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

Marine licences have been requested under the Marine (Scotland) Act 2010 in regards to the proposed construction of a quay wall and capital dredge and sea deposit at Hunterston, North Ayrshire. An Environmental Impact Assessment ("EIA") report has also been submitted under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 along with supporting documentation. The licence applications, EIA report and supporting documentation can be accessed via the following link: Hunterston Marine Construction Yard | marine.gov.scot

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been received. We appreciate your patience in this matter.

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Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team, Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

The Scottish Government

Development Management and Strategic Road Safety
Roads Directorate

George House 36 North Hanover St Glasgow G1 2AD
Direct Line: 0141 272 7593
lain.clement@transport.gov.scot

TRANSPORT SCOTLAND
CÒMHDHAIL ALBA

Louise Treble
Marine Directorate
Scottish Government,
5 Atlantic Quay,
150 Broomielaw,
Glasgow,
G2 8LU

MD.MarineLicensing@gov.scot

Your ref:
00010868 &
00010872

Our ref:
GB01T19K05

Date:
30/10/2024

Dear Sirs,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING

THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - CLYDEPORT OPERATIONS LIMITED (PER ENVIROCENTRE LIMITED) – HUNTERSTON – QUAY WALL CONSTRUCTION

00010872 - CLYDEPORT OPERATIONS LIMITED (PER ENVIROCENTRE LIMITED) - HUNTERSTON – CAPITAL DREDGE AND SEA DEPOSIT

With reference to your recent correspondence on the above development, we acknowledge receipt of the Environmental Impact Assessment Report (EIAR) prepared by EnviroCentre Limited in support of the above development. We understand that the EIAR supports both applications for the marine construction and the dredging licence.

This information has been passed to SYSTRA Limited for review in their capacity as Term Consultants to Transport Scotland – Roads Directorate. Based on the review undertaken, Transport Scotland would provide the following comments.

Proposed Development

The proposed development comprises the construction of a new quay and associated quayside infrastructure, located at Hunterston Construction Yard (HCY) in North Ayrshire. The HCY is accessible from the A78(T) via Hunterston Roundabout and Power Station Road leading onto Oilrig Road.

Transport Scotland was consulted on the Scoping Report (SR) for these applications and we issued comments in our response dated 8th December 2023.

Assessment of Environmental Impacts

Chapter 8 of the EIAR presents the assessment of generated traffic associated with the development. This states that the assessment has been carried out in accordance with the Institute of Environmental Management and Assessment (IEMA) Guidelines, entitled Environmental Assessment of Traffic and Movement (July 2023).

These specify that road links should be taken forward for further assessment where the following two rules are breached:

Rule 1: Include road links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)

Rule 2: Include road links of high sensitivity where traffic flows have increased by 10% or more.

Chapter 8 states that Automatic Traffic Count (ATC) surveys were undertaken on the A78(T) and Oilrig Road between the 23rd and 29th January 2024, to determine baseline traffic flows. The resulting flows are presented in Table 8.2 of the EIAR.

With regard to generated traffic, we note that it is estimated that there will be approximately 75 staff working on site during the construction stage. It is presumed that 60 vehicle parking spaces will be provided on site and that a maximum of 120 additional two-way trips (60 in / 60 out) associated with staff arrivals and departures will be generated per day. It is then assumed that 50% of construction vehicles will arrive/depart using the A78 (N) and 50% will arrive/depart using the A78 (S). The AM and PM peak hour and AADT traffic flows for the baseline and assessment scenarios are presented in Table 8.5 of the EIAR, with the resultant percentage uplift in traffic flows. This demonstrates that the impact of the total development flows on the A78(T) will be 1%, which is clearly well below the threshold for further assessment.

The impact of HGV movements is provided in Table 8.6. This demonstrates that an increase in HGV movements of 105 on the A78(N) will result in an 11% increase, and an increase in HGVs of 33 on the A78(S) will result in a 7% increase. Transport Scotland is, therefore, satisfied that the proposed development will not have a significant impact on the A78(T), and no further assessment is required in relation to potential environmental effects associated with this traffic.

Abnormal Loads Assessment

The EIAR states that it is not anticipated that there will be any hazardous load / large load vehicle movements associated with the development. Consequently, Transport Scotland is satisfied that no Abnormal Load Assessment is required.

Conclusions

Based on the review undertaken, Transport Scotland is satisfied with the submitted EIAR and has no objection to the development in terms of environmental impacts on the trunk road network.

I trust that the above is satisfactory but should you wish to discuss in greater detail, please do not hesitate to contact me or alternatively, Alan DeVenny at SYSTRA's Glasgow Office can assist on 0141 343 9636.

Yours faithfully

[Redacted]

Iain Clement

Transport Scotland
Roads Directorate

cc Alan DeVenny – SYSTRA Ltd.

From:	navigation safety
To:	MD Marine Licensing
Subject:	RE: 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response
Date:	17 October 2024 14:42:22
Attachments:	[Redacted]

Dear Louise,

Thank you for the opportunity to comment on the Marine Licence application for Clydeport Operations Limited (per EnviroCentre Limited) at Hunterston, being Capital dredging and sea disposal**.** The UK Technical Services Navigation team of the Maritime and Coastguard Agency has reviewed the documents received and would like to comment as follows:

We note that all works fall within the jurisdiction of a Statutory Harbour Authority (SHA), being Clydeport Operations Limited (Peel Ports) and therefore they are responsible for the safety of navigation within their waters. We also note that the SHA has undertaken MCA recommendations at scoping stage and there is a NRA specific to these works, a Hazid workshop has taken place with local stakeholders to address concerns and ensure risk mitigations are as low as reasonably practicable (ALARP), and a safety management system is in place.

The MCA confirms we have no objections to a licence being granted on this occasion. This is on the understanding that all maritime safety legislation is adhered to, and that the following risk mitigation measures take place:

Conditions:

None

In addition, the following advice should be provided to the applicant to facilitate the proposed works:

Advisories:

1. The site is within port limits and the Harbour Authority may wish to issue local warnings to alert those navigating in the vicinity to the presence of the works, as deemed necessary. Any change data including engineering drawings, hydrographic surveys, details of new or changed aids to navigation must then be passed onto The Source Data Receipt team, UK Hydrographic Office, (email: sdr@ukho.gov.uk) as per guidance in 'Harbour Master's Guide to Hydrographic and Maritime Information Exchange' published on the UK Hydrographic Office (ADMIRALTY) website.
2. Bunding and/or storage facilities must be installed to contain and prevent the release of fuel, oils, and chemicals associated with plant, refuelling and construction equipment, into the marine environment.

The MCA has considered the relevant Marine Plan as part of its assessment of this

application.

If you have any questions on this response, please let us know.
Kind regards

Jo Cooke
Marine Licensing and Consenting Advisor
UK Technical Maritime Services Navigation NavigationSafety@mcga.gov.uk

Mobile: [Redacted]

Maritime & Coastguard Agency
Spring Place, 105 Commercial Road,
Southampton, SO15 1EG

Safer Lives, Safer Ships, Cleaner Seas
www.gov.uk/mca

From: MD.MarineLicensing@gov.scot <MD.MarineLicensing@gov.scot>
Sent: 02 October 2024 09:23
Subject: 00010868 & 00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston -Consultation – Response Required by 01 November 2024

Dear Sir/Madam,

MARINE (SCOTLAND) ACT 2010, PART 4 MARINE LICENSING
THE MARINE WORKS (ENVIRONMENTAL IMPACT ASSESSMENT) (SCOTLAND) REGULATIONS 2017

00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

Marine licences have been requested under the Marine (Scotland) Act 2010 in regards to the proposed construction of a quay wall and capital dredge and sea deposit at Hunterston, North Ayrshire. An Environmental Impact Assessment ("EIA") report has also been submitted under the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 along with supporting documentation. The licence applications, EIA report and supporting documentation can be accessed via the following link: Hunterston Marine Construction Yard | marine.gov.scot

You should note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. MD-LOT acknowledge that this may affect your ability to respond fully to the consultation request. A consultation request on the additional information will be forwarded to you once the information has been received. We appreciate your patience in this matter.

Please forward your comments on the proposals as submitted at this time via electronic communication to MD.MarineLicensing@gov.scot by 1 November 2024 (30 days from date of consultation email).

Kind Regards,

Louise

Louise Treble (pronouns she/her)
Marine Licensing Casework Officer, Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150 Broomielaw, Glasgow, G2 8LU

E: MD.MarineLicensing@gov.scot

The Scottish Government

NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba
By email to **MD.MarineLicensing@gov.scot**

Louise Treble
Marine Licensing Casework Officer,
Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150
Broomielaw, Glasgow, G2 8LU

07 November 2024

Our ref: CLC177438 -ML 00010868

Dear Ms Treble

Marine (Scotland) Act 2010, Part 4 Marine Licensing
The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017
00010868 - Clydeport Operations Limited (per EnviroCentre Limited) – Hunterston – Quay Wall Construction

Thank you for your consultation of 2 October 2024 on the above development and for allowing us additional time to submit our response. The application is supported by the Environmental Impact Assessment Report (EIAR) and supporting technical appendices for the proposal (Envirocentre for Clydeport Operations Limited - May 2024) which have guided our assessment.

1. Summary

1.1 There are natural heritage interests of national importance at Southannan Sands Site of Special Scientific Interest (SSSI) close to the proposed development site. However, we advise that with the implementation of the mitigation measures detailed in the application, and in section 3.7 below, these will not be affected by the proposal.

1.2 We also provide advice on measures that would help ensure impacts on other natural heritage interests, including cetaceans are minimised (Sections 3.11-3.12). It is for the Marine Directorate to determine, within the context of its own policies, whether conditions are necessary to secure the mitigation and enhancement measures set out below.

2.Background

2.1 We understand that planning permission is sought for the construction of new 450m quay wall, infilling of dry dock basin to upgrade the existing marine construction yard and ancillary works.

2.2 Works within the planning jurisdiction of North Ayrshire Council extend to the MLWS. Beyond MLWS, works are regulated by the Marine Directorate, whose jurisdiction extends landward to the MHWS. This means that works in the intertidal area (between MHWS and MLWS) are covered by both terrestrial and marine regulators.

2.3 The proposed project incorporates the following Construction Elements related to this Marine licence application.

Removal of the existing rock armour on the western boundary;
Removal of the existing bund on the western boundary;
Installation of sub-surface revetments for the new quay wall;
Construction of up to 5 mooring dolphins with walkways
Installation, maintenance and removal of temporary grounding pad

2.4 The current application for consent is for enabling works. Subsequent application(s) are required for any future operational works. As such the EIAR includes only limited consideration of operational impacts. The EIAR provided in support of the marine Licence applications covers both regulatory jurisdictions

2.5 We note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. A further consultation request on the additional information will be forthcoming once the information has been received. These reports will help better understand the baseline condition of the sub benthic and intertidal areas within and adjacent to the proposal area.

2.6 We provided a response to the Marine Directorate EIA scoping consultation on 21 December 2023.

3.Appraisal of the impacts and advice

Southannan Sands Site of Special Scientific Interest (SSSI)

3.1 The Southannan Sands SSSI extends for over 4km along the coast. It is adjacent to the proposed development and is designated for its nationally important Intertidal marine habitats, saline lagoons and sandflats. The SSSI comprises a coastal section, subdivided into three discrete areas, which together support one of the best examples of intertidal sandflats habitat within the entire Clyde coastline. See NatureScot's SiteLink for more detail[1]. Component habitats of the Sandflats notified feature include the Priority Marine Features (PMF) intertidal seagrass beds and blue mussel beds.

3.2 Priority Marine Features do not have legislative protection, but the basis for protection of their national status across Scottish waters is included in the National Marine Plan. The proposal may impact Priority Marine Features (PMFs). Marine Directorate should consider the effect of the proposal on the PMF(s) before it can be consented.

3.3 We note that a subtidal survey, covering the area addressed by this marine licence will be submitted in due course.

[1] **https://sitelink.nature.scot/site/10261**

3.4 Currently, our existing information shows that this proposal is unlikely to have a significant impact on the national status of a PMF(s) given the limited footprint of the works and the highly modified nature of the habitat present. The subtidal assessment should provide sufficient detail to determine the distribution and extent of habitats present within the survey area creating broadscale habitat maps and permitting the quantification of areas/habitat types/PMFs which may be impacted by the proposal. The report should also detail mitigation and enhancement measures as appropriate. We will comment further once the additional information is available.

3.5 We will advise on any biosecurity measures required when we have the full survey information.

Advice on the coastal modelling study and coastal geomorphology

3.6 Based on the assessment in Chapter 9 of the EIA, and our own further assessment, significant adverse impacts on the Southannan Sands SSSI in relation to coastal process, including sediment transport, are not considered likely.

Mitigation proposals

3.7 We welcome the mitigation proposed in sections 9.8 of the EIAR designed to minimise any potential negative indirect impacts on the SSSI and its notified features from water and airborne pollution. We advise that this mitigation should be revisited following the results of the Phase 2 survey and then approved by the Regulatory Authority in consultation with SEPA and NatureScot and fully implemented as part of any consent granted for the application. This is particularly relevant as the EIAR states (section 9.7.2.2) that:

(i) Impact of a spillage or concrete runoff would be particular detrimental if a spillage was to enter into the SSSI Southannan Sands which borders the site to the south, east and north. The effect of the potential pollution incidences during construction on water quality would be dependent on the scale and nature of the incident, therefore the magnitude of impact may range from low to high prior to mitigation which would give rise to a potential effect of minor to major significance.

Project elements that may result in concrete spillage include dolphin construction and Installation of sub-surface revetments for the new quay wall.

Protected species

<u>Cetaceans & Priority Marine Features (PMFs)</u>

3.8 We advise that the following European Protected Species (EPS) and PMF species are all found within the Firth of Clyde: *harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal, grey seal and basking shark.* Cetaceans are European protected species. Noise and direct disturbance during construction and operation can cause disturbance and auditory injury impacts to these marine species.

3.9 In summary, based on our experience with previous coastal infrastructure developments, we believe that the proposed activities could go ahead, with appropriate mitigation measures being fully implemented, without causing injury or significant disturbance to

marine mammals. Some residual disturbance may still occur, which is likely to need an EPS licence which will require consultation with the Marine Directorate.

3.10 We disagree with the conclusion that marine mammals (both seals and cetaceans) have low sensitivity to underwater noise (EIAR Impact Assessments in section 5.6.6). However, even if the sensitivity score is increased to High (for Permanent Threshold Shifts) and Medium (for disturbance), we agree that, with mitigation in place, the magnitude is negligible or low, so the overall conclusion of minor significance remains the same. For other impacts (vessel disturbance, collision, dredging noise, pollution), we agree with the conclusions of the impact assessments.

3.11 The key activity of concern is the installation of the five dolphin structures, using impact driven piles. This activity has the potential to cause auditory injury and disturbance to marine mammal species. Underwater noise modelling has been carried out and an assessment made of the risks to marine mammals. The assessment does not give sufficient assurance that the risks will be mitigated as proposed. We do not agree that an extended soft start/ramp up procedure will provide appropriate mitigation, as injury can still occur even at reduced piling levels, and by extending the duration of the soft start additional noise is entering the environment. Therefore, **we advise that, if the development is consented, the applicant should provide a piling noise management plan, to be submitted and approved prior to any works commencing**. The piling noise management plan should include, for example:

- Details of the number of piles to be driven, the duration of piling, impact hammer energy.
- Details of timing of piling (e.g. seasonal, diurnal, tidal cycle).
- A quantitative assessment of the number of animals likely to experience auditory injury (PTS) and disturbance, for both an individual piling event and the full piling schedule (for those species where density estimates exist).
- An assessment of the magnitude of these impacts relative to the population of each species, in order to determine the effect on favourable conservation status (for those species where population estimates exist).
- A detailed, comprehensive mitigation plan, based on the JNCC guidance[2] (2010).
- Consideration of noise abatement systems to further reduce underwater noise levels, if needed.

3.12 To assist with this, we would be happy to meet with the applicant (post-consent) to discuss their noise modelling approach and to advise further on what is required in the piling noise management plan. Given that piling is also proposed in the construction of the quay we advise that this piling management plan includes piling proposed for both marine and terrestrial environments.

Other protected species

3.13 We note that a Preliminary Ecological Appraisal (PEA) (Technical appendix 5.1) has been submitted in support of this application. No evidence of protected species was identified

[2] **https://data.jncc.gov.uk/data/31662b6a-19ed-4918-9fab-8fbcff752046/JNCC-CNCB-Piling-protocol-August2010-Web.pdf**

during the one-day visit in September 2023 survey. However, otter records were returned from the desk study and suitable habitat were noted for otter on site and within the adjacent environment.

3.14 We advise that a Species Protection Plans should be prepared for otter. Species protection plans should be produced whether a specific species licence is required or not and included with the Construction Environmental Management Plan (CEMP) to be submitted for the approval of the regulatory authority. Species protection plans should incorporate the full range of protection measures identified in the EIAR and updated as required by the pre-construction surveys.

3.15 Preconstruction surveys should be carried out to include the site and sufficient buffer of the Gill Burn and other key ecological habitats to ensure that the proposed development will not affect protected species. We note that pre-construction surveys are proposed in EIAR Table 4.1. We welcome this approach but advise that our current guidance[3] is followed. The timing of pre-construction surveys depends on whether it is possible to survey a species at any time of year (e.g. otter) For species that can be surveyed at any time of year, pre-construction surveys should be undertaken as close to the construction period as possible, and no more than 3 months before the start of works.

Wider Countryside Birds - breeding

3.16 Whilst limited, there are suitable habitats for small scale breeding opportunities within and adjacent to the proposal footprint, in the absence of current breeding bird survey data, we recommend that the following ornithology mitigation should be implemented:

- Any vegetation clearance or clearance of manmade materials should be scheduled for outside the nesting bird season (March to August). If this is not possible, a suitably experienced ecologist should check the development site before work commences to determine the presence of any nesting birds.
- Additionally, we advise that if nesting birds are found, a suitably sized buffer zone should be set up around the nest and no work within this zone should commence until the young have fledged or the nest is no longer in use. This will ensure that no nests are destroyed during the site construction works and no offences are committed under the Wildlife and Countryside Act 1981 (as amended).

3.17 We also recommend that should consent be granted the applicant should follow our guidance on *Dealing with construction and breeding birds, March 2016*[4].

Wider Countryside Birds - wintering and roosting

3.18 The 2023/24 Wintering Bird Survey (Technical appendix 5.7) data provides a clear picture of wintering (non-breeding) bird use of the SSSI adjacent to the proposal area. The site continues to hold a large population of Curlew, a UK Birds of Conservation Concern red listed species, which have suffered continued significant declines since 1995 throughout the UK, with the strongest declines in Scotland, and in particular, within southwestern Scotland[5].

[3] **https://www.nature.scot/doc/naturescot-pre-application-guidance-onshore-wind-farms**
[4] **https://www.nature.scot/doc/dealing-construction-and-birds**
[5] https://www.bto.org/understanding-birds/birdfacts/curlew

In line with our most recent guidance (Disturbance Distances in selected Scottish Bird Species, 2022) non-breeding curlew can be disturbed at distances of up to 650m which is within disturbance buffers for the proposed development.

3.19 Disturbance distances for many of the species seen using the mudflats in winter are greater than those from the studies quoted in the EIAR. Additionally, we are concerned about the level of likely disturbance, with a schedule of year-round work (for 2 years, with no apparent attempt to avoid sensitive periods) and 0700-1900 working hours on Monday - Saturday, 0700-1400 on Sunday and with dredging round the clock for 130 days. If these hours include the winter significant lighting will be needed, and whilst noting the commitment to restrict light spill, from permanent lighting structures, onto the SSSI (EIAR 5.6.4), we anticipate there will be some unavoidable lighting impacts on birds, especially from task-based lighting.

3.20 In line with the important ornithological features identified in EIA Report (section 5.6.4), we agree with the proposed mitigation. However, in addition we advise that mitigation, including the following is included in a Wintering Bird Protection Plan and implemented in full:

- Additional screening fencing to be erected along main disturbance routes to help reduce noise, light and dust pollution and hide people moving round (in line with mitigation proposed for the XLCC factory[6]).
- Work should avoid winter periods, or at least stop before dark and during particularly cold weather, when disturbance will have far greater consequences. There is no obvious replacement roosting habitat for these species so every effort to retain them on the SSSI should be designed into the project. We would be happy to have further dialogue with the applicant to provide a workable framework to detail working arrangements that would maintain the conditions required of roosting birds in this area. particularly the definition of work practices in relation to “particularly cold weather”.
- Additional restrictions on winter working hours to reduce disturbance to roosting birds to be overseen by an Ornithological Clerk of Works (OCOW)
- All relevant personal on the site should be made aware of the environmental sensitivities of the site (proximity to designated sites and species of conservation concern) via the site induction and additional task and species-specific toolbox talks.

3.21 We also support the proposed ongoing monitoring of bird numbers and behaviour by the OCOW, during construction, to ensure that the proposed mitigation (EIAR sections 5.8.1 - 5.8.4) has the desired effect which should be used to adjust mitigation if necessary.

Cumulative impact

3.22 if the approved XLCC factory project and the current proposal begin work simultaneously we advise that the impacts on roosting waders will require a coordinated approach to mitigate to acceptable levels.

<u>Enhancing biodiversity</u>

3.23 We note that technical appendices 5.8 and 5.10 contain detail relating to biodiversity net gain (BNG) assessment (terrestrial) and biodiversity enhancement management plans BEMP (terrestrial) respectively. We note that

[6] **XLCC CABLE FACTORY - HUNTERSTON -** Environmental Impact Assessment Report Chapter 5: Ecology And Nature Conservation (Part 1 – Terrestrial Ecology)| February 2022- rps (section 5.1.206)

Section 1.2 of the BEMP states that "The proposed development will also aim to deliver enhancements in the marine environment, however, further baseline data is required to inform marine management plans". We will advise on this when the Subtidal and Phase II intertidal surveys have been completed.

3.24 We recommend that our guidance (Planning for development: What to consider and include in Habitat Management Plans[7]) is used to clearly articulate how the combined marine and terrestrial, or separate, BEMP documents will deliver the mitigation, compensation and enhancement works proposed for a project of this scale and scope. Whilst the current BEMP (TA5.10) does contain some good proposals, it would benefit from additional mapping detail and for the prescriptions within section 2.6.3 to provide quantifiable data as to what will be delivered and where.

3.25 The Hunterston natural capital assessment undertaken on behalf of the Hunterston Strategic Group, which includes Peel Ports Ltd, North Ayrshire Council and NatureScot, should be used to help achieve the right balance of brownfield redevelopment and enhancement of nature at Hunterston.

3.26 More detailed advice for biodiversity enhancements can be found in Annex 1.

Concluding remarks

This advice is provided by NatureScot, the operating name of Scottish Natural Heritage. We hope that you will find it helpful in your consideration of this application, but should you require any further information or advice, please contact **ian.cornforth@nature.scot** in the first instance.

Yours sincerely

Kerry Wallace
Head of Operations – West Central Scotland

CC. Iain Davies - Senior Development Management Officer - North Ayrshire Council
Graeme Duff- Envirocentre

Enc-
Annex 1-NatureScot Biodiversity Enhancement advice.

[7] **https://web.archive.org/web/20240518045813/https://www.nature.scot/sites/default/files/2023-12/160324%20-%20HMP%20guidance.pdf**

Annex 1 - NatureScot Biodiversity Enhancement advice.

Biodiversity enhancement

NPF4 sets out new requirements for development to deliver positive effects for biodiversity, primarily under Policy 3.

For national and major developments, or those subject to EIA, Policy 3b notes that proposals will only be supported where it can be demonstrated that they will conserve, restore and enhance biodiversity, including nature networks, so they are in a demonstrably better state than without intervention. The policy requires that such proposals demonstrate significant biodiversity enhancement, in addition to any proposed mitigation. Only when actions result in biodiversity being left in a better state than before development are positive effects secured.

The Scottish Government **Draft Planning Guidance on Biodiversity** (published November 2023) provides further advice on delivering biodiversity enhancement to clarify understanding of NPF4 Policy 3. Although labelled as "Draft Guidance" it is intended that it should be used now to assist in implementation and delivery of Policy 3.

We advise that:

- Development proposals should clearly set out the type and scale of enhancement they will deliver, ensuring that applications clearly distinguish between those elements mitigating or compensating for adverse effects and those delivering enhancement.

- Developers should prioritise on-site enhancement before off-site delivery. Where purely on-site enhancement is not possible, the Scottish Government draft guidance sets out further considerations for off-site delivery.

- It is also important that applications demonstrate that the enhancement is to be secured within a reasonable timescale and with reasonable certainty, including appropriate management and monitoring arrangements, and sustained for the future (preferably in perpetuity) in order to deliver a lasting legacy.

- Information on predicted losses, and the proposed mitigation, compensation and enhancement should be clearly set out, and also concisely summarised, in any application, so that this can be easily understood by decision makers.

- Enhancement requires consideration of all biodiversity, not just the significant effects that are the focus of EIA.

Our **Developing with Nature** guidance has been prepared, in discussion with Scottish Government, to support local development applications. It sets out a number of common measures to enhance biodiversity that are widely applicable. For national, major and EIA developments, more detailed assessment and more ambitious measures are likely to be required, but elements of our *Developing with Nature* guidance may still be helpful.

For information and updates, please see our **enhancing biodiversity webpage**.

ENDS

NatureScot
Scotland's Nature Agency
Buidheann Nàdair na h-Alba
By email to **MD.MarineLicensing@gov.scot**

Louise Treble
Marine Licensing Casework Officer,
Marine Directorate - Licensing Operations Team,
Marine Directorate
Scottish Government, 5 Atlantic Quay, 150
Broomielaw, Glasgow, G2 8LU

07 November 2024

Our ref: CLC177438-ML 00010872

Dear Ms Treble

Marine (Scotland) Act 2010, Part 4 Marine Licensing
The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017
00010872 - Clydeport Operations Limited (per EnviroCentre Limited) - Hunterston – Capital Dredge and Sea Deposit

Thank you for your consultation of 2 October 2024 on the above development and for allowing us additional time to submit our response. The application is supported by the Environmental Impact Assessment Report (EIAR) and supporting technical appendices for the proposal (Envirocentre for Clydeport Operations Limited - May 2024) which have guided our assessment.

1. **Summary**

1.1 There are natural heritage interests of national importance adjacent to the site, which could be affected by the proposal. We require further information that was requested during EIA scoping (detailed below in sections 3.3-3.4) to determine if the proposal will affect the integrity of the Southannan Sands Site of Special Scientific Interest (SSSI). **We therefore object to the proposal until this further information is obtained from the applicant and considered by the Marine Directorate. We will comment further once the additional information is available.**

1.2 The proposal could have a significant impact on the national status of Priority Marine Features (PMFs). **We therefore object to the proposal until further information is provided and considered by the Marine Directorate. We will comment further once the additional information is available**. Our appraisal below (sections 3.3-3.4)) provides further information.

1.3 We also provide advice on measures that would help ensure impacts on other natural heritage interests, including cetaceans are minimised. It is for the Marine Directorate to determine, within the context of its own policies, whether conditions are necessary to secure the mitigation and enhancement measures set out below.

2.Background

2.1 We understand that planning permission is sought for the construction of new 450m quay wall, infilling of dry dock basin to upgrade the existing marine construction yard and ancillary works.

2.2 Works within the planning jurisdiction of North Ayrshire Council extend to the MLWS. Beyond MLWS, works are regulated by the Marine Directorate, whose jurisdiction extends landward to the MHWS. This means that works in the intertidal area (between MHWS and MLWS) are covered by both terrestrial and marine regulators.

2.3 The proposed development includes works that are within the marine area, including marine dredging, temporary grounding pads and the installation of mooring dolphins. The EIAR provided in support of the marine Licence applications covers both regulatory jurisdictions.

2.4 The current application for consent is for enabling works. Subsequent application(s) are required for any future operational works. As such the EIAR includes only limited consideration of operational impacts.

2.5 As we understand it, the revised scope of the project, due to the unsuitable nature of the on-site dredge material, means that the dry dock will be infilled using imported materials (with discharge of effluent controlled under a SEPA trade effluent authorisation) and site profiling. The piling works for the new quay wall will be carried out on land above MHWS with the existing earth bund removed following completion of the piling works. Therefore, dredged material will no longer be moved from the dredge pocket to the dry dock area but will be disposed of at sea at licenced disposal sites.

2.6 This marine license application is for the removal, by multiple dredging techniques, approx. 1,546,660$m^3$of material from adjacent to the Southannan Sands SSSI.

2.7 We note that MD-LOT are seeking additional information regarding benthic surveys, which have not been submitted in the EIA Report. A further consultation request on the additional information will be forthcoming once the information has been received. These reports will help better understand the baseline condition of the sub benthic and intertidal areas within and adjacent to the proposed dredge area.

2.8 We provided a response to the Marine Directorate EIA scoping consultation on 21 December 2023, in which we requested that appropriate surveys, including intertidal, were carried out to inform the EIA.

3.Appraisal of the impacts and advice

<u>Southannan Sands Site of Special Scientific Interest (SSSI)</u>

3.1 The Southannan Sands SSSI extends for over 4km along the coast. It is adjacent to the proposed development and is designated for its nationally important Intertidal marine habitats, saline lagoons and sandflats. The SSSI comprises a coastal section, subdivided into three discrete areas, which together support one of the best examples of intertidal sandflats habitat within the entire Clyde coastline. See NatureScot's SiteLink for more detail[1]. Component habitats of the Sandflats notified feature include the Priority Marine Features (PMF) intertidal seagrass beds, native oyster and blue mussel beds.

3.2 Priority Marine Features do not have legislative protection, but the basis for protection of their national status across Scottish waters is included in the National Marine Plan.

[1] **https://sitelink.nature.scot/site/10261**

The proposal may impact Priority Marine Features (PMFs). Marine Directorate should consider the effect of the proposal on the PMF(s) before it can be consented.

3.3 We note that a subtidal survey, covering the area likely to be affected by the dredge pocket activities and a Phase II intertidal survey, covering the adjacent SSSI, will be submitted in due course in support of the Marine licence applications. It is possible that within the dredge pocket are PMF's that are linked to the PMF's found within the SSSI, e.g. Seagrass and blue mussels. Alternatively, the dredge impact area could contain other PMFs, not functionally linked to the SSSI, which also may trigger a national status assessment.

3.4 Currently, there is insufficient information to complete an impact assessment for PMFs. As the proposal could have a significant impact on the national status of a PMF(s) we therefore object to the proposal until further information is provided and considered by the regulatory authority. The subtidal assessment should provide sufficient detail to determine the distribution and extent of habitats present within the survey area creating broadscale habitat maps and permitting the quantification of areas/habitat types/PMFs which may be impacted by the proposal. The report should also detail mitigation and enhancement measures as appropriate. We will comment further once the additional information is available.

3.5 We will advise on any biosecurity measures required when we have the full survey information.

Advice on the coastal modelling study and coastal geomorphology

3.6 We note and agree with the assessment in Chapter 9 of the EIA about the following core findings of the Coastal Modelling Study:

- Deposition of 'spilled'/disturbed sediment from dredging activity would be very largely within the dredge area, with suspended sediment deposition from the dredging 'plume' predicted to be negligible within the SSSI.
- Increase in tidal flow as a result of the newly dredged bathymetry would be relatively minor and limited to the dredge area and immediate surrounds, with no change at the SSSI.
- Increase in wave heights as a result of the newly dredged bathymetry would be largely limited to the waters between the dredge area and the SSSI.
- When wind and waves are both from due south, part of the MLWS edge of the SSSI could experience an increase of <0.2m in wave height. We agree that any effect on the SSSI would be negligible because this change is minor, and the dredging would re-instate bathymetry to which the SSSI sandflats have previously adjusted.
- Any resulting changes to sediment transport with regard to the SSSI would not be significant.

3.7 The potential effects of potential relaxation of the side slopes of the dredge pocket are assessed in less detail than recommended in our scoping advice. Section 9.7.2.4 merely states that, with the designed slope gradient of 1:6 and a minimum distance to the SSSI of 280m, such relaxation would have negligible effect.

3.8 Given the limited justification provided in 9.7.2.4, we carried out our own evaluation of the potential impacts of side slope relaxation on the SSSI (see Annex 3) and we conclude that in terms of coastal processes, significant adverse impacts on the SSSI are not likely.

Protected species

Cetaceans & Priority Marine Features (PMFs)

3.9 We advise that the following European Protected Species (EPS) and PMF species are all found within the Firth of Clyde: *harbour porpoise, bottlenose dolphin, common dolphin, minke whale, harbour seal, grey seal and basking shark.* Cetaceans are European protected species. Noise and direct disturbance during construction and operation can cause disturbance and auditory injury impacts to these marine species.

3.10 Based on our experience with previous coastal infrastructure developments, we believe that the proposed dredging activities could go ahead, with appropriate mitigation measures being fully implemented, without causing injury or significant disturbance to marine mammals.

3.11 It is not clear if the EIAR or Technical Appendix 5.4[2] considered disposal of dredged material at sea and the importation of a similar volume of dredged material to the proposed development site. Both these operations have the potential to disturb cetaceans and our advice, given the volumes of material to be dumped, and the intensity of vessel movements and dumping operations, is that mitigation measures to reduce and avoid the potential disturbance impact of dredging and dumping on marine mammals are recommended.
The most effective way of mitigating the potential effects of disturbance is through the provision of a qualified Marine Mammal Observer ensuring no marine mammals are present within an agreed buffer zone.

Enhancing biodiversity

3.12 We note that technical appendices 5.8 and 5.10 contain detail relating to biodiversity net gain (BNG) assessment (terrestrial) and biodiversity enhancement management plans BEMP (terrestrial) respectively. We note that Section 1.2 of the BEMP states that "The proposed development will also aim to deliver enhancements in the marine environment, however, further baseline data is required to inform marine management plans". We will advise on this when the Subtidal and Phase II intertidal surveys have been completed.

3.13 We recommend that our guidance (Planning for development: What to consider and include in Habitat Management Plans[3]) is used to clearly articulate how the combined marine and terrestrial, or separate, BEMP documents will deliver the mitigation, compensation and enhancement works proposed for a project of this scale and scope. Whilst the current BEMP (TA5.10) does contain some good proposals, it would benefit from additional mapping detail and for

[2] Hunterston Construction Yard Subsea Noise Technical Report-(RPS 11 April 2024)
[3] **https://web.archive.org/web/20240518045813/https://www.nature.scot/sites/default/files/2023-12/160324%20-%20HMP%20guidance.pdf**

the prescriptions within section 2.6.3 to provide quantifiable data as to what will be delivered and where.

3.14 The Hunterston natural capital assessment undertaken on behalf of the Hunterston Strategic Group, which includes Peel Ports Ltd, North Ayrshire Council and NatureScot, should be used to help achieve the right balance of brownfield redevelopment and enhancement of nature at Hunterston.

3.15 More detailed advice for biodiversity enhancements can be found in Annex 2.

Concluding remarks

This advice is provided by NatureScot, the operating name of Scottish Natural Heritage. We hope that you will find it helpful in your consideration of this application, but should you require any further information or advice, please contact **ian.cornforth@nature.scot** in the first instance.

Yours sincerely

Kerry Wallace
Head of Operations – West Central Scotland

CC. Iain Davies - Senior Development Management Officer - North Ayrshire Council
Graeme Duff- Envirocentre

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Annex 1- - NatureScot Coastal Geomorphology Advice
Annex 2-NatureScot Biodiversity Enhancement advice.

Annex 1 - NatureScot Coastal Geomorphology Advice

Summary

Based on the assessment in Chapter 9 of the EIA, and our own further assessment below, significant adverse impacts on the Southannan Sands SSSI in coastal process terms are not likely. We also agree with the EIA that significant adverse impacts on other protected areas are not likely.

The proposal

The EIA is intended to support both the planning application and the marine licence application. The Preface states that it doesn't cover the operational phase of the redeveloped Yard, but Chapter 9 clearly assesses this phase, i.e. taking account of maintenance dredging.

Relevant parts of the proposal are:

- Constructing a 450m length of quay wall on the north west side of the Yard.
- Dredging to -12mCD a pocket extending north west from the new quay out to the deeper water of Hunterston channel.
- Use of the dredgings to infill the former dry dock within the Yard. Our advice only takes account of the removal of this sediment from the marine environment.

In general terms, the dredging would refresh the altered seabed morphology that has existed since creation of the Yard in the 1970s. More specifically, although the EIA only mentions previous dredging to -3mCD, 'unnatural' areas in the current bathymetry strongly suggest the proposal area was formerly dredged deeper than -5mCD, and to at least -12mCD closer to Hunterston channel (Fig 3.2 in the Technical Appendix 9.1 – Coastal Modelling Study).

Advice

We are content with the assessment in Chapter 9 of the EIA with regard to the following core findings of the Coastal Modelling Study:

- Deposition of 'spilled'/disturbed sediment from dredging activity would be very largely within the dredge area, with suspended sediment **deposition from the dredging 'plume'** predicted to be negligible within the SSSI.
- Increase in **tidal flow** as a result of the newly dredged bathymetry would be relatively minor and limited to the dredge area and immediate surrounds, with no change at the SSSI.
- Increase in **wave heights** as a result of the newly dredged bathymetry would be largely limited to the waters between the dredge area and the SSSI (the EIA does not attempt to interpret this increase which we attribute to the removal of the shallow seabed immediately fronting the north west side of the Yard).
- When wind and waves are both from due south, part of the MLWS edge of the SSSI could experience an increase of <0.2m in wave height. We agree that any effect on the SSSI would be negligible because this change is minor and the dredging would re-instate bathymetry to which the SSSI sandflats have previously adjusted.
- Any resulting changes to **sediment transport** with regard to the SSSI would not be significant.

The potential effects of potential relaxation of the side slopes of the dredge pocket are assessed in less detail than recommended in our scoping advice to the Marine Directorate. Section 9.7.2.4 merely states that, with the designed slope gradient of 1:6 and a minimum distance to the SSSI of 280m, such relaxation would have negligible effect.

We advise that potential side-slope relaxation needs further consideration, as follows:

- Although the designed slopes of 1:6 (9.5^{o}) may well prove stable, that has not been demonstrated.
- The designed slopes would be ca.42m wide, cut into a 'shelf' that lies at approximately -5mCD (see Fig 3.2 in Technical Appendix 9.1). Immediately after dredging, the *unaffected* width of this shelf to the north east, i.e. towards the SSSI, would be approximately 90m (see the "450m Quay Wall General Arrangement" drawing).
- Side-slope relaxation would not be likely to occur throughout this 90m width. For example, even relaxation to a nominal gradient of 1:15 (3.8^{o}), very likely to be stable, would only take up an additional 63m of the width.
- Therefore we consider that potential side-slope relaxation would not directly affect the shallower subtidal area that adjoins the SSSI.
- A secondary effect on wave height due to the greater area of deeper water created by potential relaxation is not likely. This is because based on rare storm waves analysed in the Coastal Modelling Study, the depth at which wave height is affected by the seabed and waves stir up sediment ('depth of closure') will be considerably less than -5m. Side-slope relaxation would further deepen the water.

Figure 1 illustrates how a nominal relaxation of dredged side slopes to a stable angle would be unlikely to affect the SSSI.

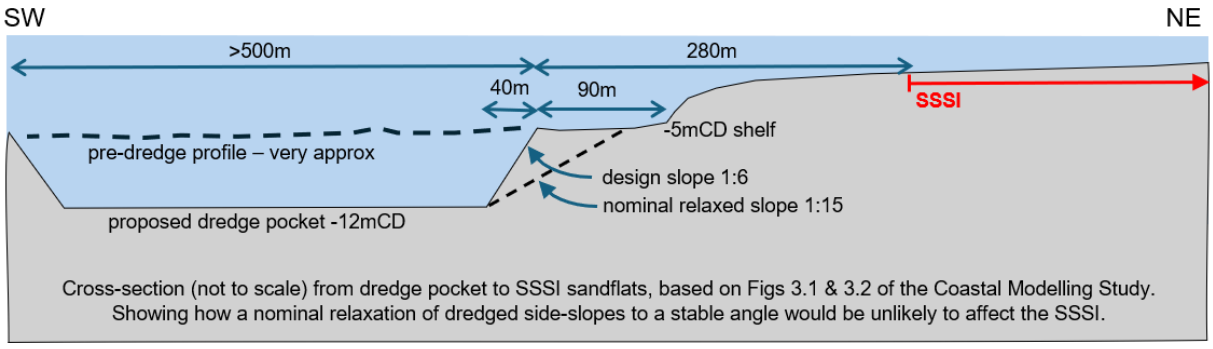

Figure 1 -NatureScot produced cross section of dredge pocket to Southannan Sands SSSI

In conclusion, although the potential side-slope relaxation is inadequately assessed in the EIA, due to the above considerations, we agree with the EIA conclusion that in terms of coastal processes significant adverse impacts on the SSSI are not likely.

Annex 2 - NatureScot Biodiversity Enhancement advice.

Biodiversity enhancement

NPF4 sets out new requirements for development to deliver positive effects for biodiversity, primarily under Policy 3.

For national and major developments, or those subject to EIA, Policy 3b notes that proposals will only be supported where it can be demonstrated that they will conserve, restore and enhance biodiversity, including nature networks, so they are in a demonstrably better state than without intervention. The policy requires that such proposals demonstrate significant biodiversity enhancement, in addition to any proposed mitigation. Only when actions result in biodiversity being left in a better state than before development are positive effects secured.

The Scottish Government **Draft Planning Guidance on Biodiversity** (published November 2023) provides further advice on delivering biodiversity enhancement to clarify understanding of NPF4 Policy 3. Although labelled as "Draft Guidance" it is intended that it should be used now to assist in implementation and delivery of Policy 3.

We advise that:

- Development proposals should clearly set out the type and scale of enhancement they will deliver, ensuring that applications clearly distinguish between those elements mitigating or compensating for adverse effects and those delivering enhancement.

- Developers should prioritise on-site enhancement before off-site delivery. Where purely on-site enhancement is not possible, the Scottish Government draft guidance sets out further considerations for off-site delivery.

- It is also important that applications demonstrate that the enhancement is to be secured within a reasonable timescale and with reasonable certainty, including appropriate management and monitoring arrangements, and sustained for the future (preferably in perpetuity) in order to deliver a lasting legacy.

- Information on predicted losses, and the proposed mitigation, compensation and enhancement should be clearly set out, and also concisely summarised, in any application, so that this can be easily understood by decision makers.

- Enhancement requires consideration of all biodiversity, not just the significant effects that are the focus of EIA.

Our **Developing with Nature** guidance has been prepared, in discussion with Scottish Government, to support local development applications. It sets out a number of common measures to enhance biodiversity that are widely applicable. For national, major and EIA developments, more detailed assessment and more ambitious measures are likely to be required, but elements of our *Developing with Nature* guidance may still be helpful.

For information and updates, please see our **enhancing biodiversity webpage**.

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