TECHNICAL TOPIC - Historic Environment

1. BASELINE AND KEY FEATURES

The key features of the historic environment which may require consideration are:

- World Heritage Sites
- Scheduled Monuments
- Listed Buildings
- Gardens and Designed Landscapes
- Inventory Battlefields
- Conservation Areas
- Undesignated historic environment assets of local and regional importance.
- Deposits of palaeoenvironmental interest.

For the scoping study, two study areas have been used to assess potential direct and indirect impacts on historic environment assets.

1km study area

The 1km study area is defined by the area that will be directly impacted by the proposed development. For the purposes of the Scoping report this study area is based on a 1km search radius around the proposed development red line boundary (see Figure 2). Details relating to the historic environment assets identified within the 1km study area are in Table 1.

An initial desk-based appraisal of the Highland Historic Environment Record (HER) has been undertaken, using data provided by The Highland Council's Historic Environment Team. This appraisal is intended to gain a basic understanding of known historic environment assets to inform the scoping process and should not be considered to be a full desk-based assessment in line with the relevant sections of the Chartered Institute for Archaeologists (CIfA) *Standard and Guidance for historic environment desk-based assessment* (2014, revised October 2020).

Designated historic environment assets

There are no Scheduled Monuments, Listed Buildings, Conservation Areas, Inventory Battlefields or Gardens & Designed Landscapes within the 1km study area.

Undesignated historic environment assets

There are eight undesignated historic environment assets within the study area listed in the Highlands HER. One of these assets (MHG20808) is located within the red line boundary of the proposed development, the remaining seven assets are located outside the red line boundary.

Historic Environment Table 1: Historic environment assets within the 1km study area

Asset in 1km study area	Description	Within extension area?	Sensitivity
MHG20808	Carse of Ardersier: a farmstead comprising one unroofed building and enclosure depicted on the 1st edition 6-inch OS map (1876, Inverness-shire 1876, sheet i). Not shown on current OS map, and site visit (October 2024) could not locate it.	No	Low
MHG48913	Comet, Whiteness, Moray Firth: tentative location of The Comet (sloop) en route from Cromarty to Peterhead went ashore to the east of Whiteness Head Buoy, 1st November 1859.	No	Low
MHG48721	Patriot, Whiteness, Moray Firth: tentative location of Patriot, sunk at Whiteness en route from Dunbeath to Waterford, 5th September 1848.	No	Low
MHG52077	Bess, Whiteness, Moray Firth: tentative location of Bess, wrecked with cargo of merino rams in October 1803.	No	Low
MHG45951	Ardersier oil rig construction yard. Closed in 2002 following almost 30 years of activity.	No	Low
MHG2818	Natural feature, Glac Nan Ceannaichean. A natural hollow traditionally thought to have been a burial place of rival packmen – locally known in the late 19th century as the "Merchant's Graves or Hollow".	No	Low
MHG20826	Upper Carse: two unroofed buildings and two unroofed structures depicted on the 1st edition of the OS 6-inch map (1876, Inverness-shire 1876, sheet i). Two unroofed buildings are shown on the current edition of the OS 1:10,000 map.	No	Low
MHG20816	Upper Carse: A farmstead comprising one roofed and one partially roofed building and two enclosures is depicted on the 1st edition of the OS 6-inch map (Inverness-shire 1876, sheet i), but it is not shown on the current edition of the OS 1:10,000 map	No	Low

Deposits of palaeoenvironmental interest
The Site's superficial geological deposits comprise raised tidal flat deposits of Holocene age, and these are commonly charged with organic debris (plant and shell) that are now above the level of the present shoreline as a result of earth movement or general fall in sea level. These deposits have the potential to contain palaeoenvironmental evidence of the full palaeoenvironmental history of the area after the last Ice Age.

10km study area

A Zone of Theoretical Visibility (ZTV) will be produced using 'surface data' which takes account of the screening effect of landcover such as built up areas and woodland. The ZTV would be run using a sequence of nominal heights to reflect the likely extent of visibility of components of different heights that might be temporarily present. A preliminary ZTV has been included with this scoping report and is included in the Landscape, seascape and visual effects chapter.

In lieu of the ZTV being produced for the EIA Report, a 10km study area was defined for initially identifying designated historic environment assets, the setting of which could potentially be impacted by the proposed development. Within the 10km study area there are:

- 42 Scheduled Monuments.
- 488 Listed Buildings.
- 4 Registered Gardens and Designed Landscapes.
- 7 Conservation Areas.
- 1 Registered Battlefield.

Once the final ZTV for the EIA Report has been produced, a further assessment will be undertaken to identify those designated historic environment assets that may require setting impact assessment; and this will be agreed in consultation with HES, The Highland Council's HET and Moray Council's archaeological advisor and conservation officers.

2. LIKELY IMPACT ON THE ENVIRONMENT

Marine works

Marine works have the potential to disturb, damage or destroy features or remains of marine historic environment interest, and deposits of palaeoenvironmental interest.

Loss of or damage to known marine archaeological remains

Dredging works have the potential to result in damage/loss of known marine archaeological remains. Known marine archaeological sites comprise three wrecks:

- Comet: MHG8913
- Patriot: MHG48721
- Bess: MHG52077

The wrecks have tentative recorded locations, meaning that while not expected within the proposed dredging areas their potential presence cannot be discounted.

Loss of or damage to unknown marine archaeological remains

Dredging works have the potential to result in damage/loss of unknown marine archaeological remains, and this is highlighted by the presence of known wreck sites in the vicinity.

Loss of or damage to deposits of palaeoenvironmental interest

During marine works any aspects of the proposed development involving dredging and excavation have the potential to result in the damage/loss of palaeoenvironmental deposits.

The Site's superficial geological deposits comprise raised tidal flat deposits of Holocene age, and these are commonly charged with organic debris (plant and shell) that are now above the level of the present shoreline as a result of earth movement or general fall in sea level. These deposits have the potential to contain palaeoenvironmental evidence of the full palaeoenvironmental history of the area after the last Ice Age.

Terrestrial site clearance and construction activity

Loss of or damage to known historic environment assets

During terrestrial site clearance and construction, any aspect of the proposed development that cuts into the ground surface has the potential to result in damage/loss of known historic environment assets.

There is one known asset within the extension area (MHG20808), however a site visit has shown that this asset no longer appears to be extant. The whole extent of the extension area has not been visited, and it is possible that the remains of historic buildings and structures, and archaeological remains may be present.

Loss of or damage to unknown historic environment assets

During terrestrial site clearance and construction, any aspect of the proposed development that cuts into the ground surface has the potential to result in damage/loss of unknown historic environment assets.

Loss of or damage to deposits of palaeoenvironmental interest

During marine works and terrestrial site clearance and construction, any aspects of the proposed development involving excavation have the potential to result in the damage/loss of palaeoenvironmental deposits.

The Site's superficial geological deposits comprise raised tidal flat deposits of Holocene age, and these are commonly charged with organic debris (plant and shell) that are now above the level of the present shoreline as a result of earth movement or general fall in sea level.

These deposits have the potential to contain palaeoenvironmental evidence of the full palaeoenvironmental history if the area after the last Ice Age.

Operational activities

Long-term changes to the setting of designated historic environment assets

There is a possibility that the proposed development could have long-term effects on the setting of historic environment assets, impacting the way in which the asset is understood, appreciated and experienced, and thus the significance/importance of the asset.

Designated historic environment assets within the project ZTV will be identified, and consultation undertaken with HES, The Highland Council HET and Moray Council to agree those that should be considered for setting impact assessment.

Of particular interest is Fort George (Category A and B Listed Buildings). It is noted that the 2018 EIA for the consented development site considered potential impacts on the setting of Fort George. The 2018 assessment identified that there would be a significant adverse impact on the setting of Fort George, and this was acknowledged by Historic Environment Scotland, although there was no associated objection to the proposed development.

Given that the extension area will be occupied by buildings and structures that would be seen in addition to those already consented, the need to revisit the setting impact assessment on Fort George in particular has been identified.

All of the above potential impacts cannot be scoped out until the information required to inform the assessment has been collected, reviewed and suitable mitigation and management plans formulated.

3. SURVEYS OR ASSESSMENTS REQUIRED

The historic environment assessment will comprise:

- Consultation with HES, The Highland Council Historic Environment Team and Moray Council's archaeological advisors and conservation officers.
- Analysis of The Highland Historic Environment Record (HER) data.
- Analysis of the National Record of the Historic Environment (NRHE) of Scotland: Canmore (*https://canmore.org.uk*) and Pastmap database (*https://pastmap.org.uk*).
- Review of Statutory lists, registers and designated areas, including Lists of Scheduled Monuments, Listed Buildings, Gardens and Designed Landscapes, Conservation Areas and Battlefields (*https://portal.historicenvironment.scot*).
- Analysis of Ordnance Survey historic map collection (*https://maps.nls.uk*).
- Analysis of available LiDAR data.
- Analysis of geotechnical investigations reports and logs associated with proposed investigations in 2025 for assessment by palaeoenvironmental specialist.
- Site specific-walkover surveys.
- Setting impact assessments of designated historic environment assets that have been identified and agreed in consultation with HES.
- Impact assessments associated with the marine works, terrestrial site clearance & construction and operation of the proposed development, with measures proposed for enhancement, mitigation and monitoring.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

- The Historic Environment Policy for Scotland (HEPS) 2019.
- Historic Environment Scotland Designation Policy and Selection Guidance 2019.
- The Highland-wide Local Development Plan (HwLDP), The Highland Council 2012 Policy 57 Natural, Built and Cultural Heritage.
- The Highland Historic Environment Strategy Supplementary Planning Guidance (2013).
- Chartered Institute for Archaeologists: Code of conduct: professional ethics in archaeology (2014, revised October 2022).
- Chartered Institute for Archaeologists: Standard and Guidance for:
    - Historic Environment Desk-Based Assessment (2014, updated October 2020).
    - Commissioning work or providing consultancy advice on archaeology and the historic environment (2014, updated October 2020).
- Historic Environment Scotland: Managing Change in the Historic Environment – Setting (2020).
- Historic Environment Scotland & NatureScot: Environmental Impact Assessment Handbook (2018).
- The Highland Council: Reporting Standards for Archaeological Works (2023).

5. METHODOLOGY

The approaches used to identify and analyse the historic environment baseline and assess the potential impacts will be in accordance with standards and guidelines produced by the Scottish Government, Historic Environment Scotland, and the Licensing and Planning Authorities.

Site-specific desk-top and walkover surveys will be conducted. Datasets will be reviewed and analysed with a view to identifying previously unidentified historic environment assets visible on the surface, the potential for unknown archaeological sites and palaeoenvironmental deposits to be present below the surface. The surveys will be conducted to appropriate professional standards for archaeological review (as outlined in relevant Chartered Institute for Archaeologists Standards and Guidance).

Core samples that will be collected for ground investigation purposes will initially be assessed by an archaeologist to ascertain whether they require palaeoenvironmental/geoarchaeological analysis. If undertaken, this analysis would assist in the development of a robust understanding of the palaeoenvironmental and geoarchaeological potential of the proposed development site, and assist in the development of an appropriate mitigation response.

The relative importance (e.g. international, national, regional, local) or sensitivity (high, medium, low) of each historic environment asset identified in the datasets will be assessed (with reference to Historic Environment Scotland Designation Policy and Selection Guidance 2019).

<u>Setting impact assessment</u>

In terms of setting, statutorily designated assets including any designated historic environment assets within the ZTV will be identified using HES datasets downloaded from *https://portal.historicenvironment.scot/downloads*.

<u>Consideration will also be given to any assets out with the ZTV that may be affected. To keep the size of the assessment reasonable and proportionate, it is</u>

proposed that a selection of designated assets, such as Scheduled Monuments and Listed Buildings, will be considered rather than every such asset, which can act as proxy for the range of effects on other assets. Relevant undesignated assets will be identified in consultation with The Highland Council HET. The importance of assets and sensitivity of setting will be identified using HES Managing Change in the Historic Environment: Setting (2020) and HES 2019, Designation Policy and Selection Guidance, including Annexes.

Key assets for viewpoints, visualisations, photomontages and wireframes will be agreed with the Landscape and Visual consultants and the statutory authority and produced according to standard best practice guidance (Landscape Institute & IEMA Guidelines for Landscape and Visual Impact Assessment (GLVIA).
The potential effects of the proposed development on the historic environment assets identified by the baseline assessment will be undertaken with reference to NatureScot and HES's Environmental Impact Assessment process in Scotland (v5, 2018). The assessment approach will be based on the maximum design scenario for the proposed development and will consider both direct and indirect impacts, and long-term effects, as appropriate.
The effects of the proposed development on historic environment assets will be assessed on the basis of their type (direct physical effects, effects on setting, cumulative effects), nature (beneficial, neutral or adverse), and longevity (reversible, short-term or long-term; irreversible, permanent).

The assessment will take into account the sensitivity of the receptor and the magnitude of impact. The assessment of sensitivity of historic environment assets reflects the relative weight which statute policy attach to them, principally as published in Scottish Planning Policy and Scottish Historic Environment Policy.

Mitigation measures designed to prevent, reduce or offset significant adverse effects will be taken into account. Residual effects will be assessed, taking into consideration the likely effectiveness of the mitigation proposed.

A range of embedded mitigation measures could be considered for a development of this nature, including:

- The preparation of appropriate Written Schemes of Investigation (WSI), which may include intrusive archaeological evaluations, excavations and watching briefs, and a Protocol for Accidental Discoveries (PAD) to avoid or mitigate accidental impacts and manage any accidental discoveries of archaeological interest.
- Production of a Construction Environmental Management Plan (CEMP) that will outline how the development will ensure the suitable implementation and control of mitigation measures.

The requirement for secondary mitigation measures will be dependent on the significance of the effects on historic environment assets and will be consulted on throughout the EIA process.

FIGURES

Figure 1. Location of 1km study area with known assets.

Figure 2. Location of 10km study area with designated assets.

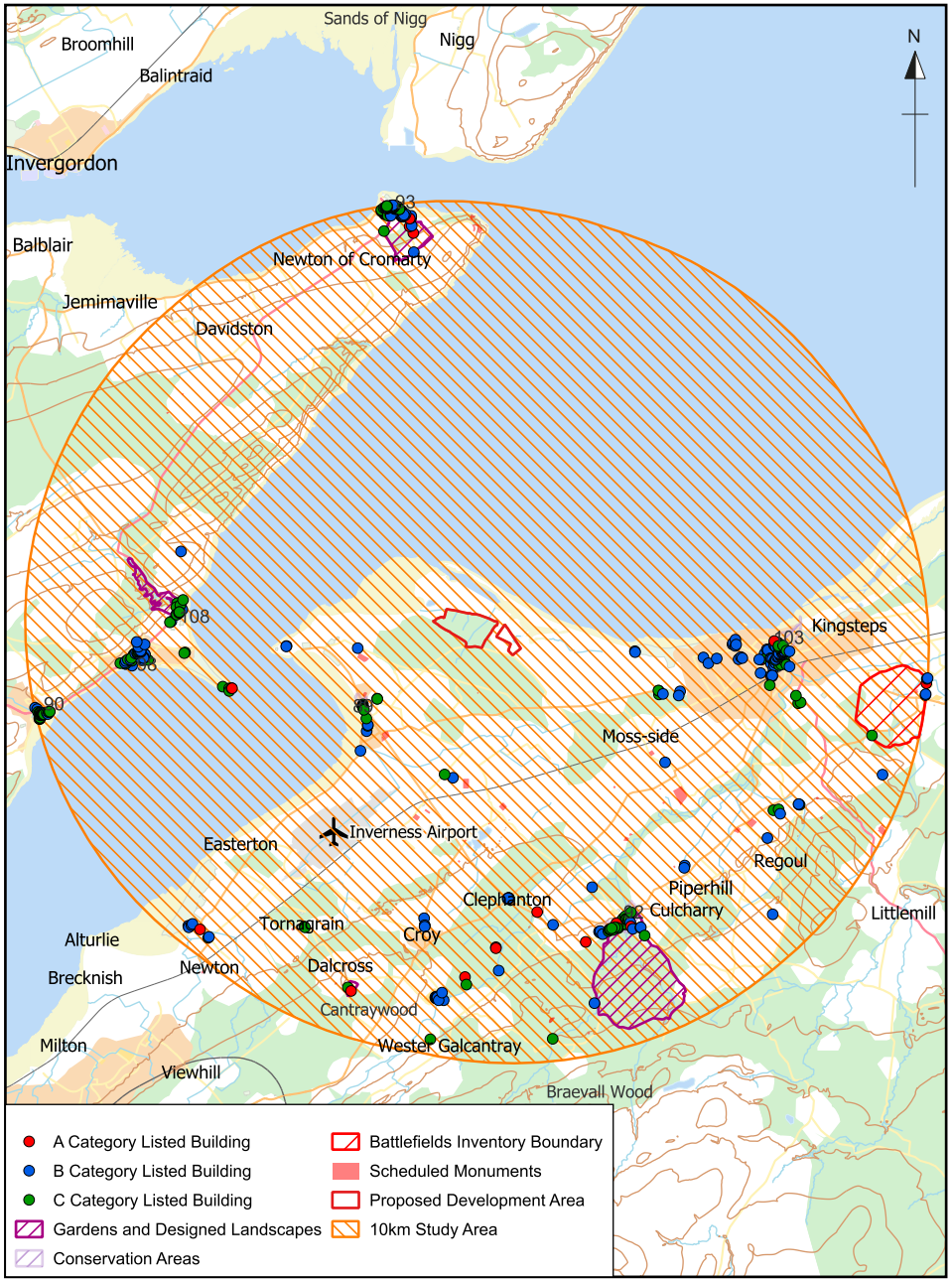
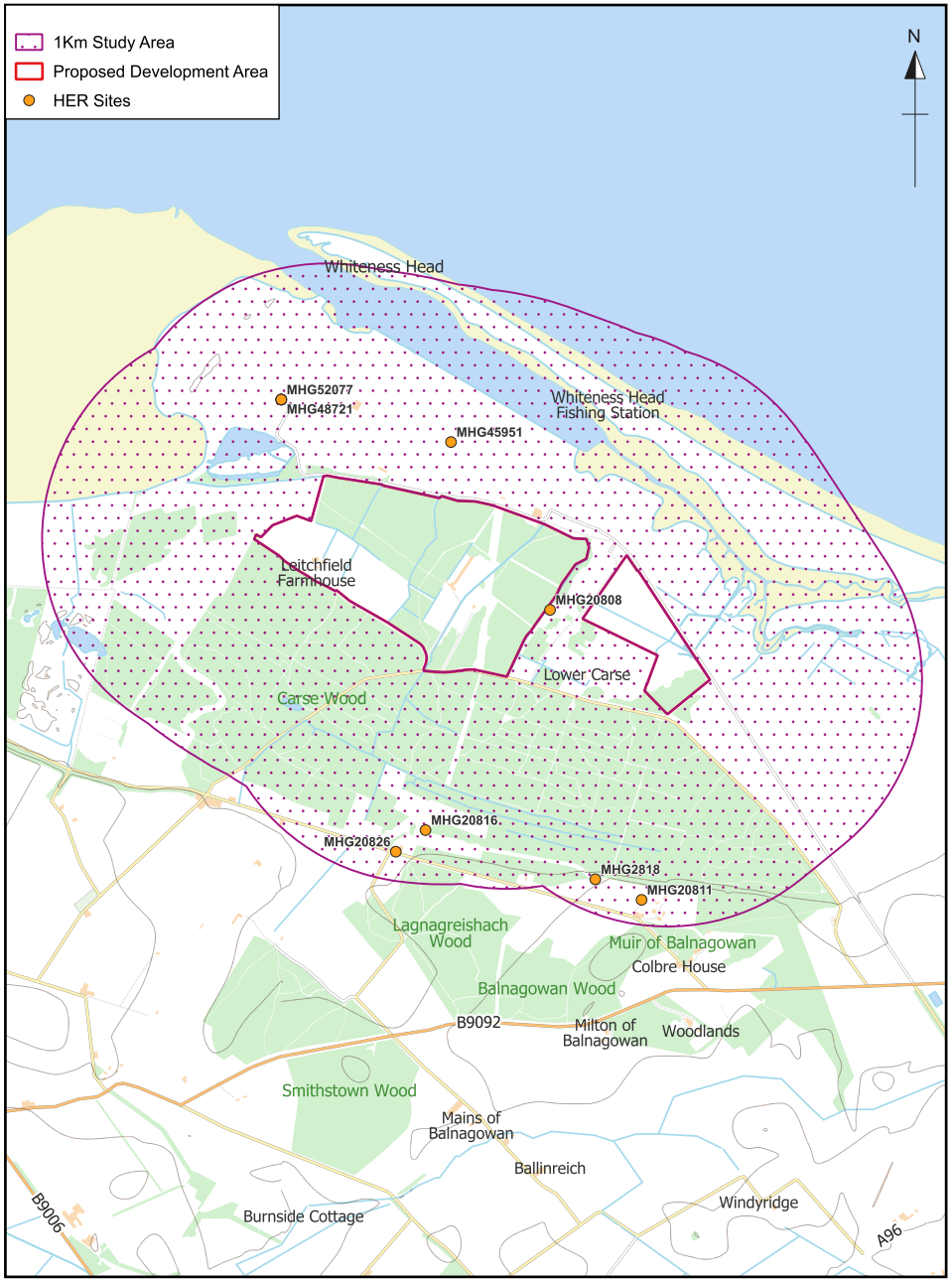


Figure 2: Location of 10km study area with designated assets

Project Name: Ardersier		
Project No: 1059	Scale @A4 1:130,000	
Date: 11/2024	ID: OR02GT	Rev. 1.00



0 0.25 0.5 0.75 1 km

CRS: OSGB36 / British National Grid / EPSG:27700

Figure 1: Location of 1km study area with known historic environment assets

Project Name: Ardersier		
Project No: 1059	Scale @A4 1:25,000	
Date: 11/2024	ID: OR02GT	Rev. 1.00

Population & Human Health

TECHNICAL TOPIC - Population and Human Health

1. BASELINE AND KEY FEATURES

Current Baseline

Individuals and communities have varying susceptibilities to adverse and/or beneficial population and health effects associated with changes in environmental and socio-economic conditions as a result of: demographic structure (for instance, age); existing burden of poor health; behaviours (for instance, lifestyle choices which constitute risk factors); and socio-economic circumstance. As an example, an elderly individual with an existing chronic cardiovascular health condition who is a smoker and has a lower than average socio-economic circumstance, would be considered more sensitive than a healthy working age individual.

For the purposes of this scoping exercise we have considered key datasets such as SMID dataset (*Scottish Index of Multiple Deprivation 2020 - gov.scot*) and also the work that was undertaken by the NHS Highland and Public Health Scotland to consider demography and deprivation for areas across the Highlands. The site is located in the Inverness area (*demography-inverness-2022.pdf*) but is also very close to the Nairn and Nairnshire area (*demography-nairnandnairnshire-2022.pdf*) so we have reviewed both documents to understand the current baseline with regards to population and human health.

The partnership area of Inverness encompasses several settlements, including Ardersier, Beauly, and Culloden, with Inverness itself being one of Europe's fastest-growing cities. As of 2021, the population of Inverness stands at 82,383, with 75% living in the urban area and 25% in rural locations. The population is relatively young, with 17.2% aged 0-15 years, 63.0% aged 16-64 years, and 19.8% aged 65 years and over. From 2002 to 2021, Inverness experienced a 23% population increase, with notable growth in the older age demographics, especially a 59% rise in those aged 65 and over. However, birth rates, while historically higher than the Highland average, have decreased in the last decade, and the region's mortality rate has stalled, raising concerns about the overall health and social progress of the population.

Despite the challenges, projections indicate a continued population increase of 4.5% in Inverness between 2018 and 2030, largely reliant on net migration gain, as the annual number of deaths surpasses births. However, demographic trends suggest a further decrease in the working-age population ratio compared to older adults. SIMD 2020 highlights significant deprivation in urban Inverness, with 13.4% of the population living in areas classified in the most deprived quintile and 10.2% identified as income deprived. This socio-economic landscape indicates a need for continued attention to the health and equity of residents in the area.

As of 2021, Nairn and Nairnshire had a population of 13,670, with approximately 74% residing in the urban area of Nairn and the rest in accessible rural regions. The demographic profile shows that 14.8% of the population are children aged 0-15 years, 59.3% are aged 16-64 years, and 26.0% are aged 65 and over. The population has experienced a 19% increase from 2002 to 2021, with significant growth in the older age groups—63% for those aged 65 and above—while the number of residents under 16 has decreased by 10% since 2011. The ratio of working-age individuals to older adults is lower than the averages for Highland and Scotland, contributing to concerns about the sustainability of the local workforce as birth rates decline.

Health indicators in Nairn and Nairnshire suggest a stagnation in mortality improvement, which raises concerns regarding public health and social progress. The area recorded 93 live births in 2020, with birth rates decreasing over the past decade. The annual death rate exceeds births, highlighting a reliance on net migration for population growth. Projections indicate an increase in the population between 2018 and 2030, especially among the elderly, while

younger age groups are expected to decline. Additionally, the SIMD 2020 data reveals that Nairn Moss-side is among the most deprived areas in Scotland, with 3.4% of the population living in the most deprived quintile. Although a lower proportion of the population faces income deprivation compared to Highland, rural deprivation remains a significant issue, affecting residents across all intermediate geography areas.

The data is showing that there are challenges across the local area with regards to an ageing population and although the population is growing, this is dependant on people moving into the local area and there is a recommendation that there is a need to focus on the overall health, equality and social progress of the population in the wider areas surrounding the proposed development site.

Future Baseline
It is expected that national initiatives will be brought forward through national and local policy to try and address these key challenges and this will be the case with or without the proposed development. The positive changes that the proposed development are providing employment for existing residents and also acting to attract people to move into the local area, helping to increase residents across the younger working age groups.

2. LIKELY IMPACT ON THE ENVIRONMENT

To assess whether the Proposed Development could potentially have any likely significant effects on Population and Human Health, we have considered the 21 health determinants provided in the IEMA guide to 'Effective Scoping of Human Health in EIA' Guidance.

This assessment has considered likely significant impacts in terms of the proposed development extension. A conclusion is provided at the end of this table.

Table 1: Population and Human Health Scoping Assessment

Categories	Wider Determinants of Health	Likely Significant?	Already covered in other EIA chapters proposed?	Further Assessment Required in Human Health chapter? (Y/N)
Health related behaviours	physical activity	No likely significant impact due to proposed development	n/a	n
	risk taking behaviour	No likely significant impact due to proposed development	n/a	n
	diet and nutrition	No likely significant impact due to proposed development	n/a	n
Social Environment	housing	No likely significant adverse impact due to proposed development. Increased employment levels could require additional housing in the local area, however there are two large consented housing developments near site to accommodate any predicted increase, and the Highland Council is also driving forward plans to enable additional housing capacity across the Green Freeport area. The proposed development is likely to result in the potential for significant beneficial effects in terms of economic activity and investment in housing	n/a	n

		and associated infrastructure, driven by the additional demand for accommodation.		
	relocation	No likely significant impact due to proposed development	n/a	n
	open space, leisure and play	Proposed extension will not exclude public from any areas that are currently accessible.No likely significant negative impacts predicted.	No – However, Project Description will contain an access section.	n
	transport modes, access and connections	No anticipated impact as the predicted transport trips during construction and operation are the same as currently consented.	No – but an updated Travel Plan will be submitted.	n
	community safety	No anticipated impact due to proposed development, site is fairly isolated from the community.	n/a	n
	community identity, culture, resilience and influence	No anticipated impact due to proposed development, the site has a long history of being used for industrial purposes and providing employment for the local community .	Yes – information on the cultural heritage and built environment will be provided in the EIAR, along with community engagement plans	n
	social participation, interaction and support	The developer is keen to provide a positive legacy for the local community and further information on the community benefits/social value proposals will be submitted with the planning application. No significant likely effects predicted.	Yes – information on how social value will be delivered will be provided as part of the supporting documentation submitted as part of the planning application and following consultation with the local community as part of the overall EIA process.	n
Economic Environment	education and Training	The proposed development will provide training and employment opportunities.	Yes – see response above.	n
	employment and Income	The proposed development will support employment and income to the local community.	Yes – the extension will support the existing job numbers associated with the consented development. Further information will be provided in the Project Description Chapter of the EIAR	n
Bio-Physical environment	climate change mitigation and adaptation	All developments can have an impact upon climate change and require consideration of mitigation and adaptation.	Yes – information will be covered in the Project Description Chapter and the Net Zero Pathway/Carbon Assessment.	n
	air quality	Potential for dust emissions during construction primarily but also during operation (depending on final design).	Yes – Within outline CEMP and the Dust Risk Assessment.	n
	water quality or availability	Potential for impacts upon the water environment at the site (land and marine) with the proposed construction.	Yes – Hydrology and Hydrogeology Assessment	n
	land quality	The majority of the proposed development is plantation	n/a	n

		woodland for >50 years and would be classed as essentially greenfield. No land quality impacts predicted.		
	noise and vibration	Potential for noise emissions during both construction and operation.	Yes – Within the Noise assessment	n
	radiation	n/a	n/a	n
Institutional and built environment	health and social care services	No likely significant adverse impact due to proposed development, but potential for beneficial effects associated with wider improvements to facilities associated with housing and indirect investment in infrastructure.		
	built environment	No likely significant effect from the proposed development but could potentially be impacts upon townscape and setting.	Yes – the Landscape, Seascape and Visual assessment will address this.	n
	wider societal infrastructure and resource	The proposed development is to provide additional capacity at the Port to support the renewable energy offshore industry. Providing society with clean, green and hopefully affordable energy will be a key part of decarbonising our society.	Yes – the Project Description chapter will provide full context on what is provided. The planning support statement will also compare the proposed development to current local and national policy to see whether it complies.	n

Conclusion

When you consider the key health determinants set out in the guidance, those that need to be considered are being assessed elsewhere in the EIAR or the planning application supporting documents. Based upon this conclusion, we would suggest that a separate Population and Human Health chapter is not required and is scoped out.

3. SURVEYS OR ASSESSMENTS REQUIRED

None anticipated as propose to Scope Out.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

- Beyond the EIA Regulations, there is no specific legislation relevant to the assessment of population and health
- IEMA guide to 'Effective Scoping of Human Health in EIA' (IEMA, 2024)

5. METHODOLOGY

The guidance on '*Effective Scoping of Human Health in EIA*' defines the approach for scoping wider determinants of health in or out of an EIA, and is derived from EU EIA Directive 2014/52/EU. The guidance expects that an EIA Report will include a chapter on human health where wider determinants of health are not being covered by other EIA technical topics that would have otherwise assessed the likely and potentially significant effects to human receptors.

The scoping assessment has identified that any potential impacts are already being assessed elsewhere in the EIAR or within the planning application supporting documents. Based upon this conclusion, we would suggest that a separate Population and Human Health chapter is not required and is scoped out.

Climate & Resilience

TECHNICAL TOPIC - Carbon Impact and Climate Change Resilience

1. BASELINE AND KEY FEATURES

Carbon Impact Assessment

As per IEMA guidance (IEMA, 2022), the baseline for any carbon impact assessment is taken as a 'business as usual' scenario, prior to existence of the proposed development. It represents existing carbon emissions from the assessment prior to construction of the project under consideration. The study area for the assessment encompasses a wider extent than the site boundary due to the consideration of embodied carbon emissions from products and materials, the transport of materials to site and the installation processes on site. The study area also includes activities that may be avoided or displaced because of the proposed development, namely construction and operational transport, heating, and electricity production activities. Data is already being collected regarding carbon emissions associated with the consented development at Ardersier Port ETF. This information is being used to create Net Zero Pathway/Carbon Assessment. This data will be available to inform the EIAR and the carbon management for the extension area.

Climate Change Resilience Assessment

The baseline for a climate change resilience assessment is typically based on the current climatic conditions, existing at the site and surrounding environment as recorded by the Met Office. The future baseline then describes the projected changes to climatic impacts (e.g., temperature, precipitation, and wind), as relevant to the geographical location, characteristics, and timeframe of the project. Haventus are currently completing a climate risk and resilience assessment for the wider area, this is being done on an annual basis and will be available to inform the EIAR.

2. LIKELY IMPACT ON THE ENVIRONMENT

Carbon Impact Assessment

It is likely that there will be an increase in emissions arising from the construction and operational phase of the proposed development. Data is currently being gathered for the existing development, considering annual emissions from the project and this information will be used to consider the emissions that could be generated by the proposed extension. This information will be used to identify opportunities to reduce carbon emissions through the various phases of the proposed development which will feed into a Carbon Management Plan for the extension but also the wider development. One of the key sources of carbon emissions during construction will be associated with Scope 3 emissions from the appointed contractors. Work is already underway to gather data from the contractors on this to inform the approach to the extension.

Climate Change Resilience Assessment

During the operational phase, the development is likely to be exposed to future climatic conditions. The following climatic impacts should be considered when considering the resilience of the proposed extension.

- An increase in mean temperatures estimated in climate change projections. This increase temperature owing to climate change could increase the sensitivity of human receptors to pollutant / dust emissions; impact on-site biodiversity; and increased cooling requirements within
the design of the proposed development.

- Changes in precipitation. Periods of increased precipitation may lead to flooding, whereas periods of decreased precipitation may lead to water scarcity, and reduce the ability for soil to absorb moisture increasing risk of flooding. The impacts on groundwater and surface water from changing precipitation will be assessed in this chapter. If receptors are determined as sensitive, the mitigation measures proposed within the Flood Risk Assessment will be considered.
- Increased frequency and intensity of storm events. Where the development may be vulnerable to storm damage, consideration will be given to the mitigation measures associated with the structure and assets resilience to wind and storm related risks and this will also be considered as part of the hydrology/hydrogeology chapter in the EIA.

3. SURVEYS OR ASSESSMENTS REQUIRED

No surveys are required.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

- *British Standards Institution (2023). PAS2080:2023 - Carbon Management in Infrastructure and Built Environment.*
- *Environmental Impact Assessment (EIA) Directive 2014/52/EU*.
- Institute of Environmental Management & Assessment (IEMA) (2020). *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation*.
- Institute of Environmental Management & Assessment (IEMA) (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance.
- The GHG Protocol Corporate Standard (WVCSD and WRI, 2004)
- IEMA guide to Climate Change Resilience and Adaptation (IEMA, 2020).

5. METHODOLOGY

To provide the necessary information with regards to carbon emissions associated with the proposed extension, it is proposed that carbon is scoped out of the EIA and instead a fully detailed Path to Net Zero assessment and technical report (that is currently being prepared) is submitted as part of the planning application. This report can go in to more detail about the emissions but also present a more holistic view of the carbon associated with the existing consented development and the extension combined. Haventus have ongoing annual carbon accounting and pathway to net zero reporting in place already. Data from these processes will be used to inform the EIAR, including the cumulative assessment.

With regards to climate resilience, it is proposed that this has a dedicated section in the project description where details of how the design has considered all the factors or resilience highlighted above. Flood risk is also being carried out as part of the Hydrology assessment and will be reported within that chapter. Climate resilience will also be considered as part of the standard port safety operational processes.

Hydrology & Hydrogeology

TECHNICAL TOPIC - Hydrology & Hydrogeology

1. BASELINE AND KEY FEATURES

Introduction

- This section of the scoping report will address hydrology, hydrogeology, soils, flood risk and water quality.
- The associated interactions with coastal processes, will be considered in the Coastal Processes section, whilst interactions with ecological receptors will be considered in the relevant ecology sections of the EIA Report.

Designations

- Local environmental designations are described in the Coastal Processes technical topic tables.

Geology, Hydrogeology & Soils:

- A single historic borehole record (NH85NW14) within the site boundary, from 1972, indicates medium dense grey silty fine sand to a depth of 60 feet underlain by layers of silt, sand and gravelly sand[1].
- BGS 1:50k geology mapping indicates:
    - Superficial deposits consisting of raised marine deposits of Holocene age – sand and gravel.
    - Superficial mapping indicates no presence of peat within or near the site.
    - Devonian sedimentary bedrock geology, Alves Formation, consisting of pebbly (gravelly) sandstone with subsidiary sandstone.
- BGS 1:625k hydrogeology mapping indicates the site is underlain by a moderately productive aquifer of up to 15 L/s.
- British Geological Society (BGS) 1:50k mySoil mapping classifies the soils of the majority of the site as sand to sandy loam texture of marine/estuarine origin with layered subsoil of land and gravel (Arenaceous-Rudaceous); this transitions along the southern boundary of the site to sand texture of Eolian sand origin with sand-rich (Arenaceous) subsoil.

Topography:

- Recent topographic survey data (June 2024) indicates that ground levels within the consented development area port lie higher than the neighbouring forestry areas, varying between 4 – 17 mAOD (inclusive of material stockpiles at the time of survey, with higher ground located on the western extent of the port.
- Surveying undertaken in 2024 of the woodland area to the south of the port (the western portion of the extension site) indicates ground levels of generally between 2.9 and 4.0 mAOD, with surveying of the area to the south-east of the port (the eastern portion of the extension site) indicating ground levels of geberally between 2.3 and 4.3 mAOD. Ground levels generally fall from south to north, but gradients are slight with appreciable undulation.

1 British Geological Survey. Available at: https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/18896448

Hydrology & Water Quality:

- Within the area to the south of the existing port (forested area), several land drains are located as denoted on SEPA mapping[2]. The main land drains (approx. 4.3 km^2 catchment area) originates south of the extension site, culverting under the road, flowing north through the area of forestry, before connecting into the perimeter drain which is located along the southern boundary of the existing port (Hydro Figure 1). Several smaller land drains are also present within the forested area draining north towards the main perimeter drain.
- While the port perimeter drain is indicated in some mapping to discharge westwards, it is actually graded to fall eastwards towards the inlet of a large twin culvert line located adjacent to the northern end of the main land drain, with this culvert discharging flows northwards under the port site into the inner harbour (Hydro Figure 1).
- An open partially forested area is also present southeast of the proposed site, where several land drains are present that drain north-eastwards (with culverting under the existing site access road) into the saltmarsh area (Hydro Figure 1).
- The water quality status of the land drains are not classified on SEPA WFD.
- The coastal water body of the Hilton of Cadnoll to Whiteness Head is classified under the WFD monitoring programme as being of overall 'Good' status in 2022, with a physico-chem status of 'High' and a hydromorphology status of 'Good'[3].
- The majority of the site is underlain by the Inverness and Ardersier groundwater body, which is classified under the WFD monitoring programme as being of overall 'Good' status in 2022, with a chemical and water quality status of 'Good'[4].

Flood Risk:

- With respect to SEPA's Flood Risk and Land Use Vulnerability Guidance (2024), the proposed development satisfies the classification of both an essential infrastructure usage (associated with renewable, low-carbon and zero emission technologies for electricity generation) that must be located adjacent to the consented port development for operational reasons and a water compatible usage by its operational link to the consented port. While development generally must be located outwith areas of flood risk, NPF4 permits exceptions in the case of water compatible uses, as well as for essential infrastructure which must be placed (within an area of flood risk) for operational reasons.
- SEPA flood maps[4] indicate isolated areas of pluvial flooding (surface water) within the existing port and proposed extension area, some of which correlate with land drain locations.
- SEPA flood maps show minimal coastal flooding along the northern and western boundary of the existing port area during a high likelihood event (1 in 10 year event). Widespread coastal flooding is also shown within the proposed extension area during a high likelihood event extending further west toward the access road during more extreme events (low like hood – 1 in 1000 year – event, and future medium likelihood – 1 in 200 year plus

2 SEPA, 2022. NGR Tool. Available at: https://map.sepa.org.uk/ngrtool/

3 SEPA, 2015. Water Classification Hub. Available at: https://informatics.sepa.org.uk/WaterClassificationHub/

4 SEPA, 2024. SEPA Flood Maps. Available at: https://scottishepa.maps.arcgis.com/apps/webappviewer

climate change - event).

- The main perimeter land drain along the southern boundary of the existing port is tidally influenced.

- SEPA flood maps show fluvial flooding within the western extent of the existing port and lagoon. Fluvial flooding is also shown to impact western areas of the proposed extension site. It should, however, be noted that no watercourses are present within the existing or proposed extension area, with all water features denoted as drains in SEPA's NGR mapping; indicated fluvial flooding is therefore considered to be a mapping artefact.
- Tidal levels and extreme sea levels for Ardersier Port are outlined in the Coastal Processes technical topic tables.

Future Climate

- SEPA's Climate change allowances for flood risk assessment in land use planning, Version 5 (2024) places the site within the North Highland River Basin Region, with the following predicted climate change impacts to the year 2100 based upon UK Climate Projections 2018 (UKCP18) predictions:
  - 40% increase in river flows;
  - 42% increase in rainfall intensity; and
  - 0.89 m sea level rise.

2. LIKELY IMPACT ON THE ENVIRONMENT

The proposed development will involve construction activities in and near the water environment. The key potential environmental impacts on the (landward) water environment during construction and operation have been identified and are outlined below:

- Potential impact on surface water overland flow pathways and pluvial (surface water) flood risk to the site and surrounding area;
- Potential changes to the local surface water drainage network;
- Potential change to coastal flooding; and
- Potential contamination of drainage, and water receptors (lagoon and coastal waterbody) through spillages and/or sediment transfer (oil, fuels and suspended solids).

Impacts on coastal processes are considered in the coastal processes chapter.

3. SURVEYS OR ASSESSMENTS REQUIRED

- Flood Risk Assessment (with respect to surface water flood risk and coastal flood risk)
- Drainage Impact Assessment/Statement
- Topographic survey of land drains, including structures, to inform flood risk assessment

- Water quality (contamination) assessment and monitoring

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

Relevant Planning Policy:

- National Planning Policy 4 (NPF4) (2023);

Relevant Legislation:

- Water Framework Directive (WFD) 2000;
- Water Environment and Water Services (Scotland) Act 2003;
- Flood Risk Management (Scotland) Act 2009;
- Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended (CAR);
- Water Environment (Miscellaneous) (Scotland) Regulations 2017;

Relevant Guidance:

- Guidelines for Water Pollution Prevention from Civil Engineering Contracts;
- Climate change allowances for flood risk assessment in land use planning, Version 5 (SEPA, 2024);
- Flood Risk and Land Use Vulnerability Guidance (SEPA, 2024);
- Guidance for Pollution Prevention (GPP) 1, 2, 3, 5, 6, 8, 13, 21, 22 and 26 (NetRegs, 2021);

5. METHODOLOGY

The assessment will follow standard EIA procedures and will include:

- Desk-based review of the proposed development and water environment;
- Consultation of key stakeholders to obtain relevant information and ensure their concerns are addressed with the EIAR;
- Establish baseline conditions:
    - Review of hydrology, water quality and drainage;
    - Review of flood risk;

- Review of geology and soils; and
- Reporting of baseline conditions to help inform potential impacts from the development.

- Carry out an EIA assessment:
  - Identify potential sensitive environmental receptors and environmental constraints;
  - Identify any potential impacts and impact significance;
  - Identification and assessment of appropriate mitigation measures to reduce and avoid any potential impacts of the proposed development; and
  - Statement of residual impacts.

Baseline data will be used, along with expert opinions, to qualitatively assess the potential impacts of the proposed development and the significance to receptors. The potential impacts will be evaluated in comparison with water quality standards and objectives, environmental quality standards and flood risk standard guidance and planning.

Flood Risk Assessment:

- National Planning Framework 4 (NPF4, 2023) favours development outwith areas of flood risk. Where development is permitted, by exception, within areas of flood risk, it is required that all risks of flooding are understood and addressed, with no increase in flood risk to other receptors permitted. As such, any increase in flood risk impacting receptors is deemed a significant adverse impact that must be avoided or, where permitted by exception, fully mitigated.
- Proposed land raising and alteration of existing land drainage arrangements has the potential to increase surface water flood risk at and south of the extension site boundary. A 1D-2D model-based assessment of flood risk associated with the existing land drains will be undertaken for the 1 in 200 year plus climate change event, to comply with NPF4 requirements and to inform design/sizing requirements of a new perimeter drain. Post-development modelling will be undertaken, for comparison against pre-development predictions, to ensure no unacceptable increase in surface water flood risk to receptors due to the development.
- Proposals also have the potential to alter coastal flood extents relative to existing conditions. Coastal flood risk will be assessed for pre- and post-development conditions, based upon the Environment Agency's Coastal Flood Boundary (CFB) dataset for 1 in 200 year plus climate change conditions, in compliance with NPF4. As the land extension is a sufficient distance from the Moray Firth and separated by the existing port, there is no potential for wave impact upon the site, such that wave analysis (including wave overtopping analysis) is not required as part of coastal flood risk assessment.
- While fluvial flood risk is indicated on SEPA's flood mapping, associated with the existing perimeter drain along the southern boundary of the port

site, this is considered an artefact, as this channel is an artificial land drain which discharges eastwards by culvert into the inner harbour and not a watercourse. Further quantitative assessment of fluvial flood risk can therefore be scoped out of the EIAR.

Drainage Impact Assessment/Statement:

- Site drainage design must comply with Water Environment (Controlled Activities) (Scotland) Regulations 2011, with no adverse (flood risk) impact due to site drainage upon other receptors permitted. As such, any increase in flood risk to other receptors due to site runoff and drainage is deemed a significant adverse impact that must be avoided or fully mitigated.
- It is assumed that the extension site will employ a similar previous site surface achieving direct infiltration as consented for the port facility. In this case, a detailed drainage impact assessment and design will not be required; a drainage design statement and preparation of appropriate design drawings will be sufficient.
- If alternative site drainage provision is preferred, more detailed hydraulic design and assessment of impact may be required, noting that drainage attenuation is not required for direct discharge to coastal waters but would be required for discharge to an inland water feature. In this case, requirements for assessment, design and reporting will be dependant upon the preferred site drainage strategy and will be subject to the requirements of The Highland Council.

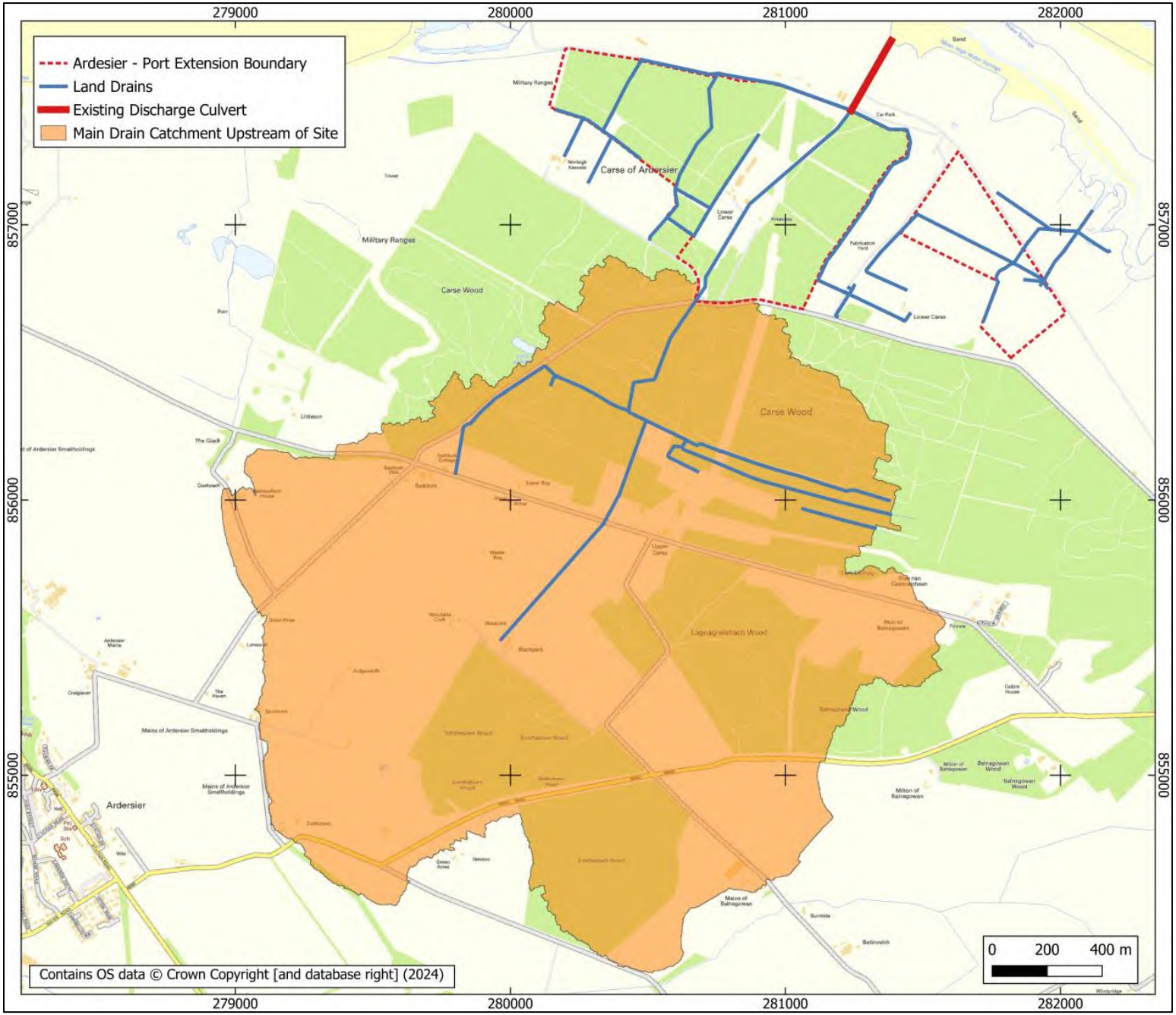
Water Quality Impact Assessment:

Assessment of the potential for chemical contamination of the water environment (drainage network and receptors (lagoon and coastal waterbody) will be scoped into the assessment. The prevention of pollution during construction and operational phases will be of particular focus due to various environmental designations and good overall WFD status of the Hilton of Cadnoll to Whiteness Head coastal waterbody. Recommendations will be made for adoption of good working practices in line with current legislation.

FIGURES

Hydro Figure 1: Land drains discharging within the extension site, with the main land drain catchment extent indicated

Hydro Figure 1: Land drains discharging within the extension site, with the main land drain catchment extent indicated



Coastal Processes and Geomorphology

TECHNICAL TOPIC - Coastal Processes

1. BASELINE AND KEY FEATURES

Introduction

Coastal processes are considered to encompass tides, waves and sediment transport processes. This section of the scoping report will address these subject areas. The associated interactions with the wider water environment, including terrestrial aspects, will be considered in the Hydrology and Hydrogeology section.

Designations

The following designations are of consideration for the proposed development. The site is immediately adjacent to;

- Whiteness Head Site of Special Scientific Interest (SSSI), which is designated for coastal geomorphology, coastal features (saltmarsh, sand dunes and shingle) and marine features (sandflats).
- Inner Moray Firth Special Protection Area (SPA) at Whiteness Head and Whiteness Sands, with the SPA designated for breeding, non-breeding and foraging birds.
- Inner Moray Firth RAMSAR site, qualifying under Criterion 1 (intertidal mudflats and sandflats, with saltmarsh, sand dunes and shingle), plus Criterion 2, 5 and 6 (various bird species).

The site is also partially situated within the Moray Firth Special Area of Conservation (SAC), which is designated for marine features (including marine mammals) (bottlenose dolphin (Tursiops truncatus) and subtidal sandbanks).

Geology and Seabed Sediment

British Geological Survey (BGS) 1:250k indicates marine sediment is primarily comprised of sand and muddy sand on the seabed north of Ardersier Port[1]. Previous phases of sediment sampling indicate that Whiteness Sands, the spit and surrounding channels are formed in mobile sand deposits. These mainly comprise of sand fractions varying between fine sand to medium-coarse sand. Gravel deposits are also present on the surface of the spit, predominantly at and above the high water mark.

Sediment within the immediate vicinity of the proposed development is generally associated with present day processes, however, chart annotations of seabed conditions highlight adjacent areas of drift deposit exposure. These annotations indicate there are two eroding Holocene or Pleistocene deposits in the area, the foreshore and offshore area to the east of the spit, and the Fort George narrows area. In these two zones recent deposits are likely thin or absent, with erosion providing an important source of gravel to be reworked by present day processes.

Topography and Bathymetry

The local bathymetry of the harbour and navigational channel at Ardersier has been subject to change over recent years, both as a result of dynamic natural processes and recent dredging operations. Historic dredging took place up to 2001 when the port was previously operational, following closure

1 British Geological Society. GeoIndex Offshore.

of the port, natural processes of spit extension and sediment deposition altered the channel platform and harbour bathymetry, before more recent dredging operations commenced in 2022 in the outer harbour up to a consented dredge depth of -6.5 metres chart datum (mCD).

Successive bathymetry surveys have been undertaken over recent years, with some of the most recent undertaken in June 2024. Within the outer harbour bed levels ranged between -7mCD to +1.8 mCD, with deeper bed levels associated with the extents of recent dredging in the centre of the channel and shallower levels present at the harbour edge, adjacent to the land and spit. Within the inner harbour bed levels are shallower varying between approximately – 5 mCD to +2.7 mCD.

Comparison of the June 2024 bed levels to previous surveys has indicated that the intertidal spit continues to extend north-west, with a westward recurve of the terrestrial spit head. Limited deposition is also occurring within the harbour. More limited change is observed further west on Whiteness Sands, generally restricted to the areas of deposition and erosion along the shoreline and intertidal/subtidal boundary.

Tidal Regime and Levels

- Tidal levels at Ardersier Port as presented within the Admiralty Tide Tables[2] are outlined below:
    - Highest Astronomical Tide (HAT) +4.8 mCD (+2.66 metres relative to Ordnance Datum (mOD));
    - Mean High Water Springs (MHWS) +4.2 mCD (+2.06 mOD);
    - Mean High Water Neap (MHWN) +3.3 mCD (+1.16 mOD);
    - Mean Sea Level (MSL) +2.5 mCD (+0.36 mOD);
    - Mean Low Water Neap (MLWN) +1.7 mCD (-0.44 mOD); and
    - Mean Low Water Springs (MLWS) +0.9 mCD (-1.24 mOD).
- Tidal Levels show a maximum astronomical tidal range of 4.6 m, a mean spring tidal range of 3.3 m and mean neap tidal range of 1.6 m.
- The SEPA derived extreme sea levels for a nearby offshore point are 3.35 mAOD for a 1 in 200 year return period and 3.51 mAOD for a 1 in 1000 year return period.
- Coastal flood risk is considered further in the hydrology and hydrogeology chapter.

Coastal Processes

- Previous assessments indicate that the proposed development is situated in a zone of dynamic coastal processes. The established conceptual model of coastal processes (see Coastal Processes Figure 1) includes a dominant longshore transport of sand and gravel along the eastern shore of Whiteness Head spit resulting in continued spit extension to the north-west, with recurves to the west. A continuity of this north-western transport pathway is highlighted, both offshore to the deeper waters of the main channel, and further west to the north-eastern intertidal and subtidal margin of Whiteness Sands. A pathway for offshore movement of sand from the northern margin of Whiteness Sands is also present, along with a returning eastern transport pathway further offshore. This eastern pathway is considered to also contribute sediment to the harbour, and the southern coastline of Whiteness Sands. The sheltered waters of the harbour are a lower energy depositional setting. Central areas of Whiteness

2 UKHO (2024). Admiralty Tide Tables Volume 1B: United Kingdom and Ireland (Excluding Isles of Scilly, English Channel to River Humber, Channel Islands and European Channel Ports) (Vol. 1).

Sands are considered to be generally stable within the local context of Whiteness Head.

- The local coastal system has been subject to a long history of modification associated with historic dredging during previous site operations, along with more recent dredging activities. This history remains an influence on present day processes particularly on the extent and direction of spit head recurve, and on the volume of water exchanged within the tidal inlet. There are resultant localised impacts on currents and sediment processes, while wider scale processes continue uninterrupted.
- Previous assessments have highlighted that local sediment transport processes are particularly influenced by wind and wave forcing from the 0 – 90 degree sector. The occurrence of storm events from this sector is likely to result in significant sediment transport and deposition locally.

Future Climate

- SEPA[3] advise a sea level rise allowance to the year 2100 within the North Highland River Basin of 0.89m.
- There is currently no consensus[4] on future climate wave climate and storm activity.

2. LIKELY IMPACT ON THE ENVIRONMENT

- The proposed development represents an extension to previously consented and licenced development layouts. In 2018 a previous layout was consented at Ardersier including dredging to -6.5 mCD in the outer harbour and -3mCD in the inner harbour. Within that application the EIAR chapter for coastal processes determined that there was the potential for effects of moderate or major significance, impacting the head of Whiteness Spit, Whiteness Sands, and associated designations. Subsequently, a dredge licence revision was issued for a revised development layout, including a deeper dredge pocket to -12.9 mCD in the outer harbour.
- In comparison to the currently licenced development, the main proposed change is a deeper dredge pocket within a portion of the inner harbour, up to -12.5 mCD. In the outer harbour and navigation channel the proposed dredge depth will be up to -12.9 mCD, as per the currently licenced proposals .
- The increase in proposed depth of dredge within the inner harbour has the potential to impact tidal flows in and out of the harbour, as well as the transmission of waves. Any such changes would have the potential to impact associated processes and surrounding habitats, including intertidal areas and saltmarsh. Given the low energy depositional setting of the inner harbour, it is considered that whilst associated impacts to sediment transport processes would be possible, it is likely that these would be of localised extent and limited magnitude, and a function of the post-development wave and tidal climate.
- Proposed rock armour would be restricted to the base of the dredge channel to mitigate propeller wash and suction effects, within the inner

3 SEPA, 2024. Climate change allowances for flood risk assessment in land use planning. Version 5. Available at: *https://www.sepa.org.uk/media/fxjgfjmf/climate-change-allowances-guidance.docx*

4 Marine Climate Change Impacts Partnership. Available at: *https://www.mccip.org.uk/all-uk/uk-impacts/hub/physical-environment*

harbour only, where required. It is considered any such placement would be at significant depth, and have minimal impact on surrounding processes.

- The proposed maintenance dredge of the channel west of tern island is intended to prevent the channel silting up, thus maintaining the island feature and associated valuable habitat. This would only be undertaken immediately in advance of tern breeding season, where required. This activity is intended to produce a positive environmental impact.
- The proposed development will involve construction in and near the coastal water environment. The potential impacts to coastal processes during construction and operation in comparison to baseline conditions are outlined below:
    - Potential changes in local coastal processes including wave climate, tidal currents, and sediment transport; and
    - Potential interaction between water environments, coastal processes and associated impacts on ecology (including saltmarsh and spit) and environmental designations.
- Potential impacts related to water quality and coastal flooding are considered in the hydrology and hydrogeology chapter.

3. SURVEYS OR ASSESSMENTS REQUIRED

- Assessment of the potential for impact to tidal currents and wave climate will be scoped in to the EIA, informed by updated hydrodynamic and spectral wave modelling, and comparison to previous phases of assessment. It is proposed that the modelling studies assess the potential differential impact on tidal and wave climate between the proposed development and the previously licenced iteration.
- Given the relatively low energy setting of the inner harbour, it is proposed to scope in a qualitative assessment of impact to sediment transport, informed in by the findings of the above hydrodynamic and spectral wave modelling studies, and previous phases of technical assessments and modelling.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

Relevant Planning Policy

- National Planning Policy 4 (NPF4) (2023);
- UK Marine Policy Statement (2011); and
- Scotland's National Marine Plan (2015).

Relevant Legislation

- Water Framework Directive (WFD) 2000;
- Water Environment and Water Services (Scotland) Act 2003;
- Marine (Scotland) Act 2010;
- Coast Protection Act 1949;

Relevant Guidance

- SEPA Flood Modelling Guidance for Responsible Authorities, Version 1.1

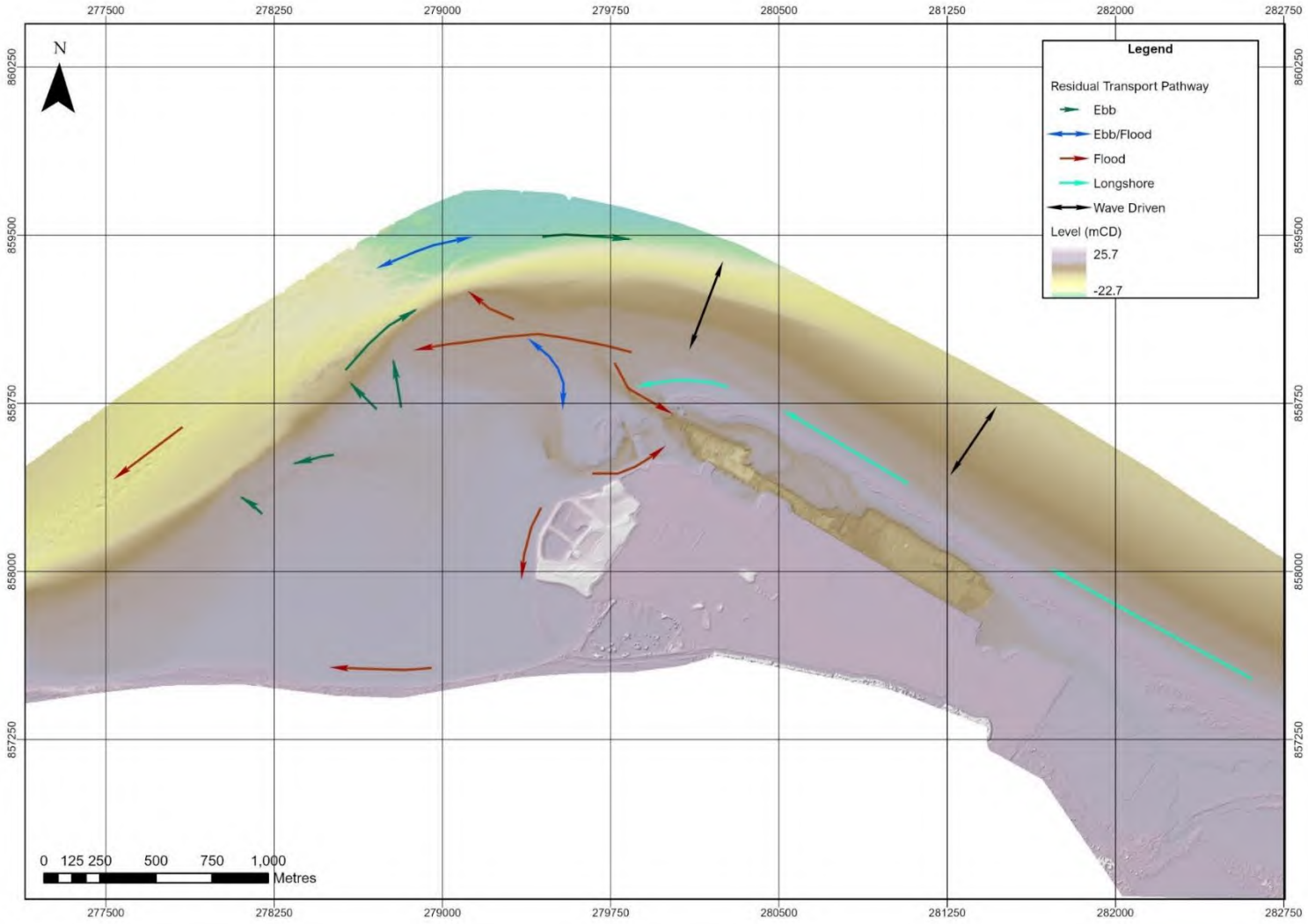
5. METHODOLOGY

- The assessment will follow standard EIA procedures and will include:
    - Desk based review of the proposed development and surrounding coastal water environment;
    - Consultation of key stakeholders to obtain relevant information and ensure their concerns are addressed within the EIAR;
    - Establish baseline conditions:
        - Review of coastal processes including bathymetry, wind climate, tidal currents and levels including extreme water levels, wave action and sediment transport;
        - Review of offshore geology and seabed sediment; and
        - Reporting of baseline conditions to help inform potential impacts from the development.
    - Undertake hydraulic modelling and spectral wave modelling study for proposed development.
    - Carry out an EIA for coastal processes:
        - Identify potential sensitive environmental receptors and environmental constraints;
        - Baseline data will be reviewed along with expert opinion, findings of hydraulic modelling and previous technical assessment to assess the potential impacts of the proposed development and the associated significance to receptors.
        - Identification and assessment of appropriate mitigation measures to reduce and avoid any potential impacts of the proposed development; and
        - Statement of residual impacts.

FIGURES

Figure 1: Conceptual Model of Sediment Transport Pathways

Figure 1: Conceptual Model of Sediment Transport Pathways



Geology, Soils and Contaminated Land

TECHNICAL TOPIC - Geology, Soils, Contamination

1. BASELINE AND KEY FEATURES

Bedrock

Alves Formation – Devonian Sandstone, pebbly (gravelly) at depth below the site, bedrock has not been encountered in recent boreholes.

Superficial Deposits

Existing platform of dredged sands over former intertidal sand and silt deposits with some sand and gravels, raised Marine Deposits Of Holocene Age, extension area – mostly sands and gravels (raised marine deposits), with some blown sand deposits locally.

Relevant information from Fletcher, T P, Auton, C A, Highton, A J, Merritt, J W, Robertson, S, and Rollin, K E. 1996. Geology of the Fortrose and eastern Inverness district. Memoir of the British Geological Survey, Sheet 84W (Scotland):

- Mineral deposits - Little metalliferous mineralisation is known in the district. At surface, notable occurrences of manganese, iron and copper have been recorded, but the limited investigations carried out so far indicate little economic potential.

Soils Extension Area

Soil maps of Scotland at a scale of 1:250 000. Macaulay Institute for Soil Research show the existing site to be underlain by Humus iron podzols, regosols and some gleys, alongside noncalcareous gleys. The extension area is predominantly noncalcareous gleys.

Topsoil thicknesses observed in cuttings and exposures around the edge of the western extension area are very thin , often 10cm or less as shown in the two images Figures 1 and 2.

Dredge Area Characteristics

Marine boreholes were carried out within the planned dredge area by Solmek in March 2023 (Phase 2: Site Investigation, Marine Scotland Boreholes, Ardersier Port, Report S230232). Twelve boreholes were located within the dredging extension area. These were drilled to at least -12.9mCD encountering generally sands, sands and gravels, which can be occasionally silty. Bedrock was not encountered in any boreholes.

Designated Areas

The Whiteness Sands SSSI to the north of the development area is dominantly a geomorphological designation and is considered under the Coastal Processes inputs to the scoping document.

The other closest geological designation is the Ardersier Glacial Deposits SSSI, which is greater than 2km from the extension area boundary (to the west-south-west).

Contamination

Historical maps on the National Map Library of Scotland website have been reviewed as far back as the 1st edition OS 6" map series of 1830s to 1880s. No evidence of development in the area other than dwelling houses and farm buildings (which are consistently present since the 1830s to 1880s map series) has been found within the extension areas.

Within the proposed dredge area twelve boreholes were drilled with samples taken for chemical analysis at 6.5m, 9.5m and 12,5m below chart datum. No significant contamination was evident in the test results.

2. LIKELY IMPACT ON THE ENVIRONMENT

Bedrock geology is not expected to be altered by the development as bedrock lies at depth below the site. Superficial deposits will also largely be unaffected, although they will be buried by the platform creation, they will not be lost.

No significant impacts from loss of soils from a geological perspective are envisaged. Habitat related impacts are considered under Biodiversity sections of scoping.

No superficial mineral resources are known to be present, and bedrock is at depth below the site so no loss of economic resources is expected.

No direct or indirect effects will be realised on Whiteness Sands SSSI or the Ardersier Glacial Deposits SSSI through extension creation and potential indirect effects on the spit will be considered under Coastal Processes.

No developments with potential to result in significant ground contamination appear to have ever been present on the extension areas.

Given no significant effects are anticipated geology, soils and contamination should be scoped out initially from a full chapter assessment. Ground investigations of the extension will include targeted sampling prior to development to confirm contamination status. Should any localised contamination be found a specific plan would be formulated at that time. For the dredge material existing chemical data will be re-evaluated with

3. SURVEYS OR ASSESSMENTS REQUIRED

Surveys are not considered to required for an geology or soils assessment perspective. Ground investigations will be carried out for geotechnical design purposes and confirmation of contamination status. Geology and soils information will be used however to inform hydrological and coastal processes assessments.

A Best Practicable Environmental Options (BPEO) assessment will carried out to establish the most appropriate route for dredge arisings (disposal or reuse) and this will include a chemical quality risk assessment. Supplementary marine investigations in the dredge pocket may be required to inform the BPEO.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

N/A at this time

5. METHODOLOGY

N/A Geology soils and contamination should be scoped out

FIGURES

Geology & Soils Figure 1. Image showing current topsoil thickness on proposed extension site

Geology & Soils Figure 2. Image showing current topsoil thickness on proposed extension site (different location)

Terrestrial Ecology

TECHNICAL TOPIC - Terrestrial Ecology and Biodiversity

1. BASELINE AND KEY FEATURES

This EIA topic relates to the direct and indirect impacts of the 'terrestrial site clearance and construction activity' part of the Proposed Development, as well as indirect terrestrial impacts of the 'marine works' and 'additional operational activities'. For coastal and marine ecology, please see that EIA topic section of the Scoping Report. For the purposes of this section, the extension site comprises two extension areas amount to a total of 197acres (79.7 hectares) of additional land.

An understanding of the proposed (and adjacent Ardersier) site's ecological baseline has been informed by the following data:

- HED Ltd. Ardersier Port Preliminary Ecological Appraisal (various landholdings)
- HED Ltd Haventus - Confidential Annex Ver 1.2
- Ardersier Port.TREE CONSTRAINTS PLAN & Tree Survey Schedule 2024
- Envirocentre Ardersier port Habitat and vegetation appendix D INNS 2024
- Envirocentre Ardersier Breeding Bird Survey Report_Final 2024
- Envirocentre Ardersier Updated Protected Species Survey Report 2024
- Envirocentre Ardersier Port Habitats & Vegetation *draft for comment* 2024

The site's dominant habitat is maturing Scot's pine (Pinus sylverstris) plantation woodland, managed in a commercial sense. Small areas of semi natural broadleaf woodland and scrub are integrated into the coniferous plantation and may be associated with wet areas, drainage channels, or old land boundaries. Holcus-juncus neutral grassland (M23b) is present as well as remnant dune-slack community (SD17d) reported to display a reducing saltwater influence as a result of historic infrastructure installation.

There is a recorded history of the site being used by a range of raptors and Schedule 1 birds. The HED studies of 2024 recorded several raptor nests (non-descript) within the pine woodlands.

New Zealand pygmyweed (*Crassula helmsii*), an invasive species, is present beyond the northern boundary and may be assocated with water bodies/water courses in the site.

Creeping Lady's-tresses (*Goodyera repens*), a GB redlisted species, often found within planted *Pinus* on stabilized sand dunes, was recorded frequently in the woodland habitat.

Baseline studies observed Red squirrel (*Scuirus vulgaris*)and their dreys, badger (*Meles meles*) setts, pine marten (*Martes martes*) field evidence, suggesting dens are present within the habitat. Suitable habitat for Great Crested Newt (*Triturus cristatus*), otter (*Lutra lutra*), reptiles i.e. common lizard (*Zootoca vivipara*) and slow worm (*Anguis fragilis*) was noted although no direct observation or field evidence was recorded. In respect to Great Crested Newt, whilst this species can be found in coastal dune and shingle habtiats, the waterbodies on the wider Ardersier site in 2018 were recorded as brackish and

eDNA sampling produced a negative result for this species.

The following statutory Designated Sites are present within 10km:

- Whiteness SSSI located <700m north west and north east of the site with notified natural features: coastal geomorphology, non-breeding birds, sandflats, saltmarsh, sand dunes, shingle *SSSI_Citation_1633.pdf*
- Ardersier Glacial Deposits SSSI located c 2km west of the site with notified natural features: glacial and marine deposits *SSSI_Citation_71.pdf*
- Kildrummie Kaines SSSI located c.4km south of the site with notified natural features: Braided esker ridges and associated glaciofluvial landforms, fens, eutrophic freshwater loch, and juniper woodland habitat *SSSI_Citation_845.pdf*
- Culbin Sands Forest and Findhorn Bay SSSI located c.9km east of the site with notified natural features coastal geology, geomorphology, supporting vascular plants, invertebrates, lichens and fungi *SSSI_Citation_478.pdf*
- Cawdor Wood SSSI located c. 8km south of the site with notified natural features Upland oak woodland and lichen assemblages *SSSI_Citation_349.pdf*
- Rosemarkie and Shandwhich Coast SSSI located c.5km west of the site with notified natural features: Geological features supporting nesting seabirds, upland birch woodland including lichen and bryophyte assemblages *SSSI_Citation_1376.pdf*
- Longman and Castle Stuart Bays SSSI located c.10km south west of the site with notified natural features: coastal eelgrass beds, mudflats, and saltmarsh, assemblage of wintering wildfowl and waders including nationally important populations of cormorant, goldeneye, red breasted merganser, redshank and wigeon *SSSI_Citation_1675.pdf*
- The Dens SSSI located c. 5km west of the site with notified natural features: glacial deposits, knife edge ridges and gullies *SSSI_Citation_1531.pdf*
- Moray Firth SAC: a body of sea located around the north-east mainland coast <700m from the site supporting Bottlenose Dolphin and Subtidal sandbanks. *Conservation_and_Management_Advice_8327.pdf*
- Cawdor Wood SAC Old sessile oak woods with Ilex and Blechnum in the British Isles located c.8km south of the site: *Conservation_Advice_Package_8222.pdf*
- Moray Firth SPA a body of sea located around the north-east mainland coast supporting populations of European importance migratory species <700m from the site: *SPA_Citation_10490 (1).pdf*
- Inner Moray Firth SPA comprises the Beauly Firth and Inverness Firth which together form the eastern-most estuarine component of the Moray Basin <700m from the site supporting populations of European importance of the Annex 1 species, migratory species, and supporting in excess of 20,000 individual waterfowl: *SPA_Citation_8515 (1).pdf*
- Inner Moray Firth Ramsar (Wetlands of international importance) is located as per the SPA (above), on the north Ardersier coast <700m from the site; *Ramsar_Site_Citation_8430.pdf*

2. LIKELY IMPACT ON THE ENVIRONMENT

The development appraisal will be split between Construction (including initial forest harvesting, vegetation and soil removal) and Operation of the facility.

To facilitate construction the proposal will lead to an unavoidable habitat loss, with limited opportunity within the site boundary to replace, recreate or enhance any retained habitat features. Ecological initiatives are expected to continue and to be increased in relation to the wider Ardersier site, particularly in relation to nesting resources for seabird colonies.

Forest harvesting and the construction process would require exclusion and closure of recorded badger setts, and perhaps sett features which have not yet been recorded. This may cause territorial shift in local badger social clans. Removal of the pine woodland will result in displacement of red squirrel and pine marten to neighbouring habitats, and a loss of nesting resource for a range of breeding birds, including raptors, will occur. The process would risk disturbance to and loss of potential habitat resource for: otter, water vole, bats (foraging resource and potential roosts), amphibians and reptiles. Demolition of buildings within the site boundary could result in the loss of structures that may host roosting bats and nesting birds.

Construction site activities and operational activities may disturb wintering and marine birds present in the locale through noise, lighting, pollution and air quality risk, vehicle/boat movement and general human activity on site and in the near landscape.

The land use change can be expected to create impacts to the water environment including loss of existing minor watercourses, remnant duneslack displaying some wetland characteristics, examples of wet woodland and grassland noted within the habitat surveys and impacts on associated aquatic ecology.

3. SURVEYS OR ASSESSMENTS REQUIRED

List essentially:

In order to inform the understanding of the baseline, the following additional surveys are proposed:

- Breeding bird survey of the site plus a buffer area suitable to capture activity of raptor species as per Disturbance Distances in selected Scottish Bird Species – NatureScot Guidance Disturbance Distances in selected Scottish Bird Species – NatureScot Guidance | NatureScot
- Badger survey of the site plus extending up to 1km radius of accessible land.
- Great Crested Newt and eDNA survey of the waterbodies on site and up to 500m from site.
- Ground Level Tree Assessment (GLTA) for bat roosts on site and up to 50m from the site boundary.
- Bat surveys of structures on site and adjacent to the site boundary if present, focussed on buildings to be demolished, or where loss of adjacent habitat would negatively affect a roost within a structure to be retained.
- Deployment of at least 3 x static recorders to collect data on bat species diversity and an indication of activity frequency within the habitats to be removed from site.
- Reptile refugia/hibernacula feature mapping on site within habitats to be removed.
- Pine marten den feature mapping on site and up to 50m from the site boundary.

- Red squirrel survey and drey mapping on site and up to 50m from the site boundary.
- Otter and water vole updated baseline surveys on site and of waterbodies up to 250m from the site boundary.

The above surveys will be followed by assessment, mitigation or species protection plans:

- Maintain breeding bird baseline data, leading to ornithological impact assessment and breeding bird protection planning.
- Targeted badger survey to accurately map the location of different sett types which could be attributed to the site's social clan(s). Dependant on these results, badger bait marking may be required to indicate the extent of social clan boundaries. The aim of targeted badger survey effort would be to qualify the expected impact on badger and publish the early version of a site-specific badger protection plan to be refined prior to
application for licence able activities.
- eDNA sampling to ascertain the status of the waterbodies on site and inform likely presence/absence of Great Crested Newt and inform any ongoing study, licensing processes, species protection and mitigation plans.
- Targeted GLTA for bats and roost assessment (aerial investigation/activity survey) to map all trees on site which could or are confirmed to host roosting bats.
- Bat surveys of structures scheduled for demolition, and/or those connected to habitat which is expected to be removed. Deployment of static recorders to collect data on bat activity across the site to ascertain species diversity attributable to the habitat to be removed. On the assumption that bat roosts are present in trees and buildings (typical) it is expected that a bat species protection plan and licencing process would be required as well as seasonal programmed avoidance and mitigation measures.
- Produce a mitigation plan to inform forestry operations and groundworks as to the sensitive, planned disruption to typical reptile refugia/hibernacla (i.e. log piles, rock piles etc.).
- Maintain baseline data, leading up to pre-felling/pre construction surveys, for Pine marten, Badger, Red squirrel, otter. water vole, reptile refugia/hibernacla and appropriate CEMP information or Species Protection Plans (SPP) as required.

Habitat Regulations Appraisal is anticipated due to the proximity of the proposal to designated sites.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

Legislation:

- The Conservation (Natural Habitats, &c.) Regulations 1994
- Nature Conservation (Scotland) Act 2004
- Wildlife and Countryside Act 1981 (as amended by the Wildlife and Natural Environment (Scotland) Act 2011)
- Protection of Badgers Act 1992 as amended by the Wildlife and Natural Environment (Scotland) Act 2011.

Guidance:

- CIEEM Guidelines for Ecological Impact Assessment (EcIA) V1.3 (2024)
- Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th edition (2023)
- Surveying for Badgers Good Practice Guidelines by Scottish Badgers (2018)
- Forestry operations and badger setts; Forestry Practice Guide (1995)
- UK BAP Mammals Interim Guidance for Survey Methodologies, Impact Assessment and Mitigation (2012)
- Great Crested Newt Conservation Handbook, Froglife (2001)
- Good Practice Guidance for Amphibians and Reptiles, produced by Stuart Otway, Jim Foster and Paul Edgar (2004)
- Otters & Development, NIEA (nd)
- Bird Survey & Assessment Steering Group. Bird Survey Guidelines for assessing ecological impacts (2024)

5. METHODOLOGY

Targeted Survey Methods will be designed in reference to the standard guidance documents as listed above and are described in summary format be-

low: **Bats**

Preliminary Bat Roost Assessment will be conducted to search for features in buildings on site which could serve to host roosting bats. Bat activity survey of the buildings on site would be conducted by vantage point observation, sound and image recording during the optimum time of year.

A visual search of all trees in the site which present Potential Roost Features will be made. These trees will subsequently be subject to elevated inspection to accurately categorise their roost features. Those scoped to provide conditions for multiple roosting bats will be subject to further investigation to ascertain likely presence/absence.

The habitats across the site will be subject to deployment of static recording units during the bat activity season to provide data on species diversity and an indication of frequency of use in order to provide information on the impact assessment of habitat loss. Guidance encourages recording to cover the period April to October. Given the likely project proposal and planning submission timeline, it is suggested that an interim analysis is conducted to inform the impact assessment and recording continues for future data analysis if required.

Badger

The site plus up to 1km radius will be searched to locate, map and characterise badger sett features. If the project appears to require the loss of a main badger sett, or significant territory of the site's social badger clan, a bait marking exercise will be undertaken to map badger territories and provide information on the impact of habitat loss.

Red squirrel

Red squirrel dreys will be located by conducting walked transects through the woodland and recording drey location and type (breeding/ non breeding) and their GPS location. Results will be mapped and information used to inform the impact assessment.

GCN eDNA

The window for sampling if from mid-April to end of June (as this is when GCN are present in the waterbodies). If the sample comes back as negative, then no further survey is required.

Breeding bird surveys

A series of breeding bird surveys will be undertaken by monthly visits in spring and early summer comprising vantage point and transect style observations, to ascertain bird species diversity, nest locations, territories, and presence of Schedule 1 bird species and provide information on the impact of habitat loss.

Otter, Pine Marten and Water vole

Baseline data for these species will be maintained by completing a regime of 'walkover' survey leading up to pre-construction checks to search for field signs of the species. This will include searches for scat/spraint/droppings, surveys of water courses, searches for likely den sites such as piles of stone, tree cavities, and mammal burrows. The results of which will inform the impact assessment as required, the CEMP and need for any licensing process.

Impact assessment method to align with CIEEM EcIA guidance:

- **Establishment of baseline**
- **Consultation proposed**
- **Identification of impacts:** Direct, indirect, cumulative
  - Construction phase
  - Operational phase
- **Identification of embedded mitigation measures**
  - Construction phase
  - Operational phase
  - Additional mitigation/ off site compensation
- **Assessment of residual effects and monitoring**

Marine Mammals

TECHNICAL TOPIC - Marine Mammals

1. BASELINE AND KEY FEATURES

The marine mammal species most likely to be present in the Port of Ardersier area and Inner Moray Firth include: minke whale; bottlenose dolphin; harbour porpoise; grey seal; and harbour seal. Other marine mammal species that have been sighted along the east coast of Scotland and in the wider Moray Firth area include humpback whale, killer whale, Risso's dolphin, white-beaked dolphin and Atlantic white-sided dolphin, although they are rarely sighted and are thus have not been considered within the scoping report further.

The data sources that shall be used to inform the marine mammal chapter of this scoping report are presented within Table 2 (included after this table). These identified data sources will be taken forward and detailed fully in a marine mammal baseline characterisation report, which will identify the most appropriate reference populations and density estimates to be used in the quantitative EIA.

2.1 Study Area

The study area for marine mammals varies depending on the species, as each species requires individual consideration based on differing ecology and behaviour. The marine mammal study area has therefore been defined at two spatial scales; a regional scale study area and the local scale study area.

The regional scale study area encompasses a wider geographic context in terms of species presence, estimated densities and abundance. This scale defines the appropriate reference populations for the assessment. The regional study area for each of the key marine mammal species is as follows:

- Bottlenose dolphin: Moray Firth Coastal East Scotland (CES) Management Unit (MU);
- Harbour seal: Moray Firth Seal Management Unit (SMU);
- Grey seal: Moray Firth SMU;
- Harbour porpoise North Sea (NS) MU;
- Minke whale: Celtic and Greater North Seas (CGNS) MU.

The local study area consists of the waters surrounding the Port of Ardersier development site, namely the Inner Moray Firth (which includes the Moray Firth SAC and the Cromarty Firth) which will therefore be the focus of this report. The extent of the regional study area with regard to marine mammal MUs is shown in Marine Mammals Figure 1. The Port of Ardersier ETF expansion within the local scale study area of the Inner Moray Firth is shown in Marine Mammals Figure 2.

2.2 Description of baseline environment

2.2.1 Cetaceans

Bottlenose dolphin

In the UK, bottlenose dolphins have been assessed as having an 'Unknown' Overall Conservation Status (JNCC 2019a), although the CES MU population is increasing (Cheney et al. 2024). The Port of Ardersier is located within the CES MU, which contains the Moray Firth SAC (within which bottlenose dolphins are a protected feature). The Moray Firth SAC will therefore be scoped into this assessment (see 2.2.3 Designated Sites). The population estimate for the

CES MU was 245 dolphins in 2022 (95%CI: 224-268), with a three year weighted mean abundance estimate of 226 (95% CI of 214-239) (Cheney et al. 2024). Individuals associated with the Moray Firth SAC are primarily observed within shallow (<20 m deep), nearshore waters of eastern Scotland (within 2 km), in particular the waters of the inner and southern coast of the Moray Firth, the Aberdeenshire coast and Tayside (Quick et al. 2014). Recent reports have indicated an increase in sightings of bottlenose dolphins from this population in the Firth of Forth and as far south as the coast of northern England (Arso Civil et al. 2022).

No bottlenose dolphins were identified in SCANS IV Block CS-K in July 2022 (Gilles et al. 2023). This does not mean a lack of bottlenose dolphin in the area, as it is noted that the SCANS surveys are not designed for small coastal populations. Thompson et al. (2015) provides the predicted spatial variation in the probability of detecting bottlenose dolphins across the Moray Firth (Marine Mammals Figure 3). While this gives an indication of the distribution of bottlenose dolphins in the Moray Firth, it does not provide density estimates that could be used in a quantitative assessment. The University of Aberdeen Lighthouse Field Station (LHFS) has undertaken bottlenose dolphin photo ID surveys in the Moray Firth since 1989. Marine Mammals Figure 4 shows areas within the Moray Firth SAC covered by these surveys in between 2017-2022 and locations with encounters with bottlenose dolphins (Cheney et al. 2024). Within the SAC, median group size ranged from 6 to 10 between 2017 and 2022, and it was estimated that 94 different individual dolphins used the SAC in 2022 (Cheney et al. 2024). While the photo-ID surveys provide data to estimate the population size, it does not provide density estimates that could be used in a quantitative assessment.

There are no good density data for bottlenose dolphins in the Moray Firth as the SAC surveys are designed to monitor abundance not density. The baseline characterisation report will provide more information on the probability of bottlenose dolphins being present in the area around the Port of Ardersier based on detections from photo ID surveys and detections at the long term PAM sites at Chanonry and the Sutors (and additional PAM data from the 2025 dredging campaign if available in time for the assessment).

Harbour porpoise

The Port of Ardersier is located within the North Sea NS harbour porpoise MU. The population estimate for the NS MU based on SCANS III data is 346,601 harbour porpoise (95% CI: 289,498 – 419,967, CV: 0.09) (IAMMWG 2023). The UK portion of this MU has an estimated abundance of 159,632 porpoise (95% CI: 127,442 – 199,954, CV: 0.12) (IAMMWG 2023). The conservation status of harbour porpoise in UK waters has been updated by the JNCC (2019b) which concludes a favourable assessment of future prospects and range, but an unknown conclusion for population size and habitat. This resulted in an overall assessment of conservation status of “Unknown” and an overall trend in Conservation status of “Unknown”. A trend analysis indicates that the harbour porpoise abundance in the North Sea is stable and has not changed since 1994, although the associated confidence intervals (CIs) are quite wide (JNCC 2019b, Hammond et al. 2021). The only SAC for harbour porpoise in the North Sea MU is the Southern North Sea SAC (>300km away from the Port of Ardersier). This SAC is too far from the development site to be scoped into the assessment (see 2.2.3 Designated Sites).

The Port of Ardersier is located in SCANS IV block CS-K, where there was an estimated density of 0.2813 harbour porpoise/km^2 in July 2022 (Gilles et al. 2023). According to results from SCANS III, the density of harbour porpoise in the cell closest to waters surrounding the Port of Ardersier from 2016 surveys was 0.373 animals per km^2.

In the Moray Firth, C-PoDs have been used to assess the spatio-temporal variation in occurrence and foraging activity in harbour porpoise (Williamson et al. 2022). Results demonstrated that porpoise detections were highest (detections made across 23 hrs/day) in the outer Moray Firth (along the Smith Bank) between July and September, but detections decreased in October (10 – 12 hrs/day). In the central Moray Firth, detection rates were lower (8 - 12 hrs/day) and in the inner Moray Firth detections were lower still (1 – 5 hrs/day) (see (Marine Mammals Figure 5). (Williamson et al. 2022). Harbour porpoises were detected most frequently (in 41% of surveyed hours) in offshore areas that had the lowest dolphin density (Williamson et al. 2022), though note that this data source does not provide a density estimate which can be used within a quantitative assessment.

[2] https://www.chelonia.co.uk/cpod_home_page.htm

Minke whale

The Port of Ardersier lies within the Celtic and Greater North Seas CGNS minke whale MU. Minke whale sightings are widely distributed, with sightings occurring between January and October with a peak between June and August, though minke whales are present in coastal UK waters year-round (Evans et al. 2011). In the UK, minke whales have been assessed as having an 'Unknown' Overall Conservation Status (JNCC 2019c). The population estimate for the CGNS MU based on SCANS-III (Hammond et al. 2017, Hammond et al. 2021) and ObSERVE data (Rogan et al. 2018) is 20,118 minke whales (95% CI: 14,061 – 28,786, CV: 018). The UK portion of this MU has an estimated abundance of 10,288 (95% CI: 6,210 – 17,042, CV: 0.26) (Rogan et al. 2018, Hammond et al. 2021, IAMMWG 2023).

The Port of Ardersier is located in SCANS IV block CS-K, where there was an estimated density of 0.0116 minke whale/km^2 in July 2022 (Gilles et al. 2023). According to results from SCANS III, the density of minke whales in the cell closest to waters surrounding the Port of Ardersier from 2016 surveys was 0.032 animals per km^2.

The closest designated site for minke whales to the Port of Ardersier is the Southern Trench Nature Conservation Marine Protected Area (NCMPA). The Port of Ardersier is located approximately 64 km west of the NCMPA by sea. This site persistently supports higher than average densities of minke whales, providing feeding grounds for juveniles and adults (NatureScot 2020) (Marine Mammals Figure 6). Although 64km west of the Port of Ardersier, vessel activity to and from the development site could impact the NCMPA. Therefore, without knowledge of planned vessel routes this NCMPA cannot be scoped out at this stage.

2.2.2 Pinnipeds

Harbour seal

The Port of Ardersier is located within the Moray Firth seal MU. The overall Conservation Status of harbour seals in UK waters has been assessed as 'Unfavourable – Inadequate' with an unknown overall trend in Conservation Status (JNCC 2013). The Moray Firth SMU August haul-out count in 2021 was 32% lower than the 2019 count (SCOS 2023).

For harbour seals, many breeding sites, which are monitored for pup production, are designated as SACs. The closest of these SACs to the Port of Ardersier for harbour seals is the Dornoch Firth and Morrich More SAC (~30km north of the Port of Ardersier) and will be scoped into this assessment (see 2.2.3 Designated Sites). The closest designated haul out site to the Port of Ardersier for harbour seals is the Ardersier designated haul-out site, <500m away from the proposed development. Nearby and close to the potential paths of ships transiting to and from the Port of Ardersier is the Findhorn designated seal haul-out site (~22 km away from the Port of Ardersier). The Ardersier and Findhorn designated haul-out sites are therefore those most likely to be affected by this development. However, nearby are also the Beauly, Cromarty Firth, Loch Fleet, Brora and Lothmore designated haul out sites (~18 km, 18 km, 36 km, 43 km and 54 km away from the Port of Ardersier, respectively, all of which are designated for both harbour and grey seals).

Marine Mammals Figure 7 provides a visual representation of the average density estimates of harbour seals (derived from Carter et al. (2020)) and SMRU harbour seal counts on land for 2021 in the Moray Firth SMU. In the latest count in 2021, a total of 221 harbour seals were recorded at the Ardersier Designated Seal Haul-out site. The percentage(s) of the British Isles at-sea harbour seal population using the Port of Ardersier site, according to Carter et

al. (2020) were 0.026, 0.040, 0.069 and 0.013 (based on the cells closest to the port site, see Marine Mammals Figure 7).

Grey seal

The Port of Ardersier is located within the Moray Firth seal MU. The overall assessment of conservation status of grey seals in UK waters has been assessed as 'Favourable' with an overall improving trend in conservation status and population modelling for regularly monitored grey seal breeding colonies across the UK show an increasing trend of <1.4% per annum (SCOS 2022, 2023).

The closest designated haul out site for grey seals is the Ardersier designated haul-out site (<500m away). Nearby and close to the potential paths of ships transiting to and from the Port of Ardersier is the Findhorn designated site (~22 km away). Nearby are also the Beauly, Cromarty Firth, Loch Fleet, Brora and Lothmore designated sites (~18 km, 18 km, 36 km, 43 km and 54 km away from the Port of Ardersier, respectively, all of which are designated for both grey and harbour seals). In addition, there are two further designated seal haul out sites in the Moray Firth, the Dunbeath-Helmsdale site and the Dunbeath-Wick site (both more than 60km from the Port of Ardersier).

For grey seals in Scotland, many breeding sites which are monitored for pup production, are designated as SACs. The closest of these SACs to the Port of Ardersier designated for grey seals is the Faray and Holm of Faray SAC in the North Coast & Orkney seal MU (~195km from the development site). Although this is the closest SAC for grey seals to the Port of Ardersier, it is too far to be scoped into the assessment (see 2.2.3 Designated Sites).

Figure 2 8 provides a visual representation of the average density estimates of grey seals (derived from Carter et al. (2020)) and SMRU grey seal counts on land for 2021 (Moray Firth) around the Port of Ardersier. In the latest count in 2021, a total of 385 grey seals were recorded at the Ardersier Designated Seal Haul-out site. The percentage(s) of the British Isles at-sea harbour seal population at the Port of Ardersier, according to Carter et al. (2020) were 0.0016, 0.0036, 0.0064 and 0.0009 (based on the cells closest to the port site, see Marine Mammals Figure 8.

2.2.3 Designated Sites

A Habitat Regulations Appraisal (HRA) screening report shall be completed for the Ardersier ETF expansion, and shall include details of the sites (specifically SACs) designated for the protection of marine mammal receptors. The HRA screening report shall identify which designated sites are scoped into the proposed HRA for marine mammal species. However, as the HRA only considers Special Protected Areas (SPAs) and SACs, other marine mammal designations such as MPAs will be considered in the EIA. As such, this section outlines all marine mammal designations within the assessment MUs for each marine mammal species. These are listed in Table 3 and Marine Mammals Figure 9.

2. LIKELY IMPACT ON THE ENVIRONMENT

Potential impact pathways relevant to marine mammals which may occur during the construction or, O&M phases of the Ardersier ETF expansion have been identified in Table 1.

Table 1 Scoping Assessment for Marine Mammals

Impact Pathway	Scoped In/Scoped Out	Justification
Construction Phase		
Noise-related impacts associated with construction activities resulting in permanent auditory injury (i.e., permanent threshold shifts (PTS))	Scoped In	Underwater noise associated with piling (for installation of mooring dolphins and extraction of existing sheet pile wall seaward of the new quay wall), other construction activities such as dredging and spoil disposal activities which all have the potential to cause permanent auditory injury. The impacts of underwater noise on marine mammals therefore require further consideration. This will ensure that any marine mammal mitigation measures are appropriately informed and developed proportionate to the risks of underwater noise to marine mammals as a result of the construction of the Ardersier ETF expansion. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Noise-related impacts associated with construction activities resulting in temporary auditory injury (i.e., temporary threshold shifts (TTS))	Scoped Out	The ranges at which TTS onset occurs do not allow assessment of the magnitude or significance of the likely consequences for individuals and ultimately populations of the predicted extent over which any TTS might occur. Therefore, TTS cannot adequately be assessed using the current TTS onset thresholds. Current TTS onset thresholds are inappropriate to determine a biologically significant level of TTS.
Noise-related impacts associated with construction activities resulting in disturbance and/or displacement of individuals (including barrier effects)	Scoped In	Underwater noise associated with piling (for installation of mooring dolphins and extraction of existing sheet pile wall seaward of the new quay wall), other construction activities such as dredging and spoil disposal activities all have the potential to have an impact on the behaviour, habitat use and distribution of marine mammals. The impacts of underwater noise on marine mammals therefore require consideration. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Collision risk impacts associated with increased vessel traffic due to the	Scoped In	It is expected that increased vessel traffic both locally within the Ardersier ETF expansion area and in the wider Moray Firth throughout construction have the potential to increase the risk of collision to marine mammals. The impacts of vessel collision risk on marine mammals therefore require

Proposed Development during construction.		consideration. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Disturbance impacts associated with increased vessel traffic due to the Proposed Development during construction (including disturbance to seal haul-outs).	Scoped In	Relatively high levels of vessel traffic (passenger, cargo, and other vessel activities) within the area form part of the existing baseline. However, it is expected that increased vessel traffic both locally within the Ardersier ETF expansion area and in the wider Moray Firth throughout construction have the potential to increase the risk of disturbance to marine mammals. The impacts of vessel disturbance on marine mammals therefore require consideration. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Changes in water quality relating to various construction activities such as vessel movements, dredging activities.	Scoped Out	Activities relating to the construction of the Proposed Development may influence water quality as a result of sediment disturbance and the accidental release of fuels, oils and/or hydraulic fluids. These impacts are expected to be localised and short-lived. With regards to the accidental release of fuels, oils and/or hydraulic fluids, the impact of pollution is associated with the construction of infrastructure and use of supply/service vessels may lead to direct mortality of marine mammals or a reduction in prey availability either of which may affect species' survival rates. However, with implementation of an appropriate PEMP and MPCP, a major incident that may impact any species at a population level is considered very unlikely. When considering sediment disturbance, marine mammals often migrate through waters where conditions are turbid for extended periods without significant impacts to species biology or behaviour. Evidence that turbidity affects cetaceans directly is not evident in the literature (Todd et al. 2015) and pinnipeds often live in dark and turbid waters, where their mystacial vibrissae, or whiskers, play an important role in orientation, discriminating objects by direct touch, or to analyse water movements (Hanke et al. 2010). Any impact is of sediment suspension is therefore predicted to be of local spatial extent, short-term duration, intermittent frequency and reversible, within the context of regional and localised marine mammal populations and therefore not significant in terms of the EIA. All relevant commitment measures are presented in Table 4.
Operations and Maintenance Phase		

Collision risk impacts associated with increased vessel traffic due to the Proposed Development during operations and maintenance.	Scoped In	It is expected that increased vessel traffic both locally within the Ardersier ETF expansion area and in the wider Moray Firth throughout O&M have the potential to increase the risk of collision to marine mammals. The impacts of vessel collision risk on marine mammals therefore require consideration. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Disturbance impacts associated with increased vessel traffic due to the Proposed Development during operations and maintenance (including disturbance to seal haul-outs).	Scoped In	Relatively high levels of vessel traffic (passenger, cargo, and other vessel activities) within the area form part of the existing baseline. However, it is expected that increased vessel traffic both locally within the Ardersier ETF expansion area and in the wider Moray Firth throughout O&M have the potential to increase the risk of disturbance to marine mammals. The impacts of vessel disturbance on marine mammals therefore require consideration. Specific consideration will be given to the potential impacts on the Ardersier designated seal haul-out site located ~500 m west of the development site, and the Moray Firth SAC designated for bottlenose dolphins. All relevant commitment measures are presented in Table 4.
Long term habitat changes, displacement and/or barrier effects	Scoped In	The introduction of new infrastructure into the marine environment can potentially result in displacement or exclusion from habitats. Further, increased vessel traffic both locally within the Port of Ardersier area and in the wider Moray Firth throughout operations and maintenance have the potential to increase the risks of barrier effects and displacement of marine mammals.
Changes in water quality relating to accidental release of pollutants.	Scoped Out	The accidental release of pollutants is limited to fuels, oils and/or hydraulic fluids. As these impacts are expected to be localised and short-lived, in addition to the fact that there shall be the implementation of Environmental Management Plans (EMP), this impact is scoped-out of any assessment. All relevant commitment measures are presented in Table 4.

3.1 Embedded Commitments

The Ardersier ETF expansion shall adopt various primary commitments (primary design principles intrinsically part of the Project design, installation techniques and engineering designs/modifications) as part of the pre-application phase to eliminate and/or reduce potential significant effects arising from a number of impact pathways (as far as possible).

Further commitments (imposed as a result of legislative requirements and/or standard sectoral practice, regardless of EIA assessment), referred to as tertiary commitments are embedded as an inherent aspect of the EIA process. Secondary commitments (which require further activity to achieve anticipated outcome- often secured through planning conditions and/or management plans) are incorporated to reduce potential significant effects to environmentally acceptable levels following initial assessment, i.e., so that residual effects are reduced to environmentally acceptable levels.

The commitments adopted by the project in relation to marine mammals are presented in Table 4.

The requirement and feasibility of any additional commitments will be dependent on the significance of the effects upon marine mammals and will be consulted upon with statutory consultees throughout the EIA process.

3.2 Potential Cumulative Impacts

The process by which potential cumulative impacts will be assessed is through a Cumulative Impact Assessment (CIA). The most significant cumulative impact on marine mammal species is likely to be disturbance from underwater noise associated with construction activities and operational vessel traffic.

For marine mammals the approach to CIA will be holistic and combine all potential sources of underwater noise including UXO clearance and pile driving at other construction projects such as at OWF sites, together with disturbance from vessels, seismic surveys and any other marine construction developments. It is proposed that projects that are planned within the Moray Firth only shall be included in this CIA, due to the extreme coastal nature of the project and limited extent for which noise propagation shall occur.

For each relevant project, an assessment will be made of the number of animals which may be impacted on any one day, based on reported levels of impacts in published EIAs where available and, where not, on various assumptions relating to impact footprints and animal densities. For each year, the maximum number animals impacted on any one day (assuming concurrent activity) will be presented as a proportion of the relevant MU.

The CIA for marine mammals will consider the maximum design scenario (MDS) for each of the projects, plans and activities. The impacts of fishing will not be considered in the CIA since these activities occurred throughout the baseline and are therefore already accounted for in the existing marine mammal baseline characterisation abundance and density estimates.

3.3 Potential Transboundary Impacts

The probability of transboundary impacts on marine mammals to occur during the construction, or O&M phases of the Ardersier ETF expansion are unlikely to result in significant impacts. The probability of transboundary impacts to marine mammals occurring during construction, particularly due to underwater noise, is unlikely given the limited extent for which noise propagation are likely to occur due to the extreme coastal nature of the development site. Further, the O&M phase is considered less likely to result in significant transboundary impacts.

The potential for any marine mammal transboundary impacts will primarily be assessed through the production of a Habitats Regulations Appraisal (HRA) report. This will consider impacts that have the potential to affect the integrity of transboundary European designated sites

3. SURVEYS OR ASSESSMENTS REQUIRED

4.1 Additional Data Sources and Surveys

A thorough, desk-based collation and review of the relevant data will be undertaken to inform the subsequent EIA. This will build upon the data sources listed in Table 2 and Section 2.

Additional data-sources are expected to include:

- SMRU Consulting are deploying two Coastal Acoustic Buoy (CAB) Guardians to provide mitigation during the Port of Ardersier's 2025 dredging campaign. These devices will allow for real time detections of vocalising cetaceans for mitigation purposes at the dredge site and the dump site.

The devices will also collate data on underwater noise levels and detections of cetaceans throughout the dredging campaign that could be analysed further (in conjunction with the Aberdeen Lighthouse Field Station PAM surveys detailed below) to improve understanding of the impacts of dredging.

- The Aberdeen Lighthouse Field Station are planning to add to existing PAM equipment deployed in the area to monitor bottlenose dolphin activity around the Port of Ardersier before, during and after the 2025 dredging campaign. In addition to long-term monitoring CPODs deployed at Chanonry Point and the Sutors (which will be used as reference sites (Fernandez-Betelu et al. 2021)), new pairs of C-PODS will be deployed at impact sites along with three other PAM monitoring sites enroute for dredging vessels between the development site and spoil ground off Burghead. Soundtraps will also be deployed to investigate changes to bottlenose foraging behaviours against various levels of background noise.
- The LHFS are also planning trial UAV surveys to characterise the use of the Ardersier designated haul-out site (Whiteness sands) by harbour and grey seals. If these trails are successful then future surveys could be conducted to assess potential changes in seal haul-out abundance and behaviour as a result of increased vessel activity around the Port of Ardersier.
- An assessment of the most up-to-date and appropriate density estimates to be carried forward to quantitative impact assessment (i.e., a new SCOS Report is anticipated to be published in late 2024.

4. RELEVANT GUIDANCE OR LEGISLATION APPLICABLE TO SURVEYS OR ASSESSMENTS

Again list of guidance or relevant legislation, please do not explain what they are the regulators should be fully aware

The assessment of Marine Mammal receptors will also comply with the following guidance:

- Institute of Ecology and Environmental Management (IEEM) guidelines for marine and coastal ecological impact assessment in Britain and Ireland (IEEM 2010, CIEEM 2018);
- The marine mammal PTS-onset noise exposure criteria (either Southall et al. (2019) or the new National Marine Fisheries Service (2024) guidance (consultation is required with NatureScot to agree which thresholds are to be used in the quantitative assessment);
- Guidance on mitigation protocols to minimise the risk of injury to marine mammals from piling noise (JNCC 2010)
- Scottish Marine Wildlife Watching Code (SNH 2017);
- Guidance on the Offence of Harassment at Seal Haul-Out Sites (Marine Scotland 2014); and
- The protection of Marine European Protected Species from injury and disturbance: Guidance for Inshore Waters (July 2020 Version) (Marine Scotland 2020).

5. METHODOLOGY

6.1 Underwater Noise Modelling

Modelling of underwater noise across the Ardersier ETF expansion will be undertaken for all potential noise sources (impulsive and continuous). This will be used to determine the potential risk of auditory injury and disturbance/displacement effects caused by underwater noise. The methods used to assess the

impacts from impulsive noise sources (e.g., piling activities which take place for the construction of mooring dolphins) will be fully described in the underwater noise technical report as part of the EIA, supported by the underwater noise modelling and analysis.

For the assessment of non-impulsive, continuous noise sources such as vibro-piling, vessel noise and dredging, models shall incorporate measured source level data to predict auditory injury impact ranges.

Outputs from the noise modelling will be combined with marine mammal density information to quantify the number of marine mammals that are likely to be impacted by the Ardersier ETF expansion. The numbers of animals impacted will be presented as proportions of the relevant MUs (entire MU and UK portion).

6.2 Assessment of Auditory Injury (PTS)

The Southall et al. (2019) thresholds have typically been used to assess the risk of auditory injury (PTS) to marine mammals in recent EIAs. However, the National Marine Fisheries Service (NOAA Fisheries) has announced the finalisation and availability of the "*2024 Update to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 3.0): Underwater and In-Air Criteria for Onset of Auditory Injury and Temporary Threshold Shifts*." Thus, it is required to be agreed which guidance NatureScot would like to see presented in the EIA to assess the risk of auditory injury (PTS).

The risk of injury will be based on dual criteria: cumulative sound exposure level (SELcum) and peak sound pressure level (SPLpeak). To assess the SELcum criterion, the predictions of received sound level over 24 hours are frequency weighted, to reflect the hearing sensitivity of each functional hearing group. The SELcum from multiple pulses will be assessed using a fleeing animal model using indicative swim speeds. The SPLpeak criterion is for unweighted received sound level. The assessment for auditory injury shall be quantitative.

6.3 Assessment of Disturbance

The assessment of piling disturbance for pile-driven mooring dolphins will be based on the best practice methodology at the time of assessment, making use of the best available scientific evidence. It is likely, based on current practice, that the methodology will incorporate the application of a dose response approach rather than a fixed behavioural threshold approach where possible. The current piling dose-response functions available are for harbour porpoise at the Beatrice OWF (Graham et al. 2017b, Graham et al. 2019) , and for harbour seals at the Lincs OWF (Whyte et al. 2020) . Where species-specific dose-response functions are not available, the harbour porpoise and harbour seal ones with be used as a proxy for all other cetaceans and seals, respectively. These functions provide estimates of the proportion of individuals disturbed when exposed to different levels of noise (unweighted SEL for single strikes, in 5 dB increments). Noise contours at appropriate intervals will be generated by noise modelling and overlain on species density surfaces to predict the number of animals potentially disturbed. This will allow the quantification of the number of animals that potentially respond. If required, population-level modelling will be conducted using the Interim Population Consequences of Disturbance Model (iPCoD model) (Harwood et al. 2014, King et al. 2015, Harwood et al. 2016) to determine if the impact is sufficient to result in changes at the population level.

6.4 Assessment of Disturbance from Vessels

Assessments made on the impacts of vessel disturbance will be based on the most up-to-date scientific evidence on the effect of construction, and/or O&M vessels on marine mammals, and shall be a qualitative assessment. For example, an assessment of vessel disturbance on marine mammals will be made drawing on the results of studies of harbour porpoise responses to construction vessel traffic by Benhemma-Le Gall et al. (2021) and Benhemma-Le

Gall et al. (2023), and from bottlenose dolphin responses to vessels by New et al. (2013), Pirotta et al. (2015a), and Pirotta et al. (2015b).

6.5 Assessment of Disturbance from Other Construction Activities

For other construction activities (such as dredging and spoil disposal), an assessment of the risk of disturbance will be based on the best available information on noise levels for each activity (qualitative assessment), alongside any available evidence of disturbance impacts provided in the literature.

In the assessment of disturbance from other construction activities and operations, detailed consideration shall be given to areas of uncertainty, the degrees of conservatism in the assessment of noise impacts to marine mammals, and their implications for the assessment. If the data collected from the Aberdeen Lighthouse Field Station PAM surveys during the 2025 dredging campaign are available and analysed by the time of authoring the Ardersier ETF expansion EIA Report (EIAR), then these will be used to inform the assessment.

6.6 Other Impacts

The assessment of potential impacts other than underwater noise (e.g., barrier effects) will be qualitative and based on the best available evidence of these impact pathways considered alongside the Ardersier ETF expansion design envelope, location and species Scoped In. Assessments will be made based on the most recent literature available at the time.

FIGURES & TECHNICAL TABLES

NB figures and title are 'grouped' together as picture and text box.

Table 2: Key sources of Marine Mammal Baseline data

Source, author and year	Summary	Coverage of the site	Data quality
Multiple data for bottlenose dolphins in Scottish waters1	Comprehensive assessment of the abundance of bottlenose dolphins in the inshore waters of Scotland, primarily through dedicated photo-identification studies of the Moray Firth SAC and the wider east coast of Scotland from Aberdeen to the Firths of Tay and Firth.	Covers the CES MU for bottlenose dolphins, and the Moray Firth Special Area of Conservation (SAC). The main survey area encompasses the Port of Ardersier and surrounding waters, from Helmsdale to Lossiemouth.	New manuscripts are continually published which report on the Moray Firth bottlenose dolphins. Where new publications are published, and are applicable to the EIA, these shall be incorporated into the EIA chapter and baseline technical report.
Graham et al. (2017a). Strategic Regional Pre-Construction Marine Mammal Monitoring	A pre-construction MMMP aiming to provide baseline data on harbour seals and bottlenose	Harbour seal tag data shows locations where seals were detected and tracks close to Port	This report provides the most site-specific information regarding the use of water surrounding the

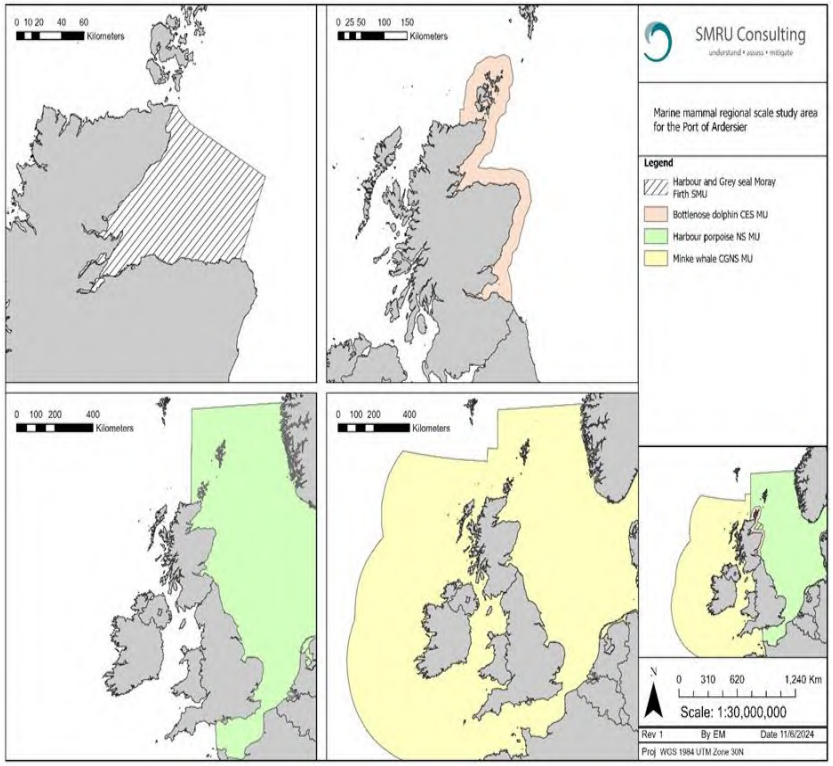
[1] (Cheney et al. 2012, Cheney et al. 2013, Cheney et al. 2014a, Cheney et al. 2014b, Thompson et al. 2015, Arso Civil et al. 2018, Cheney 2018, Cheney et al. 2018, Arso Civil et al. 2019, Cheney et al. 2019, Arso Civil et al. 2021, Arso Civil et al. 2022, Cheney et al. 2024)

Source, author and year	Summary	Coverage of the site	Data quality
Programme Annual Report 2017	dolphins in the Moray Firth SAC.	of Ardersier and in the surrounding waters on suggested foraging trips. Individuals were tagged at Loch Fleet or the Dornoch Firth between 1989 and 2017.	Port of Ardersier by harbour seals.
Fernandez-Betelu et al. (2021). Far-Field Effects of Impulsive Noise on Coastal Bottlenose Dolphins	Assessed variations in dolphin detections with PAM systems in areas exposed to various levels of piling noise. The results obtained indicate that there could be some evidence for short term behavioural responses to impulsive noise. However, overall, dolphins persisted with their use of regions exposed to piling noise throughout its duration.	Reference areas where CPODs were deployed off Chanonry Point (~6 km from Port of Ardersier) and the Sutors (~10 km from Port of Ardersier). This data source will provide information on bottlenose dolphin detections close to the Port of Ardersier.	This report provides evidence for behaviour responses to impulsive sounds within the Moray Firth SAC at a range of distances from their source. This included far field effects on bottlenose dolphin detections. Longer term unpublished data from the Chanonry Point and the Sutors PAM sites will also be used to inform the baseline.
SCOS (2023), SCOS Scientific Advice on Matters Related to the Management of Seal Populations	The annual SCOS report outlines the current status of both harbour and grey seal populations in the UK. Land-based counts of the Ardersier designated haul-out site (also known as Whiteness Sands) are available from 1988 to 2005. Aerial surveys at the Ardersier designated haul-out site are available from SMRU since 1992.	The SMU relevant to the Port of Ardersier is the Moray Firth SMU. Data are available for the Ardersier designated haul-out site (also known as Whiteness Sands) as well as other haul-out sites in the inner Moray Firth.	The SCOS reports provide scientific advice on matters related to the management of seal populations. The assessment will use the latest SCOS report at the time of drafting.
SMRU Seal telemetry database	Data collated through a consortium of funders. Used to assess connectivity and habitat associations of seal species with at-	Data encompasses the entirety of Scotland and thus, includes the area around the Port of Ardersier.	The 2019 telemetry database used will be updated if possible with the latest available data.

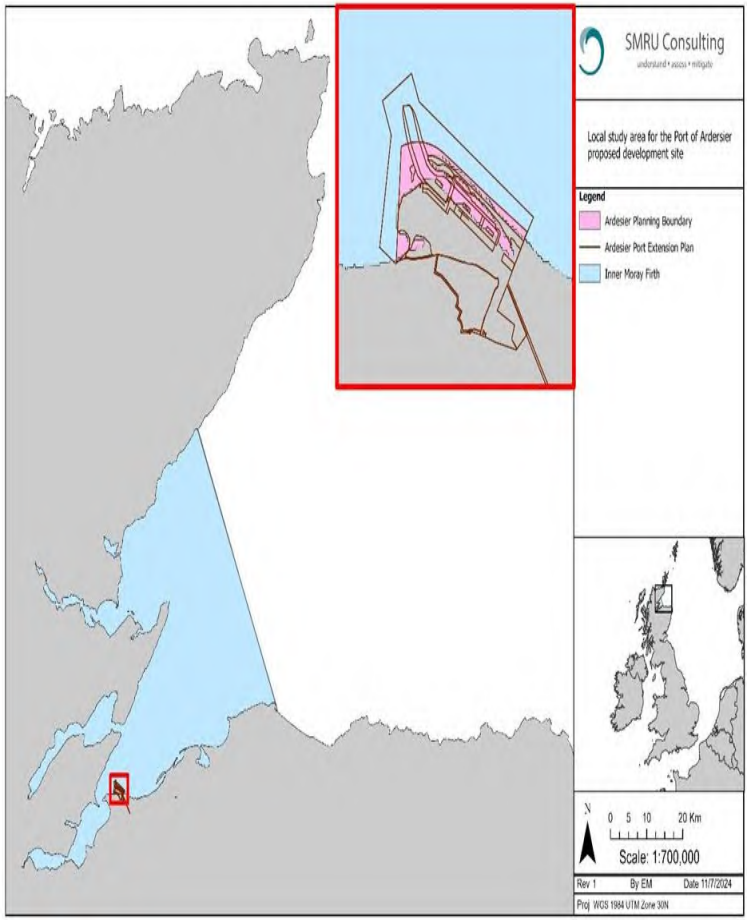
Source, author and year	Summary	Coverage of the site	Data quality
	sea and on-land locations.		
Inter- Agency Marine Mammal Working Group (IAMMWG (2023)), Updated abundance estimates for cetacean Management Units in UK waters.	The IAMMWG defined MUs for the seven most common cetacean species found in UK waters. Abundance estimates were calculated for each species within their respective MUs.	The management units applicable to the key marine mammal species identified as part of this scoping chapter are as follows – harbour porpoise: North Sea (NS) Management Unit (MU); bottlenose dolphin: Coastal East Scotland (CES) MU; and minke whale: Celtic and Greater North Sea (CGNS) MU. Each MU has connectivity with the Port of Ardersier.	Updated management units were produced in March 2023. The data used to inform the report were SCANS-III (Hammond et al. 2017) and the ObSERVE Programme (Rogan et al. 2018). It is likely that this report shall be updated in the future now SCANS IV results are available. However, no provisional date has been announced for an updated IAMMWG abundance estimate report.
Marine Scotland (2017), Designated haul-out sites for grey and harbour seals (Protection of Seals Orders)	Seal haul-out sites are designated under section 117 of Marine (Scotland) Act 2010. Seal haul-outs are locations on land where seals come ashore to rest, moult or breed. There are a total of 194 designated seal haul-out sites across Scotland.	The closest seal haul-out sites to the Port of Ardersier are Ardersier (<500m from the Ardersier ETF expansion site), Beauly (~18km away), Cromarty Firth (~18km away) and Findhorn (~22km away). Other closeby seal haul out sites include Loch Fleet (~ 36 km away), Brora (~43 km away) and Lothmore (~54km away).	Designated site locations remain up to date. There are no revisions anticipated.
Carter et al. (2020), Seal habitat preference maps	Seal haul-out data, telemetry data and habitat variables were used to model at-sea usage. This resulted in predicted distribution surfaces that give the percentage of the British Isles at sea population (excluding hauled-out animals) estimated to be present in each grid cell at any one time during the main foraging season.	Report covers the entirety of Scotland and adjacent waters, including the Port of Ardersier.	Report provides the most recent information on UK seal at-sea distribution and density. There are no immediate updates anticipated to these data.

Source, author and year	Summary	Coverage of the site	Data quality
Carter et al. (2022), Seal SAC densities	This is the peer reviewed publication of Carter et al. (2020). In addition to the at-sea density maps, this publication provides SAC-specific estimates of at-sea distribution for use in marine spatial planning were provided.	Report covers the entirety of Scotland and adjacent waters, including the Port of Ardersier. The closest seal SAC to the Port of Ardersier is the Dornoch Firth and Morrich More SAC.	Report provides the most recent information on UK seal SAC densities. There are no immediate updates anticipated to these data.
Brookes (2017). East Coast Scotland Marine Mammal Acoustic Study (ECOMMAS)	The ECOMMAS project uses acoustic recorders, known as C-PODs, at 30 locations off the east coast of Scotland, to detect echolocation clicks. At 10 of these locations, a broadband acoustic recorder has also been deployed, to record ambient noise levels, as well as other animal vocalisations.	Data for porpoise and dolphin detection-positive-days (DPD) for the east coast of Scotland. This includes locations situated near the Port of Ardersier (Cromarty, Spey Bay and Helmsdale).	Data from 2013-2022 are available for use in baseline characterisation. No spatial overlap with the Port of Ardersier, but a unique resource for long-term occurrence of porpoise and dolphin in territorial waters of east Scotland.
University of Aberdeen – Lighthouse Field Station Journal Articles on harbour porpoise and seals	Journal articles on the spatiotemporal habitat use of harbour porpoise and seals in the Inner and Outer Moray Firth, and wider North Sea area (e.g., Brookes et al. 2013, Williamson et al. 2016, Iorio-Merlo et al. 2022, Williamson et al. 2022).	Although these data sources cover specific inner and outer Moray Firth and wider North Sea areas, they are relevant to the Port of Ardersier.	New manuscripts are continually published which report on the status of harbour porpoise and seals in the Inner and Outer Moray Firth, and wider North Sea area. Where new publications are published, and are applicable to the EIA, these shall be incorporated into the EIA chapter and baseline technical report.
Fernandez-Betelu et al. (2024). Moray Firth Marine Mammal Monitoring Programme Work Package 3 – Minke Whale Monitoring Report.	This report uses digital aerial survey (DAS) minke whale sightings data and PAM detections to attempt to characterise minke whale spatio-temporal occurrence of minke whales at the study site (Moray West OWF and surrounding	Although the study area for the DAS surveys or PAM recordings do not cover the Port of Ardersier or surrounding waters, this dataset is one of the geographically closest available to the proposed Ardersier ETF	The number of minke whale detections in DAS data was too low to investigate variation in occurrence, though this was possible when combined with PAM detections.

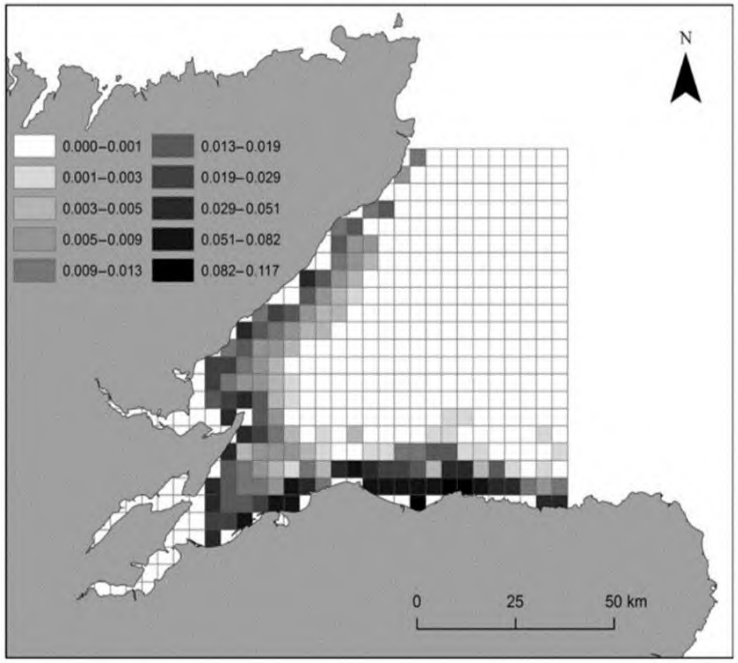
Source, author and year	Summary	Coverage of the site	Data quality
	waters).	expansion site, where there is a general lack of effort to determine minke whale occurrence.	
Gilles et al. (2023). SCANS IV	Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS IV aerial and shipboard surveys.	The Port of Ardersier is located within SCANS IV block CS-K.	SCANS surveys are conducted periodically (1994, 2005, 2016, 2022) to provide abundance estimates and trend assessment of the regularly occurring cetacean species in European shelf waters by population-wide surveys. The SCANS IV estimates are currently the most up-to-date data from the SCANS survey and provide robust absolute density estimates.
Lacey et al. (2022), SCANS III density surfaces.	Modelled density surfaces of cetaceans in European Atlantic waters in summer 2016 using the SCANS III data.	Modelled density surfaces cover the entire SCANS III survey area.	The modelled density surfaces reported for SCANS-III are those reported for the 2016 surveys. These represent spatially explicit densities which are more realistic than assuming a uniform block-wide density estimate.
Lighthouse Field Station (LHFS) PAM	Between 2013 to 2015, PAM data are available from three sites in the inner Moray Firth. Since 2018 PAM data are available from Chanonry and the Sutors. In June 2020 one PAM site was located off the Port of Ardersier.	Spatial and temporal occurrence of vocalising harbour porpoise and bottlenose dolphins.	Extensive long term dataset to inform baseline occurrence.



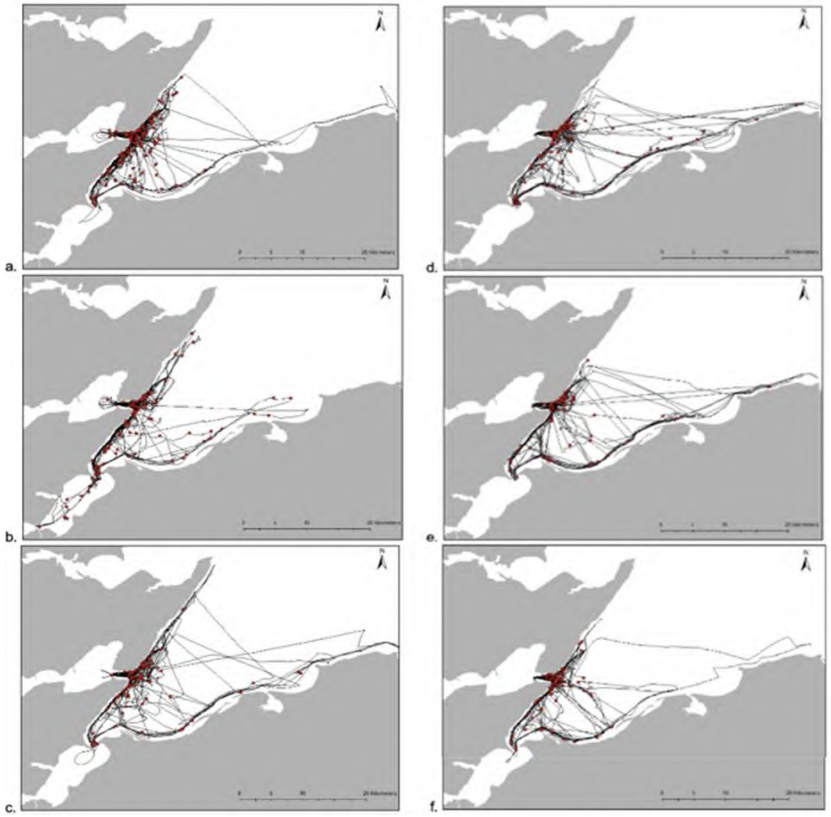
Marine Mammal Figure 1: The marine mammal regional scale study area and associated MU's for the Port of Ardersier.



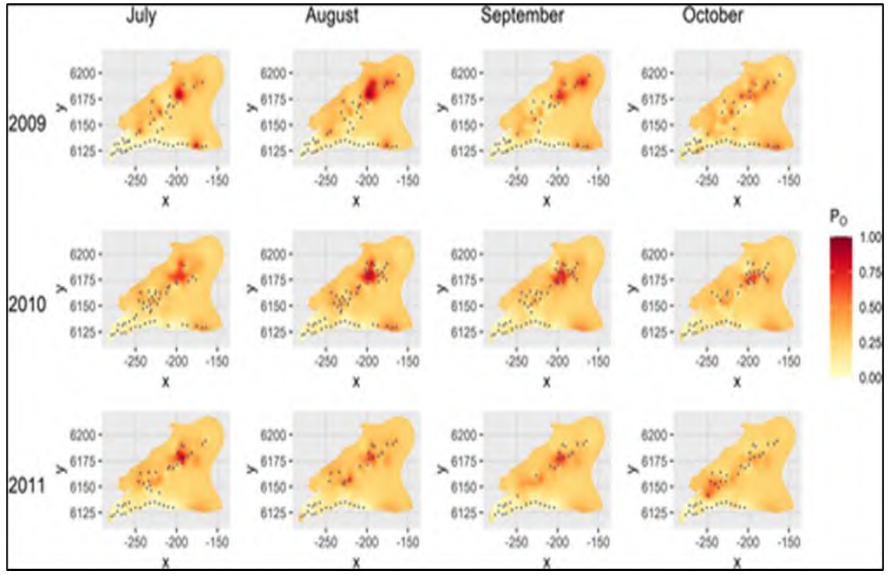
Marine Mammal Figure 2: Local study area for the Port of Ardersier.



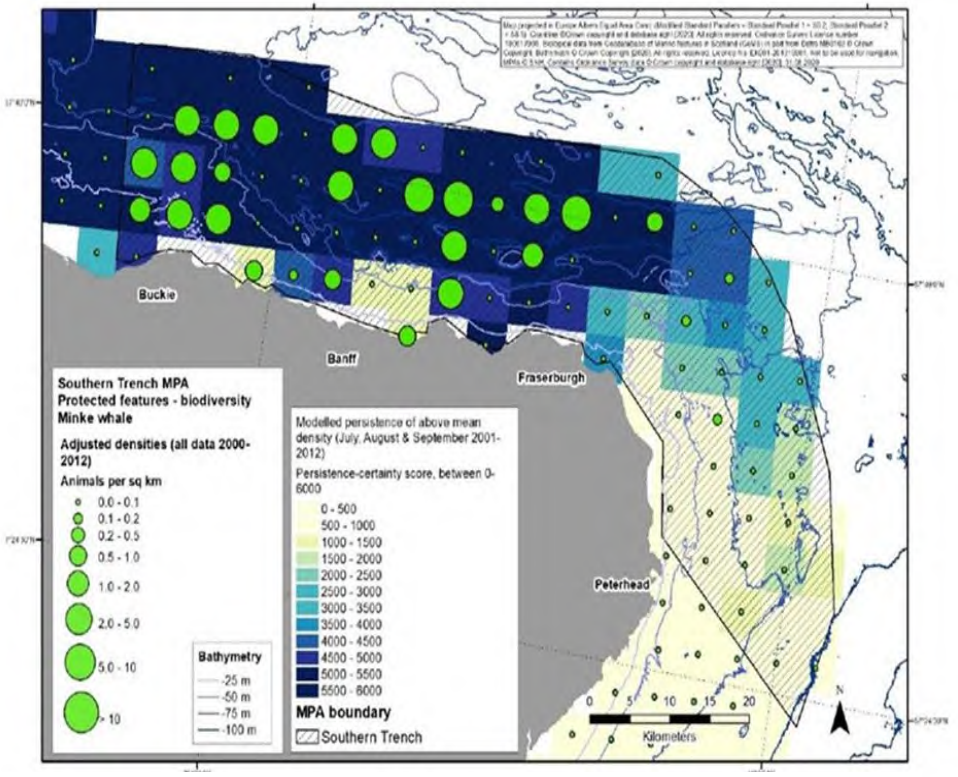
Marine Mammal Figure 3. Figure from Thompson et al. (2015): Spatial variation in the predicted probability of bottlenose dolphin occurrence across the Moray Firth.



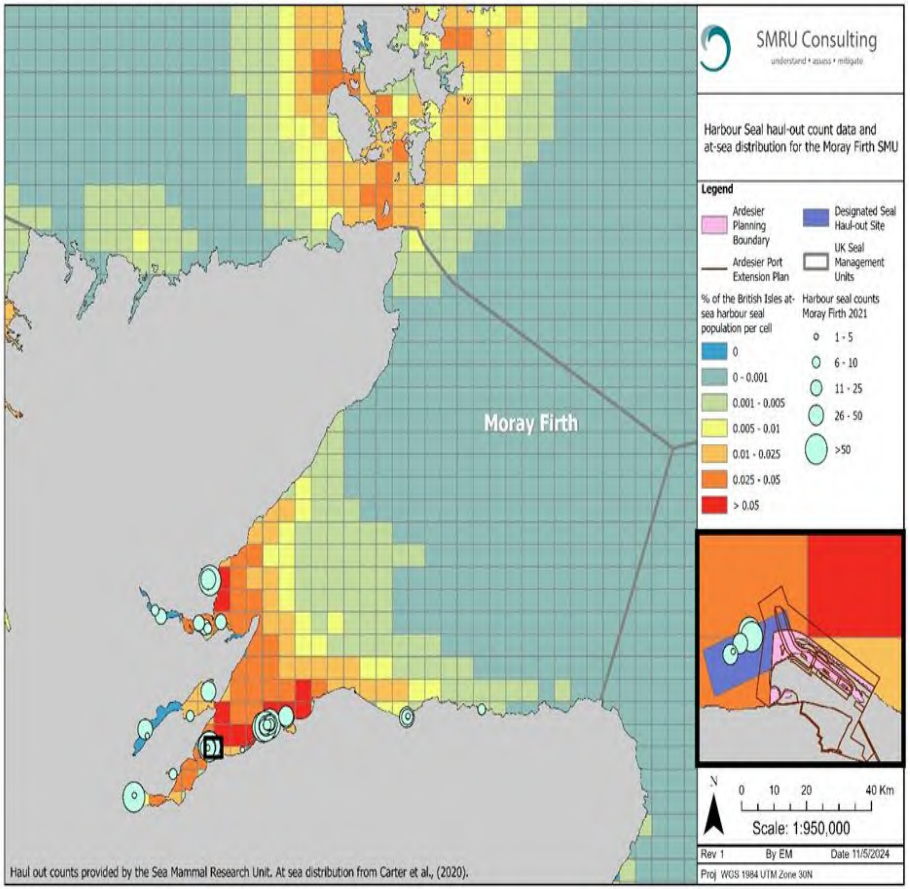
Marine Mammal Figure 4: Figure from Cheney et al. (2024): Maps of the Moray Firth SAC survey area covered (black lines) in (a) 2017, (b) 2018, (c) 2019, (d) 2020, (e) 2021 and (f) 2022 with the location of encounters with bottlenose dolphins (red dots).



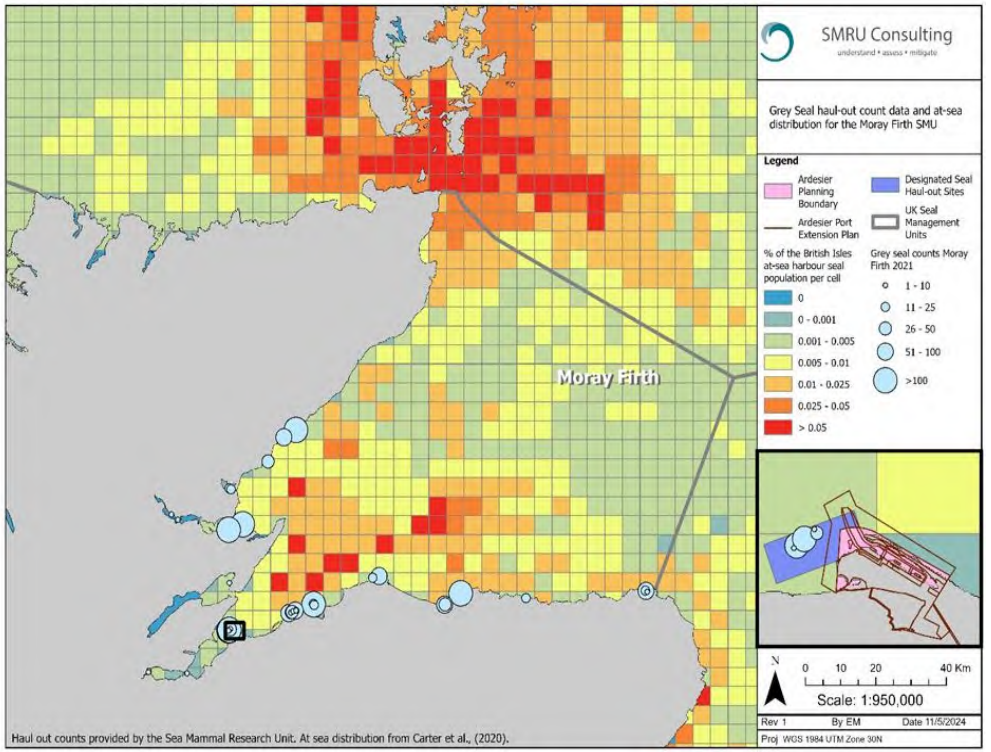
Marine Mammal Figure 5: Figure from Williamson et al. (2022): demonstrating the probability of porpoise occurrence (PO) in July–October 2009–2011. All figures are scaled from 0 to 1, indicating low to high probability. Blue points represent the locations of C-



Marine Mammal Figure 6: Figure from SNH (2014): Modelled adjusted densities and the predicted persistence of above mean densities of minke whale in the Southern Trench NCMPA



Marine Mammal Figure 7: Harbour seal % of British Isles at-sea population per 25 km2 grid cell (Carter et al. 2020, Carter et al. 2022) alongside harbour seal haul-out counts for the Moray Firth SMU for 2021 (SMRU 2021), with inset showing the Port of Ardersier Planning Boundary and Port Extension Plan.



Marine Mammal Figure 8: Grey seal % of British Isles at sea population per 25 km2 grid cell (Carter et al. 2020, Carter et al. 2022) alongside grey seal haul-out counts for the Moray Firth SMU for 2021 (SMRU 2021), with inset showing the Port of Ardersier Planning Boundary and Port Extension plan.

Table 3: List of designated sites with relevance to the marine mammal MUs included in the Scoping Chapter document, and the Port of Ardersier.

Screening	Species	Designated site	Site description and summary
Screened in	Bottlenose dolphin	Moray Firth SAC	The Port of Ardersier lies within the Moray Firth SAC, for which the bottlenose dolphin is the primary Annex II species for site selection. This SAC supports the only known resident bottlenose dolphin population in the North Sea.
Screened in	Minke whale	Southern Trench NCMPA.	The Southern Trench NCMPA lies approximately 64km east of the Port of Ardersier and persistently supports higher than average densities of minke whales. Vessel activity to and from the Port of Ardersier could impact the NCMPA. Without more information regarding planned shipping routes this designated site cannot be scoped out.
Screened in	Harbour seal	Dornoch Firth and Morrich More SAC	The Dornoch Firth and Morrich More SAC lies approximately 30km north of the Port of Ardersier. The site was initially designated for harbour seals as numbers represented almost 2% of the UK population – counts now in decline but could be attributed to redistribution of individuals.
Screened in	Harbour and grey seal	Ardersier designated seal haul-out site	The Ardersier designated haul-out site lies <500m from the Port of Ardersier and in the last counts performed in 2021 a total of 221 and 385 harbour and grey seals were recorded there, respectively.
Screened out	Harbour porpoise	Southern North Sea SAC	Although the closest SAC for harbour porpoise to the development, the Southern North Sea SAC is more than 300km from the Port of Ardersier and therefore is scoped out of the assessment due to lack of expected impacts.
Screened out	Grey seal	Faray and Holm of Faray SAC	Although the closest SAC for grey seals to the development, the Faray and Holm of Faray SAC is approximately 195km northeast of the Port of Ardersier and therefore is scoped out of the assessment due to lack of expected impacts.

Table 4: The Proposed Mitigation Commitments Relevant to Marine Mammal Receptors

Mitigation	Mitigation commitment measures
Marine Pollution Contingency Plan (MPCP)	Development of a MPCP, which will identify potential pollution sources and how the Port of Ardersier will respond to these spill events.
Marine Mammal Mitigation Plan (MMPP)	A Marine Mammal Mitigation Plan will be developed, which will be specific to piling and dredging activities. The mitigation measures within the MMMP will be informed by the following: • The design principles of the Ardersier ETF expansion and secured under Marine Licence consent conditions; and • JNCC (2010): Statutory nature conservation agency protocol for minimising the risk of injury to marine mammals from piling noise
Environmental Management Plan (EMP)	An EMP will be developed, to include a Marine Pollution Contingency Plan (MPCP). This EMP will also include information on chemical usage, and waste management.
Vessel Management Plan (VMP)	A VMP will be developed, which will detail the types and numbers of vessels involved in the Ardersier ETF expansion work. A VMP shall also be implemented for the operational & maintenance phase of the project.

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