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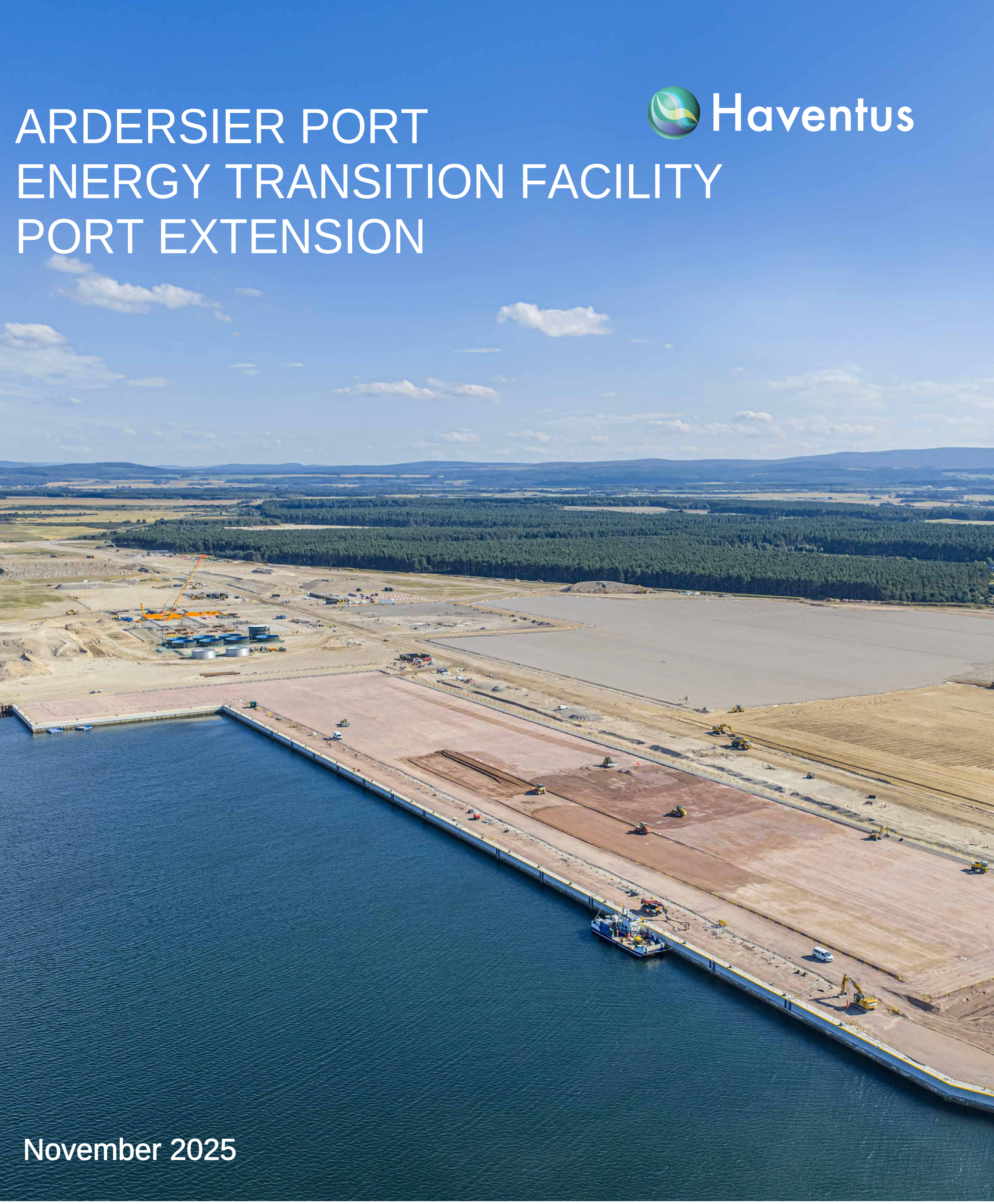

November 2025

Appendix 5.1 Construction Dust Management Plan

Construction Dust Management Plan

Contents

1. Introduction

Ardersier Ports Phase 2 development proposes large-scale earthworks involving excavation, movement and stockpiling of sands and aggregates to enable future development of the former fabrication yard. Works are scheduled to run from March 2026 to July 2028 and will generate fugitive dust and particulate matter (PM).

This Dust Management Plan (DMP) outlines the control measures and monitoring protocols for mitigating construction dust emissions at the Ardersier Port redevelopment. The plan aligns with IAQM guidance and Scottish legislation, focusing on high-risk activities such as earthworks, aggregate stockpiling, and internal haulage. Key controls include water suppression, crusting agents, real-time PM monitoring, and strict work stoppage criteria.

2. Site Setting and Sensitive Receptors

This section identifies the physical location of the site and outlines nearby sensitive receptors that may be affected by dust emissions. Understanding receptor sensitivity is essential for risk assessment and targeted mitigation.

Receptor	Direction & Distance from active Areas	Sensitivity	Justification	Latitude / Longitude
B9092 trunk road & users	South – 3 km	Low	Public exposure limited due to distance	57.5720, -3.9570
Moray Firth SPA (ecological)	North – 120 m	High	Sensitive to nutrient deposition; prevailing winds increase risk	57.6050, -4.0150
On-site workforce	Inside boundary	High	Continuous exposure monitoring during operations	
Inverness Airport	East – 2 km	Low (dust unlikely to affect operations)	Dust unlikely to affect operations at this distance (exceeds typical dispersion range)	57.5425, -4.0476
Ardersier	West – 1 km	Low	Residential area, but dust dispersion minimised by prevailing winds	57.5773, -4.0505

Prevailing wind is from the south-west ~65 % of the year, meaning off-site dust transport is mainly toward Moray Firth.

3. Scope of Works

The types of construction activities being undertaken and the scale of operations. It identifies specific tasks that may be significant sources of dust.

- Stripping and re-grading ~100 000 m^2 of soils
- Upfilling of stripped areas(height ≤ 3 m) with sand & aggregate to proposed finished platform level, and construction fill for quay wall
- Potential formation of stockpiles (height ≤ 10m) of sand and aggregate

- Internal haul routes (~3 km) and wheel-to-wheel plant movements
- Loading/unloading of aggregates to barges and road wagons
- On-site crushing and concrete batching are also planned during this phase

4. Dust Risk Assessment (DRA)

The Dust Risk Assessment evaluates the potential for dust generation and dispersion based on activity magnitude and receptor sensitivity. It forms the basis for selecting proportionate control measures.

4.1 Source magnitude (earthworks & stockpiles)

- **Large** (>100 000 m² total area, dry friable material, frequent vehicle movements).

4.2 Receptor sensitivity (IAQM definitions)

- **Human health** – High for on-site staff, Low for nearby public road
- **Ecological sites** – High (SPA sensitive to nutrient deposition)

4.3 Overall risk rating (before mitigation)

Activity	Magnitude	Receptor sensitivity	Unmitigated Risk
Earthworks	Large	High	High
Stockpiling	Large	High	High
Track-out	Large	Medium	Medium

Given the High risk, robust mitigation and continuous monitoring are required.

5. Dust Management

This section outlines the specific control measures and procedures to be implemented to minimise dust emissions. It also details roles, responsibilities, monitoring, and reporting structures.

5.1 Roles and responsibilities

Defines the individuals accountable for implementing and overseeing the DMP, ensuring controls are in place, and responding to dust events.

Project Manager

Overall implementation of the DMP, resources

HSEQ Manager

Data review, liaison with SEPA or Highland Council

Supervisors

Ensure controls are in use, stop works if trigger breached and issue toolbox talks

Occupational Hygienist

Personal exposure monitoring, face-fit testing

5.2 Mitigation and Operational Controls

Lists engineering and operational controls to suppress dust during each construction phase.

Phase	Control Measure	Detail
Site layout	Locate stockpiles ≥ 100 m from northern boundary	Use 3 m high barriers (50% porosity) along northern boundary
Soil Handling	Avoid double-handling; use direct-tip conveyors where possible	
Water Suppression	Dedicated 10 000 L bowser with high-pressure misters; treat stockpiles & haul roads (target moisture ≥ 5 %)	Target moisture ≥5% for stockpiles/haul roads; increase frequency during dry spells (>72 h no rain)
Surface stabilisation	Non-ionic biodegradable crusting agent applied to inactive areas ≥ 48 h	Freko - Apply to inactive areas ≥48 h; reapply after rainfall >5 mm
Vehicle Management	16 mph site speed, speed cameras installed	
Road/Hardstanding cleaning	Vacuum road-sweeper twice daily or as required (<50 g m^{-2})	Northern Cycling
Plant & Maintenance	Fit exhaust/engine covers; shut down engines when idle > 2 min	Flannerys, employees
Housekeeping	Daily visual sweep, immediate clean-up of spillages	
Additional Controls	Guardian monitoring units	2 Guardian PM units near SPA/earthworks

5.3 Monitoring & Trigger Levels

The use of real-time and passive monitoring to assess dust levels and the trigger levels for implementing additional controls.

Fixed Monitors

Guardian real-time monitors (2 ×) positioned upwind & downwind at 1.5 m AGL.

- Logged parameters: PM_1, $PM_{2.5}$, PM_{10} (1-min averages)

Trigger Levels (PM_{10})

- *Alert* – 1-hr mean ≥ 150 µg m^{-3} ➔ **review activities, inspect controls**
- *Action* – 15-min mean ≥ 250 µg m^{-3} (sustained for 30 min) ➔ **stop earthworks/haulage**, enhance suppression, inform PM

Data Response

- Email/SMS alarms automatically issued from monitor software to HSEQ Manager/Lead.

5.4 Reporting & Record Keeping

Monitoring data and daily observations are recorded and reported to demonstrate compliance and inform continual improvement.

- Daily site diary includes weather, activities, visual dust observation, control status
- All PM data archived on secure server for 5 years
- Non-conformance & corrective-action log maintained by HSEQ Manager

6. Occupational Hygiene & Health Surveillance

Personal exposure control measures, respiratory protective equipment (RPE) policies, and health monitoring protocols for the workforce.

- **Personal sampling** – gravimetric respirable dust & crystalline silica (quartz) on a task-based strategy (BS EN 689). Target <4 mg m^{-3} 8 hr TWA for total inhalable, <0.1 mg m^{-3} RCS, EH40
- **RPE programme** – All earthworks operatives wear FFP3 disposable or P3 half-mask; face-fit tested using qualitative Bitrex or quantitative PortaCount (record retained for 24 months)
- **Health surveillance** – Pre-placement and annual lung function (spirometry) & respiratory questionnaire overseen by OH nurse

7. Training & Competency

The training and induction requirements for personnel to ensure understanding of dust hazards and compliance with control measures.

Induction

- Induction covers dust hazards, site rules, and control hierarchy

Toolbox talks

- Toolbox talks on recognising elevated dust, use of suppression equipment to be provided

Records

- Competency records maintained with refresher training as required

8. Contingency & Stop Work Criteria

The thresholds or site conditions that necessitate halting work until additional control measures are implemented.

Immediate Stoppage

- Visible dust plume leaving the boundary for >5 min

Tiered Response

- 1st Exceedance – stop activity, dampen area, inspect controls
- 3+ Exceedance/Week – Halt all earthworks

Restart Protocol

- Verify PM_{10} <100 µg/m³ for 30mins
- Document corrective actions in Mango (QHSE integrated management system)

9. Review & Audit

The DMP will be regularly reviewed and audited to maintain its effectiveness and ensure compliance with regulatory requirements.

Frequency

- Quarterly or after level-2 exceedance (3+ action breaches)
- Incorporate feedback from SEPA, Highland Council, and local community
- Revised DMP via ISO 14001 EMS – next scheduled revision: 25 September 2025

10. Associated Documents

HAV-PR-HSEQ-040	Environmental Management

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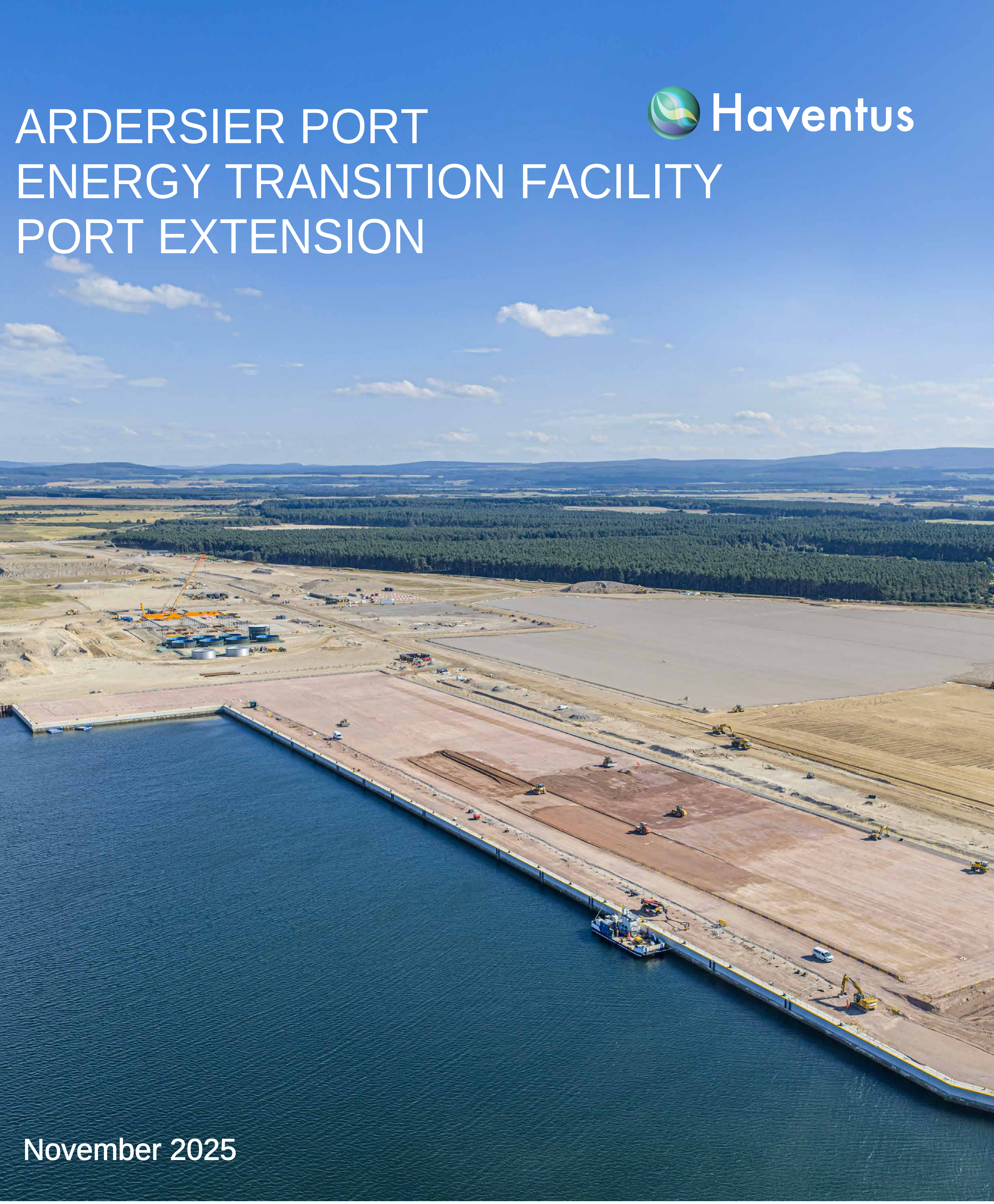


November 2025

Appendix 5.2 Lighting Strategy

Ardersier Port Extension

Revision Number	FINAL
Date	October 2025
Version:	1
Author	David Hendry
Technical Reviewer	Kevin Ramsay

CONTENTS

FIGURES

TABLES

1 LIGHTING STRATEGY

1.1 INTRODUCTION & PURPOSE

This Lighting Strategy provides a clear set of guidelines and standards for developers and other stakeholders to follow, ensuring consistency and coherence in lighting design and implementation for the current (Phase 1) and future developments within the port (Phase 2). It also provides mitigation requirements to be applied to construction activities to reduce the potential for significant impacts from obtrusive light.

1.2 LOCATION

Ardersier Port, located on the Moray Firth, features a rich coastal ecosystem with diverse habitats supporting wildlife, including various bird and mammal species including bottlenose dolphins, seals and harbour porpoise (and others).

Whiteness Head is designated as a Site of Special Scientific Interest (SSSI) and is part of the Inner Moray Firth Special Protection Area (SPA) and a RAMSAR site, the Moray Firth is a Special Area of Conservation (SAC) and the area encompasses the Sutors of Cromarty, Rosemarkie, and Fort George Special Landscape Area (SLA).

The site is bordered by the Moray Firth to the north, Carse of Delnies to the east, Carse Wood to the south, and the sand dunes and tidal sandflats of Whiteness Sands to the west. Fort George's live firing range is to the southwest, and Whiteness Head Spit, which shelters a harbour.

Nearby, there are a few houses and residents, with the village of Ardersier around 3 km to the south and Nairn approximately 6.5 km to the east. The site is visible from the surrounding coastline, although tree cover, and topography provide some screening to the south and west.

1.3 EXTANT CONSENT

This Planning permission in principle (PPiP) was renewed on 4 February 2019 and the following components are currently being constructed:

- Access channel
- Quay wall construction
- Main port activity area
- Port support/administrative buildings
- Port related light industrial uses
- Temporary on-site storage area for dredged material
- Roundabout on B9092 and new security gatehouse, and A96 roundabout late 2025

1.4 PROPOSED DEVELOPMENT

This proposed development would be an extension to the consented port and would generally comprise:

- Additional quay construction through the existing platform (mainly on land and already consented under the Harbour Revision Order (HRO)) by a combination of diaphragm wall (same method as the already constructed quay walls) and vibropiling and conventional sheet piling.
- Removal of old sheet piles to the north of the new quay wall which may involve temporary sand bunds
- A small area of infilling behind the new quay wall
- Selected deepening of the inner harbour by dredging (approximately 2,000,000m3)
- Sea disposal, Whiteness Sands nourishment and possible beneficial re-use on land or at remote site
- Possible maintenance dredge to west of Tern Island
- Scour protection in inner harbour
- A potential slipway as described in the existing Harbour Revision Order
- Localised crushed rock mattress for east of harbour
- Site clearance of extension lands (tree felling and clearing)
- Land raising and levelling of extension lands to suitable height with dredged sand
- Creation of working platform through stone placement
- Install new drainage to extension land perimeter
- Port and offshore wind related buildings including manufacturing, workshops, assembly facilities (principally bases), storage, offices and business units.

1.5 PROJECT DESCRIPTION

Following the agreement of options covering additional land to the south and east of the currently consented area, the proposed development application seeks to bring this new land into use for the same purpose and further modify the quayside areas for maximum efficiency. This application will be described as follows:

'"Continued port development and expansion of port related services for energy related uses, including marine dredging within the inner harbour, sea disposal of dredged sands, possible temporary stockpiling of dredged material, quay construction, erection of offices, industrial and storage buildings and associated infrastructure including manufacturing, assembly, storage, delivery and export of port related cargo, parking, infrastructure, services, upfilling and re-grading/surfacing of new landward areas and landscaping."

The boundary of the proposed development area is shown on the Figure 1 below.

Figure 1: Proposed Site Boundary

The Campaign to Protect Rural England (CPRE) mapping of Britain's light pollution and dark skies (England's Light Pollution and Dark Skies, CPRE, 2019) illustrates the influence of light pollution on the night skies within the study area.

The darkness lighting levels within this study area are relatively low due to the rural surroundings of Ardersier Port at 0 – 0.5 NanoWatts/cm²/sr. This is the radiance of light shining up into the night sky. Towards Nairn village centre this radiance increases to 16-32 NanoWatts/cm²/sr at its peak. Figure 2 identifies the lighting pollution map and Figure 3 below identifies the Key for the map.

Figure 2: CPRE Light Pollution Map

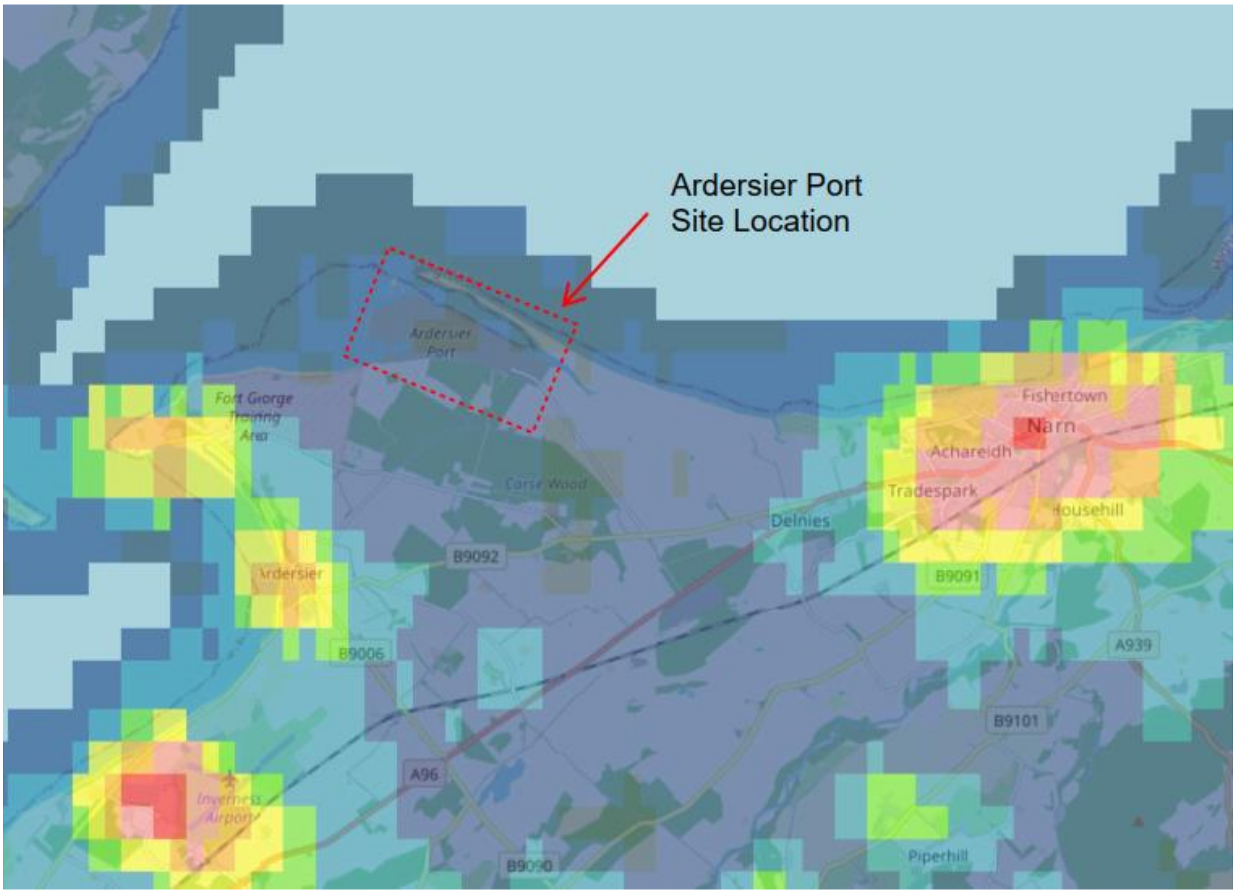
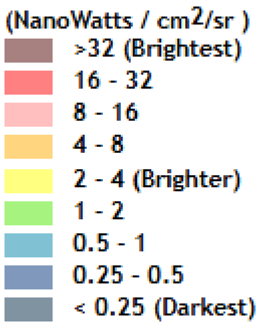


Figure 3: CPRE Light Pollution Key



1.6 DESIGN STANDARDS AND GUIDANCE

Adequate and appropriate lighting is essential for safe work, facility use, movement, and to minimise eye strain. The proposed lighting design should adhere to the following list of documents:

- BS EN 13201-2 (2015) - Road Lighting Part 2 Performance Requirements
- BS EN 12464-2:2024 - Light and Lighting - Part 2: Outdoor Work Places

  - BS EN ISO 1302:2002 - Surface Texture Indication
  - Institution of Lighting Professionals (ILP) Guidance Note 01 – GN01/21:2021 The Reduction of Obtrusive Light
  - ILP Guidance Note 08 – GN08/23:2023 Bats and Artificial Lighting
  - Society of Light & Lighting (SLL)Lighting Handbook
  - Chartered Institute of Building Services Engineers (CIBSE) LG06: The Exterior Environment
  - CIBSE LG01: The Industrial Environment
  - CIBSE LG14: Control Of Electric Lighting
  - CIBSE LG21: Protecting The Night-Time Environment
  - UK Government National Protective Performance Requirements Security Authority (NPSA) Document "Security Lighting - Guidance for Security Managers"
- Civil Aviation Authority (CAA) Advice Note 2 "Lighting Near Aerodromes".

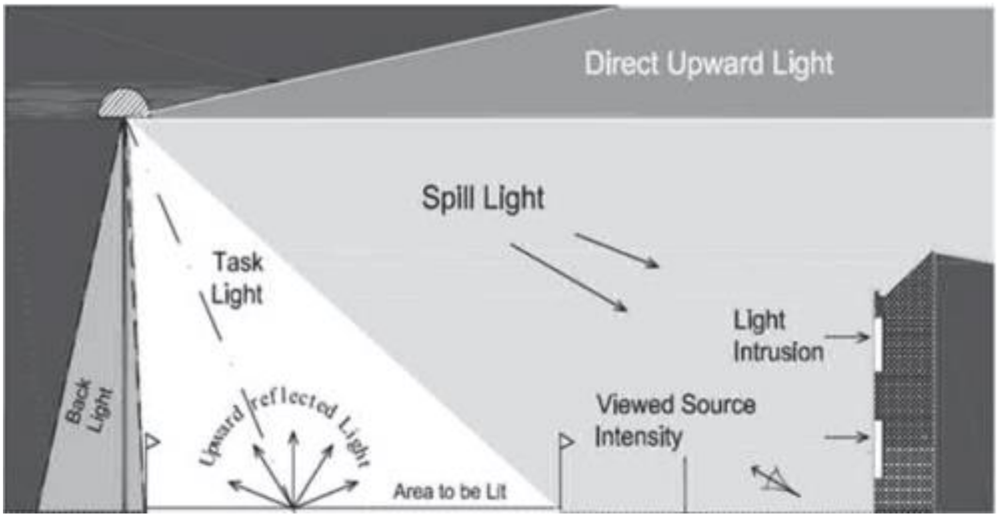
Guidance notes produced by the ILP are among the most commonly referenced guidance notes for good practice within the lighting design industry.

1.6.1 The Reduction of Obtrusive Light (GN01/21,2021)

Obtrusive light (or sometimes referred to as light pollution) refers to any light emitted in a direction in which it is not required or wanted and as such is detrimental to other users. Consideration is given to light intrusion, direct upward light (sky glow) and glare within the context of varying environmental zones.

- **Light intrusion** refers to the spilling of light beyond the boundary of the area to be lit. This includes the intrusion of light into bedroom windows.
- **Sky glow** refers to the brightening of the sky above towns caused by direct or reflected upward light.
- **Glare** refers to the uncomfortable brightness of a light source when viewed against a dark background.

Figure 4: Obtrusive Light Diagram (GN01:2021, Figure 1)



The ILP Guidance also quantifies the levels of obtrusive light regarded as acceptable for varying environmental zones E0 to E4. Reference Table 1.1 below for zone categories.

Table 1.1: Environmental Zones

Zone	Surrounding Environment	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5 +)	Astronomical observable dark skies, UNESCO Starlight reserves, International Dark-Sky Association (IDA) Dark Sky Parks
E1	Natural	Intrinsically dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, National Landscapes etc
E2	Rural	Low district brightness (SQM 15 to 20)	Sparsely inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres or suburban locations
E4	Urban	High district brightness	Town / city centres with high levels of night-time activity

In the absence of suitable statutory guidance, the ILP “Guidance Notes for the Reduction of Obtrusive Light” GN01:2021 is typically used, in order to provide suitable assessment criteria against which to assess the likely effects of artificial lighting.

1.6.2 Environmental Zone

The proposed development is located within an area of low level of district brightness, given the rural local environment. Therefore, the Environmental Zone is categorised as **E2** (Environmental Zone) in accordance with the ILP Guidance Notes and Table 1.1: Environmental Zones above.

1.6.3 Bats and Artificial Lighting in the UK (GN08/23,2023)

The ILP and Bat Conservation Trust (BCT) prepared this document. It provides guidance for artificial exterior lighting in close proximity to light sensitive ecology.

It is therefore important that the use of an area by bats is thoroughly assessed before artificial lighting is changed or added in the vicinity of a roost or where bats may commute or forage.

The document sets out the process for determining whether bats may be present on site and the application for accepted mitigation measures to avoid excessive light nuisance into identified habitats.

Where bats are present the species of bat is key and must be determined to assess what mitigation measures should be implemented to improve habitat quality.

1.6.4 SLL LG21 – Protecting the Night-Time Environment

The Society of Light and Lighting have produced this Lighting Guide which offers guidance on minimising the impact of artificial lighting on the night-time environment which begins with whether there is a need for lighting in the first place. Specifically referring to light pollution, the guidance includes best practices in lighting design to balance the need for artificial lighting and the benefits we see from darker night-time environments.

- **Light pollution** refers to the excessive or misdirected artificial light that interferes with the natural darkness of the night-time environment. It encompasses several types including Sky Glow, Glare, Light Spill as described in Section 1.61.

1.7 ECOLOGIST ENGAGEMENT

The Project Ecologist has been consulted who has highlighted a 15-20m retained woodland area, Carse Wood, to the south of the site boundary as a key habitat and potentially sensitive receptor for consideration. This will provide a buffer zone from the site but additional mitigation will be required to ensure that any light spill will be in accordance with ILP Guidance Note 08 – GN08/23:2023 Bats and Artificial Lighting.

This will can be achieved by the use of shields and cowls to block artificial light from spilling in the direction of Carse Wood.

1.8 STAKEHOLDER ENGAGEMENT

Further stakeholder engagement should be sought to provide input and feedback to ensure that lighting designs are.

- inclusive,
- balanced,
- ecologically & environmentally friendly,
- design to meet the standards required.

1.9 PROPOSED DESIGNS

To be in accordance with relevant design standards and guidance all proposed external luminaires should adhere to the following:

- shall be "dark sky approved" with minimal upwards or obtrusive light spill
- shall have a minimum colour rendering index (CRI) of 80 so as to be sufficient for CCTV images to be of a quality that can be used for prosecution
- shall have a colour temperature of 4000K or lower to suit the task and environment
- shall have a minimum glare rating of class G4 to reduce the potential for disability glare to road users
- shall be suitable for the installation of luminaire shields where deemed necessary.
- Utilise smart controls to reduce energy use and wasteful light.

All designs to be provided with light spill modeling drawings as installed at day one from full output showing lux contours values 1, 2.5, 5, 10, 15, 20 and 25.

Upward Light Ratio (ULR) calculation or confirmation through design methodology and LED luminaire selection shall also be provided.

Smart lighting controls shall be provided for each design and incorporate the following as a minimum:

- **Motion Sensors**: Lights automatically turn on when motion is detected, enhancing security and energy efficiency. Typically, utilising Radar sensors rather than Passive infra-Red (PiR) to minimise nuisance activation.
- **Dusk-to-Dawn Sensors**: Lights automatically adjust based on natural light levels, ensuring they only activate when needed.
- **Remote Control**: Manage lighting remotely through smartphone apps or web interfaces, offering convenience and flexibility.
- **Timing Schedules**: Schedule lights to turn on and off at specific times, reducing energy consumption and improving security.
- **Zone Control**: Group lights into zones and manage each zone independently for optimised lighting in different areas.
- **Manual Override**: For emergencies lighting shall be able to be manually switched off and on at a central control point.

1.9.1 Types and Positioning Requirements

LED’s are an ever evolving technology and utilising the latest LED luminaires available within the design will provide the following benefits:

- Maximum luminous efficacy allowing for more energy savings

- Full “cut-off” properties, directing light only towards the task area
- Maintaining compatibility with the latest adaptive controls and smart sensors providing the right light at the right time

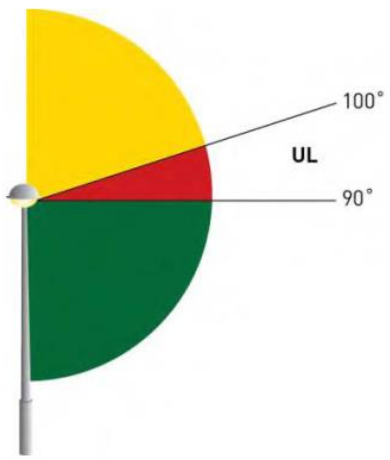
Figure 5 below is a typical IDA Dark Sky Approved LED luminaire and Figure 6 is a typical LED bulkhead.

Figure 5: LED Luminaire

Figure 6: LED Bulkhead

The modern LED luminaires and bulkheads are designed to limit upward light as the Figure 7 below indicates the suitable angle of light output before this can contribute to sky glow or upward light spill.

Figure 7: Crucial Luminaire Angle for Minimising Sky Glow



The choice of luminaire with the right optical distribution at the right mounting height is critical to minimising light spill and obtrusive light effects yet providing the right lighting performance on the task area. Sky glow is the general diffusion that is visible in the direction of large cities, airports, and industrial complexes. It occurs from both natural and artificial light sources and does not depend exclusively on the lighting design. It also depends on the atmospheric conditions (humidity, aerosols, clouds, haze, atmospheric pollution, etc.). Light propagating into the atmosphere either directly from upward directed or incompletely shielded sources, or after reflection from the ground or other surfaces, is partially scattered back towards observers on the ground.

LED luminaires and bulkheads should therefore aim to be installed at 90° to the vertical plane and a 0° inclination angle to minimise sky glow.

1.9.2 Limitations

The need for artificial lighting will be dependent on seasonality, where natural light is not sufficient and to ensure safe working conditions. The security office will have an override switch to activate the lighting as required.

No fixed external lighting shall be provided at the Quayside, mobile Lighting Towers only. For fixed external lighting, mounting heights shall be no more than 10m to reduce unnecessary light spill into the surrounding landscape.

1.10 CONCLUSION

The proposed lighting strategy for the new Port construction works aims to help achieve a safe, energy efficient and environmentally conscious lighting solution. By proposing modern LED technology paired with shielding fixtures, and smart controls to minimise light pollution and protect local wildlife while enhancing the functionality and safety of the Port.

To achieve these aims this report sets out a clear set of guidelines and relevant documentation and standards to follow to provide a compliant lighting design with suitable mitigation against the effects of obtrusive light.

ABBREVIATIONS

Table 2.2: Acronyms

Terminology	Comment
EIAR	Environmental Impact Assessment Report
THC	The Highland Council
ILP	Institution of Lighting Professionals
SSSI	Site of Special Interest
SPA	Special Protection Area
SAC	Special Area of Conservation
SLA	Special Landscape Area
km	Kilometres
PPiP	Planning Permission in Principle
HRO	Harbour Revision Order
m	Metre
m^3	Metres Cubed
CPRE	Campaign to Protect Rural England
cm^2 / SQM	Centimetres Sqaured
sr	Steradians
BS EN	British Standards European Norm
SLL	Society of Lighting and Lighting
CIBSE	Chartered Institution of Building Services Engineers
LG	Lighting Guide
NPSA	National Protective Security Authority
CAA	Civil Aviation Authority
GN	Guidance Note
BCT	Bat Conservation Trust
UNESCO	United Nations Educational, Scientific and Cultural Organization
IDA	International Dark-sky Association
DSA	Dark Sky Approved
K	Kelvin
CCTV	Closed-Circuit Television
CRI	Colour Rendering Index
ULR	Upward Light Ratio
LED	Light Emitting Diode
PiR	Passive infraRed
NanoWatts/cm^2/sr	nanowatts per square centimetre per steradian

REFERENCES

British Standards Institution, BS 5489-1: 2020 – Lighting of Roads and Public Amenity Areas (Code of practice).

British Standards Institution, BS EN 13201 Part 2: 2015 - Road Lighting Performance Requirements

British Standards Institution BS EN 12464-2:2024 - Light and Lighting - Part 2: Outdoor Work Places

British Standards Institution BS EN ISO 1302:2002 - Surface Texture IndicationSociety of Light & Lighting (SLL) Lighting HandbookChartered Institute of Building Services Engineers (CIBSE) LG06: The Exterior Environment Chartered Institute of Building Services Engineers (CIBSE) LG01: The Industrial Environment Chartered Institute of Building Services Engineers CIBSE LG14: Control of Electric LightingChartered Institute of Building Services Engineers CIBSE LG21: Protecting The Night-Time Environment

UK Government National Protective Performance Requirements Security Authority (NPSA) Document "Security Lighting - Guidance for Security Managers"

Civil Aviation Authority (CAA) Advice Note 2 "Lighting Near Aerodromes".

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Institution of Lighting Professionals. Guidance Note 08/23 Bats and Artificial Lighting, 2023. [Online]. Available from: https://theilp.org.uk/. Accessed August 2025.

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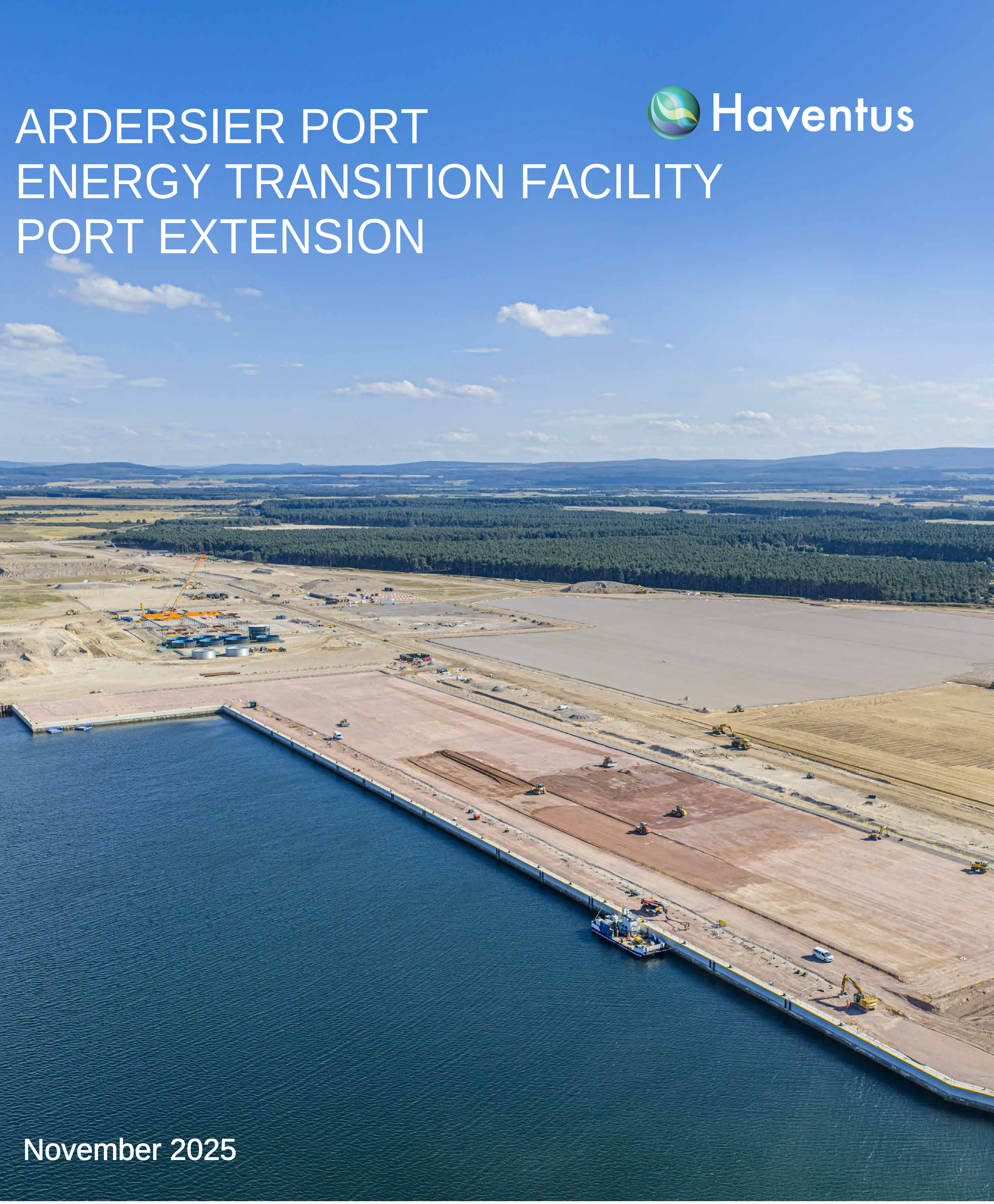


November 2025

Appendix 5.3 Waste Management Plan

Waste Management Plan

Contents

1. Introduction

This Waste Management Plan (WMP) has been developed to ensure that waste generated at Ardersier Port is managed responsibly, sustainably, and in accordance with relevant legislation and best practices. The goal is to reduce environmental impact, promote resource efficiency, and maintain compliance with the Waste Framework Directive and national waste regulations.
The definition of waste under the Waste Framework Directive (2008/98/EC) is "any substance or object which the holder discards or intends or is required to discard." This includes surplus materials from construction, packaging waste, and hazardous substances.

Three main waste types will be produced during operations at Ardersier Port:

- **Inert Waste**: Includes uncontaminated soil, concrete, rubble, and bricks.
- **Non-Hazardous Waste**: Encompasses general waste such as wood, plastic, paper, and packaging.
- **Hazardous Waste**: Covers potentially dangerous materials like solvents, oils, paints, contaminated soil, and asbestos.

This waste management plan is in conjunction with the following documents:

- Construction Phase Plan
- Construction Environmental Management Plan

2. Roles and Responsibilities

Clear roles and responsibilities are critical for effective waste management:

Project Manager

The Project Manager shall ensure that:

- They include waste management within their site audits and inspections.
- They brief the requirements of the SWMP to their teams and share with their sub-contractors as package managers.
- They appoint competent personnel to manage skips, control the removal from site and ensure Waste Transfer notes are collected and stored.

HSEQ Manager/Lead

The HSEQ Manager / lead shall ensure that they:

- They provide guidance on the management of waste to all project teams.
- Conduct regular audits of the waste management on site.
- Assist, where required, in planning site investigations and advise on waste classifications.

Employees

- Follow the waste hierarchy principles when managing waste. (Prevent, Reduce, Reuse, Recycle, Recover, Dispose)
- Ensure waste is handled in compliance with the requirements detailed in this SWMP.

3. Waste Hierarchy and Minimisation

This plan is structured around the waste hierarchy, a core principle of waste management legislation. The hierarchy prioritises actions to prevent and reduce waste generation, aiming to conserve natural resources and reduce environmental harm:

1. **Prevention:** Measures will be implemented to avoid waste generation, such as optimised design, just-in-time material deliveries, and employee training to reduce misuse.
2. **Minimisation:** Operational controls will ensure efficient material use, avoiding over-ordering and wasteful handling.
3. **Reuse:** Items such as timber, pallets, or bricks will be reused where possible, with minimal processing.
4. **Recycling:** Materials that cannot be reused will be segregated and sent to appropriate recycling facilities.
5. **Energy Recovery**: Non-recyclable combustible waste may be sent to facilities for waste-to-energy processing.
6. **Disposal:** Landfilling will only be considered where other options are not feasible.

These principles will be embedded into daily operations and reinforced through inductions and site briefings

4. Waste Types

4.1 General Waste

General waste is uncontaminated, non-electrical waste which cannot be recycled.

General waste is gathered in skips delivered by the waste service provider. In indoor areas such as kitchens, smaller receptacles may be used for the temporary storing of general waste. Typically, this type of waste is sent to a landfill site due to a lack of re-use or recycling possibilities. Handling through a sorting plant will ensure that the amount of waste to be landfilled is minimised.

General waste includes, but may not be limited to:

- Organic (food) waste from kitchens and canteens
- Food wrappers
- Empty drink containers (milk, juice, etc.)

4.2 Recyclable Waste

Recyclable waste is uncontaminated and clean waste. Depending on the requirements of the waste service provider and/or space available for segregation, recyclables may be stored together in the same bin.

Recyclable wastes are gathered in skips delivered by the waste service provider. In indoor areas, smaller receptacles may be used for the temporary storing of recyclables in which case they will be marked as such.

Recyclable waste includes:

- Wood
- Metal
- Aluminium cans
- Paper & cardboard
- Glass
- Hard plastics

4.3 Contaminated and Hazardous Materials

Hazardous waste is waste that has the potential to cause harm to personnel or the environment due to its toxic nature or hazardous components. Hazardous waste is stored separately from other types of waste in clearly marked, waterproof and lidded receptacles delivered by the waste service provider. At all times, management of hazardous waste is aimed at safeguarding personnel and the environment of negative impacts as a result of exposure to these substances.

Due to the specific nature of hazardous wastes, processing possibilities depend on the product. The waste service provider will be engaged to help identify the most environmentally friendly alternative and advise on how to handle and process the item accordingly.

Liquid hazardous waste includes, but may not be limited to:

- Oils (lubricating and waste oil from machinery and equipment)
- Chemicals
- Oil & water mixtures
- Solvents & thinner
- Paint (prior to drying)

A distinction is made between solid and liquid hazardous waste. Solid hazardous waste includes, but may not be limited to:

- Paint cans
- Batteries
- Fluorescent light bulbs
- Electrical waste
- Aerosols
- Empty chemical containers
- Empty hydrocarbon containers
- Used oil filters
- Oily or greasy rags and absorbents

5. Waste Segregation, Storage and Handling

Effective waste segregation is crucial to facilitate recycling and ensure hazardous materials are properly managed.

All waste shall be classified and segregated according to the correct coding as described in the European Waste Catalogue (EWC) list of wastes which is a harmonised, non-exhaustive list of waste types established by the European Commission (2000/532/EC) and under advice from the licenced waste service provider.

Transfer of waste to licenced waste service providers for treatment shall be done in accordance with Section 34 of the Environmental Protection Act 1990 – Duty of Care which includes making sure the waste is stored correctly and does not escape control, only transferring waste to an authorised person (a waste disposal company that can legally take it) and making sure a written record of the waste is kept every time the waste is passed to a waste disposal company.

On-site procedures include:

- Designated Waste Storage Areas: Located away from watercourses and sensitive receptors.
- Clearly Marked Containers: All skips and bins will be colour-coded and labelled for specific waste streams.
- Protection from Elements: Covered containers will prevent rain ingress and wind dispersion.
- Bunds and Secondary Containment: Hazardous waste containers will have bunded areas to contain spills.
- **Waste Handling Procedures**: Trained personnel will be responsible for moving waste using designated pathways to avoid contamination.

Routine inspections will be conducted to ensure compliance, identify misuse, and verify container integrity.

6. Waste Disposal and Recovery

Waste will be removed from site using licensed waste carriers. A WTN must be completed and signed by both the person handing over the waste and the person receiving it.
The WTN must contain enough information about the waste for it to be handled safely and either recovered or disposed legally.

Priority will be given to recovery operations over disposal:

- Licensed Facilities: Only authorised waste treatment, recycling, and disposal sites will be used.
- Inert and Recyclable Waste: Sent to recycling facilities or for use in secondary construction applications.
- Hazardous Waste: Managed under strict protocols and accompanied by Special Waste Consignment Notes.
- Documentation: All waste movements will be recorded, ensuring full traceability.

Copies of all WTN's must be kept for at least two years.

Prior to the start of any waste transport (hazardous and non-hazardous waste) the transporter or intermediary always needs to undersign the WTN and deliver a copy to the waste producer.

For the movement of hazardous waste in Scotland a Special Waste Consignment Note (SWCN) document is required. This document ensures that all hazardous waste is tracked from its origin to its final disposal.

Clear instructions and responsibilities for waste disposal will be given to all contractors and operatives.

7. Records and Legal Compliance

To ensure accountability and legal compliance, the following records will be maintained:

- Waste Transfer Notes (WTNs): For all non-hazardous waste movements.
- Special Waste Consignment Notes (SWCNs): For all hazardous waste.

- Carrier Licences: Proof of registration for all waste carriers.
- Environmental Permits: For all receiving waste facilities.
- Waste Summaries: Monthly reports on volume, type, treatment method, and destination.

This documentation will be stored on-site and be available for audit by SEPA or other relevant authorities. Compliance is assured under the Environmental Protection Act 1990 and the Waste (Scotland) Regulations 2012.

8. Contractor and Supplier Compliance

All contractors and suppliers must align with the principles of this WMP:

- Waste Container Usage: Contractors must use designated areas unless authorised otherwise.
- Waste Documentation: Contractors must provide evidence for any waste they generate or remove.
- Packaging Minimisation: Suppliers are encouraged to reduce packaging and increase recyclable content.
- Monitoring: Contractor compliance will be monitored during site inspections and audits.

Contractors shall maintain records of the following which shall be provided on request.

- ▪ Waste transfer Notes
- ▪ Any breaches of this Site Waste Management Plan
- ▪ Details of their waste management suppliers.
- ▪ Inspections / Audits of the waste carriers disposal / sorting facilities

9. Training

Operatives on site, including sub-contractors will be given training and information on the SWMP as part of their induction. In addition, toolbox talks will be given, reinforcing existing training and informing the workforce of the SWMP progress.

The onsite training will include the following topics: -

- The SWMP
- Roles and responsibilities
- Waste procedures on site, including provision of site/ skip layout plans
- Hazardous waste
- Spill response drills
- Duty of care/responsibilities
- Materials storage

The contents of SWMP will be issued to all sub-contractors and key stakeholders of the project.

10. Monitoring

All stakeholders shall be encouraged to report any issues, breaches of restrictions or risks relating to this plan to site management.

Site management contact details will be advertised at the site access in order to allow members of the public to report any issues.

11. Site Specific Considerations for Ardersier Port

Due to its coastal location and sensitive environmental surroundings, special precautions are required:

- Buffer Zones: No waste storage within 10m of watercourses or marine boundaries.
- Dust and Noise Controls: Measures in place to reduce airborne waste and minimise disruption to local communities.
- Marine Waste Regulations: Any waste from port or vessel activities must comply with MARPOL Annex V.
- Fuel and Chemical Handling: Use of bunded containers, drip trays, and mobile containment systems.

All staff will be briefed on site-specific risks and emergency response plans.

12. Associated Documents

- HAV-PL-HSEQ-040 Construction Environmental Management Plan
- HAV-PR-HSEQ-030 Waste Management and Recycling Procedure
- HAV-PR-HSEQ-040 Environmental Management

ARDERSIER PORT
ENERGY TRANSITION FACILITY
PORT EXTENSION

Haventus

November 2025

Appendix 5.4 Tree Constraints Plan

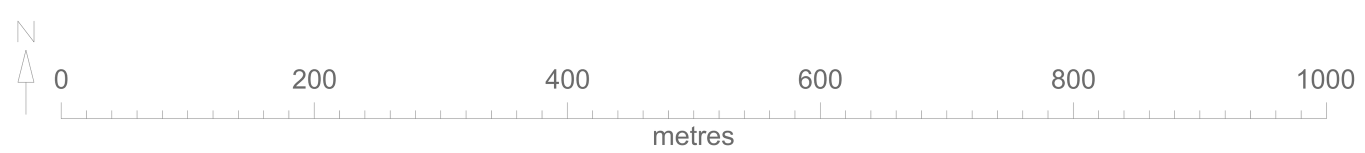
Tree Constraints Plan

Area ID	Description	Population data	Species Present	AWI Designation	Native Woodland	BS5837 Quality Grade
W1	Upland Birchwood	Early-mature/Mature Birch woodland with occasional Scots Pine and Goat Willow. Average Height 13m. Average stem diameter 300. Spacing variable.	Betula pendula. Pinus sylvestris, Salix capraea	None	Yes	B
W2	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 350mm (North site) 400mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W3	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W4	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400mm. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W5 (a,b, c)	W5a: Mature Scots Pine plantation woodland W5b: Wind damaged trees W5c: Dense pole stage Sitka Spruce Plantation with more mature Lodgepole pine on eastern boundary	W5a: Scots Pine with Lodgepole Pine on eastern and southern boundary. Average stem diameter 300-400mm. Spacing 2m. Average height 27m. W5b: Wind damaged Lodgepole Pine with Birch and Pine regeneration. W5c: Dense pole stage Sitka Spruce with mature Lodgepole Pine on Eastern boundary. Average height 10-15m. Average stem diameter 200. Spacing very dense	Pinus sylvestris. Pinus contorta, Picea sitchensis, Betula pendula	None	Only W5a	W5a: B W5b: C W5c: C
W6	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400mm. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W7	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400mm. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W8	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400-500mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W9	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 350mm (North site) 400mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W10	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 400mm. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W11	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 350mm (North site) 400mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B
W12	Mature Scots Pine plantation woodland	Mature Scots Pine plantation woodland. Average height 25. Average stem diameter 350mm (North site) 400mm other areas. Spacing 2-3m.	Pinus sylvestris	None	Yes	B

Woodland Compartment Information

BS5837:2012 Cascade chart for tree quality assessment

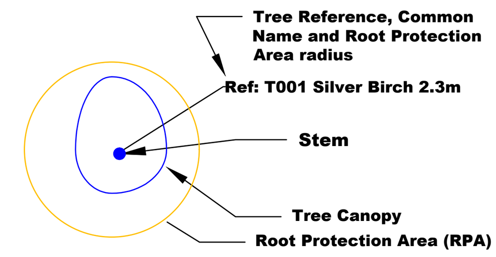
Category & Definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention				
Category U				
Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse,including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve			Red on plan RGB 127,0,0
Trees to be considered for retention				
	1. Mainly arboricultural qualities	2. Mainly landscape qualities	3. Mainly cultural values, including conservation	
Category A				
Trees of high quality with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	Light Green RGB 0,255,0
Category B				
Trees of moderate quality with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	Mid blue RGB 0,0,255
Category C				
Trees of low quality with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	Grey RGB 091,091,091



General Notes

KEY

Individual tree identified during survey:



Colours are in accordance with BS5837:2012 quality grading:

Red: Unsuitable for retention (U)
Grey: Low quality (C)
Blue: Moderate quality (B)
Green: High quality (A)

Root Protection Area (RPA): The minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority (BS5937:2012)

Woodland compartment identified during survey (Note: Yellow line denotes Root Protection Area):

Moderate Quality (B) Woodland Compartment

Low Quality (C) Woodland Compartment

Survey Area Boundary

The tree survey was performed between 23.07.2024 & 02.08.2024 by Callum McCutcheon BSc (Hons) M.Arbor.A in accordance with BS5837:2012. The Tree Constraints Plan (001) and the Tree Survey Schedule have also been produced in accordance with BS5837:2012

Tree survey performed by Callum McCutcheon BSc (Hons) M.Arbor.A on 23.07.2024-02.08.2024

Urban-Arb LLP
Arboricultural Consultants

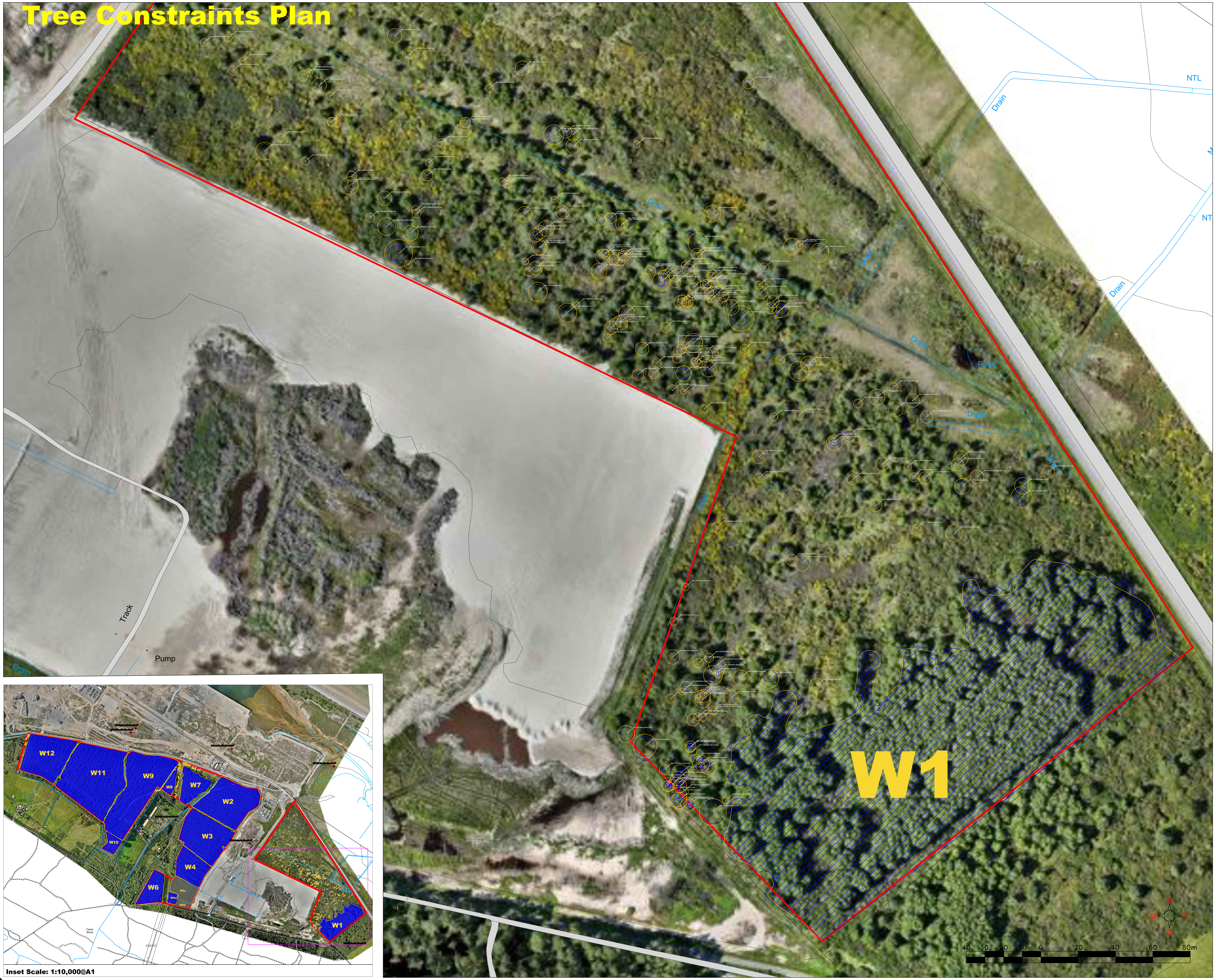
No.	Revision/Issue	Date

Firm Name and Address
Urban-Arb LLP
Dolphin Cottage
11 The Muir
Bogmoor
Spey Bay
Fochabers
Moray IV32 7PN
www.urban-arb.com

Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	001(1)
Date: 07.08.2024	
Scale: 1:5000@A1	



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General Notes

KEY

Individual tree identified during survey:

Tree Reference, Common Name and Root Protection Area radius
Ref: T001 Silver Birch 2.3m
Stem
Tree Canopy
Root Protection Area (RPA)

Colours are in accordance with BS5837:2012 quality grading:

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Low Quality (C) Woodland Compartment

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Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	001(2)
Date: 07.08.2024	
Scale: 1:1000@A1	

Tree Constraints Plan

Inset Scale: 1:10,000@A1

General Notes

KEY

Individual tree identified during survey:

Tree Reference, Common Name and Root Protection Area radius
Ref: T001 Silver Birch 2.3m
Stem
Tree Canopy
Root Protection Area (RPA)

Colours are in accordance with BS5837:2012 quality grading:

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Grey: Low quality (C)
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Root Protection Area (RPA): The minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority (BS5937:2012)

Woodland compartment identified during survey (Note: Yellow line denotes Root Protection Area):

Moderate Quality (B) Woodland Compartment

Low Quality (C) Woodland Compartment

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Project Name and Address

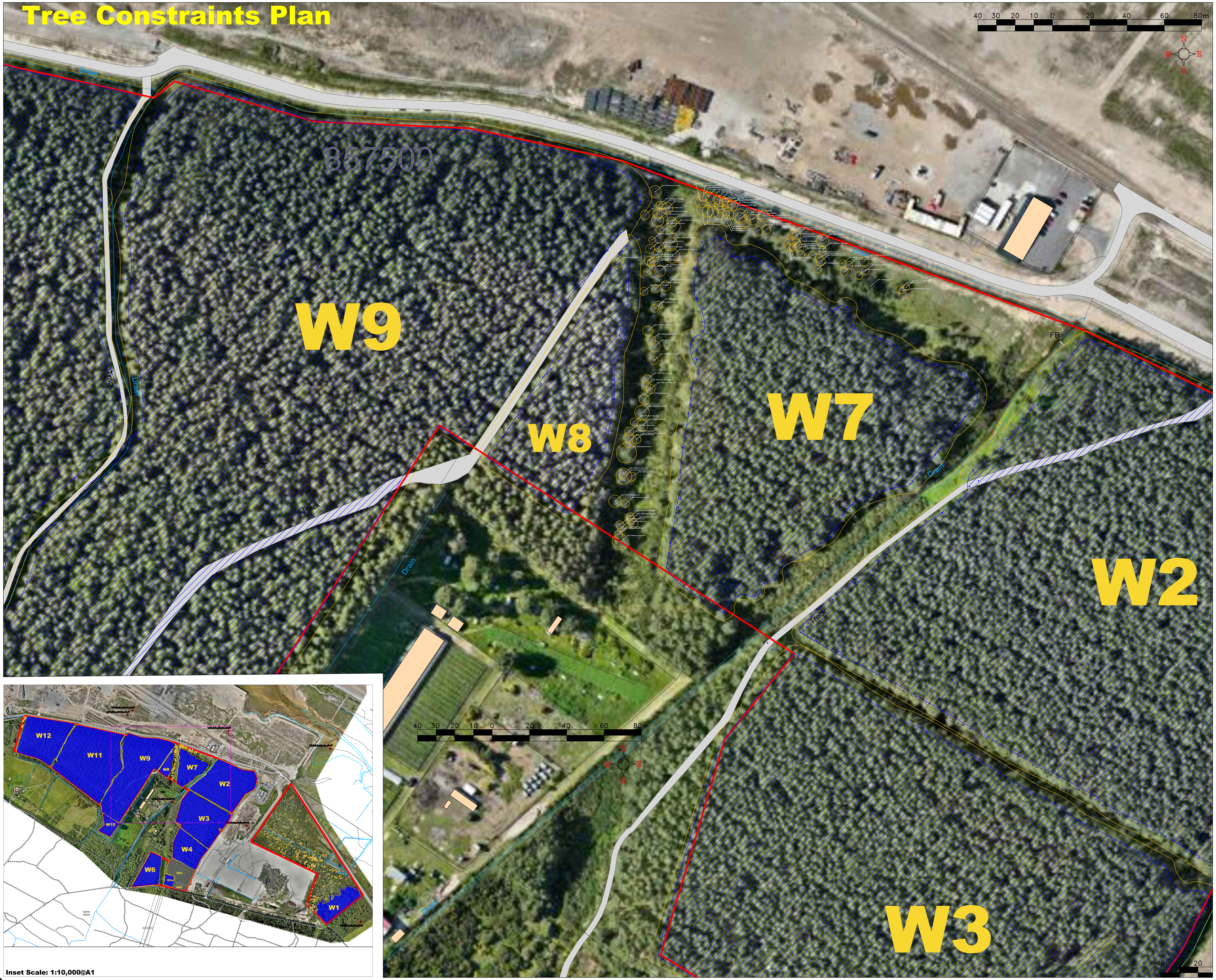
Ardersier Port

Project: **TREE CONSTRAINTS PLAN**

Sheet: **001(3)**

Date: **07.08.2024**

Scale: **1:1000@A1**



General Notes

KEY

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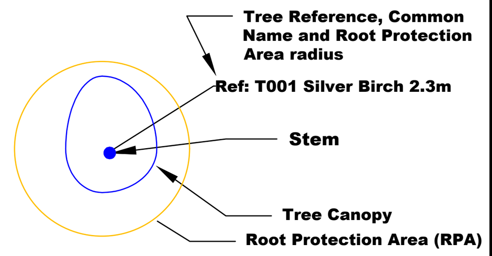

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Woodland compartment identified during survey (Note: Yellow line denotes Root Protection Area):

Moderate Quality (B) Woodland Compartment

Low Quality (C) Woodland Compartment

Survey Area Boundary

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Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	**001(4)**
Date: **07.08.2024**	
Scale: **1:1000@A1**	

Tree Constraints Plan

Inset Scale: 1:10,000@A1

General Notes

KEY

Individual tree identified during survey:

Tree Reference, Common Name and Root Protection Area radius
Ref: T001 Silver Birch 2.3m
Stem
Tree Canopy
Root Protection Area (RPA)

Colours are in accordance with BS5837:2012 quality grading:

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Green: High quality (A)

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Woodland compartment identified during survey (Note: Yellow line denotes Root Protection Area):

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Low Quality (C) Woodland Compartment

Survey Area Boundary

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Tree survey performed by Callum McCutcheon BSc (Hons) M.Arbor.A on 23.07.2024-02.08.2024

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Arboricultural Consultants

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Fochabers
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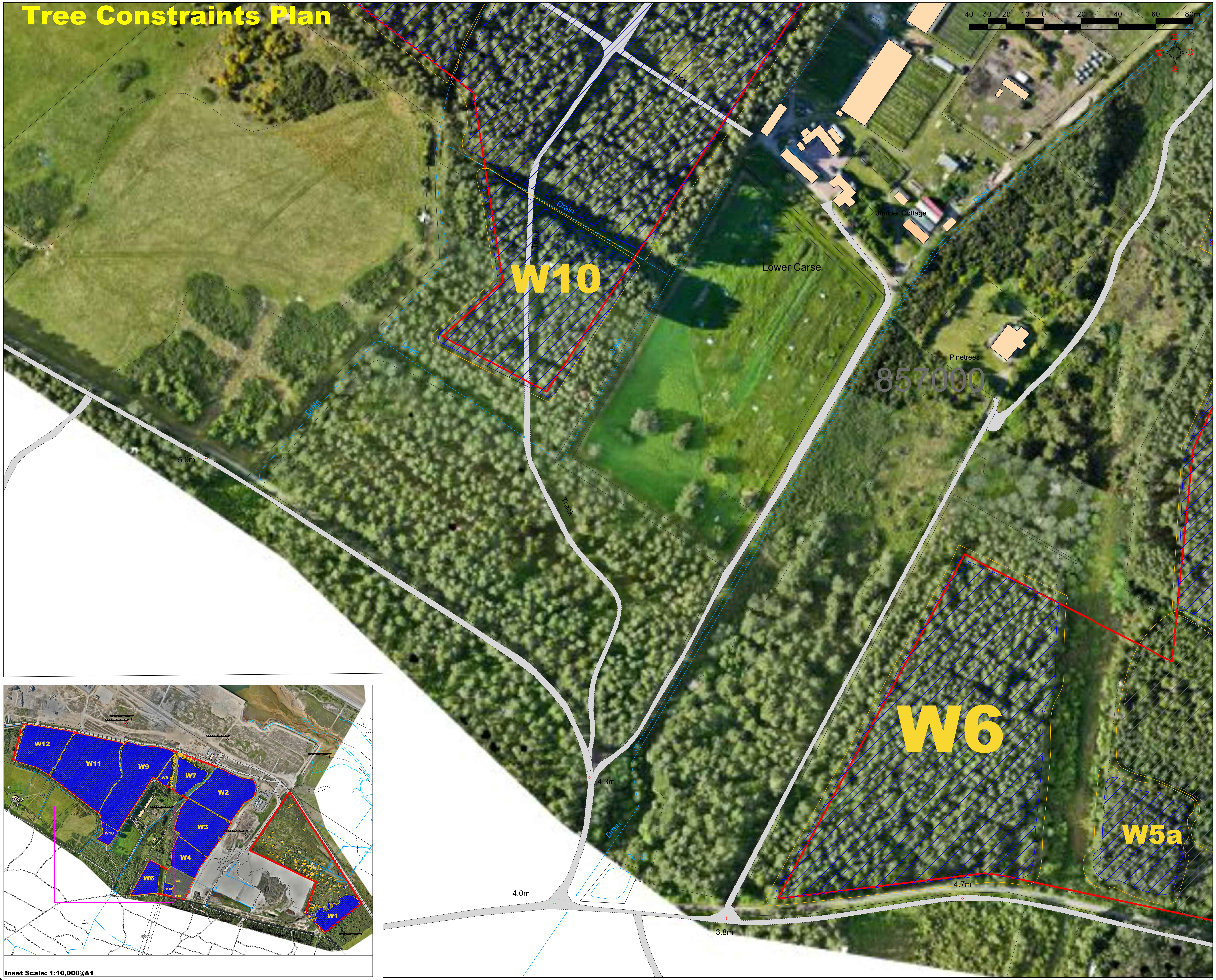
www.urban-arb.com

Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	001(5)
Date: 07.08.2024	
Scale: 1:1000@A1	

Tree Constraints Plan



General Notes

KEY

Individual tree identified during survey:

Tree Reference, Common Name and Root Protection Area radius

Ref: T001 Silver Birch 2.3m

Stem

Tree Canopy

Root Protection Area (RPA)

Colours are in accordance with BS5837:2012 quality grading:

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Blue: Moderate quality (B)
Green: High quality (A)

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Low Quality (C) Woodland Compartment

Survey Area Boundary

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Tree survey performed by Callum McCutcheon BSc (Hons) M.Arbor.A on 23.07.2024-02.08.2024

Urban-Arb LLP
Arboricultural Consultants

No.	Revision/Issue	Date

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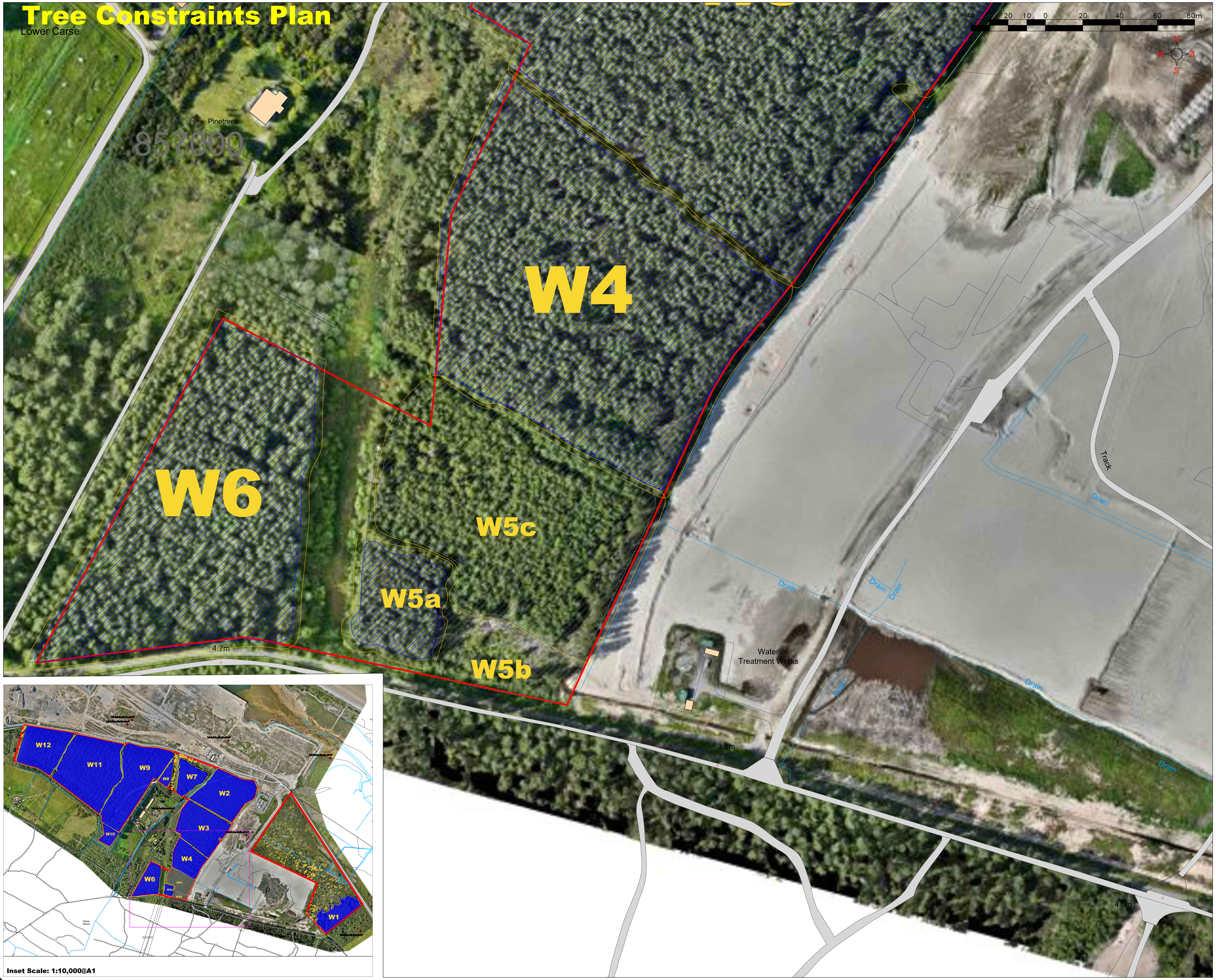
Dolphin Cottage
11 The Muir
Bogmoor
Spey Bay
Fochabers
Moray IV32 7PN
www.urban-arb.com

Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	**001(6)**
Date: **07.08.2024**	
Scale: **1:1000@A1**	



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General Notes

KEY

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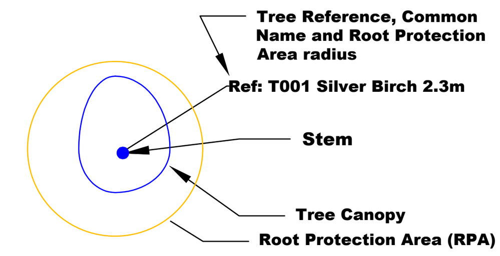

Colours are in accordance with BS5837:2012 quality grading:

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Grey: Low quality (C)
Blue: Moderate quality (B)
Green: High quality (A)

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Woodland compartment identified during survey (Note: Yellow line denotes Root Protection Area):

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Low Quality (C) Woodland Compartment

Survey Area Boundary

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Urban-Arb LLP
Arboricultural Consultants

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www.urban-arb.com

Project Name and Address

Ardersier Port

Project	Sheet
TREE CONSTRAINTS PLAN	**001(7)**
Date: **07.08.2024**	
Scale: **1:1000@A1**	

PROPOSED BUFFER ZONES

02

SITE BOUNDARY PLAN 1:2500

REPRODUCTION BASED UPON THE ORDNANCE SURVEY'S WITH THE PERMISSION OF THE CROWN COPYRIGHT RESERVED.

M.R.H Design

Legend:

Proposed Type 1 Track Surfacing

Existing 20m Woodland Buffer Zone

Indicative Wetland

Haventus

Drawing details

Drawing title:
ARDERSIER PORT LTD
BUFFER ZONES

Drawn by: MRH
Checked by:
Date: 01.08.2025
Scale: 1:2500@ A1

Revision history

Revision	Details	DR	CH	AP	Date

Drawing Status

NESS planning
PLANNING CONSULTANT

PLANNING ISSUE

Notes

Project Number 2025-22
Drawing number **25-22 -MRH-007**

MRH design
ARCHITECTURAL TECHNOLOGY

The Studio
9 Heights of Woodside
Westhill
Inverness IV2 5TH

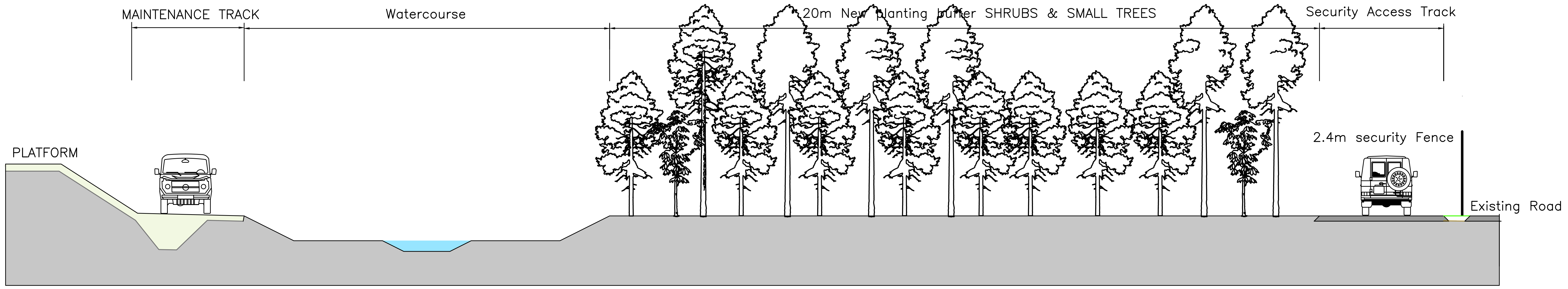
Tel/Fax: 01463 794410
Mobile: 07760 195141
Email: info@mrhdesign.co.uk
Web: www.mrhdesign.co.uk

It is the contractor's responsibility to ascertain the location of all services prior to the commencement of work. Setting out shall be the responsibility of the contractor, any discrepancies shall be reported and clarified at the earliest opportunity.

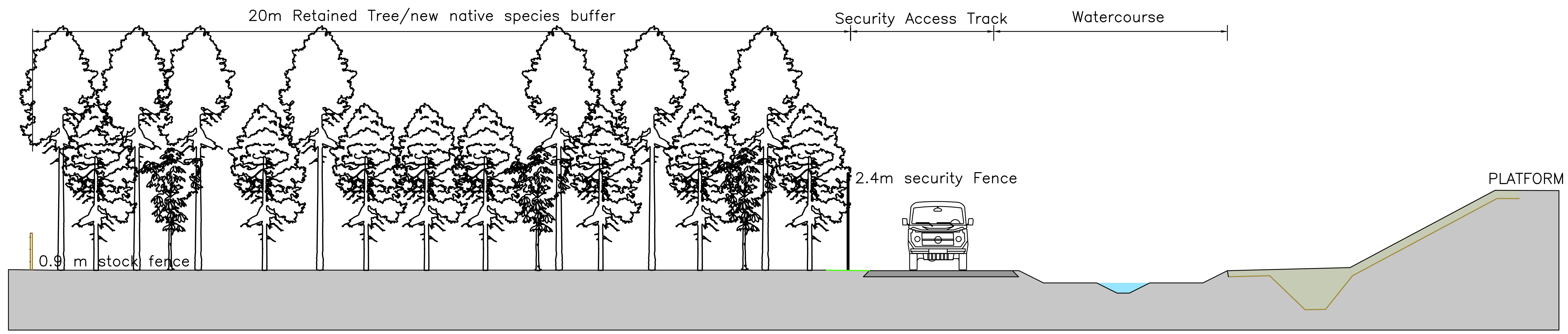
DO NOT SCALE, IF IN DOUBT PLEASE ASK

All setting out must be checked on site prior to commencement. Any discrepancy must be reported to client

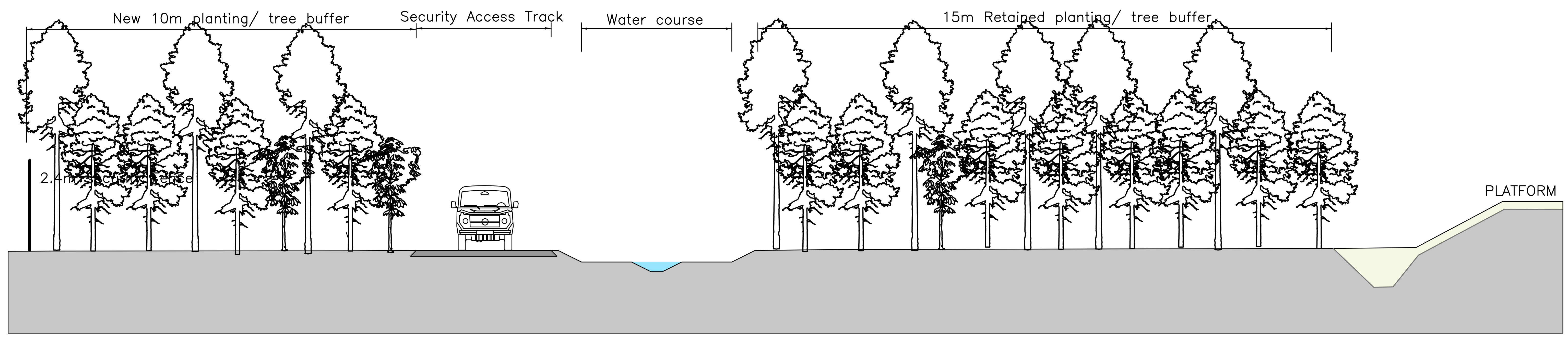
PROPOSED BUFFER DETAILS



03
CROSS SECTION A EAST BUFFER 1:100



02
STARLIGHT BUFFER TYPICAL CROSS SECTION B



01
WEST BUFFER TYPICAL CROSS SECTION C

Haventus

Drawing details

Drawing title:
ARDERSIER PORT LTD
BUFFER ZONES SECTIONS

Drawn by: MRH
Checked by:
Date: 01.08.2025
Scale: 1:2500@ A1

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Revision	Details	DR	CH	AP	Date

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Project Number 2025-22
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It is the contractor's responsibility to ascertain the location of all services prior to the commencement of work. Setting out shall be the responsibility of the contractor, any discrepancies shall be reported and clarified at the earliest opportunity.

DO NOT SCALE, IF IN DOUBT PLEASE ASK

All setting out must be checked on site prior to commencement. Any discrepancy must be reported to client

ARDERSIER PORT ENERGY TRANSITION FACILITY PORT EXTENSION

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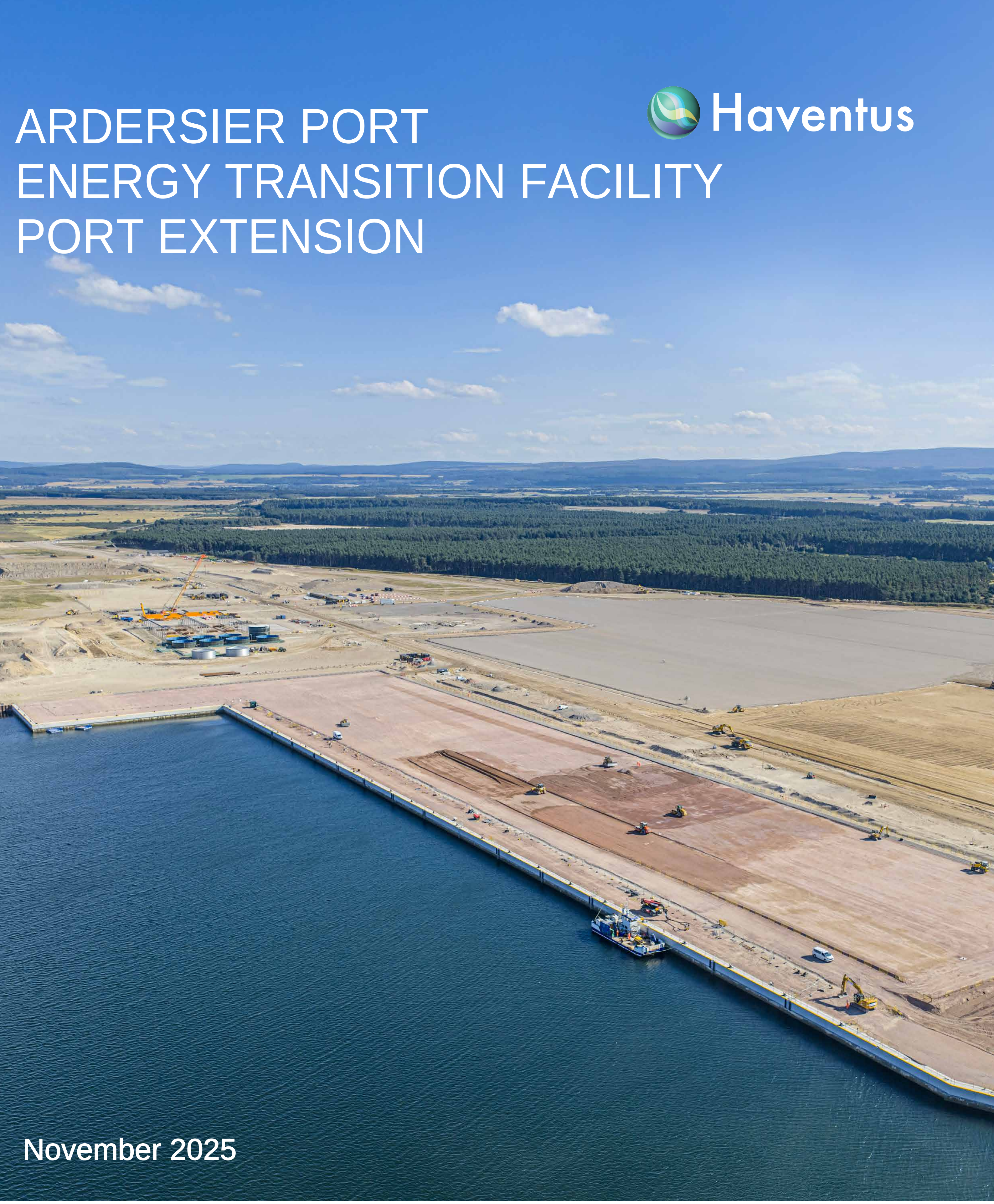

November 2025

Appendix 5.5 Estimated Greenhouse Gas (GHG Emissions Assessment and Carbon Management

Appendix 5.5: Estimated Greenhouse Gas (GHG) Emissions Assessment and Carbon Management

1. Introduction and Project Description

1.1 Purpose of this Appendix

This appendix presents an assessment of the GHG emissions associated with the Ardersier Port extension outlined throughout this document. The calculations have been undertaken in accordance with the requirements of PAS 2080:2023 - *Carbon Management in Infrastructure*. It supports the Environmental Impact Assessment (EIA) by quantifying and reporting estimated GHG emissions over the project lifecycle.

1.2 Project Overview

The proposal involves the development of the land to the south of the existing port to create a single planning unit. The extension area will accommodate uses that are compatible with and complement the existing port permission. The principal purpose is to deliver additional land that will provide an extended area to accommodate energy related activities, particularly those relating to the manufacture, storage and assembly of wind energy components (floating jackets, blades, nacelles, towers etc.).

The proposed development comprises the following key activities and be an extension of consented port activities:

- ➢ Site clearance involving the felling of the existing stand of commercial Scots Pine woodland
- ➢ Demolition of existing buildings (Pinetrees and Juniper Cottage)
- ➢ Land raising of the site area with dredged sand to the levels of the existing port area
- ➢ Formation of a working platform capped with a crushed rock/stone placement
- ➢ Erection of security fence to the outer edge of the extended site
- ➢ Biodiversity enhancements
- ➢ Surface water and new perimeter drainage upgrades

- ➢ Landscaped buffer (minimum 20m wide) to the outer boundary of the site including retention of the boundary trees
- ➢ Noise attenuation bund at the south outer boundary

As an application seeking planning in principle only, there are no details of possible buildings, but it is anticipated that warehousing, storage and office facilities will be required to support the development. These would be dealt with as future applications, where necessary, as ‘Matters Specified’.

The proposed development would also require the following marine infrastructure, and construction works.

- ➢ Additional quay construction through the existing platform (mainly on land and already consented under the Harbour Revision Order (HRO)) by a combination of diaphragm wall (same method as the already constructed quay walls) and vibropiling and conventional sheet piling.
- ➢ Removal of old sheet piles to the north of the new quay wall which may involve temporary sand bunds.
- ➢ A small area of infilling behind the new quay wall.
- ➢ Selected deepening of the inner harbour by dredging (approximately 2,000,000m3).
- ➢ Sea disposal, Whiteness Sands nourishment and possible beneficial re-use on land or at remote site.
- ➢ Maintenance dredge to west of Tern Island.
- ➢ Rock armour for erosion control and rock mattress on seabed in -6mCD area
- ➢ Localised crushed rock mattress for east of harbour.
- ➢ Mooring dolphins for erosion control.

2. Scope of Assessment

2.1 Boundaries and Life Cycle Stages

In accordance with PAS 2080, this GHG assessment considers emissions across the relevant lifecycle stages, outlined below:

- **Land Preparation & LUC (A0):** Energy consumption from land preparation and associated Land Use Change (LUC) emissions.
- **Upstream (A1-A3):** Raw material extraction, processing, and manufacturing.
- **Construction (A4-A5)**: Transport of materials and on-site activities.
- **Beyond the System Boundary (D)**: Benefits and load beyond the system boundary. Replanting of Scotts Pine and Broadleaf at an offsite location.

The use stage of this project's lifecycle both operational and end of life stages, have been excluded from this calculation. Reasoning behind these exclusions is outlined in section 2.3 below.

2.2 Emissions Sources Included

Listed below are the GHG emissions sources captured at each of the previously outlined life cycle stages;

Upstream:

- ➢ Embodied GHG emissions of quarried stone for use in the platform construction.
- ➢ Fuel and energy use from channel dredge, sand by product will be used in the construction process.
- ➢ Land Use Change (LUC), CO_2 from biomass removal, soil carbon loss, foregone sequestration.*

Construction:

- ➢ Energy and fuel used to transport quarried stone to site.
- ➢ Energy and fuel used to transport dredge sand from location at the port to the construction site.
- ➢ Energy and fuel usage of machinery onsite throughout the construction process.
- ➢ Energy and fuel usage of machinery during the tree clearing phase of the construction.

Beyond the System Boundary:

- ➢ Replanting of 120 acres of Scott's Pine woodland and 12 acres of broadleaf woodland at an off-site location.

** GHG emissions associated with LUC have been included within the capital carbon assessment boundary, in accordance with the principles of PAS 2080:2023 and EN 15978:2011. LUC emissions arise from the clearance of existing vegetation and disturbance of soils required to establish the project footprint.*

2.3 Emission Sources Excluded

In accordance with the principles of PAS 2080:2023, which allow for the exclusion of life cycle stages where emissions are demonstrably negligible or cannot be reasonably quantified, the following life cycle stages have been omitted from this calculation.

In this calculation the embodied GHG emissions from the sand will be excluded. This is because the sand is a waste product produced from other activities at the Ardersier port site, not linked with the extension proposed in this document. The dredge was conducted in another construction phase of the project not related to the platform outlined in this EIA. However, fuel usage from dredging activities has been included in this calculation.

Operational life cycle stages (B1-7) have also not been calculated. The completed platform will not generate any direct greenhouse gas emissions during its operational phase and is not expected to require maintenance over its design life. Furthermore, as the future use of the platform and any potential developments above it have not yet been defined, it is not possible to accurately estimate associated operational emissions. For these reasons, operational stage GHG emissions have been excluded from this assessment.

End of Life (EOL) stage emissions have not been assessed for this project. As outlined in Chapter 3 Section 3.1.2 of the EIA, the proposed extension areas will form a permanent part of the existing Port infrastructure, which is considered Critical National Infrastructure (CNI) and is anticipated to remain in operational use for the foreseeable future. Decommissioning of port facilities of this nature is not typically undertaken in the UK, and no such plans or timeframes exist for the Ardersier Port. Consequently, EOL impacts cannot be reasonably defined or quantified within the current regulatory or policy context.

3. Methodology

3.1 Approach

GHG emissions were estimated using a bottom-up inventory approach consistent with the international standards outlined in section 3.3. Where supplier data is available it has been used for this calculation, for example the dredging fuel consumption. As work is yet to happen some other categories are estimated and again outlined further in section 3.3.

3.2 Calculation Method

The total GHG emissions are calculated as:

$$\textbf{Total Emissions } (tCO_2e) = \sum(\textbf{Activity Data} \times \textbf{Emission Factor})$$

Where:

- Activity Data = quantity of material, fuel, or energy used
- Emission Factor = conversion factor to CO_2 equivalent (Tonnes of Carbon Dioxide Equivalent (tCO_2e) will be the standardised metric for this calculation)

Emission factors are selected in line with the principles set out in PAS 2080:2023, Clause 6.2.3, factors need to be appropriate, transparent, up to date, and sourced from credible data sets or suppliers.

3.3 Data Sources and Guidance

Sources of Usage Data:

- ➢ Tree clearing fuel usage: equipment and construction phase time were used to estimate total fuel consumption by using industry standard fuel consumption rates. Consumption rates were taken from the "Industrial Non-Road (Fuel Consumption and Emission Factors Database", for the Department for Energy Security and Net Zero (formerly Beis).
- ➢ Raw material supply, sources and quantities of the raw materials to be used in the project are known and includes the following; 200,000 m3 of quarried stone, 800,000 m2 of Geogrid textile and lastly 2,000,000 m3 of site-won sand.
- ➢ Fuel generated from dredging was calculated using data provided by Demes who conducted the dredging. This is the same methodology used for the plant fuel, where sand is unloaded from the dredging vessel to on-site storage.
- ➢ Lastly fuel usage by machinery during the construction phase of this project was calculated using the same method as the tree clearing phase, as project run times and machinery used is known at this stage.

Carbon Factor & Guidance Sources:

- ➢ DEFRA *Greenhouse gas reporting: conversion factors 2024* (UK GOV).
- ➢ Intergovernmental Panel on Climate Change (IPCC), *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*.
- ➢ Institute of Environmental Management & Assessment (IEMA, Now ISEP), *Assessing Greenhouse Gas Emissions and Evaluating their Significance in Environmental Impact Assessment (EIA): Guidance for Practitioners.*
- ➢ British Standards Institution (BSI), *PAS 2080:2023 Carbon Management in Buildings and Infrastructure.*
- ➢ Product carbon Footprint for Geogrid, OneClick LCA. Third-party verified as per ISO 14025. Available here: EPD: Geogrid from polypropylene (PP) (EPD-Naue-069-DE)

4. Results

4.1 Summary of Estimated GHG Emissions.

The estimated GHG emissions of the construction project are displayed in the table below. The results are split by lifecycle stage and include the source of GHG emissions, tCO_2e, and percentage contribution of each lifecycle stage to total GHG emissions. As outlined in PAS2080 impacts that fall outside of the system boundary will be disclosed in section 5 of this appendix.

Life Cycle Stage	GHG Emission Source	Estimated Emissions (tCO_2e)	% of Total GHG Emissions
A0	Land preparation	570.19	3.1%
A1-3	Material Production	11,212.21	61.8%
A4-5	Transport & Construction Activities	6372.28	35.1%
Total		18,154.68	

Table 1. Estimated GHG emissions of the construction of the proposed platform, including all phases outlined in section 2.2 except any emissions/savings occurring beyond the system boundary (life cycle stage D).

4.2 Estimated GHG Emission Calculations

Below is a description of the calculations used to quantify the GHG impacts at each stage listed in table 1. It will include the usage data used and also the carbon conversion factor.

A0: Land Preparation

Fuel consumption for land preparation: Total volume of diesel consumed (56,296.80 litres) x 2024 conversion factor for average biofuel diesel (2.51 $kgCO_2e$/litres) = **175.86 tCO_2e**

LUC from tree clearing: Total area cleared of coniferous woodland (120 acres/48.56 Ha) x LUC Factor (8.12 tCO_2e/Ha) = **394.33 tCO_2e**

A1-3: Material Production

Stone Material Production: Total weight of stone to be used in construction (540,000 tonnes) x 2024 aggregates conversion factor (7.75 $kgCO_2e$/tonne) = **4,185.69 tCO_2e**

Geogrid: Total area of Geogrid to be used in construction (800,000 m^2) x Geogrid conversion factor from supplier EPD (0.94 $kgCO_2e/m^2$) = **752.80 tCO_2e**

Marine Dredge Fuel: Total litres of fuel used for marine dredge (1,709,816.41 litres) x 2024 Marine Gas Oil conversion factor (2.77 $kgCO_2e$/litre) = **5,810.02 tCO_2e**

Plant Machinery Fuel: Total litres of fuel used for plant machinery to transport sand to storage location (148,439.49 litres) x 2024 conversion factor for average biofuel diesel (2.51 $kgCO_2e$/litres) = **463.70 tCO_2e**

A4-5: Transport & Construction Activities

Stone T&D: Stone to be supplied by two quarries, the weight was split 50/50 between each supplier. Total weight of stone to be supplied (540,000 tonnes) x Distance from supplier (Quarry 1: 25.6 km, Quarry 2: 30.1 km) = 15,039,000 Tonne.km. Final calculation is 15,039,000.00 Tonne.km x 2024 Conversion factor for average laden, diesel HGV (0.18 kgCO2e/tonne.km) = **3,336.40 tCO_2e**

Geogrid T&D: Total weight of Geogrid to be supplied (192.00 tonnes) x Distance from supplier (20.4 km) = 3916.80 Tonne.km. Final calculation is 3,916.80 Tonne.km x 2024 Conversion factor for average laden, diesel HGV (0.18 kgCO2e/tonne.km) = **0.87 tCO_2e**

Sand T&D: Total weight of Sand to be used in construction (3,345,000.00 tonnes) x Distance from storage location to site of construction (2.00 km) = 6,690,000.00 Tonne.km. Final calculation is 6,690,000.00 Tonne.km x 2024 Conversion factor for average laden, diesel HGV (0.18 kgCO2e/tonne.km) = **1,484.18 tCO_2e**

Construction Machinery Fuel: Total litres of fuel used by machinery in construction stage (496,456.80 litres) x 2024 conversion factor for average biofuel diesel (2.51 $kgCO_2e$/litres) = **1,550.83 tCO_2e**

4.3 Key findings

The total GHG emissions for stages A0-5 are 18,734.74 tCO_2e. The largest contributor is the Marine Gas Oil (MGO) used by the dredging vessel, which accounts for 5810.02 tCO_2e. The highest source of GHG emissions is the material production of the quarried stone (4185.69 tCO_2e). These two categories account for 55.8% of the total project footprint.

Land Use Change (LUC) was calculated for both life cycle stage A0 and D. The LUC within A0 contributes 394.33 tCO_2e, and the replanting off site (falling within stage D, outside of project boundary) accounts for a total removal of 240.38 tCO_2e.

Another key finding to highlight was that the transport of stone to the site was the third largest source of GHG emissions, producing 3,336.40 tCO_2e. Despite each quarry being within 30km of the port the significant weight purchased led to intensive GHG emissions from the transport. This highlights the selection of local suppliers to be of great importance.

As all work has been/will be carried out by contractors at the site, all GHG emissions fall into Scope 3.

5. Carbon Reduction and Mitigation Measures

5.1 Design Stage Reductions

The main consideration made during the design phase of this project was to use the site-won sand as one of the primary materials for the site capping. As this material was a by-product from previous dredging occurring on the site it is considered out of scope. If Ardersier were to purchase the same volume of sand from a virgin source it would have produced 25,927 tCO_2e.

5.2 Construction Stage Reductions

Due to the nature of the construction there were minimal opportunities to reduce the GHG emission impact of the construction phase. However, suppliers within 30km of Ardersier for the quarried stone and geogrid used in construction were selected to reduce GHG emissions from lifecycle stage A4.

5.3 Estimated Carbon Savings

Other than the aforementioned carbon saving by using the site-won sand Ardersier have also committed to replant the 120 acres of Scotts Pine plantation that was cleared for this construction project. This will be replanted within 30 km of the port. This will lead to total carbon removals of 290.80 tCO_2e. This figure was calculated assuming LUC from managed non-degraded grassland to the land use type mixed broadleaf and conifer woodland, this results in 4.50 tCO_2e of removals per hectare.

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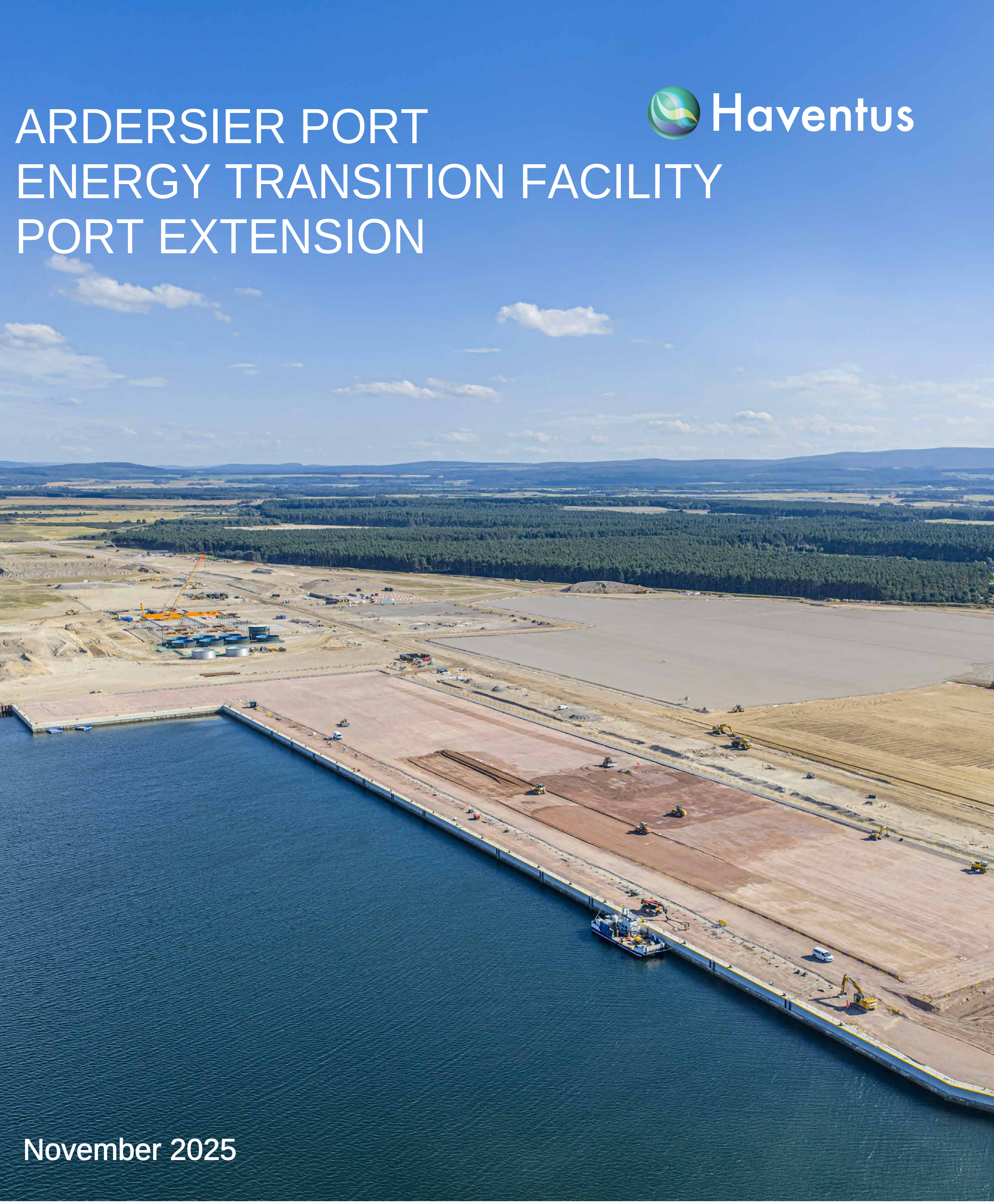

November 2025

Appendix 5.6 Travel Plan Framework

Ardersier Port **03/11/2025**

Reference number GB01T24ARD1

TRAVEL PLAN FRAMEWORK

SYSTRA

ARDERSIER PORT

TRAVEL PLAN FRAMEWORK

IDENTIFICATION TABLE	
Client/Project owner	Ardersier Port Ltd
Project	Ardersier Port
Study	Travel Plan Framework
Type of document	Report
Date	03/11/2025
Reference number	GB01T24ARD1
Number of pages	38

APPROVAL

Version	Name		Position	Date	Modifications
2	Author	D Harris	Consultant	31/10/2025	Planning Issue
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	Approved by	G Moon	Associate	03/11/2025	

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1. INTRODUCTION

1.1 General

1.1.1 SYSTRA Ltd (SYSTRA) has been appointed by Ardersier Port Ltd (APL), to prepare an updated Travel Plan related to the next phase of the redevelopment of Ardersier Port, which is located 16km to the north-east of Inverness, in the Highland Council (THC) area.

1.1.2 The site location is located ~4km to the north-east of Ardersier itself, and ~7.5km to the west of Nairn, as shown in **Figure 1.**

Figure 1. Ardersier Port Site Location

1.1.3 A Travel Plan (TP) is a site-specific management tool designed to encourage people to rethink their travel choices and requirements in order to minimise and manage the impacts of travel on the environment.

1.1.4 An initial TP was prepared in February 2024. This updated TP has been produced to support the proposed 'Ardersier Port Extension', which would see the total development expanded from c.350 acres to c.500 acres. The TP takes into account the latest proposals on site, and sets out how the development is expected to progress.

1.1.5 Given the scale of the development, the Travel Plan will be delivered over a long period (potentially up to ten years), and will be updated prior to each major phase.

1.1.6 APL is committed to ensuring that staff, suppliers and visitors can access the Port safely and sustainably, and supports the proposals set out in this Plan.

1.1.7 A separate Construction Traffic Management Plan (CTMP) will be put in place to control, manage and mitigate the effects of construction traffic throughout the various future phases of the development. The TP considers only long-term operational travel to and from the development, rather than typically shorter and more intensive periods of construction on site.

1.2 The Consented Development

1.2.1 The original ‘Planning in Principle’ consent for the development was obtained in 2013, and renewed in 2018 (18/04552/PIP), subject to Matters Specified in Conditions.

1.2.2 The development description is “*Establish a port and port related services for energy related uses, including marine channel dredging, quay realignment, repair and maintenance, erection of offices, industrial and storage buildings, delivery and export of port related cargo and associated new road access, parking, infrastructure, services, temporary stockpiling of dredged material, re-grading and upfilling of landward areas and landscaping*”

1.3 Completed Phase 1A Development

1.3.1 Phase 1A of the development, which proposed the establishment of a security gatehouse and access point on site, has been completed. As part of this works, a new site access roundabout on the B9092 was constructed in December 2024, and a roundabout on the A96 will be constructed as soon as practicable (expected to commence in Q4 2025).

1.3.2 Following completion of dredging in summer 2025, It is expected that the Port will be open and operational in Q4 2025.

1.4 Proposed Extension

1.4.1 The proposed Extension would see the total development area expanded from c.350 acres to c.500 acres. Consent is being sought for the following elements:

“*Continued port development and expansion of port related services for energy related uses, including marine dredging within the inner harbour, sea disposal of dredged sands, possible temporary stockpiling of dredged material, quay construction, erection of offices, industrial and storage buildings and associated infrastructure including manufacturing, assembly, storage, delivery and export of port related cargo, parking, infrastructure, services, upfilling and re-grading/surfacing of new landward areas and landscaping*.”

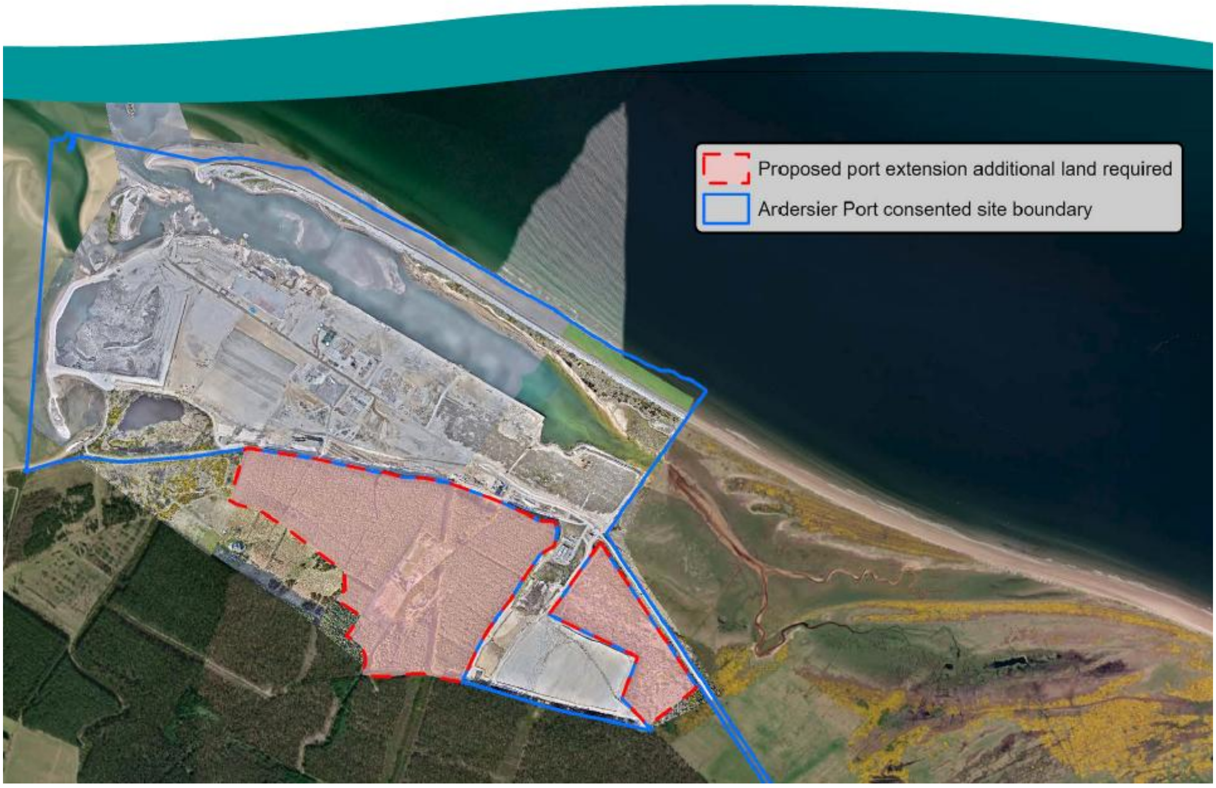

Figure 2. Proposed Extension

1.4.2 Essentially, the additional land is to be brought into use for the same purposes as across the existing consented site. Although the overall site area will be larger than consented, the proposed numbers of workers during construction and operation associated with the proposed extension are broadly similar to that which is already consented.

1.5 Approach to the Ardersier Port Travel Plan

1.5.1 Given the scale of the overall development, the TP is expected to be implemented over the long term (possibly as much as a 10-year period).

1.5.2 The constructed Phase 1A employs only small number of people on site, and it is not practical to apply most of the measures typically proposed as part of TPs at this very early stage of the development.

1.5.3 The TP therefore focuses on the provision of a comprehensive 'Framework' for later phases of development.

1.5.4 **Table 1** presents the number of predicted employees on site over the next ten years. These predicted numbers will be influenced by tenant occupancy and activity, so are subject to change.

Table 1. Predicted Employee Numbers

Group	Year										
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Haventus Staff	30	30	70	70	70	70	70	90	90	90	90
Consultants and Contractors	10	10	35	135	185	735	835	1060	1620	2220	2420
TOTAL	**40**	**40**	**105**	**205**	**255**	**805**	**905**	**1150**	**1710**	**2310**	**2510**

1.5.5 **Table 1** shows that there are predicted to be approximately 2,510 permanent employees on site by 2035, with a steep rise from 2029 onwards.

2. SITE ACCESSIBILITY

2.1 Transport Overview

2.1.1 An overview of the transport links in the vicinity of the site is shown in **Figure 3** overleaf.

2.2 Site Entrance

2.2.1 All access into the site, during both the construction and operational phases, will be taken from the new roundabout on the B9092, which is shown in **Figure 3**. The gated access point leads to a private road, which provides direct access into the site.

2.2.2 Access on foot and by bicycle will also be taken via the main vehicle access. It is expected that given the site's location, there will only ever be a small number of walking trips into the site, even when fully operational. Cycle travel, particularly from Ardersier and Nairn, or when combined with a rail journey, is a viable option.

2.2.3 Vehicles heading to and from Inverness will use the direct route south to the soon-to-be constructed roundabout on the A96 (currently a priority junction). Work on the new roundabout is due to commence on site imminently.

2.2.4 Vehicles heading to and from the direction of Nairn, with the exception of HGVs, will use the A96 / B9092 junction to the east of the site access point. The approved construction route for HGVs to and from the site is via the new roundabout junction further to the west.

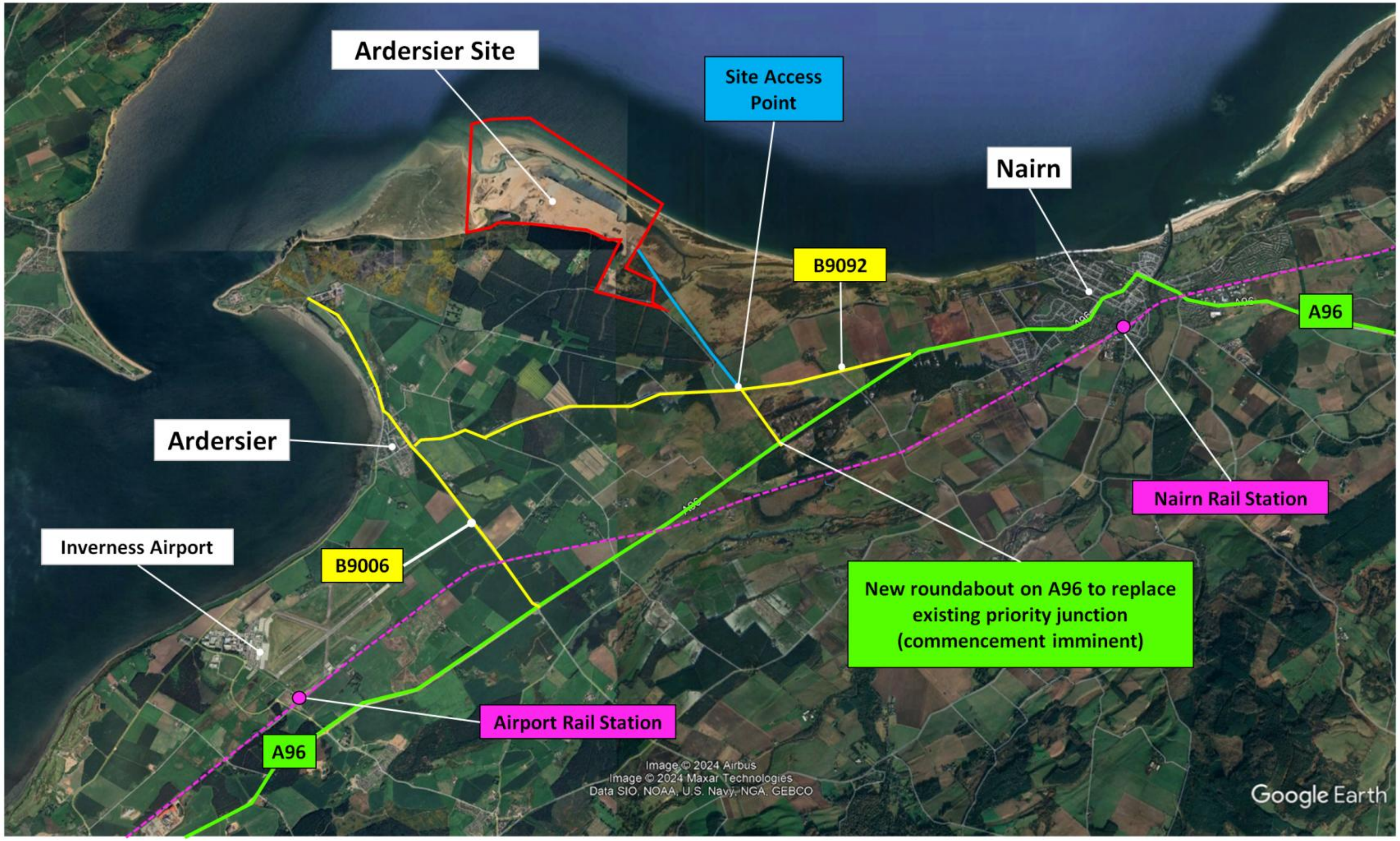

Figure 3. Transport Overview

2.3 Road Network

2.3.1 Further details on the local road network are provided below:

Unclassified Road to south of Site Access point

2.3.2 An unclassified local road, which forms a crossroads with the B9092 and site access, provides the most direct access between the site and the A96, which is 3.5km to the south. Between the B9092 and the A96(T) this minor road is a single carriageway with a speed limit of 60mph.

B9092

2.3.3 The B9092 is a single carriageway rural route, and is predominantly subject to a 60mph speed limit. It runs from Ardersier past the site to join the A96 to the west of Nairn. the A96(T) and Nairn. In the vicinity of the site access junction, a 30mph speed limit is in place, and street lighting is in place. Both measures have been implemented to improve road safety.

2.3.4 There are no footways in the vicinity of the site.

A96(T)

2.3.5 The A96(T) provides the strategic road link between Inverness and Aberdeen. In the vicinity of the site, it is a single-carriageway road with a speed limit of 60mph.

2.3.6 Transport Scotland intend to dual the section of the A96 between Inverness and Nairn, which will also include construction of the Nairn Bypass. The scheme has been consented, but no timetable has yet been set for its construction.

2.4 Pedestrian and Cycling Facilities

2.4.1 The distance to the site from the nearest settlements of Ardersier (4km) and Nairn (7.5km), combined with the lack of pedestrian facilities such as street lighting and footways, limit the propensity for walking trips to and from the site.

2.4.2 There are however reasonable opportunities for accessing the site by bike. Ardersier is a 13-minute cycle journey, while Nairn town centre is a 16-minute cycle journey, using the local road network. Cycle and rail interchange opportunities are available at Nairn and Inverness Airport Railway Stations, with Nairn being closest to the site.

2.5 Bus

Current Services

2.5.1 Stagecoach Service 10/10A/M96 runs between Inverness and Nairn every 30 minutes during the week, as well as hourly on both Saturday and Sunday. The route follows the B9092, and passes the site access point.

2.5.2 A summary of bus services that serve the bus stops in Ardersier and Nairn are detailed in **Table 2** below.

Table 2. Bus Timetable

OPERATOR	BUS NO.	ROUTE	FREQUENCY		
			Mon-Fri	Sat	Sun
Stagecoach in the Highlands	10/10A/M96	Inverness Bus Station–Inverness Airport–Ardersier–Nairn–Forres-Elgin	30 mins	60 mins	60 mins

2.5.3 Two new bus stops on either side of the B9092, close to the site entrance, have been recently constructed as part of Phase 1A.

Future possibilities

2.5.4 An employee bus service is being considered for later phases, which would run to coincide with the main shift start and end times. The exact route of this service is still to be developed; however, it is envisaged that stops may include the nearest rail stations and both Ardersier and Nairn. APL will work closely with bus operators (Stagecoach, and potentially Ember) to identify what services can be provided in each phase.

2.6 Rail Services

2.6.1 Nairn Rail Station is ~6km to the east of the site entrance, which is approximately a 7-minute journey by road. Inverness Airport Rail Station, which opened in 2023, is 9km to the south-west of the site, which is approximately a 9-minute journey by road.

2.6.2 Both stations on the Inverness-Aberdeen line which includes stations at Forres, Elgin, Keith, Huntly, Inverurie and Kintore. There are currently ~18 trains a day in each direction, running at frequencies of between 60-120 minutes.

2.6.3 Cycle time to the Ardersier Port site from the station is approximately 16 minutes via the most direct route (which involves a section on the A96), or 25 minutes via the B9091 which avoids the A96.

2.7 Air Travel

2.7.1 Inverness Airport is located 13km west of the site. UK and international destinations are accessible from the airport. Bus, rail and taxi interchange opportunities are available at the Airport for onward travel to Inverness, Ardersier and Nairn.

3. TRAVEL PLAN MEASURES

3.1 Existing Measures

3.1.1 Given the small number of employees currently on site in Phase 1A, no specific TP measures are currently in place.

3.1.2 A Travel Plan Coordinator (TPC) has been appointed, to ensure that a named person is in place who will have responsibility for the Travel Plan, and who will develop it for later stages.

3.1.3 The TPC is:

Gregor Ogilvie
Project Director
Haventus
Ardersier Port Approach
Inverness
IV2 7QX

3.1.4 The remit of the TPC will include, but is not limited to the following:

- Providing a point of contact for all travel related enquiries;
- Promoting and implementing the measures as recommended in this TP;
- Establishing and coordinating links with transport operators and key stakeholders, including the local authority;
- Processing comments and suggestions from staff and visitors;
- Reviewing and updating the TP periodically, and in advance of future phases.
- Reporting the outcomes of the TP process to Haventus' Senior Management Team.
- Eventually chairing a Transport Working Group (TWG), comprising of TPCs from each of the different businesses located on the site.

3.1.5 Ahead of the next phase of development, the TPC will begin to liaise with the potential future operators of different parts of the site, and make contact with relevant organisations (e.g. bus operators, Scotrail and Transport Scotland) to investigate future measures, and establish the progress of other transport schemes in the area which may affect the Travel Plan, such as the A96 Dualling.

3.1.6 The Zoned nature of the site means that it is likely to be occupied by a number of different companies. It is recommended that each of these companies signs up to the overall site Travel Plan, which will contain 'collective' site-wide initiatives (such as a bus service), as well as measures which will need to be delivered by each specific company (e.g. changing facilities for cyclists). The Haventus TPC will coordinate this arrangement, which is summarised in **Figure 4**.

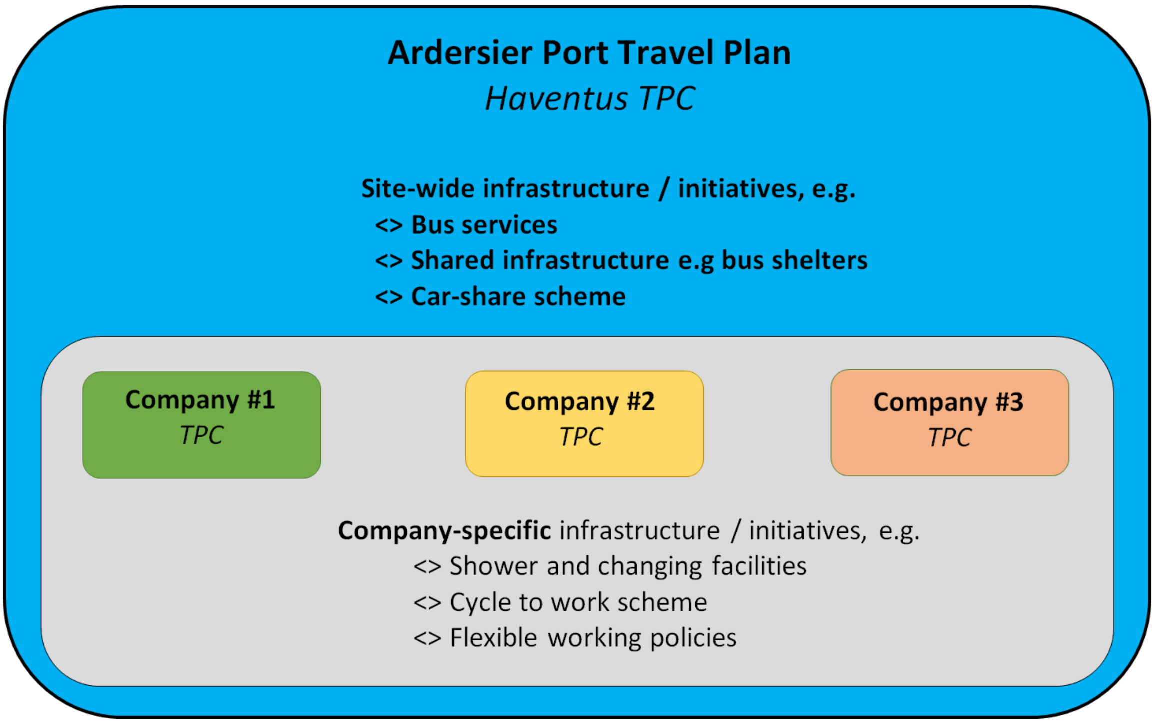

Figure 4. Travel Plan Structure

3.2 Future Phases

Overall Approach

3.2.1 The site is located in a rural area between Ardersier and Inverness, and therefore there are likely to be very few walking trips to and from the development.

3.2.2 The potential for a substantial number of cycling trips is reasonably limited, although this is a viable option for future employees who live in Ardersier or Nairn, or who may bring their bike on the train from further afield. The TP should promote measures that make it as appealing as possible to cycle to the site, such as promotion of the 'Bike to Work' scheme, and the provision of high-quality cycle parking facilities, and well-maintained shower and changing facilities.

3.2.3 It is anticipated that most employees will live within Inverness, Ardersier, Nairn, Forres or Elgin, and the Travel Plan should focus on promoting sustainable travel from these destinations.

3.2.4 Promoting bus travel to the site has the most potential to remove private vehicle trips from the road network. Existing services from Inverness, and the towns along the A96 corridor to the east and west of the site, operate every hour, and pass the site access point on the B9092.

3.2.5 These existing services could be enhanced, either by providing more frequent services, by timetabling buses to coincide with shift patterns, or by extending the operating hours of the existing service.

3.2.6 The bus stops near the site access are still some distance from the Port itself, so Haventus is considering a shuttle bus between the Port and the B9092, which would be put in place when staff numbers on site increase.

3.2.7 Alternatively, dedicated bus services could be provided by particular tenants (or groups of tenants) for their own staff, which could pick up shift workers from key settlements, and link into both the Airport and Nairn rail stations.

3.2.8 Rail travel to the site could be encouraged by providing a local shuttle bus service from Nairn railway station. Again, this should be considered as part of later phases of development.

3.2.9 If some future employees cannot be tempted out of their cars, the Travel Plan should also consider a dedicated car-sharing scheme on-site, which would match employees according to their shift pattern and home address.

3.2.10 Each phase of the development will provide suitable Electric Vehicle (EV) charging facilities on site, which will be considered on a site-wide basis, as well as for the specific needs of individual tenants.

Travel Plan Measures

3.2.11 It is recommended that the Travel Plan measures set out below are considered as part of the next phase of development which will result in a significant number of permanent employees on the site, which SYSTRA suggest is around 100 people. Based upon the employee projections in **Table 1**, this may occur in 2027.

3.2.12 The measures set out below have been broken down into the following categories.

- Information and Promotion;
- Cycling;
- Public transport; and
- Managing car use.

3.2.13 Some measures will be collective (site-wide) measures which will be delivered and managed on a site-wide basis by the overall TPC, others will be individual measures, which will need to be delivered in-house by each company.

3.3 Information and Promotion

3.3.1 Travel information for staff and visitors is essential to achieve an awareness of sustainable travel options which are available in the local area. This will be particularly effective if provided during the recruitment process, and when staff are about to start on site.

3.3.2 As a starting point, the Ardersier website, and individual company websites, should have a “how to get here” section, that provides visitors with information on how they can get to the site by a range of transport modes.

3.3.3 The TP will be promoted to employees via dedicated Travel Notice Boards in each business, which will be located in prominent areas within the ‘backroom’ area of each premises. The notice boards will display general information relating to the TP, information relating to sustainable travel, and any current promotions.

3.3.4 This information should include:

- Recommended cycling routes to the Ardersier Port site from Nairn, Ardersier and the nearest rail stations.;
- Location of cycle parking facilities on-site;
- Location of showers, lockers and changing facilities;
- Bus and rail timetable information and stops locations;
- Information on any staff bus services;
- Local taxi information; and
- Posters highlighting health benefits and cost benefits of travelling sustainably.

3.3.5 The TPC's contact details will be permanently displayed on the board, allowing staff members to contact them directly if required.

3.3.6 Reception and building management staff should be made aware of the importance of understanding the range of travel options available to / from the site so that they can then advise others.

3.4 Walking

3.4.1 It is recognised that there is limited scope for encouraging walking as a viable mode of transport to and from the Ardersier Port site due to the distance / journey time from the nearest settlements, and the lack of adequate footway provision along the routes to the site.

3.5 Cycling

3.5.1 In order to encourage cycling to the site, a range of measures should be offered which include information and incentive-based measures, as well as physical improvements. Potential measures are set out below.

Information / Incentive-based Measures

- Where available, the provision of local cycling maps, routes and cycling times to key destinations (to be displayed on notice boards; as discussed above);
- The provision of basic on-site cycle tools and equipment (e.g. hand pump, puncture repair kit etc.) in addition to the facilities already available;
- Setting up a bicycle users' group (BUG) to encourage regular cyclists, should demand prove sufficient. This could include cycle training and road safety training;
- Explore the possibility of introducing a "cycle to work" scheme for staff (further details provided below);
- Provide a guaranteed lift home should the cyclist become ill or in the event of an emergency; and
- Investigate the provision of "free breakfasts" for cyclists or other incentive schemes such as recording the miles covered by commuting cyclists.

Physical Improvements

- Providing sheltered and secure cycle parking at the premises (as part of the development proposals);
- Providing lockers, showers and changing facilities at the site;

- Explore the possibility of providing workplace “pool bikes” for staff to commute with in the local area (for example to Nairn or Ardersier). This can be an effective way to introduce staff to cycling and a way to progress into encouraging cycling for commuting purposes. Safety equipment would also need to be provided (helmets etc); and
- Improved signage of cycle-friendly routes / core paths to notify cyclists that they are permitted to use these routes.

Cycle-to-Work-Scheme

3.5.2 To promote healthier journeys to work and to reduce environmental pollution, the 1999 Finance Act introduced an annual tax exemption, which allows employers to loan cycles and cyclists' safety equipment to employees as a tax-free benefit.

3.5.3 The provision of bicycles and bicycle safety equipment are entirely exempt, with no ceiling on their value. Tax law does not define the meaning of ‘cyclists' safety equipment’, which can include a wide range of cycle accessories, security equipment and clothing.

3.5.4 It is noted that there are many third-party providers who administer cycle to work schemes, but the salary sacrifice part of the scheme must be run by the employer’s payroll department. More information on setting up a scheme can be obtained from the HMRC website[1].

3.6 Public Transport

3.6.1 The measures to increase public transport use should focus on either improving existing services, or providing new, dedicated services to transport employees to and from the site.

Improving Existing Services

3.6.2 Existing services can be improved by either:

- Enhancing the frequency of existing services;
- Re-timetabling existing services, or providing new services, to coincide with future shift patterns; and / or
- Extending the operating hours of existing services.

3.6.3 Given the distance from the site access point to the B9092, it will be necessary for services to divert into and out of the site from the B9092, or for a separate shuttle service to be provided.

3.6.4 The delivery of these services will need to be discussed and agreed with Stagecoach, or another operator. Depending upon whether they are immediately commercially viable to Stagecoach, it may be that individual (or collective tenants) initially contribute to these improvements.

3.6.5 Employers can pay subsidies to finance public transport that provides a service to them e.g. where more direct access is provided to the workplace. In such circumstances, there is

1 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/845725/cycle-to-work-guidance.pdf

normally no tax or National Insurance Contribution's (NIC) to pay, as long as the service is available to all employees.

New Bus Services

3.6.6 There is likely to be an imbalance between shift patterns on the site, and 'traditional' bus services. Site tenants may therefore wish to provide dedicated bus services themselves, using private operators. These services could take the following forms:

- Dedicated bus services from major settlements along the A96 (likely between Inverness and Forres), which would be timed according to shift patterns.
- Shorter shuttle services running between the site and Nairn railway station, providing employees with the opportunity to 'rail and ride' to the site.

3.6.7 The enhancement / introduction of bus services will need to be phased in line with phases of development on the site, with improvements keeping pace as the number of employees increases.

3.6.8 As part of the current phase, TPC will make initial enquiries with Stagecoach, and within Haventus, to map out how these improvements might be delivered.

Season Tickets

3.6.9 The TPC will investigate the potential for interest free season ticket loans, to enable employees to benefit from longer-term ticket discounts.

3.6.10 Employers can also offer a free or low-interest season ticket loan up to a value of £10,000 per year. Where such assistance is offered, there are no tax or NICs implications provided the full amount of the loan is repaid to the employer and total loans outstanding do not exceed £10,000 at any time. The loan is administered through payroll and effectively allows the purchase of an annual travel pass which usually offers a significant saving over buying individual weekly or monthly passes. The employee pays back the loan through salary deductions on a monthly basis

PT information

3.6.11 The TPC will ensure that staff are well informed and can access relevant public transport service information. Bus timetable information and free public transport journey planners can be obtained from the Traveline Scotland website www.travelinescotland.com.

3.7 Managing Car Use

3.7.1 Car-sharing is perhaps the most attractive alternative to single occupancy vehicle travel. It provides a convenient and direct means of travel for employees, and allows travel costs to be shared. From an employer's perspective, it also reduces the parking demand on site.

3.7.2 Car-sharing can be implemented by most organisations, although there are certain factors which determine the uptake of schemes. These include:

- Consistent work hours across the site. In this instance shift patterns are helpful;

- Residential concentrations of employees. Again, employees are likely to be concentrated in the main towns on the Moray coast;
- High percentage of employees with commutes longer than 10 miles, or 20 minutes; and / or
- Constrained parking supply.

3.7.3 Measures to encourage car-sharing at the Ardersier Port Site could include:

- 'Matching' staff through an employee database of staff willing to car-share, and their home location; and
- Providing priority parking spaces for those who car-share.

3.7.4 Two options for delivering the car-share scheme would be:

- Using an existing service provider (such as Liftshare.com) that provides a free-to-use web service.
- Developing an in-house system, 'matching' employees using a simple spreadsheet.

3.8 Reducing the Need to Travel

3.8.1 The most effective way of reducing the transport impact of a development is to reduce, or remove the need to travel at all.

3.8.2 The TPC should work with companies to promote flexible working, home working and hot-desking for staff where possible.

3.8.3 Related actions include:

- Reducing the need for unnecessary business trips by promoting video and tele-conferencing;
- Promoting 'agile' working;
- Promoting shared business travel trips;
- Reviewing business travel procedures and policies; and
- Promoting sustainable travel modes for business trips.

4. ACTION PLAN

4.1.1 **Table 3** presents the TP Action Plan.

Table 3. TP Action Plan

TIME	ACTION / MEASURE
Prior to occupation of Phase 2 (or first subsequent phase to employ >100 people on site)	• TPC to investigate potential public transport season ticket loans, and Cycle to Work schemes. • TPC to review proposed EV charging requirements on a site-wide basis, and the requirements of individual tenants, and develop an EV strategy to support future provision. • TPC to update Travel Plan. • Issue travel information to employees prior to them starting on site, including details of bus services. • Ensure website and staff intranet include up-to-date travel information • Ensure Travel Notice Boards are in place in communal areas, and populate with first tranche of information. • Ensure that cycle parking, and changing facilities are in place.
Within 3 months of first 'significant' occupation	• Undertake staff travel surveys. • Following receipt of surveys results, set TP mode share targets, and confirm initiatives for Year 1. • Investigate Liftshare scheme, or similar, or set up in-house matching service for employees.
15 months after opening	• Undertake first refresh of staff and travel surveys. • Provide update to THC and refresh TP. • Undertake above steps every 12 months for first 5 years of development.
Continuous actions	• TPC to work with new organizations on site, under the umbrella of the site-wide TP. • TPC to liaise with transport operators, THC, TS and businesses across the site.

5. TARGETS, MONITORING AND REVIEW

5.1 Baseline Mode Share

5.1.1 Establishing the existing mode share is the starting point for any TP. In this case, as the development is not yet operational, travel surveys of staff will need to be carried out when there is the first 'significant' presence on site.

5.1.2 Given the very small number of employees currently on site, it is recommended that these are undertaken within three months of occupation of the next significant phase of the development, e.g. when there are >100 employees on site.

5.1.3 It is likely that the employee survey will be issued online. For each person surveyed, the staff travel survey will need to establish:

- Home postcode
- Staff members - Typical working patterns (day / night, full / part time)
- Usual mode of travel to the site
- How long the journey takes.
- Reasons for choice of mode
- Initiatives / factors that could influence the person to change mode.
- Willingness to consider car-sharing.

5.1.4 The above information will allow the baseline employee modal split to be calculated. Based on this, suitable targets can be set for the TP to aim towards.

5.2 Targets

5.2.1 Targets are important as they give the TP direction from its inception, providing measurable goals.

5.2.2 When setting site-specific targets, it is important that they are 'SMART' (**S**pecific, **M**easurable, **A**chievable, **R**ealistic and **T**imebound.

5.2.3 The main objectives of the TP are:

- To reduce the dependence of employees on single occupancy private car travel; and
- To encourage staff members and employees to make more sustainable travel choices when travelling to and from the site.

5.2.4 The main target of the MMP will therefore be:

- A decrease in the percentage of employees travelling by single occupancy private car to and from the store. This will result in a related increase in the frequency of walking, cycling, public transport and car sharing trips.

5.3 Monitoring and Review

5.3.1 Mode share targets over one, three and five-years period will be set once the post-occupation baseline mode share is known. Progress towards these targets will be monitored through repeat annual travel surveys at the store.

5.3.2 This monitoring is an opportunity to measure TP achievements on an annual basis. This will then inform the ongoing development of the TP, ensuring its targets and measures remain relevant to the needs of the residents, is site-specific and fit for purpose. Results will be analysed to enable the following:

- Measurement of the success of the TP, enabling focused improvement on areas that have not achieved the desired modal shift via appropriate revisions to the TP measures;
- Identification of early success stories of the TP, which can help to encourage further participation and build momentum for sustainable travel;
- Ensures that changing travel patterns are considered, ensuring that the TP measures can be updated to reflect the needs of residents; and
- Allows targets which have been set too low or unrealistically high to be readjusted.

5.3.3 Annual survey results will be submitted to THC, which will set out the current MMP initiatives, and what is proposed over the coming year.

5.3.4 In the event that initial targets set out in the TP are not met, this will present an opportunity for a calibration exercise for future target setting and Action Plan refresh and review.

5.3.5 The roll-out of Electric Vehicles (EV) across the UK, both privately and within company fleets, is a rapidly evolving area. The TP should help to develop an EV Strategy to ensure that the EV infrastructure provided on site, both across the full site and for individual tenants, is suitable to encourage and support future EV use.

6. SUMMARY & CONCLUSIONS

6.1.1 SYSTRA Ltd (SYSTRA) has been appointed by Ness Planning on behalf of APL, to prepare a Travel Plan (TP) Plan related to the redevelopment of Ardersier Port, which is located 16km to the north-east of Inverness.

6.1.2 The Travel Plan was initially produced in February 2024, prior to commencement of Phase 1A on site, which has since been completed.

6.1.3 As part of this works, a new site access roundabout on the B9092 was constructed in December 2024, and a roundabout on the A96 will be constructed as soon as practicable (expected to commence imminently).

6.1.4 The TP has been updated to reflect the Proposed Extension to the Port, which would see the total development expanded from c.350 acres to c.500 acres. The additional land is to be brought into use for the same purposes as across the existing consented site. Although the overall site area will be larger than consented, the proposed numbers of workers during construction and operation associated with the proposed extension are broadly similar to that which is already consented.

6.1.5 The constructed Phase 1A employs only small number of people on site, and it is not practical to apply most of the measures typically proposed as part of TPs at this very early stage of the development. The TP therefore focuses on the provision of a comprehensive 'Framework' for later phases of development.

6.1.6 The Zoned nature of the site means that it is likely to be occupied by a number of different companies. It is recommended that each of these companies signs up to the overall site Travel Plan, which will contain 'collective' site-wide initiatives (such as a bus service), as well as measures which will need to be delivered by each specific company (e.g. changing facilities for cyclists).

Existing Measures

6.1.7 Given the small number of employees currently on site in Phase 1A, no specific TP measures are currently in place.

6.1.8 A Travel Plan Coordinator (TPC) has been appointed, to ensure that a named person is in place who will have responsibility for the Travel Plan, and who will develop it for later stages.

Future Phases

6.1.9 It is recommended that the Travel Plan measures set out below are considered as part of the any phase of development which will result in a significant number of permanent employees on the site, which SYSTRA suggest is around 100 people. Based upon the latest employee projections, this may occur in 2027.

6.1.10 Later iterations of the TP should focus on:

- Promoting cycle trips to the site from Ardersier or Nairn, or from cyclists who arrive by train at Nairn Station, or the Airport Rail Station.

- Enhancing existing bus services, or providing new, dedicated bus services from Inverness, and the towns along the A96 corridor to the east.
- Investigating a shuttle-bus service from Nairn Rail Station, to promote 'Rail and Ride''.
- Developing an EV strategy to support site-wide EV roll-out, and the needs of prospective tenants.
- Promoting interest-free loans for the purchase of public transport season tickets, and promoting the 'Cycle to Work' scheme amongst employees.
- Promoting a car-share scheme, administered either by a third-party provider, or 'in-house'.

Action Plan

6.1.11 The TP sets out an Action Plan, with Actions being identified up to 15 months following first occupation. These Actions include undertaking an employee Travel Survey within three months of 'significant' occupation of the site, and using this to set TP targets.

Monitoring and Review

6.1.12 The TP will be reviewed on an annual basis (through refreshed travel surveys), and ahead of each major phase of development.

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

A diverse group of results-oriented people, we are part of a strong team of professionals worldwide. Through client business planning, customer research and strategy development we create solutions that work for real people in the real world.

For more information visit www.systra.co.uk

ARDERSIER PORT
ENERGY TRANSITION FACILITY
PORT EXTENSION

Haventus

November 2025

Appendix 5.7 Commercial Fisheries

Haventus

Commercial Fisheries

APEM Group Ltd.

Client:	**Haventus**
Address:	**Ardersier Port**
	Ardersier Port Approach
	Inverness
	IV2 7QX
Project reference:	**P00019141**
Date of issue:	**October 2025**

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"This is a draft document and should not be cited"

Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
v1.0	10/10/2025	All	All	Draft	APEM Ltd.
V2.0	21/10/25	All	All	Address Client comments on Draft	APEM Ltd.

Competent Expert Evidence

Name	Role	Years of Experience	Professional Memberships	Qualifications
Tom Bridges CSci CMarSci MIMarEST	Author	11	Institute of Marine Engineering, Science and Technology (IMarEST)	BSc (Hons), MSc
Angie de Burgh	Technical Reviewer	16	Marine Biological Association (mem.MBA)	BSc (Hons), MSc

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Acronyms and Abbreviations

Term	Definition
AIS	Automatic Identification System
BERR	Department for Business, Enterprise and Regulatory Reform
CEA	Cumulative Effects Assessment
CEFAS	Centre for Environment Fisheries and Aquaculture Science

CIEEM	Chartered Institute of Ecology and Environmental Management
CPA	Coastal Protection Act
CSD	Cutter Suction Dredger
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMODnet	European Marine Observatory Data Network
EMSA	European Maritime Safety Agency
EU	European Union
FEPA	Food Environmental Protection Act
FiSMaDiM	Fisheries Sensitivity Mapping and Displacement Modelling
FLO	Fisheries Liaison Officer
FLOWW	Fisheries Liaison with Offshore Wind and Wet Renewables group
FMMCP	Fisheries Mitigation, Monitoring and Communication Plan
ICES	International Council for the Exploration of the Sea
JNCC	Joint Nature Conservation Committee
MD-LOT	Marine Directorate – Licensing Operations Team
MDS	Maximum Design Scenario
MD-SEDD	Marine Directorate - Science, Environment, Digital and Data
MMO	Marine Management Organisation
NMPi	National Marine Plan interactive
NSP	Navigational Safety Plan
NtM	Notice to Mariners
O&M	Operation and Maintenance
OWM	Offshore Wind Farm
PEMP	Project Environmental Monitoring Plan
RBS	Register of Buyers and Sellers
SAR	Swept Area Ratio
SFF	Scottish Fishermen's Federation
TSHD	Trailer Suction Hopper Dredger
UK	United Kingdom
VMS	Vessel Monitoring System
ZoI	Zone of Influence

Units

Unit	Definition
km^2	Kilometre squared
Km	Kilometre
kW/h	Kilowatt-hour
m	Meter
nm	Nautical mile
£	Pound Sterling
t	Tonnes

1. Introduction

The aim of this technical appendix is to assess the potential impacts to commercial fisheries arising from the proposed development, with the objective of identifying potential impacts arising from the proposed development, both alone and cumulatively, on matters raised during the scoping opinion process (see Section **Error! Reference source not found.**), across both the construction and operation and maintenance (O&M) phases.

The project description is provided in Chapter 3: Project Description of the EIAR. An Environmental Constraints Plan is provided in Chapter 1: Introduction.

2. Legislative Context

Overarching legislation, policy, and guidance in relation to the Environmental Impact Assessment Report (EIAR) for the proposed development is provided in Chapter 2: Methodology of the EIAR. While there are no specific legislative controls that provide provisions for commercial fisheries within the context of Environmental Impact Assessment (EIA), The Marine Works (Environmental Impact Assessment) (Scotland) Regulations (2017) establish the requirement for EIA in relation to marine licensing in Scotland and strategic policy frameworks such as the Scottish National Marine Plan (Scottish Government, 2015) and the UK Marine Policy Statement (HM Government, 2011) provide relevant guidance for managing fisheries within marine planning.

3. Consultation

A request for an EIA scoping opinion was sought from the Marine Directorate - Licencing Operations Team (MD-LOT) and The Highlands Council in January 2025 as part of the EIA Scoping Process. A formal consultation period was held between February and March 2025, during which, statutory consultees were consulted and invited to provide feedback.

During this period, concerns were raised by MD-LOT, the Marine Directorate - Science, Environment, Digital and Data (MD-SEDD) and the Scottish Fishermen’s Federation (SFF) regarding the potential impact of the proposed development on commercial fisheries. MD-SEDD identified that the proposed works overlap with high-value whelk landing areas within the North & East Regional Inshore Fisheries Group, with additional landings of blue mussel, brown crab, lobster, and velvet crab nearby, indicating active creel fisheries in the area. The SFF reported feedback from local inshore fishers and recommended direct engagement by the Applicant. Scottish Ministers further advised that the Applicant must consult with fisheries representatives and local fishermen to identify fishing grounds in the vicinity and ensure that smaller vessels not represented in Vessel Monitoring System (VMS) data are adequately considered in the assessment.

A summary of the relevant consultation responses received during scoping opinion, and how these concerns have been addressed within this report, are outlined in Table 5.1Error! Reference source not found..

Table 5.1. Consultation relevant to commercial fisheries

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
MD-SEDD	Scoping opinion June 2025	The Ardersier development overlaps with ICES rectangles 44E5 and 44E6. MD-SEDD advise that landings data suggest an important whelk fishery within the ICES rectangle 44E5, which covers the waters to the west of the development. According to the NAFC report (Shelmerdine & Mouat, 2021), between 2013-2017 the average value of whelk landings in 44E5 were £118,353, despite this rectangle only containing a small portion of sea area. This is the highest value for whelk for all ICES rectangles within the North & East Regional Inshore Fisheries Group area. There were also landings in 44E5 of blue mussel (average £41,026), as well as brown crab (average £8,590), lobster (average £1,995) and velvet crab (average £615), suggesting a potential creel fishery in the area. MD-SEDD advise that commercial fisheries are scoped into the assessment. It is likely that any inshore vessels fishing in this area will not be represented in VMS data as they may be under 12 m in length, however they may have Automatic Identification Systems (AIS) present on their vessels which can be used to understand where fishing vessels are active. MD-SEDD advise consultation with fisheries representatives and local fishermen to determine the presence of fishing grounds in the vicinity of the development, to ensure smaller fishing vessels are not excluded from the assessment.	Study area for this technical appendix defined as ICES rectangles 44E5 and 44E6. Most up to date available fisheries statistics (2019 – 2023) analysed to inform Section 4 – Baseline, supported by VMS / ScotMap spatial data. No further consultation has been undertaken with fisheries stakeholders.
MD-LOT	Scoping opinion June 2025	The Scottish Ministers direct the Applicant to the MD-SEDD advice and advise that it is fully addressed within the EIA Report. In its advice, MD-SEDD noted that the site of the Proposed Works overlap with highest value areas for whelk landings within the North & East Regional Inshore Fisheries Group. There were also landings within the vicinity of the Proposed Works of significant value for blue mussel, brown crab, lobster and velvet crab, suggesting the potential for creel	'See response above for MD-SEDD.'

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
		fishery in the area. Additionally, in its response, the SFF noted that it has had some concerns raised from local inshore fishers and advised the Applicant should engage directly with the fishers. On this basis, the Scottish Ministers advise that commercial fisheries must be scoped in for further assessment in the EIA for both phases. The Scottish Ministers advise that the Applicant must consult with fisheries representatives and local fishermen to determine the presence of fishing grounds in the vicinity of the Proposed Works and to ensure that smaller fishing vessels, not captured in Vessel Monitoring System data, are not excluded from the assessment.	
Scottish Fishermen's Federation (SFF)	Scoping opinion June 2025	This response to the above scoping request is presented by the Scottish Fishermen's Federation on behalf of the 450 plus fishing vessels in membership of its constituent associations, the Anglo Scottish Fishermen's Association, Fife Fishermen's Association. Fishing Vessel Agents and Owners Association, Mallaig & Northwest Fishermen's Association, Orkney Fisheries Association, Scottish Pelagic Fishermen's Association, the Scottish White Fish Producer's Association and Shetland Fishermen's Association. As we have had some concern from local inshore fishers in this area recently, we propose that it would require input from them directly impacted to feed into this.	No further consultation has been undertaken with fisheries stakeholders.

4. Baseline

The overall aim of this technical appendix is to assess the potential impacts arising from the proposed development, on key issued raised within the scoping opinion relating to commercial fisheries.

4.1 Study Area

The project is located in the inner Moray Firth, on the northeast coast of Scotland within the United Kingdom (UK) Exclusive Economic Zone (EEZ) and UK territorial waters, inside the 12 nautical mile (nm) limit. For statistical and fisheries management purposes, the Moray Firth region falls within the International Council for the Exploration of the Sea (ICES) Division IVa (northern North Sea), which is subdivided into standardised statistical rectangles measuring 30 nm^2, or 103 km^2 per rectangle. These divisions facilitate consistent data collection and reporting across Member States operating in the region.

The proposed development overlaps with ICES rectangles 44E5 and 44E6. ICES rectangle 44E5 and 44E6 both cover an area of approximately 3,316 km^2 respectively, therefore the overlap of the total footprint of the proposed development equates to a minimal proportion of each rectangle. For the purposes of this commercial fisheries technical appendix, ICES rectangles 44E5 and 44E6 delimit the commercial fisheries study area. The study area is presented in Figure 5.1.

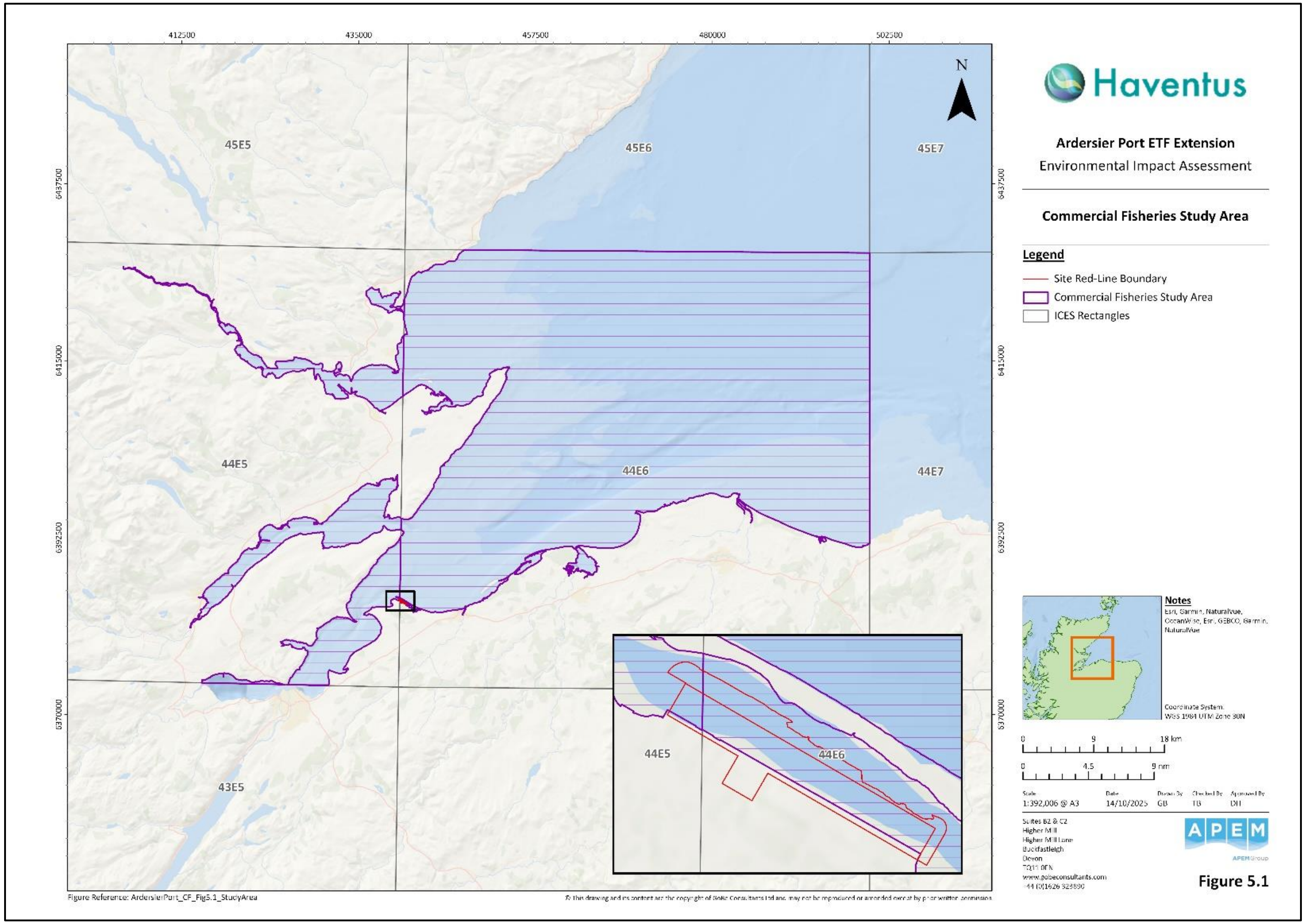

Figure 5.1: Commercial Fisheries Study Area

4.2 Desktop Study

To inform the assessment on commercial fisheries, a high-level desk-based review has been undertaken using a range of existing spatial and scientific data sources (Table 5.2Error! Reference source not found.). The findings of this research are presented below to provide an understanding of the proposed development environment in relation to key issued raised within the scoping opinion relating to commercial fisheries. The commercial fisheries baseline has been mainly characterised by publicly available MMO fisheries statistics data for ICES rectangles 44E5 and 44E6 (MMO, 2023), cross referenced with Scottish Sea Fisheries Statistics (Marine Directorate, 2025) to ensure a comprehensive analysis. These data are presented in the following paragraphs and provide a sufficient representation of the UK fishery within ICES rectangles 44E5 and 44E6 as they include information on various parameters, for example, first sales value, landed weight, vessel length group and gear type. These MMO data are for UK vessels only, however, VMS data from European Union (EU) vessels (including the UK) 12 m and over in length in terms of average total fishing effort and average Swept Area Ratio (SAR) between 2019 and 2022 has also been analysed.

Variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and are the principal reason for considering up to five years of key baseline data. Given the data reporting period considered in this assessment (2019 to 2023), existing baseline data may to some extent capture potential changes in commercial fisheries activity resulting from the COVID-19 pandemic, which is understood to have temporarily affected market demand and supply chains and changes in fishing patterns resulting from the withdrawal of the UK from the EU.

Table 5.2. Summary of desk-based review sources.

Title	Purpose	Reference
UK Sea Fisheries Statistics (2019-2023)	Landings statistics data for UK-registered vessels, with data query attributes for: landing year; landing month; vessel length category; ICES rectangle; vessel/gear type; port of landing; species; live weight (tonnes); and value (£).	Marine Management Organisation, (2023)
Vessel Monitoring System (VMS) data	VMS data for UK registered vessels 15 m and over in length. Note that UK vessels 12 m and over in length have VMS on board, however, to date, the MMO provides amalgamated VMS datasets for 15 m and over vessels only. VMS data sourced from MMO displays the first sales value (£) of catches.	Defra Data Services Platform, Marine management Organisation, (2020-2022)
Swept Area Ratio (SAR) data for EU registered vessels ≥12 m	VMS data for EU registered vessels 12 m and over in length. VMS data sourced from ICES and available through EMODnet displays the surface SAR of catches	European Marine Observation and Data Network (EMODnet)

Title	Purpose	Reference
	by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear contacts (or sweeps) the seabed surface. Surface SAR provides a proxy for fishing intensity.	Human Activities (fishing effort) in collaboration with International Council for the Exploration of the Sea (ICES), (2019-2022)
Marine Scotland National Marine Plan interactive (NMPi) portal (ScotMap Inshore Fisheries Data)	ScotMap, accessed via Marine Scotland’s NMPi portal, provides spatial data on fishing activity from vessels under 15 m, based on interviews conducted between 2011 and 2013. It maps key features such as fishing effort, gear types, and vessel activity across Scottish waters, including designated fishing grounds. This data has been used to supplement and cross-reference MMO landings and spatial datasets to ensure comprehensive coverage of commercial fishing activity within the study area.	Marine Scotland, Scottish Government, (2014)
FiSMaDiM (Fisheries Sensitivity Mapping and Displacement Modelling) data	These datasets are used to model and understand how fishing activities might be affected by marine developments and how fishing effort could be redistributed as a result.	CEFAS data hub, Centre for Environment, Fisheries and Aquaculture Science (CEFAS), (2023)
Fishing vessel route density data	Fishing vessel route density, based on vessel AIS positional data. AIS is required to be fitted on fishing vessels 15 m and over in length.	European Maritime Safety Agency (EMSA), via European Marine Observation and Data Network (EMODnet), (2024)
Key commercial fisheries stock assessments (where available)	While stock assessments are typically conducted at broader regional scales, for example North Sea or West of Scotland, several key commercial species relevant to the Moray Firth are regularly assessed by ICES and reported in Scottish marine assessments.	ICES and Marine Scotland, (2019-2023)

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4.2.1 Key Target Species and Socioeconomic Importance

Commercial fisheries contribute significantly to the local economy, supporting employment, landings value, and supply chains in northeast Scotland. Ports such as Fraserburgh and Buckie rely on shellfish and demersal landings from vessels operating within the study area. Displacement or disruption could have downstream effects on processors, transport, and community resilience, particularly for small-scale operators.

On average, landed weight equating to 75 tonnes with a first sales value of £148,228 was landed from ICES rectangle 44E5, based on 5-years landings data between 2019 to 2023. Peak landings occurred in 2019 with 117 tonnes landed at a first sales value of £208,210. The lowest landings in the 5-year reporting period were recorded in 2023 with 64 tonnes landed at a first sales value of £85,093.

Trends in landings from ICES rectangle 44E5 show an appreciable drop from 2019 (117 tonnes at a first sales value of £208,210) to 2020 (72 tonnes at a first sales value of £118,486), through to 2021 (42 tonnes at a first sales value of £109,828). Landing statistics indicate initial recovery in 2022 (79 tonnes at a first sales value of £219,518), however in 2023 landings dropped to the lowest point in the data 5-year data reporting period with 64 tonnes landed at a first sales value of £85,093. It is noted that the period of the baseline data analysis includes years impacted by COVID-19, specifically 2020 and 2021 when restrictions affected normal business operations and market trade. Landings at a national level were seen to decline over this period. For example, the total first sales value of commercial landings by Scottish vessels decreased from £735 million in 2016, to £520 million in 2020 due to the impacts of COVID-19.

In ICES rectangle 44E5, whelk dominated landed weight and first sales value between 2019 and 2020, and in 2023. Landed weight values range from 102.3 tonnes with a first sales value of £120,656 in 2019, 66.1 tonnes with a first sales value of £76,205 in 2020 and 61.1 tonnes with a first sales value of £68,475 in 2023. Landed weight of whelks dropped significantly in 2021 and 2022 to 12.9 tonnes at a first sales value of £12,999 and 36.3 tonnes at a first sales value of £35,409 in 2022. Brown crabs dominated landed weight and first sales value in 2021 with 13.8 tonnes landed at a first sales value of £33,226 and continued to dominate first sales value in 2022 at £72,272 although landed weight was below that of whelks at 27.4 tonnes.

Nephrops are consistently landed year-on-year across the reporting period, however landings and first sales value fluctuate from a peak in landings in 2022 of 10.96 tonnes with a first sales value of £66,601 to a low of 1.1 tonnes in 2021 with a first sales value of £12,525. Ballan wrasse were only landed in 2019 to 2021, and although represent a small proportion of average landed weight by species in the rectangle (0.04 tonnes), had an average first sales value of £3,113 in the reporting period. Lobsters (0.59 tonnes at a first sales value of £9,221), velvet crabs (1.4 tonnes at a first sales value of £4,752) and scallops (4 tonnes at a first sales value of £8,538) are consistently landed year-on-year across the 5-year reporting period and alongside the species discussed above, comprise the majority of landed weight and first sales value within ICES rectangle 44E5.

Finfish and other species, although targeted within this rectangle, represent a small proportion individually overall of average landed weight and first sales value. Fisheries

Statistics indicate that shellfish species were caught using dredges, demersal trawls, and creels, pots and traps. Figure 5.2 and Figure 5.3 present the results of this analysis.

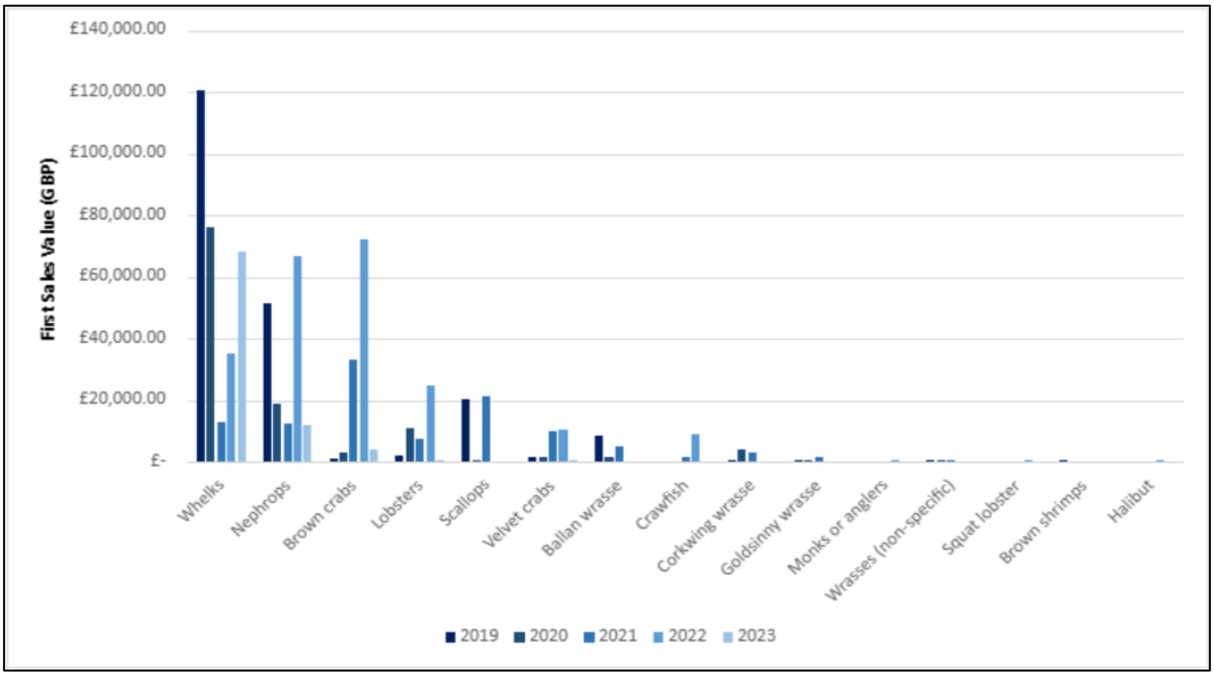

Figure 5.2: Average annual landed value of species from ICES rectangle 44E5, based on 5-year average from 2019 to 2023 (MMO, 2023a).

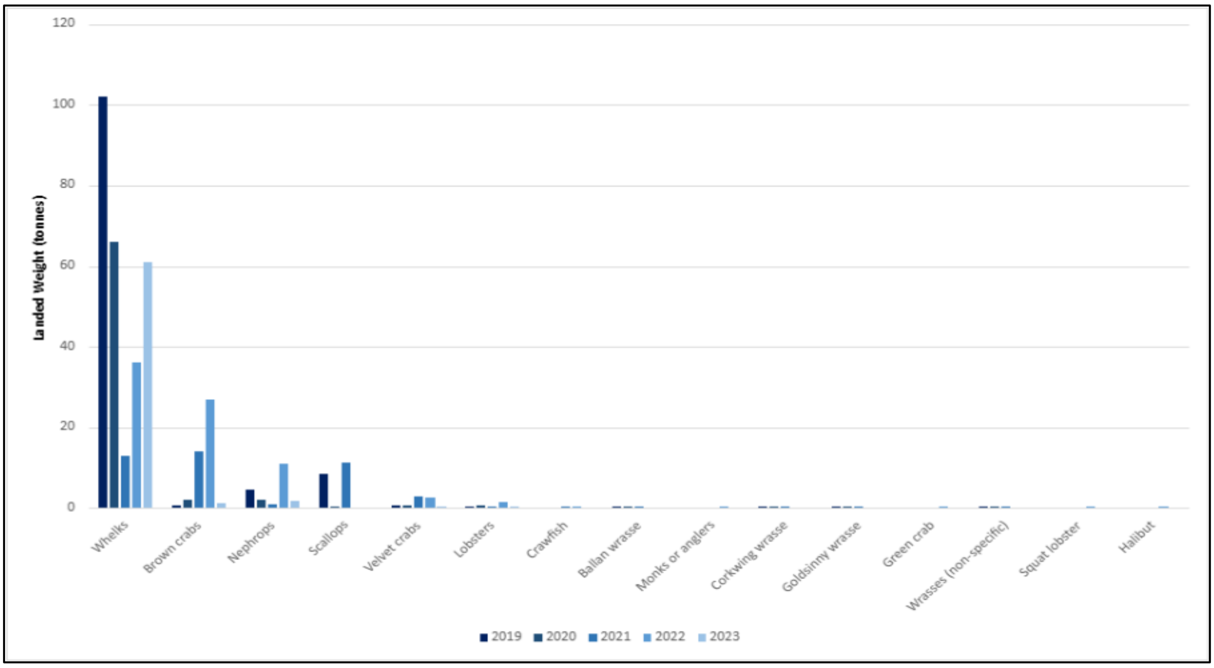

Figure 5.3: Average annual landed weight of species from ICES rectangle 44E5, based on 5-year average from 2019 to 2023 (MMO, 2023a).

On average, landed weight equating to 662 tonnes with a first sales value of £2.65 million was landed from ICES rectangle 44E6, based on 5-years landings data between 2019 to 2023. Peak landings occurred in 2019 with 1015 tonnes landed at a first sales value of £ 3.85 million. The lowest landings in the 5-year reporting period were recorded in 2020 with 467 tonnes landed at a first sales value of £1.5 million.

Trends in landings from ICES rectangle 44E6 show an appreciable drop from 2019 (1015 tonnes landed at a first sales value of £ 3.85 million) to 2020 (467 tonnes landed at a first sales value of £1.5 million) and remain lower in 2021 (476 tonnes landed at a first sales value of £1.7 million), however landings steadily rise through 2022 into 2023 with 763 tonnes landed at a first sales value of £ 3.5 million. As described for ICES rectangle 44E5, this includes years impacted by COVID-19, specifically 2020 and 2021 when restrictions affected normal business operations and market trade and aligns with declines in landings at a national level during this period.

In ICES rectangle 44E6, *Nephrops* dominated landed weight and first sales value between 2019 and 2023, except in 2019 where landed weight of squid was 354 tonnes. Landed weight values for Nephrops range from 158 tonnes with a first sales value of £629,521 in 2020 to 372 tonnes with a first sales value of £2.03 million in 2023 and a 5-year average of 241.2 tonnes at a value of £1.22 million. Squid had the highest landed weight in 2019 with a first sales value of £882,673, however landings dropped significantly in 2020 to 153 tonnes with a first sales value of £382,766 and continued to drop to a low of 86 tonnes in 2021, remaining stable in the remainder of the reporting period. Lobsters represent the next highest first sales value with an increasing trend in landings and first sales value observed ranging from a low of 18.1 tonnes at a first sales value of £239,732 in 2020 to a peak of 47.3 tonnes in 2023 at a first sales value of £707,413.

Landed weight and first sales value of mixed squid and octopi peaked in 2019 at 91.4 tonnes at a value of £654,389, however dropped significantly in 2020 to 14.4 tonnes, continuing to a low of 2.4 tonnes in 2022 with a slight increase observed in 2023 to 5.24 tonnes. Brown crabs (40.24 tonnes at a first sales value of £102,590), whelks (76 tonnes at a first sales value of £84,446), velvet crabs (22.03 tonnes at a first sales value of £54,347) and scallops (21.4 tonnes at a first sales value of £43,831) are consistently landed year-on-year across the 5-year reporting period and alongside the species discussed in paragraph 1.4.1.15, comprise the majority of landed weight and first sales value within ICES rectangle 44E6.

Haddock represents the fifth highest landed weight in the rectangle, ranging from 8.4 tonnes with a first sales value of £11,124 in 2020 to 59.1 tonnes with a first sales value of £46,620 in 2022 and an average first sales value of £25,547 across the data reporting period. Although significantly lower in landed weight than Haddock, corkwing wrasse (0.2 tonnes with a first sales value of £33,727), monks or anglers (3.85 tonnes at a first sales value of £13,208), mackerel (6.7 tonnes at a first sales value of £8,843), Plaice (1.64 tonnes at a first sales value of £950), Dabs (1.95 tonnes at a first sales value of £417) and green crab (0.91 tonnes at a first sales value of £812) are important target species within ICES rectangle 44E6. Finfish and other species, although targeted within this rectangle, represent a small proportion individually overall of average landed weight and first sales value within ICES rectangle 44E6. Fisheries Statistics indicate that the majority of demersal and pelagic fish landed by UK vessels were caught using demersal trawls. Shellfish species were caught using beam trawls, dredges, demersal trawls, and pots and traps. Figure 5.4 and Figure 5.5 present the results of this analysis.

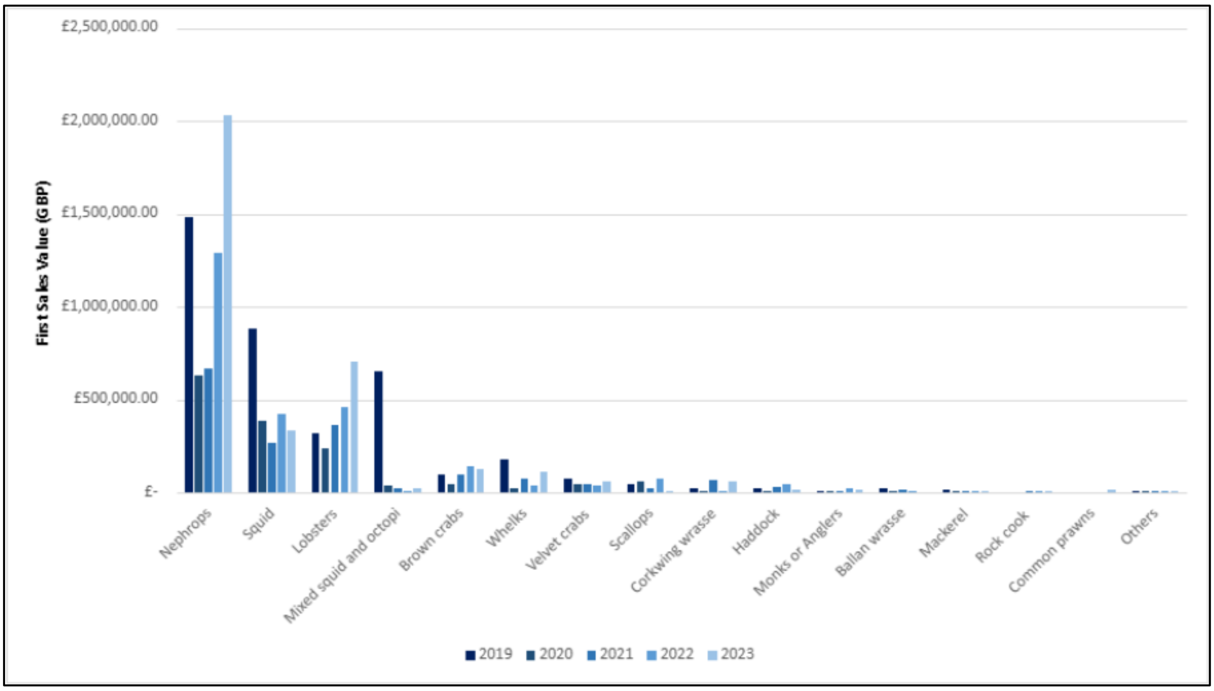

Figure 5.4: Average annual landed value of species from ICES rectangle 44E6, based on 5-year average from 2019 to 2023 (MMO, 2023a).

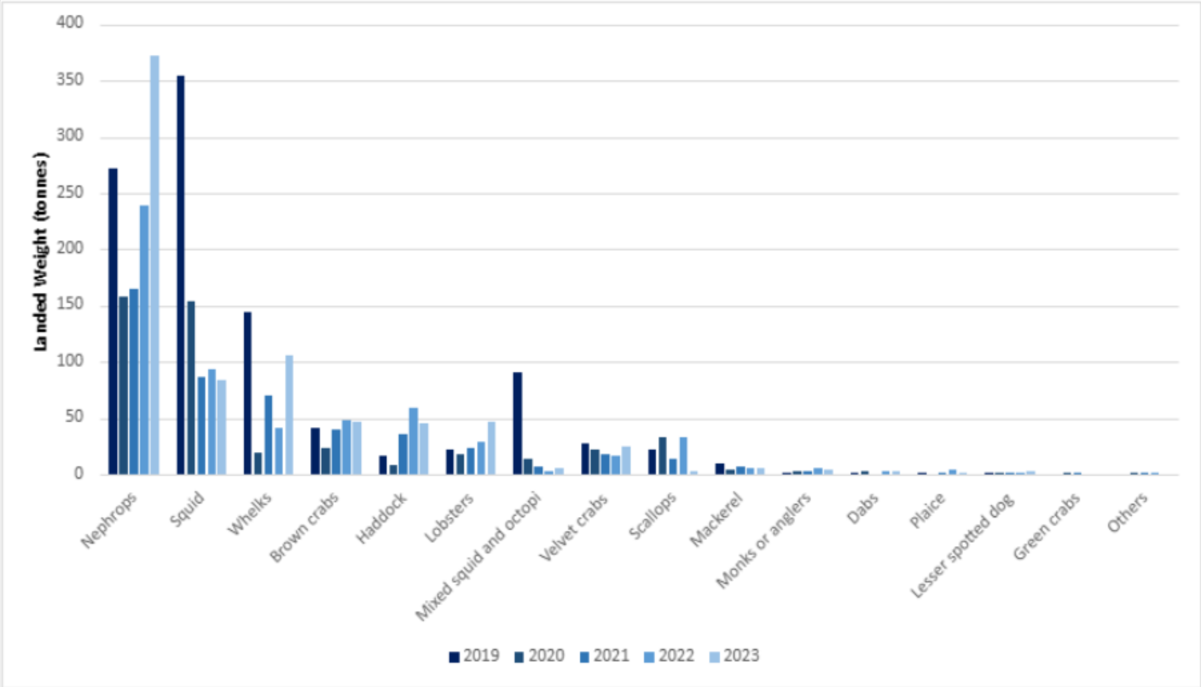

Figure 5.5: Average annual landed weight of species from ICES rectangle 44E6, based on 5-year average from 2019 to 2023 (MMO, 2023a).

4.2.2 Fleet Composition and Vessel Size

The Moray Firth exhibits a varied depth profile that influences both ecological dynamics and fishing activity. In its inner reaches, depths typically range from 10 to 50 m, with shallower areas around estuaries and river mouths. As the firth opens eastward into the North Sea, depths increase significantly, reaching up to 100 to 200 m in offshore areas. The firths funnel-like bathymetry, from narrow and shallow in the west to broader and deeper in the east, shapes tidal flow, sediment transport, and species distribution, and plays a key role in determining the types of fishing gear and vessels that operate within different zones of the Firth (Marine Scotland, 2020; Moray Offshore Renewables Ltd, 2018).

ICES rectangles 44E5 and 44E6 cover a portion of the inner reaches of the Firth, however 44E6 extends into deeper waters at its furthest boundary extents. Fisheries statistics indicate that the study area comprises productive shellfish grounds, supporting a predominantly shellfish-oriented fishery shaped by the region's sheltered waters and relatively shallow depths. Landings are predominantly comprised of *Nephrops*, whelks, brown crabs, lobsters, velvet crabs and squid, targeted by a mixed inshore fleet of vessels 10 m and under and over 10 m in length deploying demersal trawls and static gear such as creels and pots with the majority of landings by value being made by vessels 10 m and under in length. Vessels operate from nearby ports including Fraserburgh, Buckie, Lossiemouth, Burghead and Nairn.

In ICES rectangle 44E5, the highest level of activity is undertaken by vessels 10 m and under in length deploying pots and traps targeting *Nephrops*, brown crabs, velvet crabs, lobsters and whelks. Significantly lower levels of demersal trawling targeting demersal finfish, squid and other species is undertaken by vessels 10 m and under. Low levels of dredge activity has been identified for vessels over 10 m. Fishing activity trends reflect the shallow, inshore nature of this portion of the study area. Fishing activity trends in ICES rectangle 44E6 reflect access for vessels to deeper waters. Pots and traps are almost exclusively deployed by vessels 10 m and under, however vessels 10 m and under and over 10 m share a near equal proportion of demersal trawl activity within the rectangle targeting demersal finfish, squid and other species. Vessels over 10 m in length are also deploying demersal seines and pelagic trawls, targeting mobile pelagic species such as mackerel, however this activity predominantly occurs further offshore.

The fleet operating in this area is dominated by vessels 10 m and under in length. These vessels typically conduct short trips within the firth and adjacent coastal waters, with fishing effort concentrated in spring and summer months when shellfish activity peaks. Seasonal patterns are influenced by water temperature, breeding cycles, and market demand with crab and lobster often landed together, while whelk fishing tends to peak in the off-season for crustaceans. Pelagic species are not a major component of the catch in these rectangles, though mackerel may be landed seasonally in small volumes. Landings of the species detailed above vary seasonally, with inshore vessels often equipped to move from species to species throughout seasons. Figure 5.6 and Figure 5.7 present the results of this analysis.

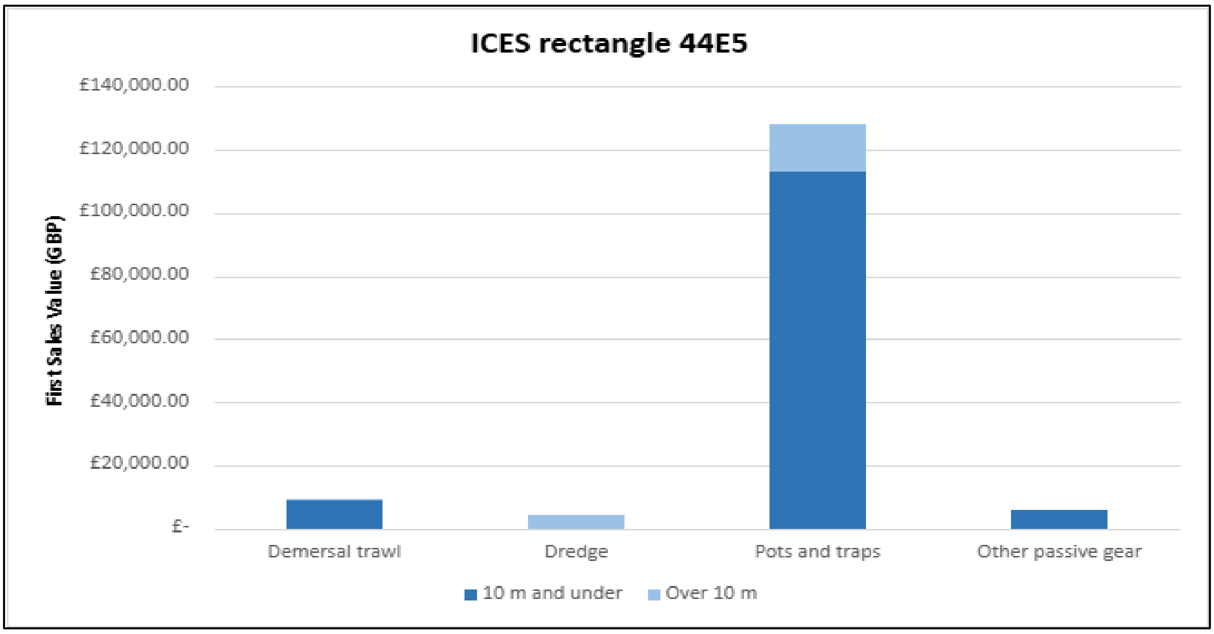

Figure 5.6: Comparative effort by gear type for vessels 10 m and under and over 10 m operating in the ICES rectangle 44E5.

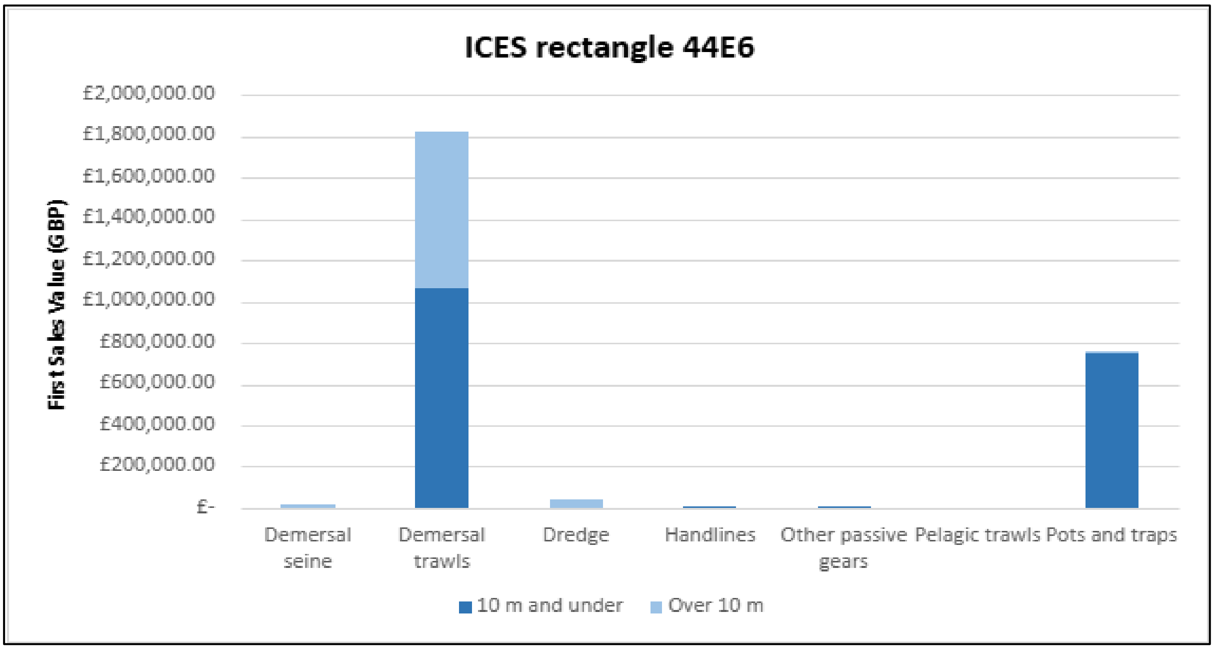

Figure 5.7: Comparative effort by gear type for vessels 10 m and under and over 10 m operating in the ICES rectangle 44E6.

EU-27 landings statistics indicate that the study area is almost exclusively fished by UK vessels operating from Scotland, England and Northern Ireland, however very low levels of activity by a French vessel targeting hake as a quota species (0.1 tonne landed into Ullapool with a first sales value of £254) was identified in 2020. Records indicate that no fishing activity has been undertaken by French vessels or vessels of any other nation since 2020, therefore this assessment focuses on UK fleets operating within the study area.

4.2.3 Fishing Grounds and Intensity of Use

In addition to fisheries statistics data, VMS and spatial data to map fishing activity is available for UK and EU fleets. VMS data expressed as fishing intensity sourced from ICES and available through EMODnet (EMODnet, 2025) displays the surface SAR of catches by different gear types and covers EU (including UK) registered vessels 12 m and over in length. Surface SAR indicates the number of times in an annual period that a demersal fishing gear sweeps the seabed surface compared to the total area of the seabed in a defined grid cell (typically 0.05° × 0.05°). Surface SAR provides a proxy for fishing intensity and has been analysed to determine an average annual SAR based on data from 2019-2022.

Figure 5.8 indicates that fishing intensity by EU (including UK) registered vessels 12 m and over in length ranges throughout the study area. Intensity ranged from inshore areas overlapping the approaches to Ardersier Port of low to moderate fishing intensity by vessels deploying demersal bottom towed gear, with less than 0.1 (or 10%) of those grid cells being swept by fishing gear on average over the course of a year. This indicates minimal bottom-contact gear disturbance across the seabed by vessels 12 m and over within the inshore portion of the study area and suggests the predominance of static fishing methods such as creels, which exert negligible pressure on benthic habitats. Areas further offshore within the study area are subject to higher fishing intensity, increasing as waters get deeper, ranging from 0.2 up to 10. Higher SAR values (more than 1.0) indicate repeated trawling, often associated with degraded benthic habitats and reduced biodiversity, therefore 10 represents an area of very high bottom towed gear intensity.

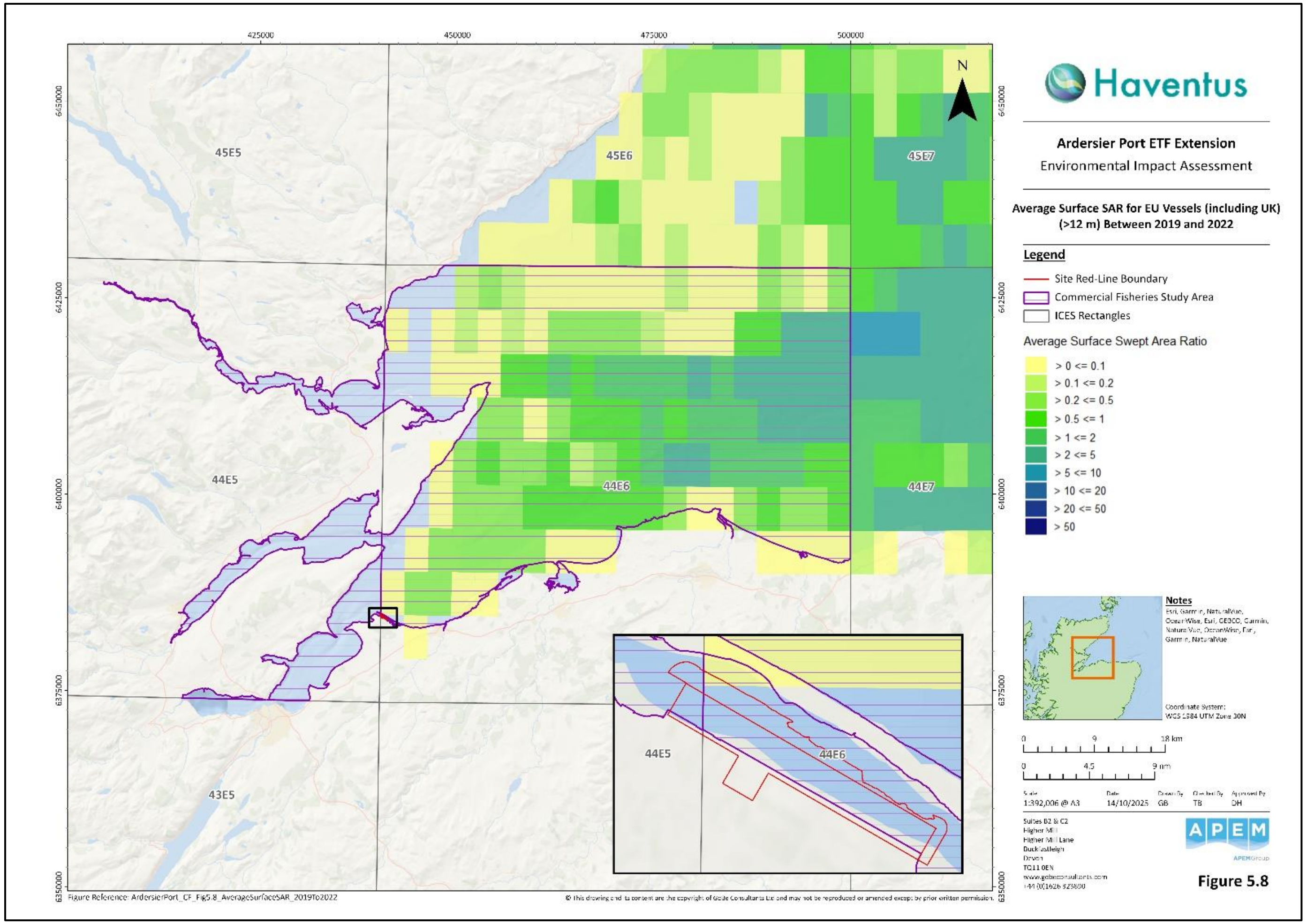

Figure 5.8: Average surface SAR for EU Vessels (including UK) (>12 m) between 2019 to 2022 (Source: EMODnet, 2025).

In 2020, UK vessels over 15 metres in length recorded notable fishing effort across ICES rectangles 44E5 and 44E6. Effort was measured in kilowatt-hours (kW/h), derived from VMS data that combines engine power with time spent fishing. These rectangles exhibited a mix of gear types, with otter trawls (bottom and midwater), *Nephrops* trawls, and Scottish seines being predominant in offshore zones, while static gear such as creels were more common in nearshore areas. Fishing effort intensity varied spatially, with 44E6 covering deeper offshore waters showing higher kW/h totals compared to the more sheltered 44E5. This distribution reflects both ecological gradients and operational preferences, with mobile gear concentrated in deeper, less structurally complex habitats. Low levels of fishing effort are indicated in areas overlapping the approaches to Ardersier Port (Figure 5.9).

It should be noted that the quantitative datasets identified may not capture all commercial fisheries activity within the study area. For example, the ICES and MMO VMS datasets only cover vessels ≥12 m or ≥15 m in length respectively and although UK vessels ≥12 m in length have VMS on board, the MMO only provides amalgamated VMS datasets for ≥15 m vessels currently.

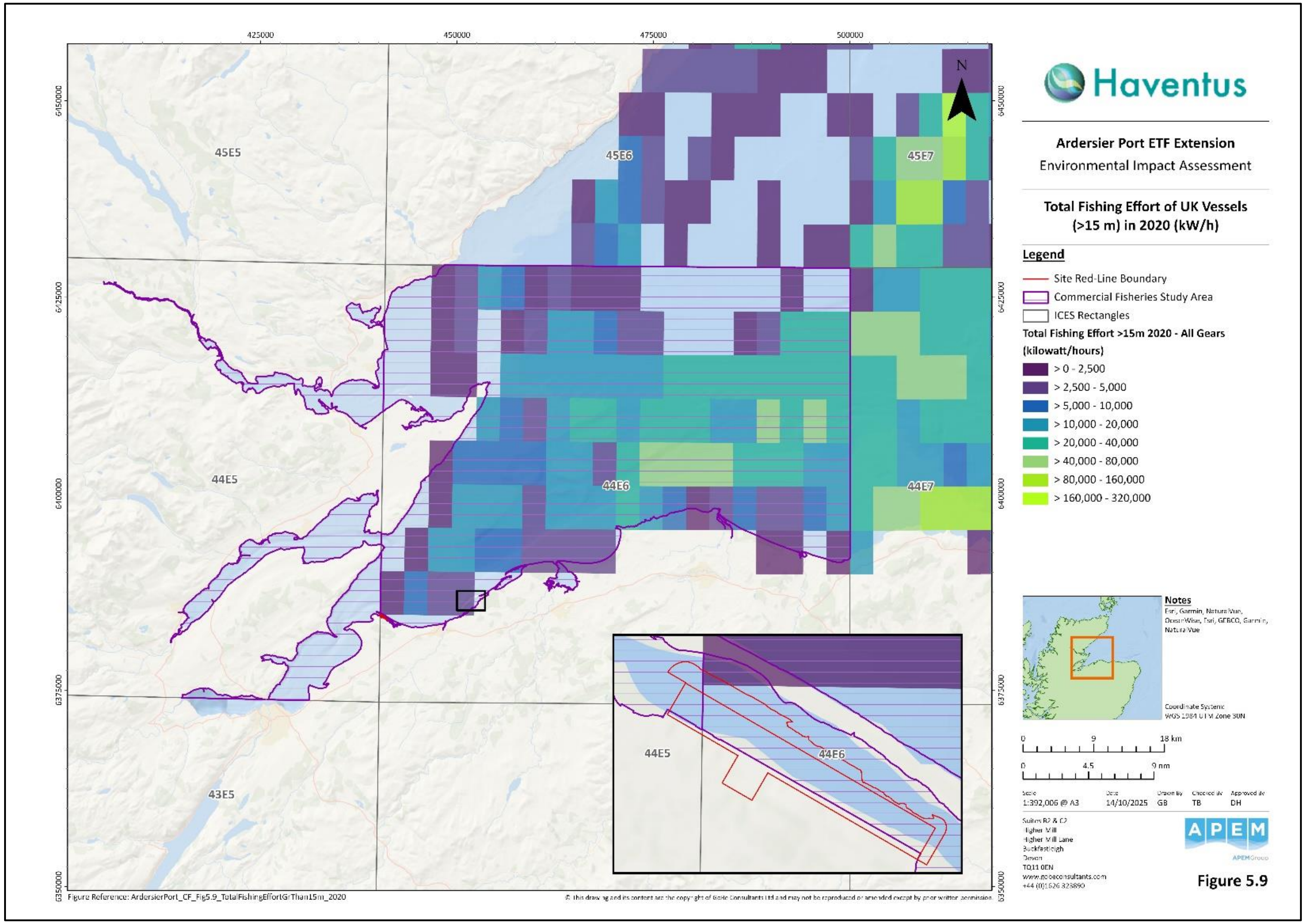

Figure 5.9: Total Fishing Effort of UK Vessels (>15 m) in 2020 (kW/h) (Source MMO, 2025).

VMS data on the average SAR for EU vessels, including those from the UK, measuring 12 metres and over, was analysed for six gear types operating within the study area. This analysis focused on the average total fishing effort between 2019 and 2022 for beam trawls, bottom otter trawls, bottom seines, dredges, pelagic trawls and seines, and static gear, providing a spatially resolved understanding of commercial fishing activity within the defined commercial fisheries study area. Beam trawls, bottom seines, pelagic trawls and seines, and static gear were shown to have no spatial overlap with indicative areas overlapping the approaches to Ardersier Port. Figure 5.10 and Figure 5.11 show that bottom otter trawls and dredges (respectively) had persistently low average SAR values in the inshore areas that overlap with the approaches to Ardersier Port with higher levels of effort being exerted in offshore sections of the study area and elsewhere in the North Sea.

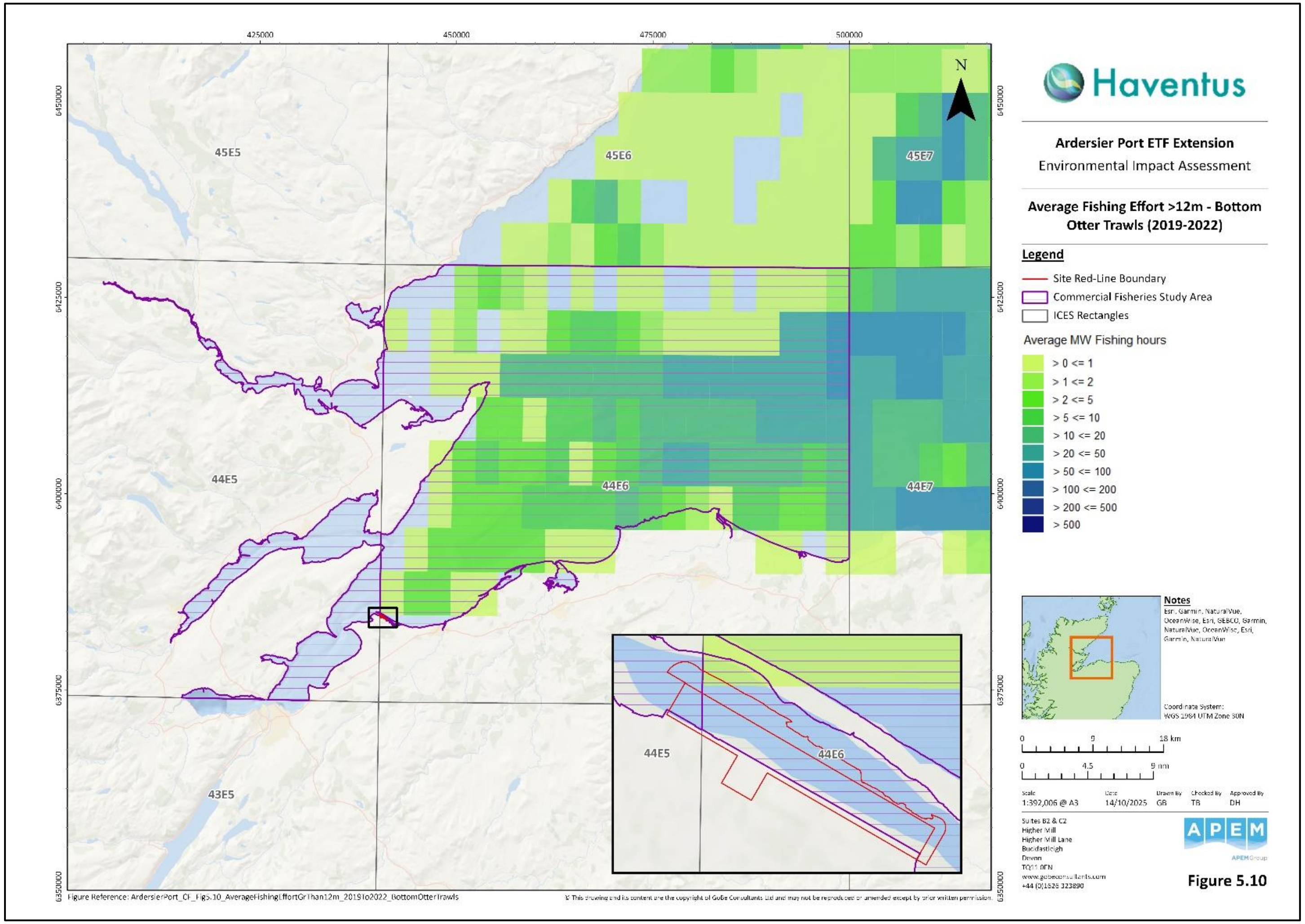

Figure 5.10: Average Fishing Effort >12 m - Bottom Otter Trawls 2019 – 2022 (Source: EMODnet, 2025).

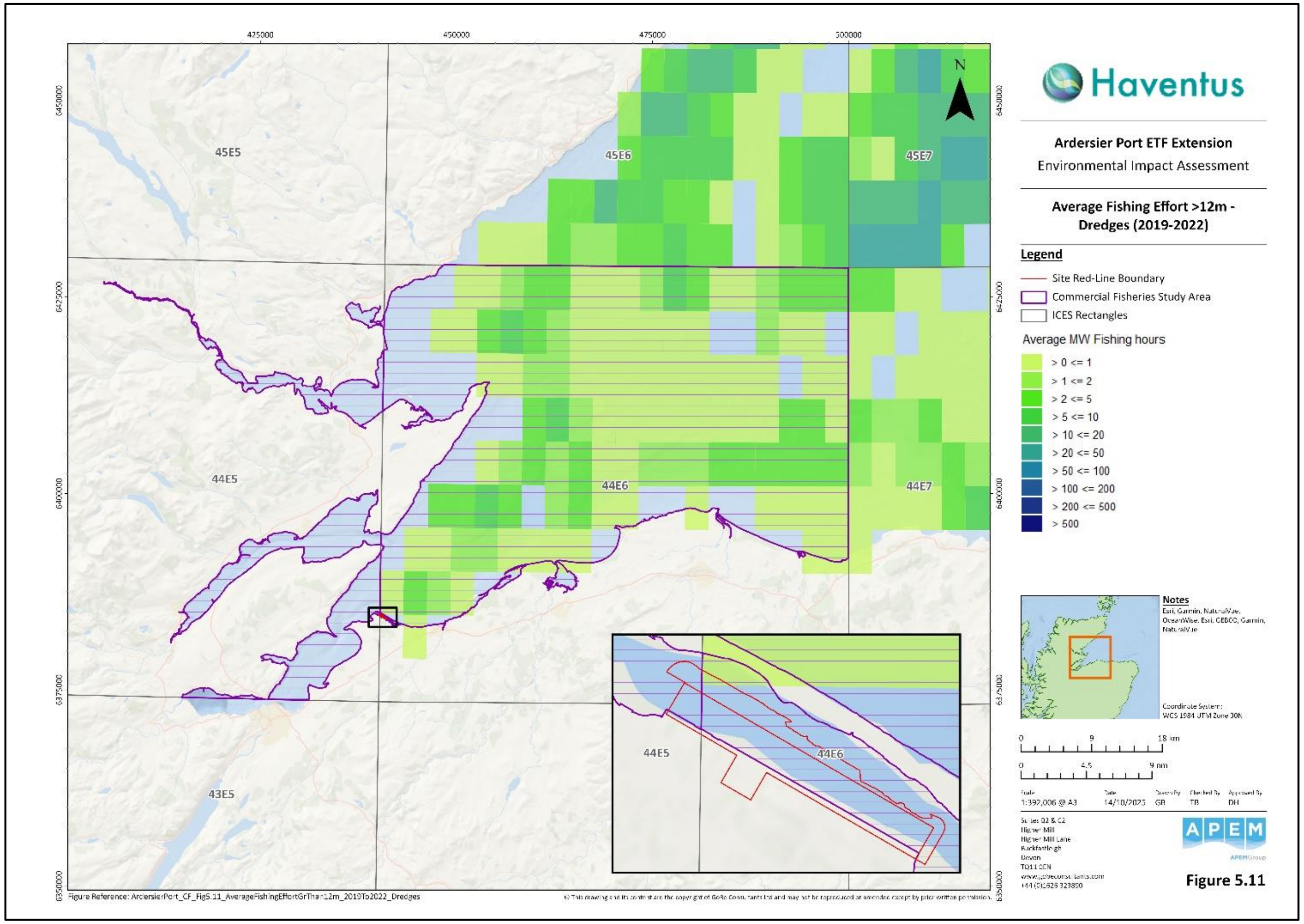

Figure 5.11: Average Fishing Effort >12 m - Dredges 2019 – 2022 (Source: EMODnet, 2025).

4.2.4 ScotMap Fishing Activity

ScotMap data (Scottish Government, 2014) captures the distribution and economic importance of inshore commercial fisheries around Scotland based on interviews conducted with over 700 fishers operating vessels under 15 m in length (Figure 5.12 and Figure 5.13). Within the Moray Firth, ICES statistical rectangles 44E5 and 44E6 encompass inshore fishing grounds used by small-scale vessels, particularly those deploying static gear such as creels for shellfish targeting brown crab, lobster and *Nephrops*. ScotMap data for these rectangles indicates low to moderate levels of fishing activity along the coastal margins. These areas are economically important for small-scale local fishers who may be disproportionately sensitive to disturbance to fishing activities from marine development or dredging operations. The ScotMap dataset also highlights the presence of other gear types in the region, including occasional use of mobile gear such as demersal trawls and dredges. While fishing intensity varies seasonally, the data provides a baseline for assessing potential spatial overlap between proposed marine works such as capital dredging and established fishing grounds.

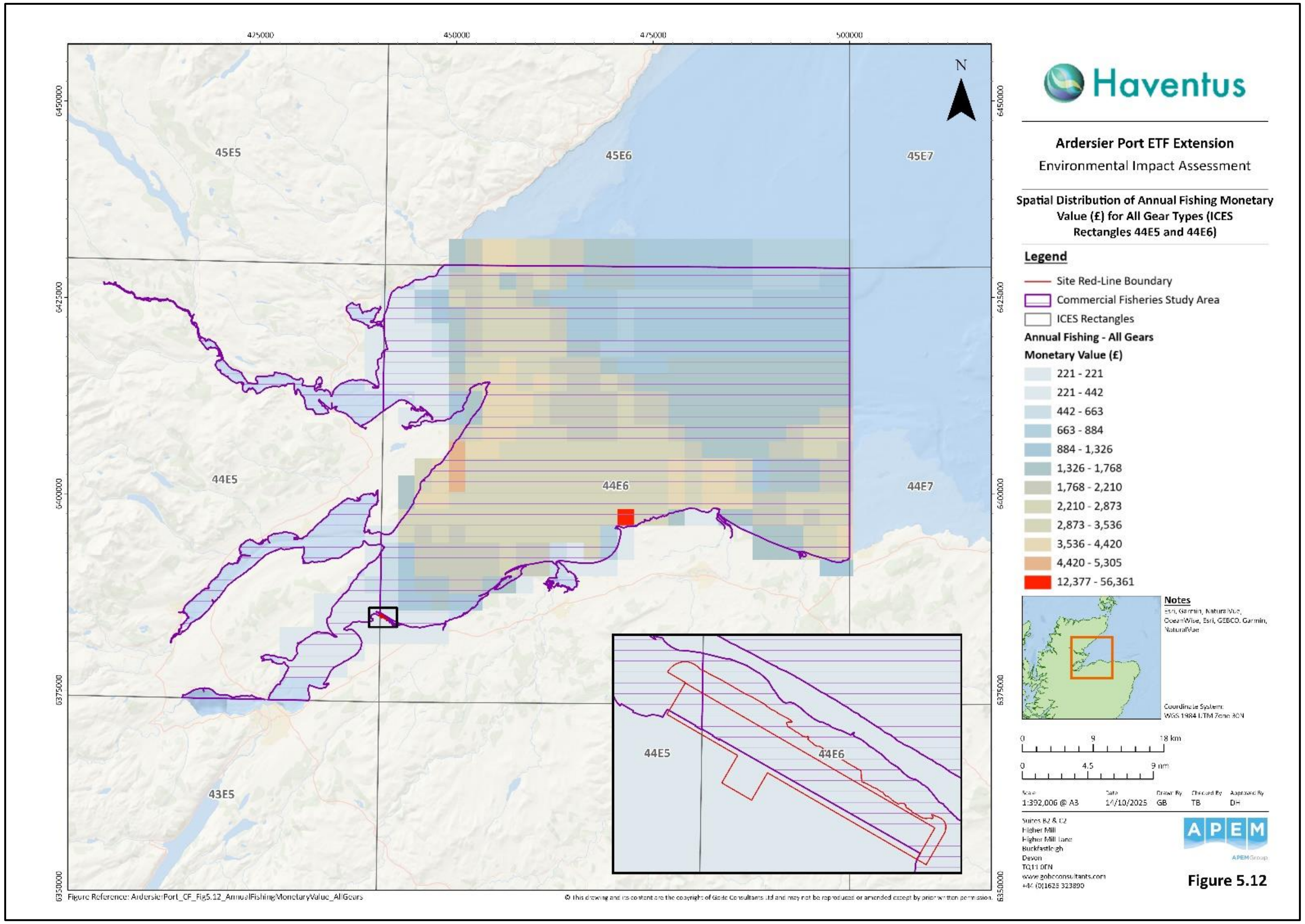

Figure 5.12: Spatial Distribution of Annual Fishing Monetary Value (£) for All Gear Types in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

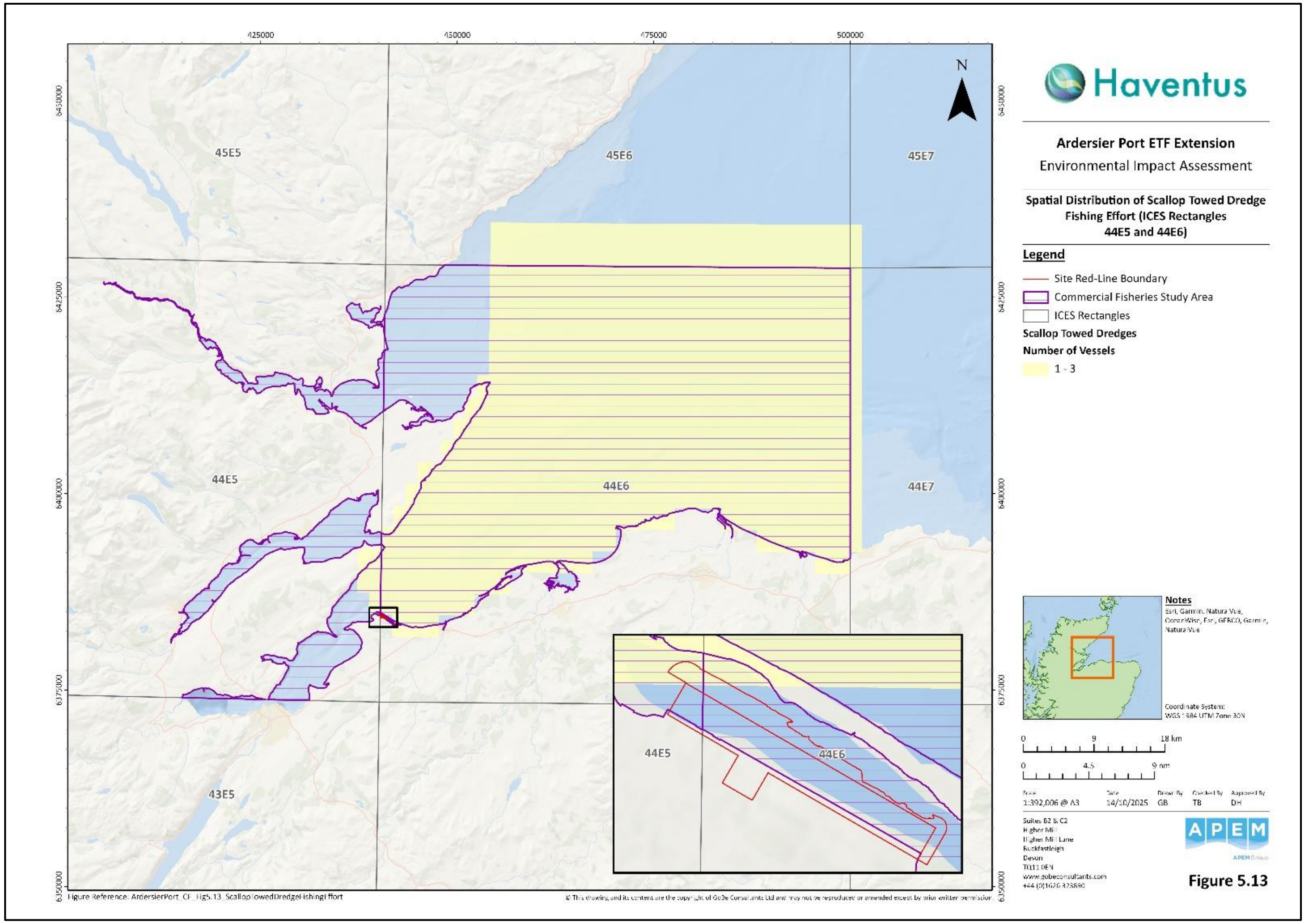

Figure 5.13: Spatial Distribution of Scallop Towed Dredge Fishing Effort in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

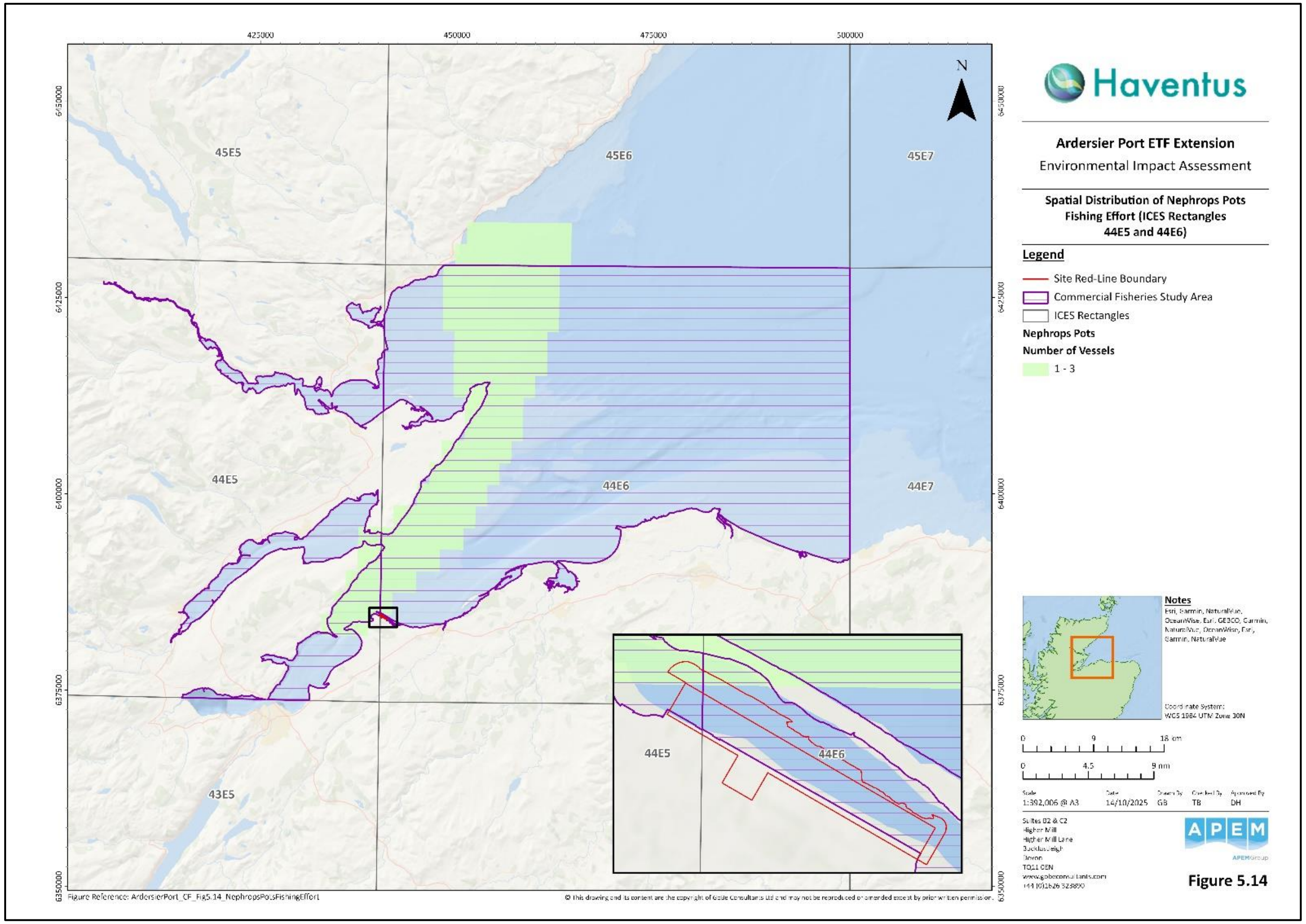

Figure 5.14: Spatial Distribution of Nephrops pots Fishing Effort in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

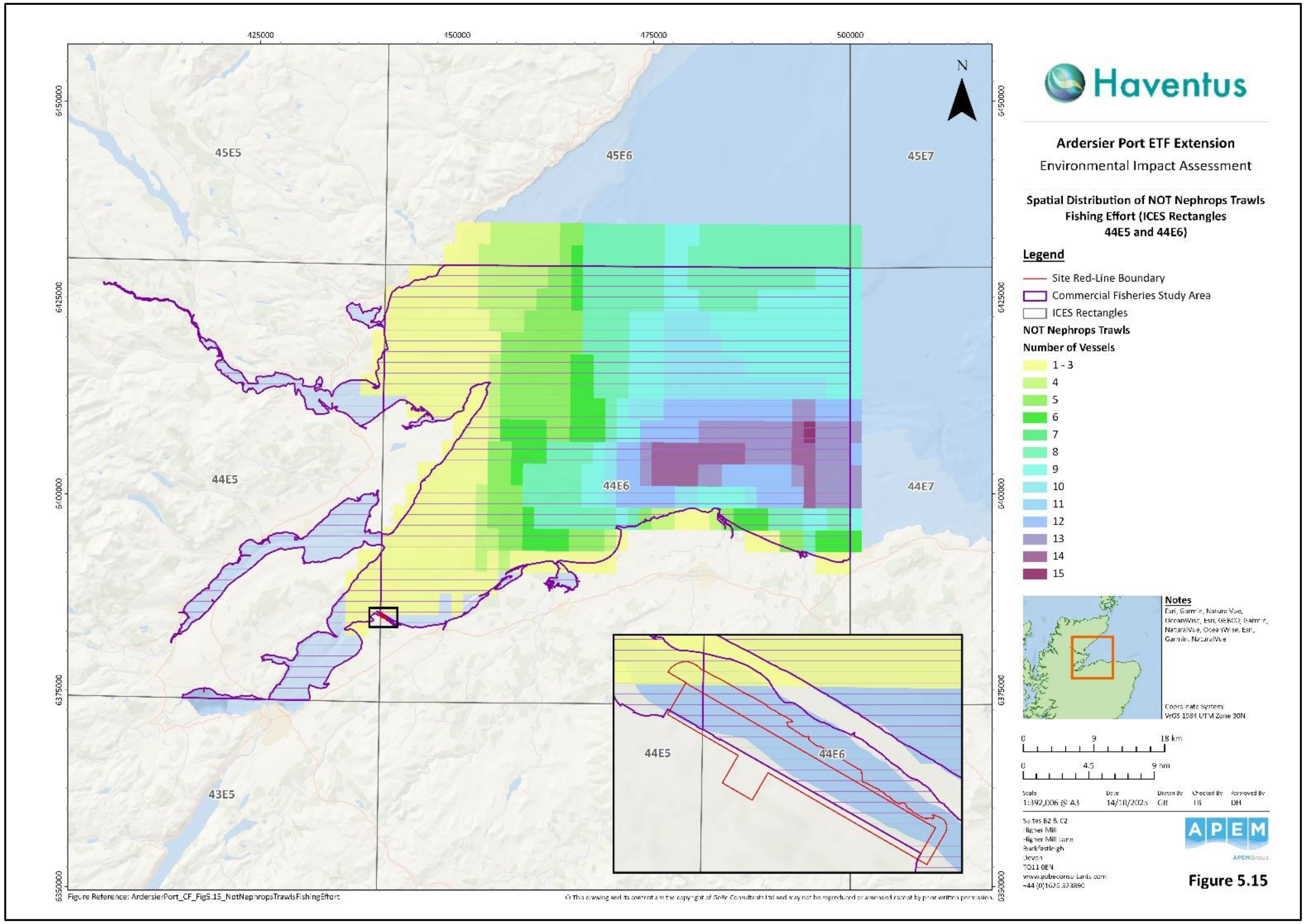

Figure 5.15: Spatial Distribution of NOT *Nephrops* Trawls Fishing Effort in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

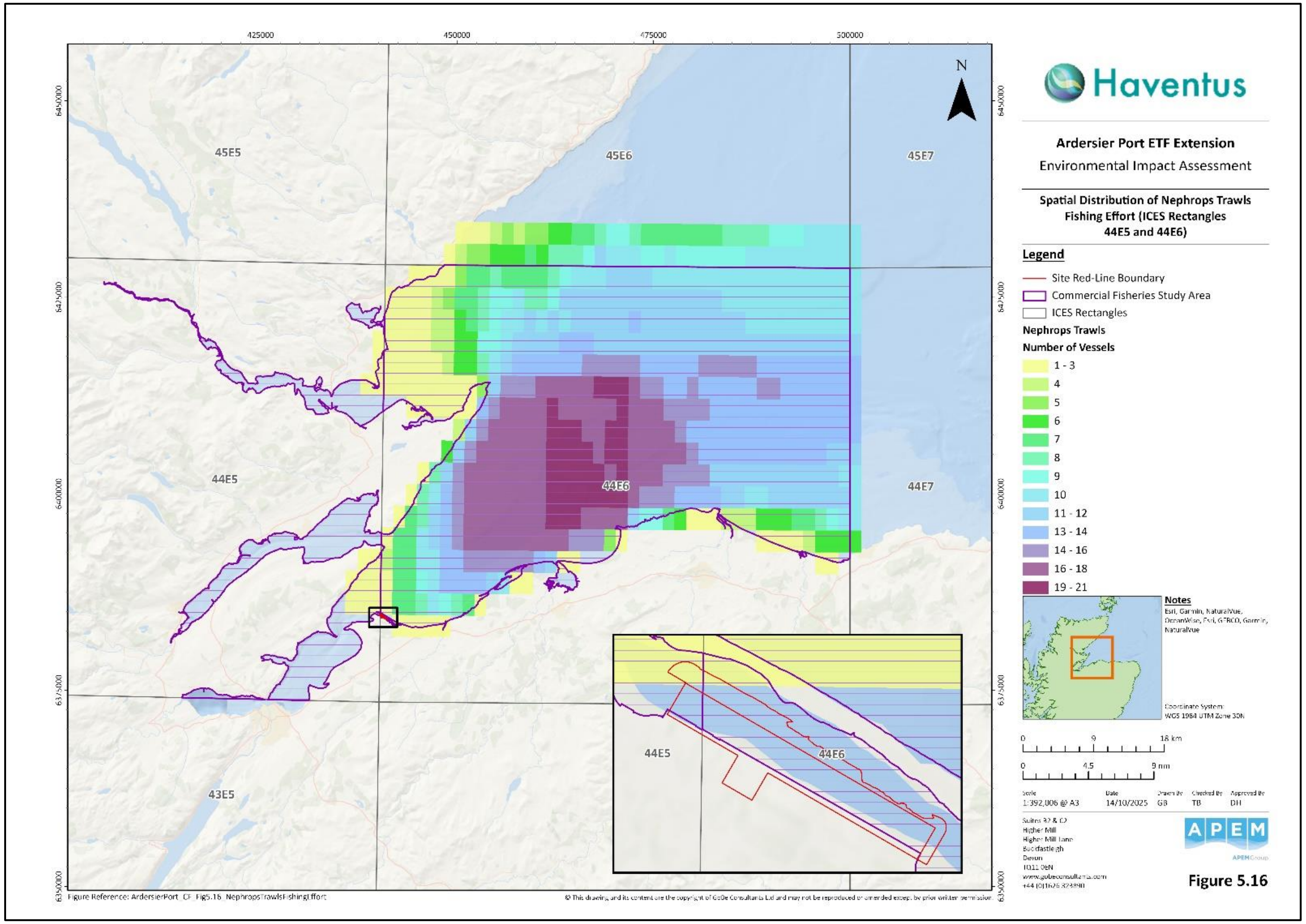

Figure 5.16: Spatial Distribution of *Nephrops* Trawls Fishing Effort in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

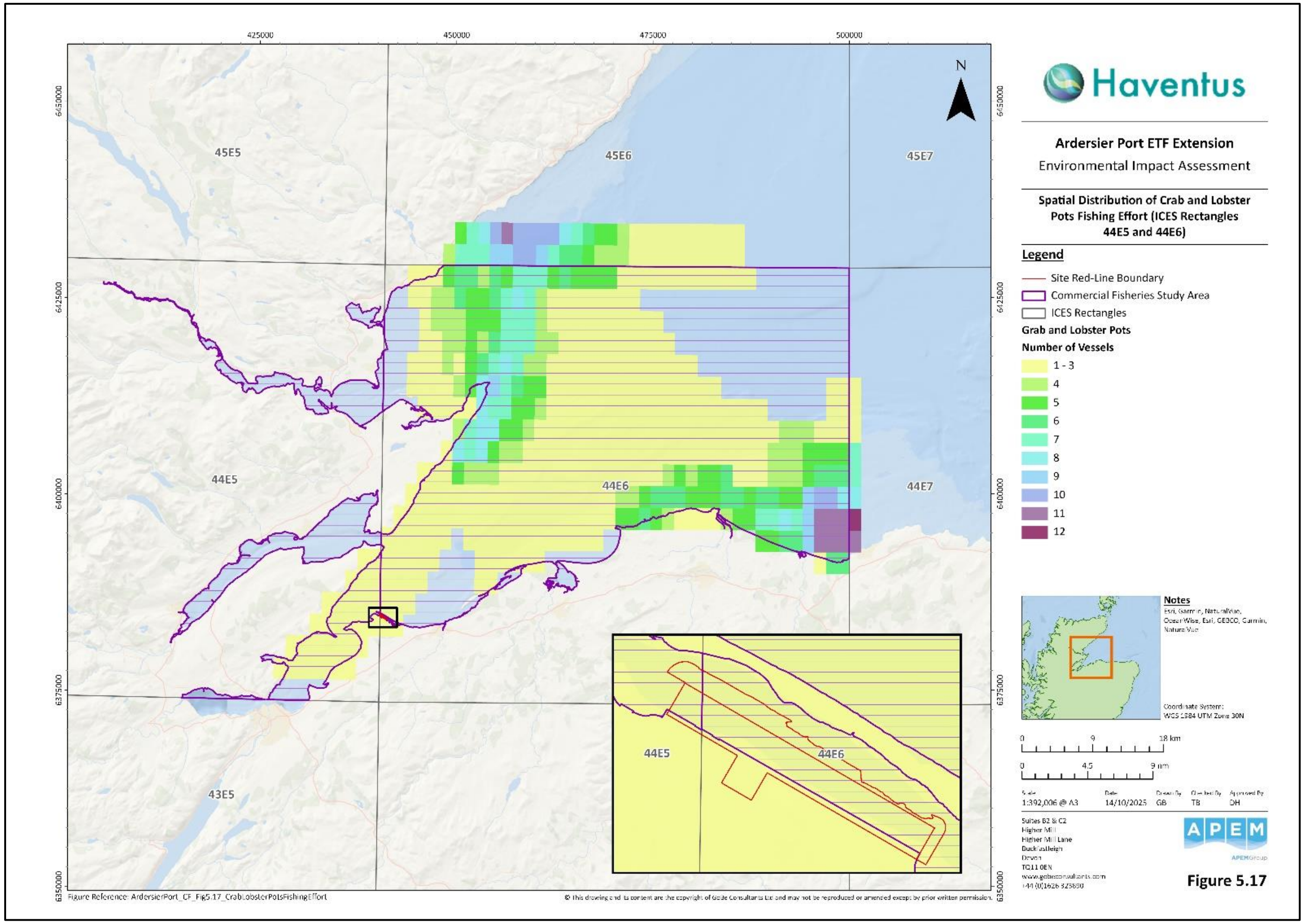

Figure 5.17: Spatial Distribution of Crab and Lobster Pots Fishing Effort in ICES Rectangles 44E5 and 44E6 Based on ScotMap Data.

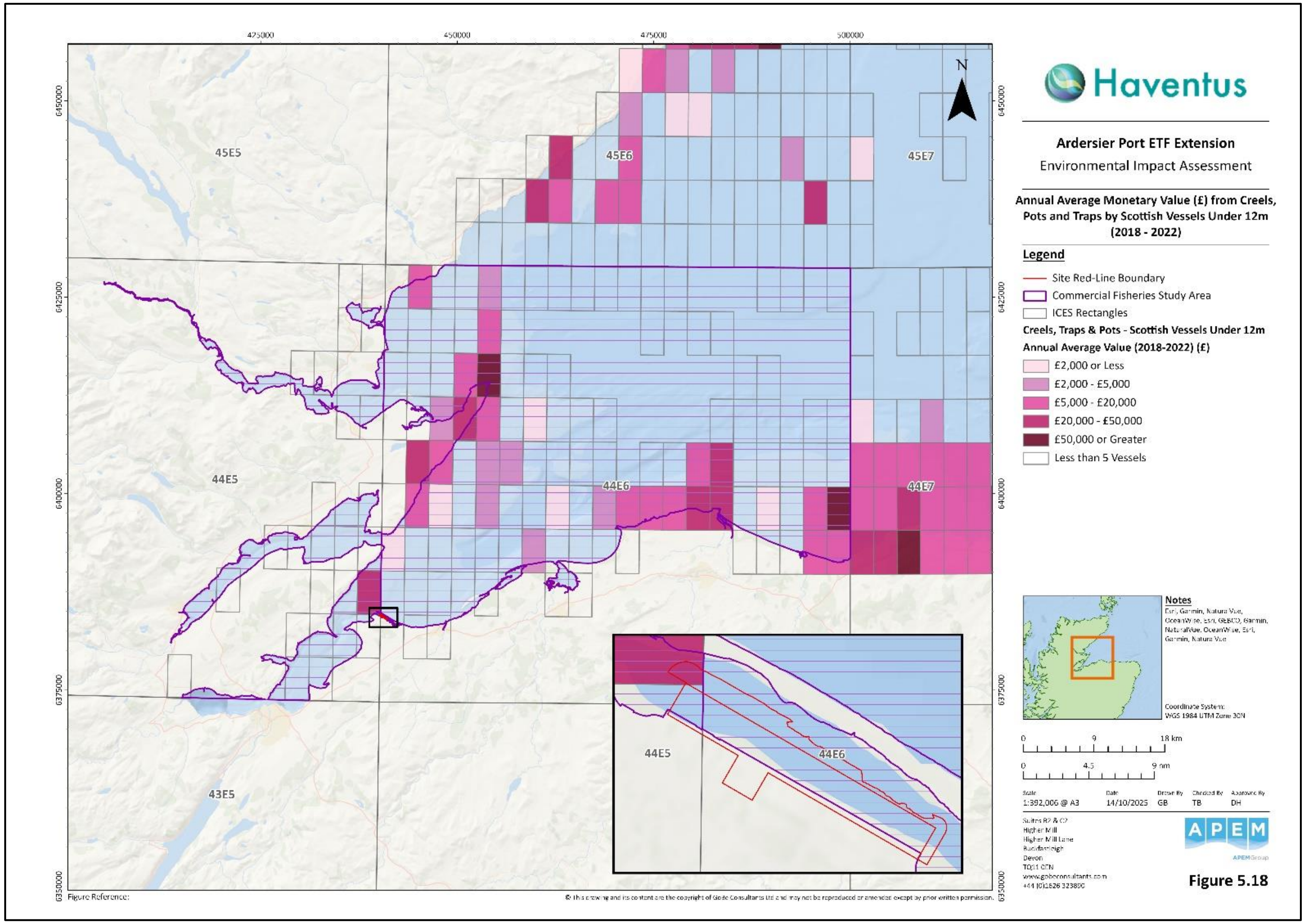

Figure 5.18: Average Annual Monetary Value (£) from Creels, Pots, and Traps by Scottish Vessels Under 12 m (2018–2022).

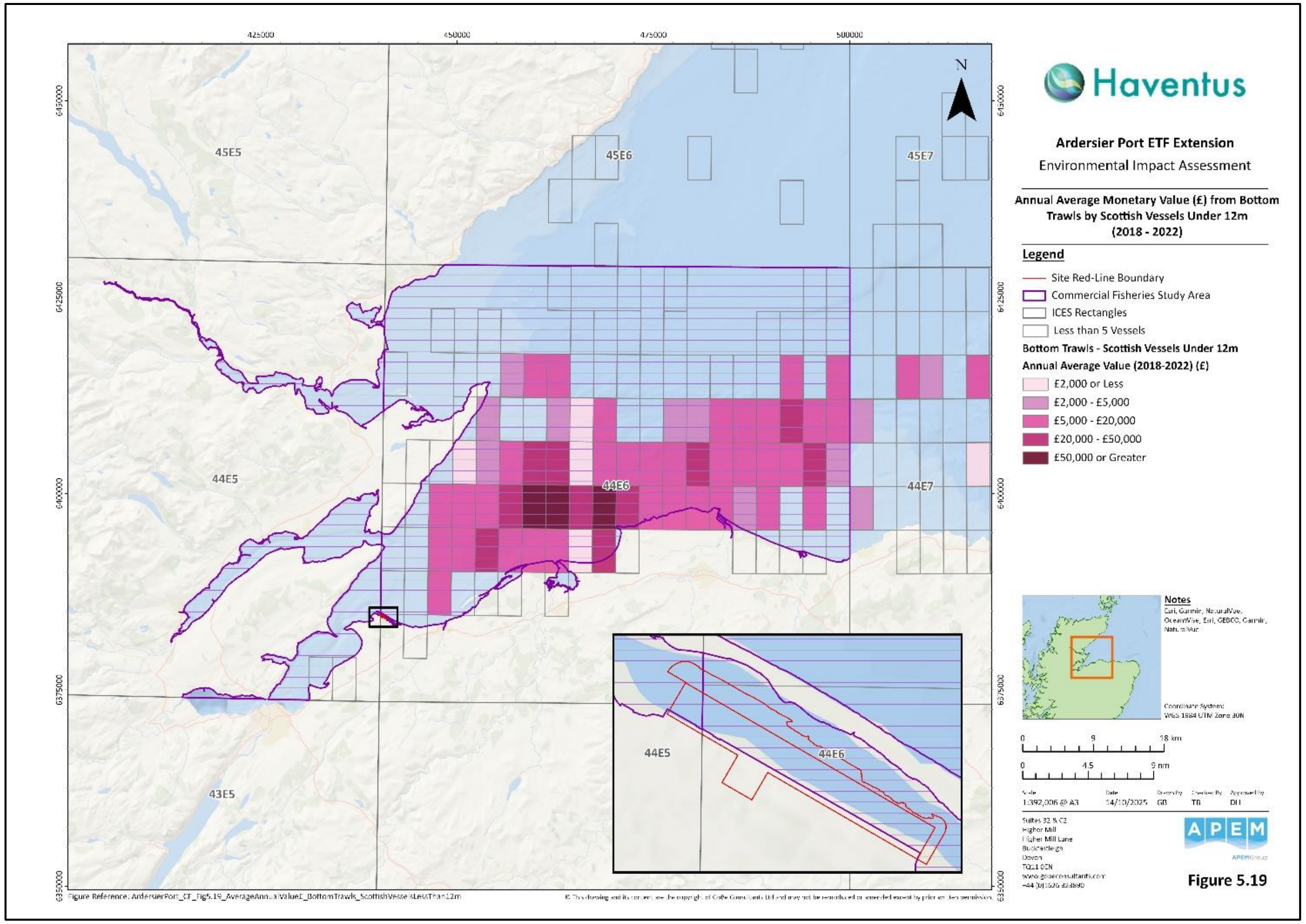

Figure 5.19: Average Annual Monetary Value (£) from Bottom Trawls by Scottish Vessels Under 12 m (2018–2022).

4.2.5 Access and Navigational Safety

The proposed port extension and associated dredging activities in the Moray Firth may disrupt established transit routes and gear deployment zones for commercial fishing vessels. Potential risks include restricted access to preferred fishing grounds, increased steaming distances, and heightened likelihood of gear conflict. Navigational safety considerations must account for vessel manoeuvrability, visibility of dredging infrastructure, and anchoring spread, particularly under adverse weather or low-light conditions. These factors are critical for ensuring safe and efficient operations within an already active marine environment.

EMSA fishing vessel density track data illustrates the movement patterns and concentration of fishing vessels across European waters over time. By aggregating satellite and AIS signals, it reveals hotspots of fishing activity and identifies frequently used routes. Fishing vessel route density data indicates low - medium levels of activity by fishing vessels (including both steaming and active fishing) in the vicinity of the proposed development, particularly within 6 nm.

4.2.6 Key Fleet Metiers

In summary, based on the data gathered to inform this baseline characterisation, the key fleet metiers operating across the inshore portion of the study area include (in no particular order):

- Local inshore Scottish creel fleet (vessels typically <15 m) targeting brown crab, lobster, velvet crab and whelk operating year-round;
- Local inshore Scottish otter trawl fleet (vessels typically <15 m) targeting *Nephrops* focused on muddy substrates with seasonal peaks in spring and autumn;
- Local inshore Scottish dredge fleet (vessels typically <15 m) targeting scallops operating year-round; and
- Local inshore Scottish demersal trawl fleet (vessels typically <15 m) targeting finfish and other demersal species operating year-round.

5. Assessment Methodology

The overall aim of this technical appendix is to assess the potential impacts arising from the proposed development, on key issues raised within the scoping opinion relating to commercial fisheries.

5.1 Guidance

The evaluation of potential impacts on commercial fisheries, specifically sensitivity, magnitude, and significance, falls outwith the scope of guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM), which addresses ecological receptors. Commercial fisheries are treated as socio-economic receptors, assessed through, empirical data, sector-specific policy guidance and professional judgement. This includes the Scottish Government's Good Practice Guidance for Assessing Fisheries Displacement by Other Licensed Marine Activities (2022), the Marine Policy Statement (HM Government, 2011), relevant Scottish Marine Plans, and advice from Marine Scotland and the Marine Management Organisation (MMO). Key considerations include spatial and temporal overlap with fishing activity, economic dependency and cumulative pressures. This methodology ensures a robust, transparent, and context-specific approach aligned with the commercial and socio-economic nature of fisheries within the marine environment.

In addition to the general approach and guidance outlined in Chapter 2: Methodology, the assessment of commercial fisheries receptors will also be informed by the following guidance documents where they are specific to this topic:

- Developing guidance on fisheries Cumulative Impact Assessment for wind farm developers (Blyth-Skyrme, 2010b);
- Options and opportunities for marine fisheries mitigation associated with wind farms (Blyth-Skyrme, 2010a);
- Fisheries Liaison with Offshore Wind and Wet Renewables group (FLOWW) Best Practice Guidance for Offshore Renewables Developments: Recommendations for Fisheries Liaison (FLOWW, 2014);
- Draft Guidance on preparing a Fisheries Management and Mitigation Strategy (Marine Scotland, 2020);
- Assessing fisheries displacement by other licensed marine activities: good practice guidance Marine Scotland Science (2022);
- Mapping fishing activities in the UK EEZ: a brief overview of data, methods, and tools. Report produced for The Crown (Mendo *et al*. 2023);
- Best Practice Guidance for Fishing Industry Financial and Economic Impact Assessments (Seafish, 2022);
- Centre for Environment Fisheries and Aquaculture Science (CEFAS), (2004). Offshore Windfarms: Guidance note for Environmental Impact Assessment in Respect of FEPA and CPA requirements; and
- Cumulative impact assessment guidelines, guiding principles for cumulative impacts assessments in offshore wind farms (Renewable UK, 2013).

5.2 Criteria for Assessment

The EIA technical appendix will follow the general approach outlined in Chapter 2: Methodology of this EIAR. Whilst this has informed the approach that has been used for commercial fisheries, the following section describes how this methodology will be applied, and adapted as appropriate, to address the specific needs of the commercial fisheries assessment.

The criteria for determining the significance of effects will be a two-stage process involving defining the magnitude of the impacts and the sensitivity of the receptors. The magnitude of potential impacts is defined by factors including the spatial extent of any interaction, and the likelihood, duration, frequency and reversibility of a potential impact. The sensitivity of commercial fisheries receptors is defined by both their potential vulnerability to an impact (the ability of the receptor to accommodate a temporary or permanent change) and their recoverability (the extent to which a receptor will recover following an impact). Where required, secondary mitigation measures above those embedded in the proposed development design as primary measures, will be proposed to avoid or minimise significant adverse effects.

5.2.1 Sensitivity

Sensitivity has been carefully considered in the assessment of effects, with receptor sensitivity to potential impacts clearly articulated within the narrative where relevant, including consideration of recoverability. The criteria for defining sensitivity in this chapter are outlined in Table 5Error! Reference source not found..

Table 5.3. Sensitivity criteria

Value	Criteria
High	Receptor is highly vulnerable to impacts that may arise from the project and recoverability is long term or not possible. **And/or**: No alternative fishing grounds are available.
Medium	Receptor is somewhat vulnerable to impacts that may arise from the project and has moderate levels of recoverability. **And/or**: Moderate levels of alternative fishing grounds are available and/or fishing fleet has moderate operational range.
Low	Receptor is not generally vulnerable to impacts that may arise from the project and/or has high recoverability. **And/or**: High levels of alternative fishing grounds are available and/or fishing fleet has large to extensive operational range; fishing fleet is adaptive and resilient to change.
Negligible	Receptor is not vulnerable to impacts that may arise from the project and/or has high recoverability.

Value	Criteria
	And/or: Extensive alternative fishing grounds available and/or fishing fleet is highly adaptive and resilient to change.

5.2.2 Magnitude

The magnitude of an impact is determined based on its extent, duration and frequency. Magnitude of impact has been assessed taking into account primary mitigation measures designed into the proposed development to avoid or minimise environmental effects. Where an impact could reasonably be assigned to more than one level of magnitude, professional judgement has been used to determine which level is applicable. The magnitude criteria for commercial fisheries receptors are defined in Table 5.

Table 5.4. Magnitude criteria

Magnitude	Criteria
High	Impact is of long-term duration (e.g., greater than 12 years duration) and/or is of extended physical extent. **And**: Impact is expected to result in one or more of the following: • Substantial loss of target fish or shellfish biological resource (e.g., loss of substantial proportion of resource within project Area); and • Substantial loss of ability to carry on fishing activities (e.g., substantial proportion of effort within project Area). Substantial loss of economic value of commercial landings, that are nationally or regionally significant.
Medium	Impact is of medium-term duration (e.g., less than 12 years) and/or is of moderate physical extent. **And**: Impact is expected to result in one or more of the following: • Partial loss of target fish or shellfish biological resource (e.g., moderate loss of resource within project Area); and • Partial loss of ability to carry on fishing activities (e.g., moderate reduction of fishing effort within project Area). Partial loss of economic value of commercial landings that is locally significant.
Low	Impact is of short-term duration (e.g., less than 2 years) and/or is of limited physical extent. The short-term duration is based on professional judgement and is not definitive dependant on the nature of the impact. **And**: Impact is expected to result in one or more of the following: • Minor loss of target fish or shellfish biological resource (e.g., minor loss of resource within project Area); and

Magnitude	Criteria
	• Minor loss of ability to carry on fishing activities (e.g., minor reduction of fishing effort within project Area). Minor loss of economic value of commercial landings that is not locally significant.
Negligible	Impact is expected to be undetectable compared to pre-project baseline conditions. Minimal loss of economic value of commercial landings.

5.2.3 Significance

Assessment of the significance of effect on commercial fisheries receptors has been determined by considering the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 5**.** In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached. The magnitude of the impact is correlated against the sensitivity of the receptor to provide a level of significance. On this basis, potential impacts are assessed as Negligible, Minor, Moderate or Major.

For the purposes of this assessment, any effects with a significance level of major and/or moderate have been deemed significant in EIA terms, while those of minor or negligible are deemed non-significant.

Table 5.5. Significance of effect matrix

Significance of Effect		**Sensitivity of Receptor**			
		Negligible	Low	Medium	High
Magnitude of Effect	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Negligible	Minor	**Moderate**
	Medium	Negligible	Minor	**Moderate**	**Major**
	High	Negligible	**Moderate**	**Major**	**Major**

5.3 Embedded Mitigation

As the design of the proposed development has evolved, a number of measures have been considered and proposed in relation to commercial fisheries to reduce the potential for impacts on environmental and socio-economic receptors. These measures are presented below in Table 5 and in the Mitigation Register and will likely further evolve over the development process as the EIA progresses and in response to stakeholder consultation.

Table 5.6. Embedded mitigation measures

Embedded Mitigation	Rationale
Advance warning and accurate location details of construction and operation and maintenance (O&M) operations and any associated Temporary Exclusion Zones will be disseminated to fishers via Notices to Mariners (NtMs) and Kingfisher Bulletins.	NtMs and Kingfisher Bulletins serve as essential communication tools, helping commercial fishers and vessel operators avoid hazardous areas, prevent gear loss, and coordinate movements around active worksites throughout the construction and operation and maintenance (O&M) phases.
Development of and adherence to a Navigational Safety Plan (NSP)	A NSP is vital during capital dredging within port limits to safeguard all sea users. It sets out measures including Safety Zones, accurate charting, construction buoyage, and temporary lighting of assets (if applicable). The NSP also ensures mariners are kept informed through NtMs, helping prevent navigational hazards and maintain safe passage throughout the works.
Development of and adherence to a Construction Environmental Management Plan (CEMP), which will set out how environmental impacts will be controlled and mitigated during the construction phase of the project.	The development and implementation of a CEMP ensures that environmental risks are proactively identified and mitigated throughout the construction phase of a project. By detailing procedures for pollution control, waste management, noise reduction, and ecological protection, the CEMP promotes regulatory compliance, safeguards sensitive habitats, and supports responsible construction practices that minimise disruption to surrounding environments and communities. The CEMP will also set out commitments to environmental monitoring in pre-, during and post-construction phases of the project.
Dropped objects reporting procedure	Any objects accidentally dropped on the seabed will be promptly reported and assessed for potential hazards to other marine users. Where recovery is feasible and the object poses a risk, such as obstruction to navigation or interference with fishing gear, appropriate retrieval measures will be undertaken. This commitment supports safe marine operations, protects commercial fisheries, and aligns with best practice in environmental stewardship.
Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the project and fishing activities (e.g., FLOWW, 2014; 2015).	These standards provide a framework for effective communication, conflict resolution, and incident response in the event of interactions between construction activities and fishing activities. By following established procedures, the project ensures transparency, promotes mutual understanding, and upholds industry-recognised protocols that safeguard both operational integrity and the interests of the fishing community.

5.4 Assumptions and Limitations

- Limitations of fisheries statistics data include the spatial size of ICES rectangles, which can misrepresent actual activity across the proposed development and any associated sediment plume, therefore care is required when interpreting these data;
- All commercial landings by UK-registered vessels are subject to the Register of Buyers and Sellers (RBS) legislation, meaning landings from vessels of all lengths are recorded in the MMO's iFish database. While vessels under 10 m are not legally required to declare catches, registered buyers must submit sales notes for all first-sale fish and shellfish. These notes include vessel details (name, port letters, and number), and for the under 10 m sector, coastal staff supplement missing data such as gear type and fishing area using local knowledge, inspections, surveillance, and discussions with vessel operators;
- VMS data from the MMO only covers vessels ≥15 m, so inshore activity by smaller vessels (<15 m) is often underrepresented. Apparent gaps in inshore fishing on VMS maps may reflect this limitation rather than actual absence of activity. To address this, fisheries statistics and ScotMap spatial data have been analysed to help capture data from smaller inshore vessels;
- Fishing vessel route density data from the EMSA is based on AIS data, representing activity for vessels with AIS (≥15 m in length). A limitation of AIS data is that it does not distinguish between steaming and actively fishing; nevertheless, it provides corroboration for key fishing grounds and insight into transit routes to alternative fishing grounds;
- The ScotMap data accessed via the NMPi portal reflects spatial fishing activity reported by operators of vessels < 15 m, based on interviews conducted between 2011 and 2013. As such, the dataset is over a decade old and may not accurately represent current fishing patterns, fleet composition or regulatory context. It excludes vessels over 15 metres and relies on self-reported information, which may introduce spatial or effort-related bias;
- No dredge plume modelling has been undertaken in relation to potential impacts on commercial fisheries. As such, any assessment of effects on sensitive receptors is based on qualitative analysis and available baseline information, without predictive modelling of sediment dispersion or turbidity; and
- Limited engagement has been undertaken with the local fishing industry during the data collection and consultation phases. While available datasets and secondary sources provide valuable insights into commercial fishing activity, they may not fully capture the nuanced spatial and seasonal patterns, gear-specific practices or socio-economic dependencies unique to local fleets. This lack of direct input could result in

an incomplete representation of fishing effort and stakeholder concerns, potentially affecting the accuracy and relevance of impact predictions.

Data limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources. As such, the limitations identified are not considered to significantly affect the certainty, or reliability, of the impact assessments presented in Section 7.

5.5 Impacts Scoped In / Scoped Out

The following section presents the EIA scoping table, outlining key project parameters and potential impacts considered during the scoping process. The key project parameters detailed in Table 5.7 represent worst-case assumptions to ensure a conservative and robust evaluation. This approach allows for a comprehensive assessment of potential risks and impacts, providing confidence that actual outcomes are likely to be more favourable than those presented.

Table 5.7. Scoping assessment for commercial fisheries.

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
Construction			
Reduction in access to, or exclusion from, established fishing grounds.	**<u>Capital dredging of main harbour area</u>** • Dredging of the inner harbour, using a CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 m below Chart Datum (mCD), with a small section in the east of the harbour to approximately - 6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • Removal of 200-500 m^3 of sand.	Scoped In	Dredging operations within port limits may temporarily exclude fishers, particularly those using static gear from traditional grounds near the port approach, breakwaters, or mooring zones due to safety exclusion areas and active dredge footprint. While dredging is confined to the port, safety zones, vessel movements, or sediment plumes may extend beyond the port limits, temporarily restricting access to nearby fishing grounds outwith the limits.

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
	Disposal of capital dredge material at Burghead • Vessels transiting between the harbour and the disposal site.		
Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds.	**Capital dredging of main harbour area** • Dredging of the inner harbour, using a CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 m below Chart Datum (mCD), with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **Potential dredging operations to the west of 'Tern Island'** • Removal of 200-500 m^3 of sand. **Disposal of capital dredge material at Burghead** Vessels transiting between the harbour and the disposal site.	Scoped In	Fishers displaced from areas near the port entrance due to dredging related disturbance may relocate gear to nearby inshore areas, concentrating effort further afield, increasing competition and the risk of gear entanglement or gear conflict in neighbouring fishing grounds.
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity.	**Installation of new quay wall and integration pocket** • All excavations and installation works will be carried out through the existing platform without any exposure to the marine environment.	Scoped In	Noise, turbidity, and sediment resuspension and dispersion from dredging may disrupt feeding, spawning, or sheltering behaviour of commercial fisheries target species, reducing catch rates and prompting temporary relocation of fishing effort.

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
	• Piling of the quay wall - Vibropiling or conventional sheet piling of the quay wall within the marine environment, followed by infilling behind this to level off the platform. **Removal of old sheet piles** • Excavation of sheet piles to at least below Mean High Water Springs (MHWS). • Removal of sheet piles using a vibratory piling rig and lay on platform. **Installation of mooring dolphins** • Installation of piles through combination of vibropiling and impact piling. • Installation is expected to take place over approximately 19 days with piling occurring for 12 days during that period. **Capital dredging of main harbour area** • Dredging of the inner harbour, using a CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 m below Chart Datum (mCD), with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel.		

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
	• Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **<u>Potential dredging operations to the west of 'Tern Island'</u>** Removal of 200-500 m^3 of sand.		
Increased vessel traffic associated with the project within fishing grounds leading to interference with fishing activity.	**<u>Capital dredging of main harbour area</u>** • Dredging of the inner harbour, using a CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 m below Chart Datum (mCD), with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • Removal of 200-500 m^3 of sand. **<u>Disposal of capital dredge material at Burghead</u>** Vessels transiting between the harbour and the disposal site.	Scoped In	Dredgers, barges, and support vessels transiting between the port and offshore disposal sites may pass through active fishing grounds, interfering with gear deployment, hauling, or safe navigation.
Additional steaming to alternative fishing grounds	**<u>Capital dredging of main harbour area</u>** • Dredging of the inner harbour, using a CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance.	Scoped In	Fishers who typically operate close to the port entrance may need to travel further to avoid construction related disturbance, increasing fuel costs, reducing fishing time and impacting operational efficiency.

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
	• Dredging to approximately 12.4 m below Chart Datum (mCD), with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **Potential dredging operations to the west of 'Tern Island'** • Removal of 200-500 m^3 of sand. **Disposal of capital dredge material at Burghead** Vessels transiting between the harbour and the disposal site.		
Temporary increases in SSC and sediment deposition from dredge spoil leading to disruption of fishing activity through smothering of target species and reduced catch rates.	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Potential impacts on commercial fisheries receptors from capital dredge spoil disposal have been scoped out of detailed assessment. Deposition is proposed at established, licensed marine disposal sites where operations are tightly regulated and environmentally modelled to avoid significant disruption to sensitive receptors.
Operations and Maintenance (O&M)			
Long-term exclusion from established fishing grounds.	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Long-term exclusion from established fishing grounds as a result of O&M activities has been scoped out of the assessment due to O&M related activities for Phase 2 having already been consented in 2019 during phase 1.

Impact Pathway	Key Project Parameters	Scoped In / Out	Justification
Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds.		Scoped Out	Displacement of fishing effort as a result of O&M activities has been scoped out of the assessment due to O&M related activities for Phase 2 having already been consented in 2019 during phase 1.
Interference with fishing activity from maintenance vessel traffic.		Scoped Out	Interference with fishing activity from maintenance vessel traffic has been scoped out of the assessment due to O&M related activities for Phase 2 having already been consented in 2019 during phase 1.
Alteration of fish and shellfish behaviour influencing species distribution, catch rates, or seasonal abundance patterns.		Scoped Out	Alteration of fish and shellfish behaviour influencing species distribution, catch rates, or seasonal abundance patterns has been scoped out of the assessment due to O&M related activities for Phase 2 having already been consented in 2019 during phase 1.
Reduced fishing efficiency and increased costs.		Scoped Out	Reduced fishing efficiency and increased costs as a result of O&M activities have been scoped out of the assessment due to O&M related activities for Phase 2 having already been consented in 2019 during phase 1.
Increased SSC and deposition from maintenance dredging.		Scoped Out	Maintenance dredging was considered within the 2018 EIA, and a separate application has been submitted to the Marine Directorate for a maintenance dredge licence for the main port approach.

6. Assessment

6.1.1 Construction

6.1.1.1 Reduction in access to, or exclusion from, established fishing grounds

VMS data (MMO, 2023a), ScotMap spatial data (ScotMap, 2025), fisheries landings statistics, and informal consultation with local fisheries stakeholders indicate that the area surrounding the port approach channel supports low to moderate levels of commercial fishing activity, as described in Section 4.2. Fishing activity outside the port limits is predominantly undertaken by inshore vessels deploying static gear, such as pots and creels, targeting whelk, brown crab, lobster, velvet crab, and *Nephrops*. To a lesser extent, demersal trawls are used to target *Nephrops*, squid, and other demersal species.

ScotMap data indicates very low levels of effort by small-scale or opportunistic inshore vessels deploying pots and creels within the port limits. However, through existing Harbour Powers a byelaw is being implemented that will prohibit fishing within the Statutory Harbour Area. Fishing activity in the region is therefore concentrated in adjacent coastal waters rather than within the operational port itself (Scottish Government, 2014; 2025). As a result, direct impacts from reduction in access to, or exclusion from, established fishing grounds within the proposed development footprint as a result of construction phase activities have not been considered further in this assessment.

Capital dredging activities are proposed within the port limits, spanning a corridor of approximately 800 m inshore from the seaward extent of the port boundary to 1,800 m toward the port facilities, to deepen the port basin and approach channel for larger vessel access. Sediment plumes generated during dredging may reduce visibility and create operational challenges for fishing gear deployment, indirectly discouraging fishing activity in adjacent areas. While spoil disposal is anticipated to occur at the licensed Burghead disposal site, located approximately 32 km from the proposed development, the combined effect of dredging and disposal operations may result in short-term displacement of fishing effort and reduced access to productive grounds within the vicinity of the port.

Magnitude of Impact

The dredging will deepen the harbour to 12.4 m below Chart Datum (CD), with an area in the east of the harbour dredged at between 3 and 6 metres m CD. These works will result in the removal of approximately 2,000,000 m^3 of sediment, which will be disposed of approximately 2 km offshore, near Burghead. The dredging is proposed to take place between March and November in either 2027, 2028, or 2029, with an approximate duration of 12 weeks. Given the location of the planned dredging works 800 m inside the port limits, and the prohibition of fishing activity within this area, temporary exclusion zones in relation to works undertaken by cutter suction dredgers (CSD) and/or trailer suction hopper dredgers (TSHD) outwith the port limits are not currently anticipated being required. NtMs will be issued to inform vessels of transit routes between the port and the Burghead disposal site, ensuring timely communication and helping to minimise navigational conflicts with other marine users, including fishing vessels. As such, the magnitude of potential exclusion-related impacts on commercial fisheries is considered **low**, given the limited spatial extent of the works, existing restrictions within the port, and the transient nature of vessel movements along the disposal route.

In the absence of sediment plume modelling, a tidal excursion distance of approximately 1.1 km near Riff Bank has been used as a proxy to estimate sediment transport from dredging activities. Given the coarse nature of the seabed, predominantly comprising sand and gravel with minimal silt, and the semi-diurnal tidal flows of the Moray Firth, sediment plumes are expected to be short-lived and largely contained within the port. As a result, any indirect spatial exclusion for inshore vessels using creels, trawls, or dredges is anticipated to be localised and temporary, with **low** overall magnitude.

Sensitivity of Receptor

The affected commercial fisheries receptors are locally important and may experience temporary disruption due to reduced access to, or exclusion from, established fishing grounds during dredging and disposal activities. However, given that the planned dredging works are located within the port limits where fishing is prohibited and any additional spatial restrictions are expected to be limited in extent and duration, vessel operators are likely to adapt with minimal impact. Furthermore, advance notice of works and the transient nature of vessel movements along the disposal route support the conclusion that affected commercial fisheries receptors have a **medium** sensitivity to this impact pathway.

Significance of Effect

The duration of dredging operations, and therefore associated sediment deposition, is expected to be short-term (approximately 12 weeks) and confined to the construction phase. Given the location of the planned dredging works 800 m inside the port limits where fishing activity is already prohibited and the limited spatial extent of potential exclusion, additional restrictions for vessels operating outside the port are not currently anticipated. Considering the medium sensitivity and adaptability of affected commercial fisheries, particularly inshore vessels capable of adjusting to temporary spatial restrictions, the potential impact from reduction in access to established fishing grounds is assessed as **minor adverse** and **not significant** in EIA terms.

Secondary Mitigation and Residual Effect

Embedded mitigation measures, including advance notification of dredging activities and disposal vessel transit routes via NtMs, are expected to reduce disruption to inshore fisheries operators. No further mitigation is considered necessary, as the likely effect in the absence of additional measures, beyond the embedded mitigation measures outlined in Error! Reference source not found., is not significant in EIA terms. The residual effect is therefore assessed as **minor adverse**.

6.1.1.2 Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds

The surrounding coastal waters of the Firth support a mix of fleet segments operating across overlapping grounds, particularly during seasonal peaks targeting whelk, brown crab, lobster, velvet crab, *Nephrops*, squid and other demersal species. Whilst the capital dredge footprint within the port limits is not a core fishing area, adjacent grounds are routinely used by multiple operators, often with differing gear types and operational fishing patterns, therefore the potential for spatial overlap and gear interaction is heightened in nearshore environments where fishing effort is concentrated and access to preferred grounds is constrained by physical, regulatory or operational limits. ScotMap data indicates very low levels of effort by small-scale or opportunistic inshore vessels deploying pots and creels within the harbour limits, however, through existing Harbour Powers a byelaw is being implemented that will prohibit fishing within the Statutory Harbour Area, therefore direct impacts from displacement have not been considered further in this assessment.

Magnitude of Impact

As discussed above, capital dredging is proposed within the port limits to deepen the basin and approach channel, spanning a corridor from 800 m offshore to 1,800 m inland, enabling access for larger vessels. Approximately 2,000,000 m³ of sediment will be removed and disposed of at a licensed site near Burghead, approximately 32 km from the proposed development. Works are scheduled between March and November in 2027, 2028, or 2029, lasting approximately 12 weeks, using cutter suction and trailer suction hopper dredgers, both of which are known to generate sediment plumes. These sediment plumes have the potential to displace fishing activity directly outside the port limits, resulting in short-term disruption to established patterns of activity, including gear deployment, retrieval, and seasonal targeting strategies. Temporary displacement from areas directly adjacent to the port boundary may result in the relocation of small-scale inshore vessels deploying pots and creels and demersal trawls into adjacent fishing grounds. This redistribution of effort has the potential to increase competition for space, particularly where static and mobile gear types co-exist outside the port boundary. Displaced vessels may be forced to operate in unfamiliar or less optimal grounds, increasing the risk of gear conflict, entanglement, or loss. Additionally, concentrated effort in neighbouring areas may elevate fishing pressure on target stocks, potentially affecting catch rates and economic returns.

In the absence of plume modelling, tidal excursion distances of up to 1.1 km have been used to estimate sediment transport, though most material is expected to settle within the port due to coarse seabed composition (predominantly sand and gravel, with only 2% silt). Tidal dynamics in the Moray Firth, driven by semi-diurnal cycles and coastal hydrodynamics, support efficient dispersion and rapid settling of suspended sediments. As a result, sediment plumes are anticipated to be short-lived and spatially confined. These results support the conclusion that while short-term turbidity increases are expected, the environmental footprint of the plume is spatially limited and temporally brief. Displacement is expected to be short-term and temporary in nature, occurring only during the active capital dredging phase (approximately 12 weeks). Therefore, the magnitude of displacement is considered **low**.

Sensitivity of Receptor

Static gear operators are particularly vulnerable to gear conflict when displaced into areas used by mobile gear fleets. The risk of entanglement or gear loss may increase when vessels operate in unfamiliar or suboptimal grounds. Additionally, concentrated fishing effort in neighbouring areas may elevate pressure on target stocks, potentially affecting catch rates and economic viability. However, local fleets are generally adaptable and have experience navigating temporary spatial constraints. This operational flexibility, combined with the short-term nature of the displacement, supports a conclusion of **medium** sensitivity for the affected commercial fisheries receptors.

Significance of Effect

Due to the limited spatial extent of dredging, short duration of works, rapid dispersion of sediment plumes, and the coarse nature of seabed material, any disruption to commercial fisheries is expected to be temporary and localised. The overall impact on commercial fisheries is assessed as **minor adverse** and **not significant** in EIA terms.

Secondary Mitigation and Residual Effect

Embedded mitigation measures aim to minimise disruption to fishing activity. These include advance notification of dredging operations and disposal vessel transit routes through issue of NtMs, . Such measures are expected to reduce the likelihood of gear interaction, facilitate operational planning, and support safe navigation and compliance. No further mitigation is considered necessary, as the likely effect in the absence of additional measures beyond the embedded measures outlined in **Error! Reference source not found.**, is not significant in EIA terms. The residual effect is therefore assessed as **minor adverse**.

6.1.1.3 Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity

The coastal waters surrounding the port approach channel support a broad range of commercially targeted shellfish and finfish species. These species are targeted by inshore vessels with seasonal peaks in effort aligned to biological cycles and market demand (MMO, 2023a). Benthic habitats in the area provide foraging and sheltering grounds, and while no designated spawning or nursery areas are located within the dredge footprint, adjacent habitats may support sensitive life stages (CNE-Siar, 2025). Species-specific responses to disturbance vary, but many shellfish are known to be sensitive to changes in turbidity, sedimentation, and underwater noise, particularly during moulting or reproductive periods (Jennings and Kaiser, 1998; Boyd *et al*., 2003). Disruption to these environmental conditions may influence species distribution, behaviour, and catchability, with implications for fishing activity and economic viability.

Between April and September, the inshore waters of the Moray Firth support several key seasonal fisheries. Brown crab and lobster are actively targeted during this period, with increased catchability linked to warmer water temperatures and seasonal moulting and mating behaviours (CNE-Siar, 2025). Whelk fishing also intensifies in spring and early summer, as favourable substrate conditions and water clarity improve catch rates (MMO, 2023a). The proposed capital dredging window March to November inclusive, for an approximate duration of 12 weeks overlaps directly with these seasonal fisheries, increasing the potential for disruption to active fishing operations and catch availability. These seasonal patterns are important for local fleet planning and should be considered when scheduling construction activities to minimise adverse effects. The proposed installation of a new quay wall and integration pocket involves vibropiling or conventional sheet piling within the marine environment, removal of existing sheet piles, and installation of mooring dolphins. While all excavations and installation works will be conducted from the existing platform without direct exposure to the marine environment, piling will be undertaken within the marine environment. The works are expected to span approximately 19 days, with active piling occurring over 12 days during this period. These activities have the potential to temporarily disturb commercially important fish and shellfish resources and disrupt local fishing operations.

Magnitude of Impact

As discussed above, capital dredging is proposed within the port limits to deepen the basin and approach channel, spanning a corridor from 800 m offshore to 1,800 m inland, enabling access for larger vessels. Approximately 2,000,000 m^3 of sediment will be removed and disposed of at a licensed site near Burghead, approximately 32 km from the proposed development. Works are scheduled between March and November in 2027, 2028, or 2029, lasting approximately 12 weeks, using CSD's and TSHD's, both of which are known to generate sediment plumes. Capital dredging activities have the potential to disturb benthic habitats through the generation of sediment plumes that affect water clarity and substrate composition. These changes can alter the availability of foraging grounds, reduce visibility for predator-prey interactions, and trigger avoidance behaviour in target species. Consequently, this may lead to short-term displacement of stocks from traditional fishing grounds, reducing catch rates and driving relocation of effort.

In the absence of plume modelling, tidal excursion distances of up to 1.1 km have been used to estimate sediment transport, though most material is expected to settle within the port due to coarse seabed composition (predominantly sand and gravel, with only 2% silt). Tidal dynamics in the Moray Firth, driven by semi-diurnal cycles and coastal hydrodynamics, support efficient dispersion and rapid settling of suspended sediments. As a result, sediment plumes are anticipated to be short-lived, spatially confined and rapidly dispersed by tidal flushing. Underwater noise and vibration generated by vibropiling undertaken within the confines of the harbour may cause temporary displacement of fish and shellfish species from the immediate vicinity of the works. Species sensitive to acoustic disturbance, such as herring, cod, and crustaceans, may exhibit avoidance behaviour, potentially leading to short-term disruption of local fisheries. Removal of old sheet piles using vibratory rigs may also contribute to cumulative noise exposure, although these impacts are expected to be localised and short term in nature.

Excavation of sheet piles below Mean High Water Springs (MHWS) may result in minor sediment resuspension, which could affect benthic habitats and filter-feeding organisms, however, the spatial extent and duration of these activities are limited, and significant impacts on shellfish beds or nursery grounds are considered unlikely. The magnitude of biological disturbance to commercially important species resulting in displacement or disruption to inshore fisheries is considered **low**.

Sensitivity of Receptor

Mobile shellfish species, including those commercially targeted in the area, are generally tolerant of short-term increases in suspended sediment. These species inhabit dynamic coastal environments where turbidity levels naturally fluctuate and possess behavioural and physiological adaptations that allow them to withstand episodic sedimentation (Roberts *et al*., 2010; Boyd *et al*., 2021). While elevated sediment may temporarily affect foraging or burrow ventilation for *Nephrops*, these effects are reversible, and individuals typically return to affected grounds once conditions stabilise (Royal HaskoningDHV, 2024). The mobility of crustaceans and gastropods also enables them to avoid areas of peak turbidity, reducing the likelihood of long-term displacement or population-level impacts (JNCC, 2011). The marine environment adjacent to the works supports a range of commercially important fish and shellfish species, some of which may be sensitive to acoustic disturbance. Local fisheries, particularly small-scale and inshore operators, may be vulnerable to temporary displacement due to restricted access or changes in fish behaviour. However, the resilience of these receptors is considered moderate to high, given the short duration of disturbance and the availability of alternative fishing grounds nearby.

Nevertheless, the sensitivity of fisheries to biological disturbance is considered **medium**, as catch rates and economic returns are closely tied to species availability and behaviour. Given the short duration of disturbance and the availability of alternative fishing grounds nearby, local fleets are generally adaptable and capable of responding to short-term changes in stock distribution.

Significance of Effect

Considering the short-term and temporary nature of biological disturbance associated with the activities described above, the resilience of commercially targeted species to transient, short-lived episodic disturbance, and the moderate sensitivity of affected fisheries to temporary changes in stock behaviour and availability, the potential impact on commercial fisheries from disturbance of target species leading to displacement or disruption of fishing activity is assessed as **minor adverse** and **not significant** in EIA terms.

Secondary Mitigation and Residual Effect

Embedded mitigation measures, including appropriate and timely communication with fisheries stakeholders, are expected to reduce disruption and support operational planning. These measures will help ensure that local fleets are informed of dredging schedules and can adjust their activities accordingly. No further mitigation is considered necessary, as the likely effect in the absence of additional measures beyond the embedded commitments outlined in **Error! Reference source not found.** is not significant in EIA terms. The residual effect is therefore assessed as **minor adverse**.

6.1.1.4 Increased vessel traffic within fishing grounds leading to interference with fishing activity

This section assesses the potential impact of increased vessel traffic on commercial fisheries during Phase 2 of the proposed development, specifically in relation to capital dredging and spoil disposal operations. While dredging activities are confined to the port limits, vessel movements will extend beyond the immediate footprint to include transits to Burghead marine disposal site. These transits may intersect with areas used by inshore fishing vessels, particularly those deploying static gear.

Magnitude of Impact

Phase 2 of the proposed development will result in a temporary increase in vessel traffic associated with capital dredging and support operations. Dredging will be confined to the port limits, with vessel movements concentrated along a corridor extending approximately 800 m seaward from the port boundary and 1,800 m inland toward the quay. However, vessel traffic will also increase between the port and Burghead marine disposal site, where dredge spoil will be transported and deposited.

Although the disposal site is located away from sensitive fishing grounds, transits between the dredge site and disposal ground may intersect with areas used by inshore fishing vessels, particularly those deploying static gear. This could result in short-term interference with gear placement or vessel manoeuvrability during peak disposal operations. Given the temporary and intermittent nature of vessel transits between the two locations, the magnitude of interference is considered **low**.

Sensitivity of Receptor

Inshore fishing vessels operating in the vicinity of the port are considered to have **low** sensitivity to temporary increases in vessel traffic associated with capital dredging and spoil disposal. These vessels are typically small, mobile, and capable of adjusting gear placement or transit routes in response to short-term spatial restrictions. Operators are familiar with dynamic coastal conditions and routinely adapt to seasonal changes, marine works, and other maritime activities. Their operational flexibility reduces the likelihood of significant disruption.

Significance of Effect

With appropriate advance notice and embedded mitigation measures in place, such as NtMs , disruption to fishing operations is expected to be minimal and manageable. The potential impact from increased vessel traffic within fishing grounds is therefore assessed as **minor adverse** and **not significant** in EIA terms.

Secondary Mitigation and Residual Effect

Embedded mitigation measures including timely communication with vessel operators through NtMs, is expected to reduce the likelihood of gear interaction and support safe coexistence of port operations and fishing activity. No further mitigation is considered necessary, as the likely effect in the absence of additional measures beyond the embedded measures outlined in **Error! Reference source not found.**, is not significant in EIA terms. The residual effect is therefore assessed as **minor adverse**.

6.1.1.5 Additional Steaming to Alternative Fishing Grounds

This section evaluates the potential impact of temporary spatial restrictions and additional steaming requirements for inshore fishing vessels during Phase 2 of the proposed development. Capital dredging and associated marine operations within the statutory harbour limits may displace fishing activity adjacent to the port, leading to changes in operational patterns, increased transit times, and economic implications for local fleets.

Magnitude of Impact

Phase 2 of the proposed development will result in direct temporary spatial restrictions within the statutory port limits due to capital dredging and associated marine operations. ScotMap data indicates very low levels of effort by small-scale inshore vessels deploying pots and creels within the harbour limits. However, through existing Harbour Powers a byelaw is being implemented that will prohibit fishing within the Statutory Harbour Area. Fishing activity in the region is concentrated in adjacent coastal waters rather than within the operational harbour itself (Scottish Government, 2014; 2025). Therefore, direct impacts resulting from additional steaming to alternative fishing grounds for vessels that would otherwise fish within the proposed development footprint have not been considered further in this assessment.

Vessels operating adjacent to the port limits may be required to temporarily relocate to alternative fishing grounds during the construction phase. This may result in short-term additional steaming, particularly for vessels targeting grounds near the approach channel or along the transit corridor to the licensed offshore marine disposal site. Capital dredging activities will generate sediment plumes that could displace fishing activity directly outside the port limits, resulting in short-term disruption to established patterns of activity.

Additional steaming time resulting from temporary displacement can lead to increased fuel consumption, operational costs, and reduced fishing efficiency for affected vessels. Longer transit distances to alternative grounds may shorten the effective fishing window within a given tide or day, particularly for small inshore vessels with limited endurance and crew capacity. This can impact catch volumes and profitability, especially for fisheries targeting species with time-sensitive landing requirements such as *Nephrops*. While most inshore vessels are operationally flexible and capable of adapting to short-term spatial changes, cumulative effects of extended steaming are more problematic, particularly if sustained over longer periods, contributing to economic strain, increased wear on gear and engines, and logistical challenges in maintaining regular fishing schedules.

As discussed above, capital dredging is proposed within the port limits to deepen the basin and approach channel, spanning a corridor from 800 m offshore to 1,800 m inland, enabling access for larger vessels. Approximately 2,000,000 m³ of sediment will be removed and disposed of at a licensed site near Burghead, approximately 32 km from the proposed development. Works are scheduled between March and November in 2027, 2028, or 2029, lasting approximately 12 weeks, using cutter suction and trailer suction hopper dredgers, both of which are known to generate sediment plumes. In the absence of plume modelling, tidal excursion distances of up to 1.1 km have been used to estimate sediment transport, though most material is expected to settle within the port due to coarse seabed composition (predominantly sand and gravel, with only 2% silt). Tidal dynamics in the Moray Firth, driven by semi-diurnal cycles and coastal hydrodynamics, support efficient dispersion and rapid settling of suspended sediments. As a result, sediment plumes are anticipated to be short-lived, spatially confined and rapidly dispersed by tidal flushing. Given the short-term nature of displacement and the operational flexibility of local fleets, the magnitude of impact associated with additional steaming to alternative fishing grounds is considered to be **low**.

Sensitivity of Receptor

Inshore fishing vessels operating in the vicinity of the port are considered to have **low** sensitivity to temporary increases in steaming distance associated with capital dredging and spoil disposal. These vessels are typically small, mobile, and capable of adjusting gear placement or transit routes in response to short-term spatial restrictions. Operators are familiar with dynamic coastal conditions and routinely adapt to seasonal changes, marine works, and other maritime activities. While cumulative effects of extended steaming may present operational challenges, the short-term nature of the displacement and the absence of critical fishing grounds within the harbour limits reduce overall sensitivity.

Significance of Effect

With appropriate advance notice and embedded mitigation measures in place disruption to fishing operations is expected to be minimal and manageable. The potential impact from additional steaming to alternative fishing grounds is therefore assessed as **minor adverse** and **not significant** in EIA terms.

Secondary Mitigation and Residual Effect

Embedded mitigation measures, including timely communication with vessel operators through NtMs, are expected to reduce the likelihood of operational disruption and support safe coexistence of port operations and fishing activity. No further mitigation is considered necessary, as the likely effect in the absence of additional measures, beyond the embedded measures outlined in **Error! Reference source not found.**, is not significant in EIA terms. The residual effect is therefore assessed as **minor adverse**.

6.1.2 Operation and Maintenance

No impacts have been scoped in for commercial fisheries receptors during the operation and maintenance phase of the Proposed Development, as described in Table 5.7.

7. Cumulative Assessment

Impacts from the proposed development alone are generally spatially restricted to the inner port area, however, certain impacts have the potential to be observed over a wider area in the inner Moray Firth. These cumulative effects are the effects of the Ardersier ETF Expansion, combined with the effects from other projects, on the same receptor or group of receptors. Chapter 14: Cumulative Effects details how potential cumulative effects will be assessed for the Ardersier ETF Expansion through a Cumulative Effects Assessment (CEA).

A CEA screening process has identified the relevant other plans, projects, and activities which are to be included in the assessment. Those plans/projects relevant to the CEA for commercial fisheries receptors are indicated in Table 55.8. For each of these relevant plans/projects, the most up-to-date publicly available project parameters have been used to inform the CEA. These plans or projects may present different levels of potential cumulative effect when combined with the proposed development, informed by other plan/project’s readiness and likelihood for actual operation.

This CEA for commercial fisheries has considered the worst-case design scenario for each of the proposed development plans and activities. For potential effects on commercial fisheries receptors, planned projects were screened into the assessment based on a 15 km zone of influence (ZoI) for the CEA. This distance reflects the spatial extent over which key project-related stressors have the potential to contribute to spatial compression, increased vessel traffic, and long-term exclusion zones, resulting in a reduction of available fishing grounds and intensified displacement effects. Given the spatial nature of commercial fishing activity and breadth of the commercial fisheries study area, determination of an appropriate ZoI is subject to professional judgement, however evidence from similar development assessments indicates that ZoIs for commercial fisheries impacts typically range between 10 and 30 km, depending on project design parameters, receptor sensitivity and hydrodynamic conditions. The adopted 15 km ZoI is therefore considered precautionary yet proportionate for a project of this scale, capturing both direct and indirect pathways of impact while aligning with best practice in cumulative effects methodology and ensuring interactions with other marine activities and developments in the vicinity are appropriately considered. Each project, plan or activity within the screening range has been considered and screened in or out based on effect–receptor pathway, data confidence and the temporal and spatial scales involved. Projects were therefore screened out, if they had the following:

- No temporal overlap with the proposed works at the Ardersier Port;
- No physical effect-receptor overlap; and
- No effect-receptor pathway.

Operational/active projects were also screened out, as they were considered to be existing impacts included within the baseline (this includes all shipping ports, shipping routes and oil and gas pipelines), or if no construction timeline was available.

Table 5.8. Relevant plans and/or projects considered for cumulative effects.

Plan/Project	Summary	Distance from Ardersier Port	Dates of proposed works	Operational by (if relevant)	Summary of interaction with Proposed Development
Ardersier ETF Expansion	Port Expansion	N/A	Piling operations – 2026 Piling and dredging- 2027-2028 Dredging- 2029	2030	N/A
Port of Cromarty Firth	Maintenance Dredging	9.45 km (screened in on a precautionary basis)	2025-2028	2029	Dredging operations have a temporal interaction with dredging and piling operations at Ardersier Port in 2026-2028.
Port of Nigg	Maintenance Dredging and Sea Disposal	10.84 km (screened in on a precautionary basis)	2025-2026	2027	Dredging operations have a temporal interaction with dredging operations at Ardersier Port.
Invergordon Service Base Phase 5 Development	Extension to the existing Quay West Berth Capital Dredging and Sea Deposit	14.3 km (screened in on a precautionary basis)	2025 - 2028	2030	Dredging and construction operations have a temporal interaction with Ardersier Port in 2026-2028.

Impacts that are scoped into the assessment alone are generally spatially restricted to being within close proximity to the proposed development. However, certain potential impacts, such as displacement of fishing activity, have the potential to be observed over a wider area.

For commercial fisheries, the following impacts from the proposed development have the potential to act cumulatively with impacts from other plans and/or projects to contribute to cumulative effects:

- Reduction in access to, or exclusion from established fishing grounds;
- Displacement leading to gear conflict and increased fishing pressure on adjacent grounds; and
- Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity.

In assessing potential cumulative effects on commercial fisheries, the Worst-Case Design Scenario will be considered for each relevant project. This approach ensures that the assessment captures the maximum potential impact by evaluating the largest spatial footprint, highest intensity of activity, longest duration, and least favourable timing of works, particularly where these coincide with sensitive fishing periods or ecological windows.

7.1.1.1 Reduction in access to, or exclusion from established fishing grounds

The CEA considers the potential for reduction in access to, or exclusion from, established fishing grounds resulting from multiple marine developments within 15 km of the proposed development, as detailed in .

Table 58, each of which has the potential to contribute to cumulative effects on commercial fisheries receptors.

Magnitude of Cumulative Impact

Dredging activities, while typically short-term and spatially confined, may temporarily restrict access to fishing grounds due to safety exclusion zones, increased vessel traffic and sediment plumes. These impacts are generally limited in duration and extent, but when considered cumulatively, may contribute to broader patterns of displacement and disruption and disproportionate effects on small inshore vessels with limited spatial flexibility. Dredging operations proposed at the proposed development alone, and from screened in projects (dredging at the Port of Cromarty Firth and the Port of Nigg) have the potential to result in cumulative impacts on commercial fisheries receptors. Where multiple developments coincide spatially or temporally, the potential for compounded displacement of fishing effort increases. This may result in economic impacts for local fleets, increased fuel costs, gear conflict, or pressure on alternative fishing areas.

Maintenance dredging works at the Port of Cromarty Firth are proposed to be undertaken at the same time as the proposed works at Ardersier Port (located 9.45 km from Ardersier Port). The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which piling and dredging works at Ardersier Port are proposed. Observations of the Phase 3 Development construction operations at the Port of Cromarty Firth, reported the creation of sediment plumes at both the dredging and disposal sites, although the observed plumes were relatively small, dispersed quickly and at no point occluded the Cromarty Firth.

Dredging operations, and sea disposal are also proposed at the Port of Nigg, located 10.84 km from Ardersier Port. These operations are proposed to be undertaken from 2025 to 2026, during which piling and dredging works at Ardersier Port are proposed. Results of sediment transport modelling show that as the sediment within the Port predominantly consists of sand, with a very small level of fines (silt or clay), the majority of sand and silt lost to the water column during dredging will remain within the dredge area, with any with increased turbidity and sedimentation also being very localised and anticipated to be short term. Disposal of dredged material generated at both the Port of Cromarty Firth and Port of Nigg occurs at Sutors disposal ground, approximately 30 km from the Burghead disposal site, therefore no cumulative sediment plume or vessel transit overlap is expected to occur as a result of these projects.

Given the localised nature of effects from the proposed works at the Ardersier ETF Expansion, and the limited spatial overlap with screened-in projects, none of which are located within close proximity to the Port (the nearest being 9.45 km away), the magnitude of cumulative impact on commercial fisheries receptors is considered to be **low**. This reflects the confined footprint of dredging and marine operations, the absence of critical fisheries receptors within the immediate ZoI, and the spatial separation between the proposed development and other projects.

Sensitivity of Receptor

The sensitivity of commercial fisheries receptors to reduced access to, or exclusion from established fishing grounds is detailed in Section 7.1.1.1 of this technical appendix and are assessed as having a **medium** sensitivity.

Significance of Effect

Each project considered within the CEA has or will be subject to its own environmental appraisal, supported by dedicated mitigation measures designed to minimise individual and collective impacts. These measures are tailored to the nature, scale, and location of each development, and include spatial planning to reduce overlap with sensitive receptors, timing restrictions to avoid key ecological or fishing seasons, and operational controls to limit disturbance. By implementing project-specific mitigation, the potential for cumulative effects, such as reduced access to, or exclusion from established fishing grounds is reduced. This approach ensures that while multiple developments may occur within the same regional footprint, their combined impact is managed through coordinated planning. The cumulative footprint of these developments will be monitored to ensure that access to key fishing grounds is maintained wherever possible, and that any residual impacts are proportionate and appropriately managed.

Given the localised nature of exclusion zones and the temporary duration of most construction and dredging activities, the magnitude of impact on access to established fishing grounds is considered low. Commercial fisheries in the region exhibit medium sensitivity to spatial restrictions, however existing mitigation measures such as navigational notices, stakeholder engagement, and phased scheduling are anticipated to minimise disruption. While spatial squeeze from multiple concurrent projects is acknowledged, these works are generally confined to port infrastructure or involve dredging operations that are spatially and temporally limited. As such, cumulative interactions from multiple projects in the Moray Firth with the potential to exert reduced access to, or exclusion from established fishing grounds are unlikely to result in significant additional pressure beyond what has already been assessed for each development individually. The potential impact from cumulative reduced access to, or exclusion from established fishing grounds is therefore assessed as **minor adverse** and **not significant** in EIA terms.

7.1.1.2 Displacement leading to gear conflict and increased fishing pressure on adjacent grounds

The cumulative assessment considers the potential for displacement leading to gear conflict and increased fishing pressure on adjacent grounds resulting from multiple marine developments within 15 km of the proposed development, as detailed in .

Table 58.

Dredging activities, while typically short-term and spatially confined, may temporarily displace fishing activity. Although impacts are generally limited in duration and extent, when considered cumulatively, they may contribute to broader patterns of disruption with disproportionate effects on small inshore vessels that lack the flexibility to relocate easily. Displacement of fishing effort into adjacent areas can increase the risk of gear conflict, particularly where multiple fleets operate in close proximity or where alternative grounds are limited.

This redistribution of effort may also lead to intensified fishing pressure on habitats not typically subject to high levels of effort, with potential implications for stock sustainability and economic viability.

Maintenance dredging works at the Port of Cromarty Firth are proposed to be undertaken at the same time as the proposed works at Ardersier Port (located 9.45 km from Ardersier Port). The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which piling and dredging works at Ardersier Port are proposed. Observations of the Phase 3 Development construction operations at the Port of Cromarty Firth, reported the creation of sediment plumes at both the dredging and disposal sites, although the observed plumes were relatively small, dispersed quickly and at no point occluded the Cromarty Firth.

Dredging operations, and sea disposal are also proposed at the Port of Nigg, located 10.84 km from Ardersier Port. These operations are proposed to be undertaken from 2025 to 2026, during which piling and dredging works at Ardersier Port are proposed. Results of sediment transport modelling show that as the sediment within the Port predominantly consists of sand, with a very small level of fines (silt or clay), the majority of sand and silt lost to the water column during dredging will remain within the dredge area, with any with increased turbidity and sedimentation also being very localised and anticipated to be short term.

Given the localised nature of effects from the proposed works at the Ardersier ETF Expansion, and the limited spatial overlap with screened-in projects, none of which are located within close proximity to the Port (the nearest being 9.45 km away), the magnitude of cumulative impact on commercial fisheries receptors is considered to be **low**. This reflects the confined footprint of dredging and marine operations, the absence of critical fisheries receptors within the immediate ZoI, and the spatial separation between the proposed development and other projects.

Sensitivity of Receptor

The sensitivity of commercial fisheries receptors to displacement is detailed in Section 7.1.1.2 of this technical appendix and are assessed as having a **medium** sensitivity.

Significance of Effect

Each project considered within the CEA has been or will be subject to its own environmental appraisal, supported by dedicated mitigation measures designed to minimise individual and collective impacts. These measures are tailored to the nature, scale, and location of each development and include spatial planning to reduce overlap with sensitive receptors, timing restrictions to avoid key ecological or fishing seasons, and operational controls to limit disturbance.

While spatial squeeze from multiple concurrent projects is acknowledged, these works are generally confined to port infrastructure or involve dredging operations that are spatially and temporally limited. As such, cumulative interactions from multiple projects in the Moray Firth with the potential to displace fishing activity are unlikely to result in significant additional pressure beyond what has already been assessed for each development individually. The cumulative impact is therefore assessed as **minor adverse** and **not significant** in EIA terms.

7.1.1.3 Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity

The cumulative assessment considers the potential for disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity resulting from multiple marine developments within 15 km of the proposed development, as detailed in .

Table 55.8.

Magnitude of Cumulative Impact

Construction activities have the potential to disturb commercially important fish and shellfish resources across the regional marine environment. These disturbances may arise from underwater noise, sediment resuspension, changes in water quality, and physical seabed disruption. Such pressures can alter the behaviour, distribution, or availability of target species, particularly during sensitive biological periods such as spawning, settlement, or migration. The cumulative assessment therefore considers how these pressures when occurring simultaneously or in close succession may lead to temporary displacement of fishing activity or reduced catch efficiency in affected areas. While dredging impacts are typically short-term and spatially limited, and Offshore Wind Farm (OWF) and port construction phases are time-bound, the combined footprint of multiple developments may increase the likelihood of disruption to fishing operations. This is especially relevant where activities overlap with key fishing grounds or coincide with periods of heightened biological sensitivity.

Maintenance dredging works at the Port of Cromarty Firth are proposed to be undertaken at the same time as the proposed works at Ardersier Port (located 9.45 km from Ardersier Port). The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which piling and dredging works at Ardersier Port are proposed. Observations of the Phase 3 Development construction operations at the Port of Cromarty Firth, reported the creation of sediment plumes at both the dredging and disposal sites, although the observed plumes were relatively small, dispersed quickly and at no point occluded the Cromarty Firth.

Dredging operations, and sea dispersal are also proposed at the Port of Nigg, located 10.84 km from Ardersier Port. These operations are proposed to be undertaken from 2025 to 2026, during which piling and dredging works at Ardersier Port are proposed. Results of sediment transport modelling show that as the sediment within the Port predominantly consists of sand, with a very small level of fines (silt or clay), the majority of sand and silt lost to the water column during dredging will remain within the dredge area, with any with increased turbidity and sedimentation also being very localised and anticipated to be short term.

Given the localised nature of effects from the proposed works at the Ardersier ETF Expansion, and the limited spatial overlap with screened-in projects, none of which are located within close proximity to the Port (the nearest being 9.45 km away), the magnitude of cumulative impact on commercial fisheries receptors is considered to be **low**. This reflects the confined footprint of dredging and marine operations, the absence of critical fisheries receptors within the immediate ZoI, and the spatial separation between the proposed development and other projects.

Sensitivity of Receptor

The sensitivity of commercial fisheries receptors to displacement or disruption as a result of disturbance of commercially important fish and shellfish resources is detailed in Section 7.1.1.3 of this technical appendix and are assessed as having a **medium** sensitivity.

Significance of Effect

Each project considered within the CEA has or will be subject to its own environmental appraisal, supported by dedicated mitigation measures designed to minimise individual and collective impacts. These measures are tailored to the nature, scale, and location of each development, and include spatial planning to reduce overlap with sensitive receptors, timing restrictions to avoid key ecological or fishing seasons, and operational controls to limit disturbance. By implementing project-specific mitigation, the potential for cumulative effects, such as reduced access to, or exclusion from established fishing grounds is reduced. This approach ensures that while multiple developments may occur within the same regional footprint, their combined impact is managed through coordinated planning. The cumulative footprint of these developments will be monitored to ensure that access to key fishing grounds is maintained wherever possible, and that any residual impacts are proportionate and appropriately managed.

Given the localised nature of exclusion zones and the temporary duration of most construction and dredging activities, the magnitude of impact is considered low. Commercial fisheries in the region exhibit medium sensitivity to spatial restrictions, however existing mitigation measures such as navigational notices, stakeholder engagement, and phased scheduling are anticipated to minimise disruption. While spatial squeeze from multiple concurrent projects is acknowledged, these works are generally confined to port infrastructure or involve dredging operations that are spatially and temporally limited. As such, cumulative interactions from multiple projects in the Moray Firth are unlikely to result in significant additional pressure beyond what has already been assessed for each development individually. The potential impact from cumulative disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing activity is therefore assessed as **minor adverse** and **not significant** in EIA terms.

8. Assessment Summary

A summary of the assessment of impacts alone undertaken in Section **Error! Reference source not found.**, and CEA undertaken in Section **Error! Reference source not found.** is provided in Table 5.9. This includes residual effect significance after any required secondary mitigation and proposed monitoring.

Table 5.9. Summary of commercial fisheries technical appendix key findings.

Effect	Receptor	Magnitude	Sensitivity	Significance	Secondary Mitigation	Residual Effect
Construction						
Reduction in access to, or exclusion from, established fishing grounds	Local inshore Scottish creel fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish otter trawl fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish dredge fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish demersal trawl fleet	Low	Medium	Minor	N/A	Minor
Displacement of fishing activity leading to gear conflict and increased fishing pressure on adjacent grounds	Local inshore Scottish creel fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish otter trawl fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish dredge fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish demersal trawl fleet	Low	Medium	Minor	N/A	Minor

Effect	Receptor	Magnitude	Sensitivity	Significance	Secondary Mitigation	Residual Effect
Disturbance of commercially important fish and shellfish resources leading to displacement or disruption of fishing	Local inshore Scottish creel fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish otter trawl fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish dredge fleet	Low	Medium	Minor	N/A	Minor
	Local inshore Scottish demersal trawl fleet	Low	Medium	Minor	N/A	Minor
Increased vessel traffic associated with the project within fishing grounds leading to interference with fishing activity	Local inshore Scottish creel fleet	Low	Low	Minor	N/A	Minor
	Local inshore Scottish otter trawl fleet	Low	Low	Minor	N/A	Minor
	Local inshore Scottish dredge fleet	Low	Low	Minor	N/A	Minor
	Local inshore Scottish demersal trawl fleet	Low	Low	Minor	N/A	Minor
Additional steaming to alternative fishing grounds	Local inshore Scottish creel fleet	Low	Low	Minor	N/A	Minor

Effect	Receptor	Magnitude	Sensitivity	Significance	Secondary Mitigation	Residual Effect
	Local inshore Scottish otter trawl fleet	Low	Low	Minor	N/A	Minor
	Local inshore Scottish dredge fleet	Low	Low	Minor	N/A	Minor
	Local inshore Scottish demersal trawl fleet	Low	Low	Minor	N/A	Minor

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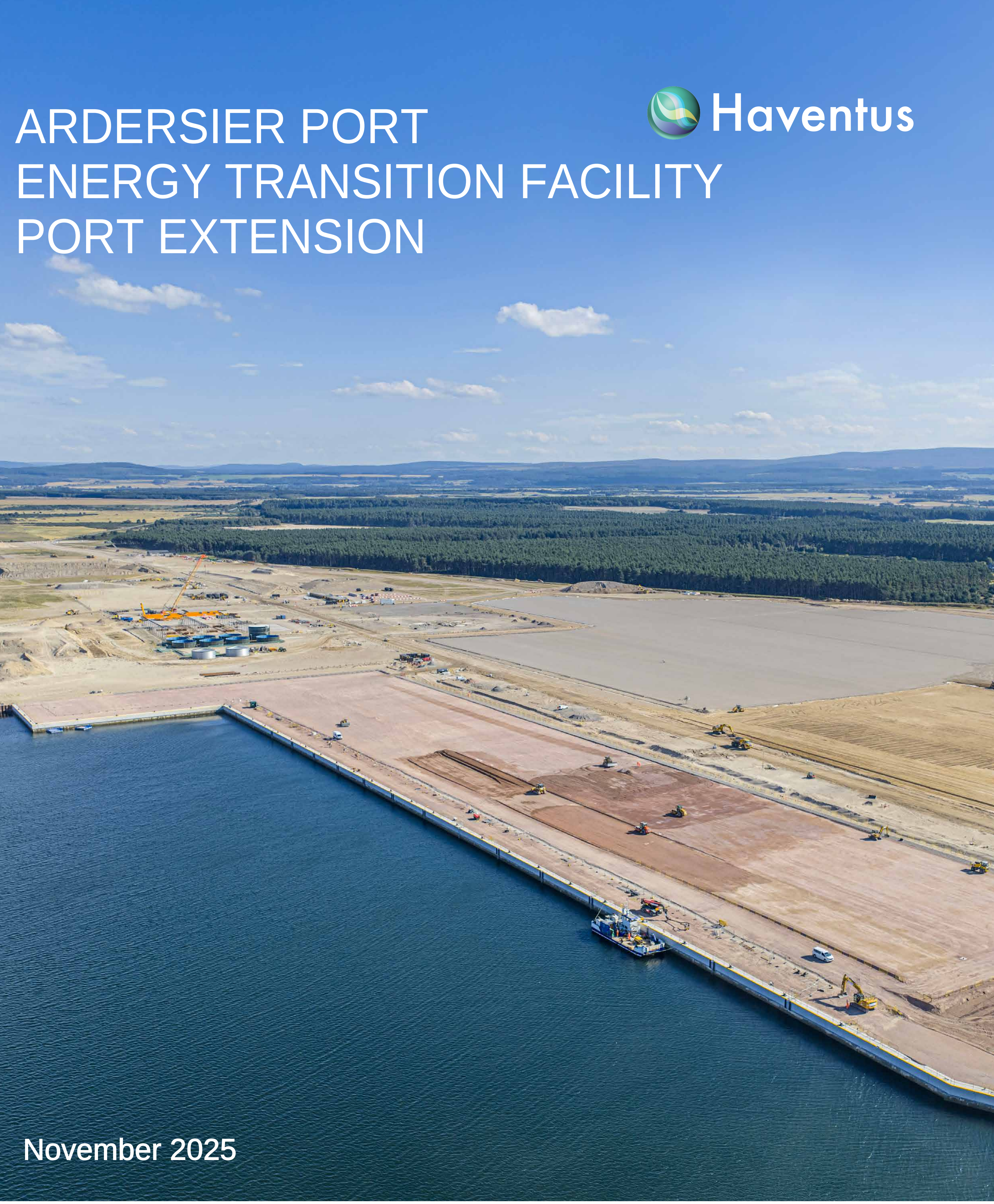
Haventus

ARDERSIER PORT
ENERGY TRANSITION FACILITY
PORT EXTENSION



November 2025

Appendix 5.8 Marine and Coastal Ecology

Haventus

Marine and Coastal Ecology

APEM Group Ltd.

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Date of issue: October 2025

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Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
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Competent Expert Evidence

Name	Role	Years of Experience	Professional Memberships	Qualifications
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Anna Luff	Author	6	Marine Biological Association (mem.MBA)	BSc (Hons), MSc
Angie de Burgh	Technical Reviewer	16	Marine Biological Association (mem.MBA)	BSc (Hons), MSc

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Acronyms and Abbreviations

Term	Definition
BAP	Biodiversity Action Plan
BPEO	Best Practice Environmental Option
BWM	Ballast Water Management
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CSD	Cutter Suction Dredger
DSFB	District Salmon Fishery Board
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMODnet	European Marine Observation and Data Network
ES	Environmental Statement
EU	European Union
EUNIS	European Nature Information System
GES	Good Environmental Statement
HED	Highland Ecology and Development
IMO	International Maritime Organisation
INNS	Invasive Non-Native Species
IUCN	International Union for Conservation of Nature
JNCC	Joint Nature Conservation Committee
MarESA	Marine Evidence-based Sensitivity Assessment
MarLIN	Marine Life Information Network
mCD	Chart Datum
MD-LOT	Marine Directorate - Licencing Operations Team
MD-SEDD	Marine Directorate - Science, Environment, Digital and Data
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Plan
MoUs	Memoranda of Understanding
MPA	Marine Protected Area
MSFD	Marine Strategy Framework Directive
MSS	Marine Scotland Science
MSW	Multi-sea-winter
NBN	National Biodiversity Network
NNS	Non-Native Species

Term	Definition
NVC	National Vegetation Classification
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbons
PMF	Priority Marine Feature
PWMP	Port Wast Management Plan
RSIS	Ramsar Sites Information Service
SAC	Special Area of Conservation
SEL	Sound Exposure Level
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPL	Sound Pressure Level
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
SWS	Single Winter Salmon
TSHD	Trailing Suction Hopper Dredgers
TSS	Total Suspended Solids
TTS	Temporary Threshold Shift
UK	United Kingdom
UWN	Underwater Noise
VER	Valued Ecological Receptor

Units

Unit	Definition
dB	Decibels
kJ	Kilojoule
km	Kilometre
mm	Millimetre
m	Metre
m2	Metre squared
m3	Metre cubed
nm	Nautical mile
NTU	Turbidity

1. Introduction

The aim of this Technical Appendix is to assess the potential impacts to marine and coastal habitats and diadromous fish arising from the proposed development, with the objective of identifying potential impacts arising from the proposed development, both alone and cumulatively, on matters raised during the scoping opinion process, across both the construction and operation and maintenance (O&M) phases. Potential impacts to marine mammals are considered in Chapter 11: Marine Mammals, of the Environmental Impact Assessment Report (EIAR).

The project description is provided in Chapter 3: Project Description of the EIAR. An Environmental Constraints Plan is provided in Chapter 1: Introduction.

2. Legislative Context

A summary of relevant legislation directly applicable to marine and coastal habitats and diadromous fish is outlined in Table 5.1.

Table 5.1 Legislation and policy relevant to Marine and Coastal Ecology and Diadromous Fish.

Legislation and Policy	Relevance
International	
The Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR Convention) (1992).	The OSPAR Convention serves as the collaborative framework for 15 Western European governments dedicated to safeguarding the marine environment in the North East Atlantic region. In 2003, the United Kingdom (UK) government made a commitment to establish a well-managed and ecologically coherent network of Marine Protected Areas (MPAs), commonly referred to as the OSPAR MPA commitment. As part of the UK's initial contribution to the OSPAR network, Marine Special Areas of Conservation (SACs) designated under the European Habitats Directive have been submitted. In 2008, OSPAR compiled a catalogue of marine habitats and species facing threats or decline in the north-east Atlantic.
The International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management (BWM) Convention) (2004)	An international treaty adopted by the International Maritime Organisation (IMO) to prevent the spread of harmful aquatic organisms via ballast water and sediments.
The Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention) (1979)	Provides the framework for agreements known as Memoranda of Understanding (MoUs) that focus on the conservation of particular migratory species or groups of species. These MoUs provide a framework for collaborative conservation efforts among countries to protect migratory animals.
European Union (EU)	
EU Habitats Directive (Directive 92/43/EEC) and associated implementing habitats regulations: 1) The Conservation of Habitats and Species Regulations (2017), (as amended) 2) Conservation (Natural Habitats, &c.)	The EU Habitats Directive lists 11 marine habitats, eight of which are found in benthic environments. SACs have been designated in UK waters to meet the requirements outlined in Article 3 of the Directive and to contribute to the European network of conservation sites. 1) Implements species protection requirements of the Habitats Directive in Scotland, in relation to specific activities up to 12 nautical miles (nm), including applications for s36 consent. 2) Implements species protection requirements of the Habitats Directive in Scotland on land and within 12 nm.

Legislation and Policy	Relevance
Regulations (1994), (as amended)	
The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention; 1979)	Focuses on safeguarding and preserving marine biodiversity, habitats, and geological features within European wildlife areas. Specifically, the Convention underscores the importance of conserving marine biodiversity by establishing protected zones to sustainably manage fish and shellfish populations and their habitats, as outlined in Article 4, which mandates Contracting Parties to enact legislative measures for habitat conservation of specified flora and fauna species
EU Directive 2008/56/EC – Marine Strategy Framework Directive (MSFD)	The MSFD sets out measures for Good Environmental Status (GES) in the marine environment.
National	
The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations (the ‘Habitat Regulations’), (2019)	Transpose the requirements of retained EU law (i.e. the ‘Habitats Directive’ and the ‘Birds Directive’) into Scottish law.
Marine and Coastal Access Act (2009)	The Marine and Coastal Access Act 2009 Establishes provisions for the management and protection of the marine environment.
Wildlife and Countryside Act (1981), (as amended)	The Wildlife and Countryside Act (1981) makes it an offence to intentionally (or recklessly) kill, injure or take any wild animal listed on Schedule 5 of the Act, and prohibits interference with places used for shelter or protection, or intentionally disturbing animals occupying such places.
Nature Conservation (Scotland) Act (2004)	The Nature Conservation (Scotland) Act (2004) sets out a series of measures which are designed to conserve biodiversity and to protect and enhance the biological and geological natural heritage of Scotland.
Marine (Scotland) Act (2010)	The Marine (Scotland) Act (2010) requires all regulators to ensure that there is no significant risk of hindering the achievement of the conservation objectives of a MPA before giving consent to an activity, plan, or project. A management intervention will be required if an ongoing activity presents a significant risk of hindering the achievement of an MPA’s conservation objectives. This intervention will be practical and proportionate, using the most appropriate statutory mechanism to reduce the risk.
The Marine Works (Environmental Impact Assessment (EIA)) (Scotland) Regulations (2017)	The Marine Works (Environmental Impact Assessment) (Scotland) Regulations (2017) establishes the requirement for EIA in relation to marine licensing in Scotland.
Merchant Shipping (Control and Management of Ships’ Ballast Water and	Implements the BWM Convention into UK law following the UK’s accession in May 2022. It ensures compliance post-Brexit and includes enforcement mechanisms specific to UK jurisdiction.

Legislation and Policy	Relevance
Sediments) Regulations 2022	
Invasive Non-Native Species (INNS) (EU Exit) (Scotland) (Amendment etc.) Regulations 2020)	This legislation was introduced to ensure the continued operability of EU Regulation 1143/2014 on INNS in Scotland following Brexit. It replaces references to EU institutions and processes with Scottish equivalents, creating a Scottish list of species of special concern and empowering Scottish Ministers to manage and amend this list. The regulations also update enforcement provisions under the Wildlife and Countryside Act 1981, enabling control measures, licensing, and penalties for activities INNS.
Marine Strategy Regulations 2010	The MSFD requires the UK to put in place measures to achieve or maintain GES in the marine environment by 2020. The MSFD is transposed for the whole of the UK by the Marine Strategy Regulations 2010, providing a UK-wide framework for meeting the requirements of the Directive. The Marine Strategy Regulations 2010 still contain references to the MSFD. Where the provisions of the Directives being referred to contain references that do not make sense for the purposes of the Marine Strategy Regulations now that the UK is no longer a Member State, the amendments set out how the provisions are to be read in order for them to make sense. For example, references to "Member States" in certain provisions of the Marine Strategy Regulations are to be read as if the UK were a Member State.
Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003	The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 is the primary legislation governing the management and conservation of salmon and freshwater fisheries in Scotland. The Act provides the Scottish Government with powers to regulate salmon fishing and protect vulnerable salmon stocks, requiring annual assessments and mandatory catch-and-release or retention bans where necessary. It also empowers the establishment of local District Salmon Fishery Boards to manage fisheries and introduces measures like a ban on the sale of rod-caught salmon to aid conservation efforts.
Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003	The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003 is the primary legislation governing the management and conservation of salmon and freshwater fisheries in Scotland. The Act provides the Scottish Government with powers to regulate salmon fishing and protect vulnerable salmon stocks, requiring annual assessments and mandatory catch-and-release or retention bans where necessary. It also empowers the establishment of local District Salmon Fishery Boards (DSFBs) to manage fisheries and introduces measures like a ban on the sale of rod-caught salmon to aid conservation efforts.
Scottish Priority Marine Features (NatureScot, 2020)	NatureScot and the Joint Nature Conservation Committee (JNCC) collaborated with Marine Scotland to establish a Priority Marine Features (PMFs) list, which identifies crucial marine habitats and species in Scotland's seas. This list is in line with Marine Scotland's vision for marine nature conservation as articulated in the Marine Nature Conservation Strategy. It functions as a focused roadmap for future conservation endeavours in Scotland (SNH, 2014). In 2013, Marine Scotland conducted a consultation on the proposed PMFs list

Legislation and Policy	Relevance
	(Marine Scotland, 2013). Within this compilation, the various benthic and intertidal species and habitats have either been previously documented in the surrounding area or have the potential to exist within the study area.
Eel Management plans for the United Kingdom: Scotland River Basin District (Department for Environment Food and Rural Affairs, 2010)	Established in 2010 in response to the Eel Recovery Plan (formed under European Commission Council Regulation No 1100/2007) with the aim of improving the European eel stocks.
Scottish Wild Salmon Strategy (Scottish Government, 2022b)	Published in January 2022, the Scottish Wild Salmon Strategy outlines the objectives, actions to improve the conditions of Scotland's rivers and coastal waters and better manage salmon stocks.

3. Consultation

A request for an EIA Scoping Opinion was sought from the Marine Directorate - Licencing Operations Team (MD-LOT) and The Highlands Council in January 2025 as part of the EIA scoping process. A formal consultation period was held between February and March 2025, during which, statutory consultees were consulted and invited to provide feedback.

During this period, concerns were raised by MD-LOT, the Marine Directorate - Science, Environment, Digital and Data (MD-SEDD) team, NatureScot and The Highland Council regarding the consideration of marine and coastal habitats within the EIA. Specifically, these concerns relate to the potential impact of the proposed development on the qualifying interests of nearby designated sites.

Concerns were also raised by MD-LOT, MD-SEDD, NatureScot, DSFB and The Highland Council regarding the consideration of diadromous fish within the EIA. Specifically, these concerns relate to the potential impacts of the proposed development on migratory salmonid fish including Atlantic salmon (*Salmo salar*) and sea trout (*Salmo trutta*).

A summary of the relevant consultation responses received during the scoping process, and how these concerns have been addressed within this report, are outlined in Table 5.2.

Table 5.2. Consultation relevant to marine and Coastal Ecology and Diadromous Fish.

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
MD-LOT	Scoping Opinion June 2025	The Applicant has not considered coastal and marine ecology as part of the Scoping Report. The Scottish Ministers note that a coastal and marine ecology EIA chapter is referred to under heading 1 of Appendix A: Terrestrial Ecology in the Scoping Report, but this topic has not been considered in the Scoping Report and it is therefore assumed that the Applicant does not consider that coastal and marine ecology should be within the scope of the EIA. However, the Scottish Ministers advise that coastal and marine ecology must be scoped in for both the construction and operational phases of the Proposed Works.	An assessment of the potential impacts on marine and coastal ecology, including marine and coastal habitats has been undertaken in Section 6.1 of this Technical Appendix.
MD-LOT	Scoping Opinion June 2025	The Applicant has not considered diadromous fish as part of the Scoping Report and it is therefore assumed that the Applicant does not consider that diadromous fish should be within the scope of the EIA Report. However, the Scottish Ministers advise that diadromous fish must be scoped in for both the construction and operational phases of the Proposed Works.	An assessment of the potential impacts on diadromous fish from the proposed development has been undertaken in Section 6.2 of this Technical Appendix.
MD-LOT	Scoping Opinion June 2025	Scottish Ministers note that salmon and sea trout are considered as endangered in Scotland and are known to migrate through the Moray Firth and therefore advise that diadromous fish must be scoped in for further assessment in the EIA during construction, operation and maintenance.	An assessment of the potential impacts on diadromous fish from the proposed development has been undertaken in Section 6.2 of this Technical Appendix.
MD-LOT	Scoping Opinion June 2025	Based on the advice provided by NatureScot, the Scottish Ministers advise that the impacts of rock armour deposits must be fully assessed in the EIA.	An assessment of the potential impacts of rock armour deposits on marine and coastal habitats has been undertaken in Section 6.1 of this Technical Appendix, including the impacts of ‘Permanent and/or long-term habitat loss/alteration

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
			from introduction of hard structures' (Section 6.1.2.1).
MD-LOT	Scoping Opinion June 2025	The Scottish Ministers advise that that the potential effect on Whiteness Sands requires investigation and must be scoped in for consideration in the EIA for construction, operation and maintenance, beyond the scope suggested by the Applicant.	An assessment of the potential impacts on Whiteness Sands Site of Special Scientific Interest (SSSI) from the proposed development has been undertaken in Section 6.1 of this Technical Appendix.
MD-SEDD	Scoping Opinion June 2025	MD-SEDD noted that the Scoping Report is not clear if the chapter on coastal processes and geomorphology includes subtidal habitats and species, and that the subtidal sandbank qualifying interest of the Moray Firth SAC was not considered in the Scoping Report. The Scottish Ministers advise that impacts on the subtidal sandbank qualifying interest of the Moray Firth SAC must be scoped in for further assessment in the EIA.	An assessment of the potential impacts on the subtidal sandbank qualifying interest of the Moray Firth SAC from the proposed development has been undertaken in Section 6.1 of this Technical Appendix.
MD-SEDD	Scoping Opinion June 2025	MD-SEDD advise of the presence of a horse mussel bed off Chanonry Point and advised that hydrodynamic modelling of the dredge and deposit areas must be carried out to determine if the Proposed Works will affect any subtidal benthic features, including subtidal sandbanks and horse mussel beds.	Sediment plume modelling has not been undertaken for the proposed development. However, previous monitoring of Total Suspended Solids (TTS) and turbidity have been conducted prior to, during and following the phase 1 capital dredge for Ardersier Port, which commenced in April 2025. This information has been used to assess the potential impacts of increased Suspended Sediment Concentration (SSC) and deposition from capital

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
			dredging activities, on marine and coastal habitats in Section 6.1. This includes subtidal sandbanks and horse mussel beds.
MD-SEDD	Scoping Opinion June 2025	All dredging operations should consider the sensitive salmon smolt migration period and this sensitive window should be determined and avoided for all dredging operations. The selection of the deposit site for dredge material should consider potential connectivity with salmon from the River Moriston SAC and other important salmon and sea trout rivers in close proximity to the Proposed Works, as listed in the MD-SEDD advice.	An assessment of the potential impacts from Underwater Noise (UWN), and increased SSC and deposition from dredging activities, on diadromous fish from the proposed development has been undertaken in Section 6.2 of this Technical Appendix, and due regard has been given to the potential connectivity with salmon from the River Moriston SAC and other important salmon and sea trout rivers in close proximity to the Proposed Works.
MD-SEDD	Scoping Opinion June 2025	It is advised that all local DSFBs, as listed in the MD-SEDD advice, should be consulted on the Proposed Works.	Local DSFB's have been consulted during the scoping process, with concern's raised addressed within this Technical Appendix. Further consultation is anticipated to take place on the EIAR for the proposed development.
NatureScot	Scoping Opinion June 2025	NatureScot advise that coastal and marine ecology should be scoped in. NatureScot advised that modelling studies for the potential impacts on coastal processes due to the inner harbour dredging, as detailed under heading 5 of Appendix A: Coastal	An assessment of the potential impacts of 'changes in physical processes resulting from capital dredging and installation of hard structures (e.g.,

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
		Processes and Geomorphology in the Scoping Opinion, must include the potential impacts on the protected coastal habitats.	changes in wave/tidal current regimes)' has been undertaken in Section 6.1 of this Technical Appendix, with reference to coastal processes modelling studies outlined in Chapter 10: Coastal Processes and Geomorphology.
NatureScot	Scoping Opinion June 2025	NatureScot notes that the subtidal sandbanks qualifying feature of the Moray Firth SAC can have a low resilience to the introduction or spread of INNS and advises that the Proposed Works have the potential to introduce and spread the invasive non-native species slipper limpet via the deposit of dredge material. NatureScot advise that a robust Port Biosecurity Plan with a strong focus on managing risks associated with slipper limpet and future monitoring of the invasive species is included as part of the EIA. The Scottish Ministers agree with NatureScot's advice and advise this potential impact must be scoped in for assessment within the EIA for both construction and operational phases.	An assessment of the potential impacts of the 'increased risk of introduction and/or spread of marine INNS' has been undertaken for both the construction and O&M phases of the proposed development in Section 6.1 of this Technical Appendix. A marine INNS biosecurity management plan has been produced for the proposed development (Chapter 5: Supporting Information and Assessments) as an appendix. Due regard has been given to managing risks associated with slipper limpet and future monitoring of INNS.
NatureScot	Scoping Opinion June 2025	NatureScot advise that the deposit of rock armour might adversely affect the Inner Moray Firth Ramsar Site habitats and/or replace them with artificial structures where currently natural coastal habitats predominate.	An assessment of the potential impacts of rock armour deposits on marine and coastal habitats has been undertaken in Section 6.1 of this Technical Appendix,

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
			including the impacts of ‘Permanent and/or long-term habitat loss/alteration from introduction of hard structures’ (Section 6.1.2.1).
NatureScot	Scoping Opinion June 2025	NatureScot advised that the deeper dredge could significantly increase the harbours tidal volume and therefore hydrology. This could cause the inlets main tidal channel to alter its profile and/or width, potentially changing the extent of the sand dune, shingle and saltmarsh habitats of the Inner Moray Firth Ramsar Site. Additionally, any change to inundation characteristics on the saltmarsh could affect the nature and characteristics of this habitat, which can be sensitive to such changes.	An assessment of the potential impacts of ‘changes in physical processes resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)’ has been undertaken in Section 6.1 of this Technical Appendix, with reference to coastal processes modelling studies outlined in Chapter 10: Coastal Processes and Geomorphology.
NatureScot	Scoping Opinion June 2025	NatureScot advise that the dredging has the potential to affect Whiteness Sands, which supports the Inner Moray Firth Ramsar Site habitats of sand and mudflats, through increasing the tidal volume and therefore increasing water flow through the access channel.	An assessment of the potential impacts of ‘changes in physical processes resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)’ has been undertaken in Section 6.1 of this Technical Appendix, with reference to coastal processes modelling studies outlined in Chapter 10: Coastal Processes and Geomorphology.
NatureScot	Scoping Opinion June 2025	NatureScot also advised that there are potential impacts on sedimentation and water circulation within the Inner Moray Firth Ramsar Site from the dredging required to	An assessment of the potential impacts of ‘changes in physical processes

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
		maintain Tern Island, and by the potential change to the volume of dredge sediment deposited at Whiteness Sands, compared to that currently licenced.	resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)' has been undertaken in Section 6.1 of this Technical Appendix, with reference to coastal processes modelling studies outlined in Chapter 10: Coastal Processes and Geomorphology.
Nairn DSFB	Scoping Opinion June 2025	Nairn DSFB noted that migratory salmonid fish, specifically salmon and sea trout have not been considered as part of the Scoping Report. It advised that as the site of the Proposed Works lies in close proximity to the River Nairn, an important river for migratory salmonids, the impact of dredging and noise on these species should be assessed in the EIA.	An assessment of the potential impacts from UWN, and increased SSC and deposition from dredging activities, on diadromous fish from the proposed development has been undertaken in Section 6.2 of this Technical Appendix. Due regard has been given to salmonids migrating from the River Nairn and through the Moray Firth.
The Highland Council	Scoping Opinion March 2025	The proposal have the potential to affect: • the Inner Moray Firth Ramsar; • Moray Firth SAC; • Moray Firth and Inner Moray Firth Special Protection Areas (SPA); and • Whiteness Head Site of SSSI. The EIA must therefore assess the direct and indirect impacts on these protected areas and their qualifying interests in the context of their conservation / management objectives. The assessment must also consider the impact of the proposal as a single	As highlighted in Chapter 15: Schedule of Mitigation and Enhancements, an Appropriate Assessment (AA) will be carried out by NatureScot, drawing on information provided as part of the EIAR on potential impacts to the Inner Moray Firth SPA and the Inner Moray Firth SPA and SAC.

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
		development and cumulatively with other developments affecting these protected areas.	An assessment of both direct and indirect impacts of the proposed development on qualifying features of designated sites including the Inner Moray Firth Ramsar, Moray Firth SAC and Whiteness Head SSSI has been undertaken in Section 6.1 of this Technical Appendix. An assessment of the cumulative impacts of the proposed development with other developments has been undertaken in Section 7 of this Technical Appendix.
The Highland Council	Scoping Opinion March 2025	It would be expected that any potential barriers to salmon migration to be considered. The cumulative impacts should be considered, particularly those within the Cromarty and Moray Firth.	An assessment of the potential impacts on diadromous fish from the proposed development has been undertaken in Section 6.2 of this Technical Appendix. Particular regard has been given to the potential for barriers to migration from UWN, and sediment plumes from the proposed development. The potential for cumulative impacts on diadromous fish has also been assessed in Section 7 of this Technical Appendix (with

Consultee	Date and Nature of Consultation	Summary of response	How and where addressed
			particular regard to those within the Cromarty and Moray Firth).

4. Baseline

The overall aim of this Technical Appendix is to assess the potential impacts arising from the proposed development, on key issues raised within the scoping opinion relating to marine and coastal habitats, and diadromous fish.

4.1 Marine and Coastal Ecology Study Areas

For the purposes of this report, the marine and coastal ecology Study Areas are presented in Figure 5.1 below, and are defined as the following spatial scales for the respective topics of this Technical Appendix:

- Marine and coastal habitats Study Area
    - The Study Area for marine and coastal habitat receptors is defined by the greatest zone of influence from the proposed development works for these features. This is anticipated to result from indirect effects that arise from changes to the physical environment, particularly increased suspended sediment and sediment deposition. The Study Area is therefore defined by the area over which suspended sediment might travel following disturbance from the proposed works. In the absence of sediment plume modelling, the Study Area represents a buffer around the proposed development defined by the mean spring tidal excursion. This represents the expected maximum distance that suspended sediments may be transported on a mean spring tide in a flood and/or ebb direction, although most suspended sediments are expected to be deposited much closer to the disturbance activity. The closest mean spring tidal excursion distance to the proposed development is located approximately 4 kilometres (km) at Riff Bank (ABPmer, 2025) and has been used as a proxy as the expected maximum distance that suspended sediments may be transported. Here, the tidal excursion distance is approximately 1.1 km. For marine and coastal habitat receptors, a precautionary 2 km Study Area for suspended sediment has been defined and is referred to as the 'marine and coastal habitat Study Area' in this Technical Appendix (Figure 5.1). Direct impacts on marine and coastal habitat receptors, from impacts such as habitat disturbance and habitat loss, will be encapsulated within the proposed development boundary, and defined Study Area.
- Diadromous fish Study Area
    - For diadromous fish receptors, a wider Study Area has been defined, by potential impact ranges from UWN, representing the greatest zone of influence from the proposed development works on diadromous fish receptors. This area has been informed by the outputs of the UWN modelling,

undertaken for the proposed development. The greatest range of impact from UWN, from impact piling operations, is 1,760 m (for Temporary Threshold Shift (TTS)), with a potential wider range of impacts arising from behavioural effects. As a precautionary measure, considering the mobile nature of diadromous fish receptors, the Study Area has been defined as a 5 km buffer from the proposed development, and is referred to as the ‘diadromous fish Study Area’ in this Technical Appendix (Figure 5.1). Potential impacts on diadromous fish arising from sediment disturbance, and release of sediment bound contaminants, will be encapsulated within this defined Study Area.

- Disposal site Study Area
    - A further Study Area has been defined, to encapsulate the greatest zone of influence from spoil disposal at the Burghead disposal site. The greatest range of impact from these works will arise from increased SSC and sediment deposition. The disposal site Study Area is therefore defined by the area over which suspended sediment might travel following spoil disposal, as defined by the mean spring tidal excursion. The tidal excursion at the Burghead disposal site is approximately 1.3 km (ABPmer, 2025); therefore, as a precautionary measure, a 2 km Study Area for suspended sediment has been defined and is referred to as the ‘disposal site Study Area’ in this Technical Appendix (Figure 5.1).

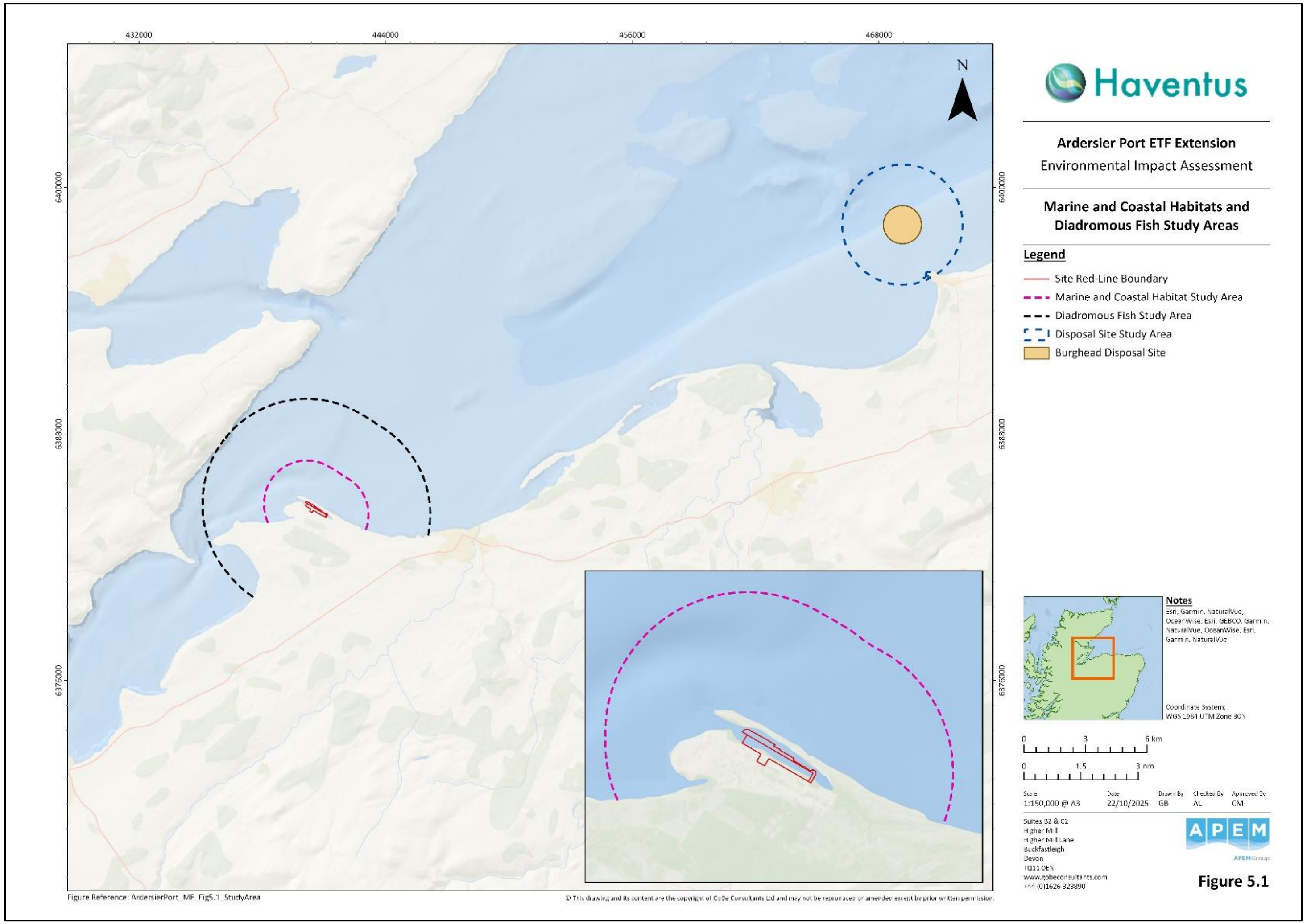

Figure 5.1. Marine and Coastal Habitats and Diadromous Fish Study Areas.

4.2 Desktop Study

To inform the assessment on marine and coastal habitats and diadromous fish, a high level desk-based review has been conducted using a range of existing ecological and environmental data (Table 5.3).

Table 5.3. Summary of desk-based review sources used.

Source	Summary
Ardersier Port Expansion Chapter 12: Terrestrial Ecology -Technical Appendix 12.13: Phase 1 and Habitat Condition Assessment	Site-specific Phase I walkover habitat survey and condition assessment of terrestrial habitats, conducted by Highland Ecology and Development (HED) ltd for the proposed development.
Ardersier Port Expansion Chapter 12: Terrestrial Ecology -Technical Appendix 12.15: National Vegetation Classification (NVC)	Site-specific NVC walkover survey of terrestrial habitats conducted by HED ltd for the proposed development.
Ardersier Port Habitat Survey Update (EnviroCentre, 2024)	UK habitat and NVC walkover surveys of terrestrial habitats conducted by EnviroCentre ltd at Ardersier Port.
Former Fabrication Yard Ardersier EIAR - Technical Appendix 8.3: Intertidal and Benthic Ecology (EnviroCentre, 2018a)	Phase I intertidal walkover survey conducted by EnviroCentre ltd across the intertidal area of Ardersier Port including Whiteness Head as part of the previous EIAR in 2018 for construction and dredging works at Ardersier Port.
Ardersier Port Proposed Offshore Renewables Manufacturing and Port Facility Environmental Statement (ES) Volume 2 (Savilles, 2013)	Phase I intertidal and subtidal benthic grab surveys and characterisation of intertidal and subtidal biotopes as part of the previous ES in 2013 for construction and dredging at Ardersier Port.
Phase 1 Whiteness Head Habitat Survey (Physlia, 2005)	Phase I intertidal walkover survey conducted by Physalia ltd in 2005, characterising littoral and supralittoral habitats at Whiteness Head, in the vicinity of the former Ardersier Rig Yard.
National Biodiversity Network (NBN) Atlas (NBN, 2025)	Records of marine INNS within the marine and coastal habitat Study Area.
European Marine Observation and Data Network (EMODnet) broad scale seabed habitat map for Europe (EUSeaMap) (EMODnet, 2023)	European Nature Information System (EUNIS) Level 4 model, detailing biological zone and substrate across the study areas and wider region.
Information on species of conservation interest (JNCC, 2007)	Species specific data, of native species of conservation interest.
Scottish Salmon and Sea Trout Fishery Statistics (2024)	Long-term records on catches of Atlantic salmon and sea trout.

4.3 Designated Sites

There are several designated sites with marine and coastal habitat qualifying features which interact with the marine and coastal habitat Study Area, and the Disposal site Study Area. No designated sites with qualifying diadromous fish features lie within the diadromous fish Study Area or the Disposal site Study Area. One SAC (the River Moriston SAC) has been identified that has potential connectively with the diadromous fish Study Area, and the disposal site Study Area due to the potential for migrating Atlantic salmon to transit these areas.

All such designated sites with marine and coastal habitat and diadromous fish qualifying features that could be affected by the construction and O&M phases of the proposed development are set out in Table 5.4, and are shown relative to the proposed development and Burghead disposal site in Figure 5.2.

Table 5.4. Designated sites within the Study Area and their relevant qualifying interests and conservation/management objectives.

Site	Distance from the proposed development	Distance from the Burghead disposal site	Relevant Qualifying Features	Relevant Conservation Objectives
Whiteness Head SSSI	0.00 km	28.37 km	Sandflats Saltmarsh Sand dunes Shingle	**Objectives for Management** • To maintain and where appropriate manage coastal processes and features in order to safeguard the extent and condition of the special habitats and landforms present. • To maintain habitats and conditions suitable for important bird populations by avoiding damage and disturbance. To maintain habitats and conditions suitable for rare and scarce plants and invertebrates associated with the sandflats, saltmarsh and shingle spit.
Inner Moray Firth Ramsar site	0.00 km	28.37 km	Mudflat Sandflat Saltmarsh Shingle	There are no specific conservation objectives or management measures for the Inner Moray Firth Ramsar site. Conservation objectives for the Inner Moray Firth SPA include: • To avoid deterioration of the habitats of the qualifying species, thus ensuring that the integrity of the site is maintained. • To ensure for the qualifying species of the Inner Moray Firth SPA that the following are maintained in the long term: ○ Distribution and extent of habitats supporting the species. Structure, function and supporting processes of the habitats supporting the species.

Site	Distance from the proposed development	Distance from the Burghead disposal site	Relevant Qualifying Features	Relevant Conservation Objectives
Moray Firth SAC	0.18 km	0 km	**Annex I habitats that are a primary reason for selection of this site:** Sandbanks which are slightly covered by seawater all of the time (1110)	**Conservation Objectives for Sandbanks which are slightly covered by seawater all of the time (1110)** • Maintain/restore the extent and distribution of the habitat within the site. • Maintain/restore the structure and function of the habitat and the supporting environment on which it relies. Maintain/restore the distribution and viability of the typical species of the habitat.
River Moriston SAC	56.24 km Whilst this site doesn't lie within the proposed development Study Areas, there is potential for connectivity as Atlantic salmon migrate out of the River Moriston and into the Moray Firth.	85.71 km Whilst this site doesn't lie within the disposal site Study Area, there is potential for connectivity as Atlantic salmon migrate out of the River Moriston and into the Moray Firth.	**Annex II species present as a qualifying feature, but not a primary reason for site selection:** Atlantic salmon	**Conservation Objectives for Atlantic salmon** • Restore the population of Atlantic salmon, including range of genetic types, as a viable component of the site. • Restore the distribution of Atlantic salmon throughout the site. Restore the habitats supporting Atlantic salmon within the site and availability of food.

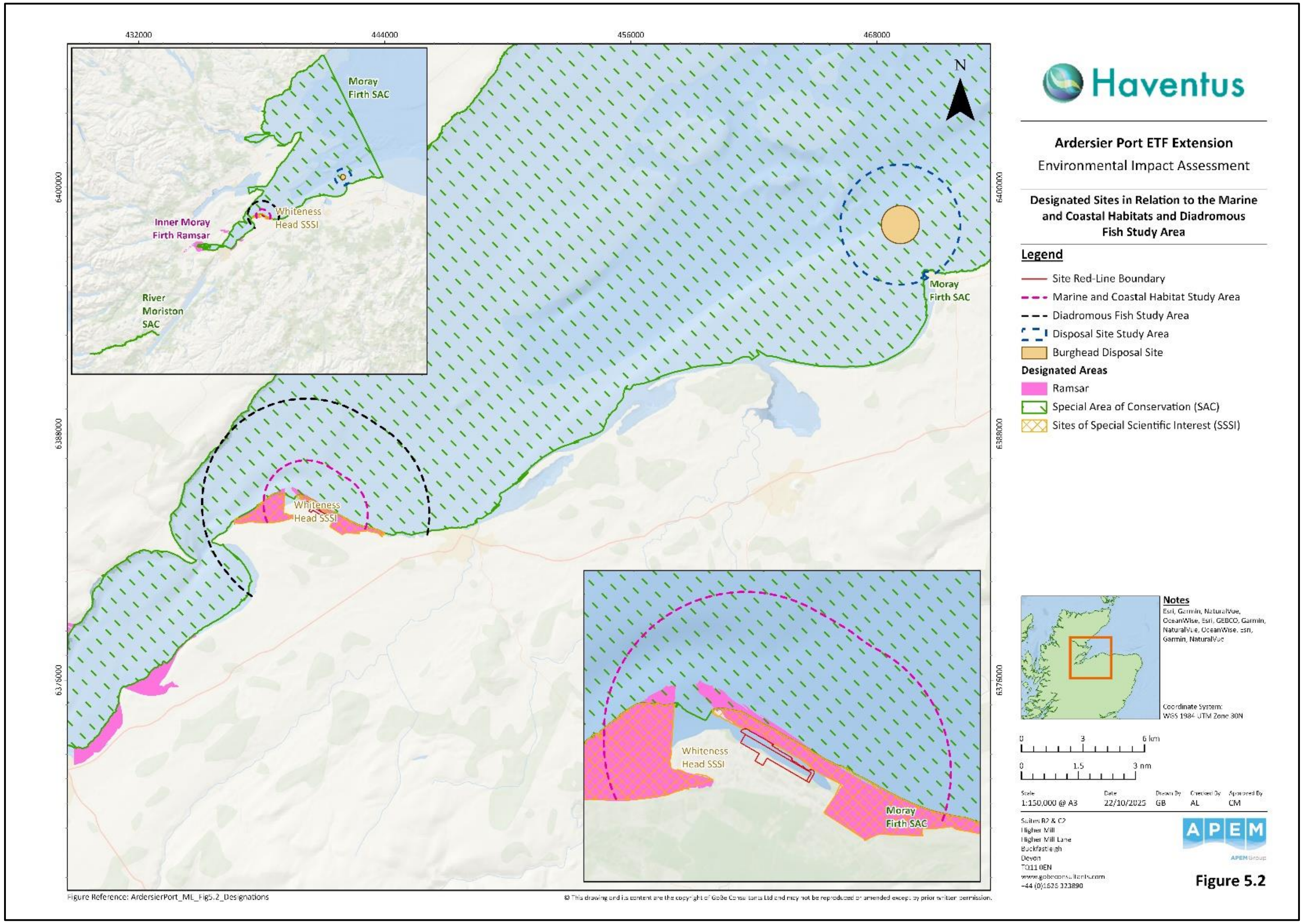

Figure 5.2. Designated Sites in Relation to the Marine and Coastal Habitats and Diadromous Fish Study Areas.

4.4 Marine and Coastal Habitats

4.4.1 Coastal Habitats

For the purpose of this Technical Appendix, coastal habitats are considered terrestrial and nearshore environments, influenced by the marine environment (i.e. salt spray and coastal weather), but are located above Mean High Water Springs (MHWS) and not exposed to tidal action. Within the marine and coastal habitat Study Area, coastal habitats include sand dunes which are described below in more detail.

Sand dunes

Sand dunes are a qualifying feature of the Whiteness Head SSSI, located within the marine and coastal habitat Study Area (Scottish National Heritage (SNH), 2013). Site-specific UK habitat and NVC surveys conducted as part of the proposed development identified that sand dune habitat is present along the length of the Whiteness Head spit. Sand dune habitat is primarily classified as 'dune grasslands' with a small area of 'shifting dunes with marram' to the east of Whiteness Head spit (EnviroCentre, 2024; Chapter 12: Terrestrial Ecology - Technical Appendix 12.13 and 12.15).

4.4.2 Intertidal Habitats

Intertidal habitats are those which are submerged by seawater during high tide but exposed to the air during low tide. Within the marine and coastal habitat Study Area, a range of intertidal habitats including mudflats, sandflats, shingle and saltmarsh are present (EnviroCentre, 2018a), which are described in below in more detail.

Mudflats

Mudflats are a qualifying feature of the Whiteness Head SSSI, located within the marine and coastal habitat Study Area (SNH, 2013). Mudflat habitat has previously been identified during an intertidal walkover survey conducted as part of the ES for construction and dredging at Ardersier Port in 2013 (Savills, 2013). In this survey, habitat classified as 'muddy sand' (LS.LSa.MuSa; MA525)[1] was recorded on the northern and more sheltered shoreline within Ardersier Port, adjacent to the Whiteness Head split. However, this habitat

[1] The name of this biotope has since been updated to 'Polychaete/bivalve-dominated Atlantic littoral muddy sand'.

was not recorded following a walkover survey undertaken as part of ES for construction and dredging at Ardersier Port in 2018 (EnviroCentre, 2018a).

Sandflats

Sandflats are a qualifying feature of both the Whiteness Head SSSI and Inner Moray Firth Ramsar site, located within the marine and coastal habitat Study Area (Ramsar Sites Information Service (RSIS), 2006; SNH, 2013). Sandflat habitat has previously been identified during intertidal Phase 1 surveying at Whiteness Head spit by Physalia (2005), in which areas of intertidal sand (with occasional patches of shingle) were identified on the eastern southern shore and entire northern shore of the Whiteness Head spit. This area of intertidal sand was characterised by cockles, lugworm and, at low tide levels on exposed shores, razor shells.

Sandflats were also identified during intertidal walkover surveys conducted as part of the ES for construction and dredging at Ardersier Port in 2013 and 2018 (Savills, 2013; EnviroCentre, 2018a). In these surveys, habitats classified as 'fine sand' (LS.LSa.FiSa; MA524)[2] and 'mobile sand' (LS.LSa.MoSa; MA523)[3] were recorded.

'Fine sand' (LS.LSa.FiSa; MA524) is present on both the northern shoreline of Ardersier Port, with areas of sandflat not covered at low tide, towards the entrance of Ardersier Port. These areas of 'fine sand' (LS.LSa.FiSa; MA524) are characterised by casts of the polychaete lugworm (*Arenicola marina*) and common cockle (*Cerastoderma edule*). 'Fine sand' (LS.LSa.FiSa; MA524) is also present at the lower edge of the northern (outer) shoreline of the Whiteness Head spit, exposed to the Moray Firth (Savills, 2013; EnviroCentre, 2018a).

'Mobile sand' (LS.LSa.MoSa; MA523) is present at the more exposed areas of the entrance to Ardersier Port, on both shores, and on the northern (outer) shore of the Whiteness spit. These areas of 'mobile sand' (LS.LSa.MoSa; MA523) are not covered by low tide and are largely amphipod dominated habitats (Savills, 2013; EnviroCentre, 2018a).

Shingle

Shingle is a qualifying feature of both the Whiteness Head SSSI and Inner Moray Firth Ramsar site, located within the marine and coastal habitat Study Area (RSIS, 2006; SNH, 2013). Shingle habitat has previously been identified during intertidal Phase 1 surveying at Whiteness Head

[2] The name of this biotope has since been updated to 'Polychaete/amphipod-dominated fine sand shores'.

[3] The name of this biotope has since been updated to 'Barren or amphipod-dominated Atlantic littoral mobile sand'.

spit by Physalia (2005), in which areas of intertidal shingle (with occasional patches of exposed sand) supporting talitrid amphipod shrimps and occasionally barnacles, characterised the southern shore of the Whiteness Head spit to the west.

Shingle habitat was also identified during intertidal walkover surveys conducted as part of the ES for construction and dredging at Ardersier Port in 2013 and 2018 (Savills, 2013; EnviroCentre, 2018a). In these surveys, the intertidal shingle habitat was recorded to the west on the southern shoreline of Ardersier Port and on the northern shoreline towards the entrance of Ardersier Port and classified as 'barren shingle' (JNCC code: LS.LSC.Sh.BarSh; EUNIS code: MA3211)[4], (Savills, 2013; EnviroCentre, 2018a).

Saltmarsh

Saltmarsh is a qualifying feature of both the Whiteness Head SSSI and Inner Moray Firth Ramsar site, located within the marine and coastal habitat Study Area (RSIS, 2006; SNH, 2013). Saltmarsh habitat has previously been mapped as part of the national Scottish saltmarsh survey, undertaken between 2010 and 2012 and includes areas of saltmarsh to the east of the proposed development (SNH, 2012), (Figure 5.3). Findings from the national Scottish saltmarsh survey indicated that this area of saltmarsh was classified as back-barrier saltmarsh, with vegetation communities of *Plantago maritima–Armeria maritima* sub-community found in mosaic with *Juncus gerardii* dominated sub-community and *Carex flacca* sub-community, (Haynes, 2016).

Site-specific UK habitat and NVC surveys conducted as part of the proposed development also identified these areas of coastal saltmarsh to the east of the proposed development. Saltmarsh here was classified as '*Suaeda maritima* saltmarsh community' (EnviroCentre, 2024; Chapter 12: Terrestrial Ecology - Technical Appendix 12.13 and 12.15).

4.4.3 Subtidal Habitats

Subtidal habitats are those which are continually submerged by seawater at all times, irrespective of tidal fluctuations. The EUSeaMap (2023) habitat types (MSFD benthic broad habitats) mapped by EMODnet indicate that for the Moray Firth and within the marine and coastal habitat Study Area, subtidal habitat is 'Atlantic circalittoral seabed', consisting of large areas of 'Atlantic infralittoral sand' (MB52), 'Atlantic circalittoral sand' (MC52), 'Atlantic

[4] The name of this biotope has since been updated to 'Barren littoral shingle'.

infralittoral mud' (MB62) and 'Atlantic circalittoral mud' (MC52) (EMODnet, 2023), (Figure 5.3).

For the Burghead disposal site, the EUSeaMap (2023) habitat types by EMODnet indicate that for the disposal site Study Area, subtidal habitats are characterised by 'Atlantic infralittoral sand' (MB52), 'Atlantic circalittoral sand' (MC52), 'Atlantic circalittoral mud' (MC62), 'Atlantic offshore circalittoral sand' (MD52) and 'Atlantic offshore circalittoral mud' (MD62), (EMODnet, 2023) (Figure 5.4).

The Moray Firth SAC is designated for the Annex I habitat 'sandbanks which are slightly covered by seawater all of the time'. Subtidal sandbank habitat which occurs within the marine and coastal habitat Study Area and the disposal site Study Area is described below in more detail.

Sandbanks

The proposed development is immediately adjacent to the boundary of Moray Firth SAC, which is designated for the Annex I habitat 'sandbanks which are slightly covered by seawater all of the time' (Table 5.4), (NatureScot, 2025a). Within Moray Firth SAC, there is approximately 45,000 ha of subtidal sandbanks, of which, approximately 320 ha occur within the marine and coastal habitat Study Area (Figure 5.3). These sandbank habitats of the Moray Firth SAC consist of several different types which may occur within the marine and coastal habitat study area including 'moderately deep relict sandbanks', 'sand bars' and 'deep, macrotidal channels and associated sandbanks' (NatureScot, 2025a).

There are a number of biotopes within the Moray Firth associated with the subtidal sandbanks which may occur within the marine and coastal habitat Study Area, primarily variations of *Amphiura* communities. Shallow areas with clean, medium-fine sand are important habitat for *Echinocardum* sp. / *Ensis* sp. biotopes (NatureScot, 2025a). The deeper relict sandbanks host brittlestar beds with an abundance of common brittlestar (*Ophiothrix fragilis*) as well as a smaller abundance of the black brittlestar (*Ophiocomina nigra*). Cobbles and stones with keel worm (*Pomatoceros triqueter*) and coralline algae were also common (Foster-Smith *et al*., 2009).

Sandbank habitat was identified during a subtidal benthic grab survey conducted as part of the ES for construction and dredging at Ardersier Port in 2013 (Savills, 2013). The survey, identified the following subtidal sandbank habitats:

- 'Sublittoral sand in low or reduced salinity (lagoons)' (MB52);
- 'Infralittoral mobile clean sand with sparse fauna' (MB5231);

- '*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand' (MB5233); and
- 'Polychaete/bivalve-dominated Atlantic littoral muddy sand' (MA525)[5].

Although the above habitats were recorded as part of the ES for construction and dredging at Ardersier Port in 2013 (Savills, 2013), it was not possible to ascertain where samples were taken in relation to the proposed development as mapping of samples were not available.

For the Burghead disposal site, sandbank habitats are present within the disposal site Study Area (Figure 5.4).

Horse mussel beds

Horse mussel (*Modiolus modiolus*) beds are a PMF in Scotland and are known to occur within the Moray Firth. However, the closest known horse mussel beds are approximately 6 km southwest of the proposed development off Chanonry Point and beyond the marine and coastal habitat Study Area (Figure 5.3).

[5] This biotope was originally recorded as 'Muddy Sand' (LS.LSa.MuSa) which has since been updated to 'Polychaete/bivalve-dominated Atlantic littoral muddy sand' (MA525).

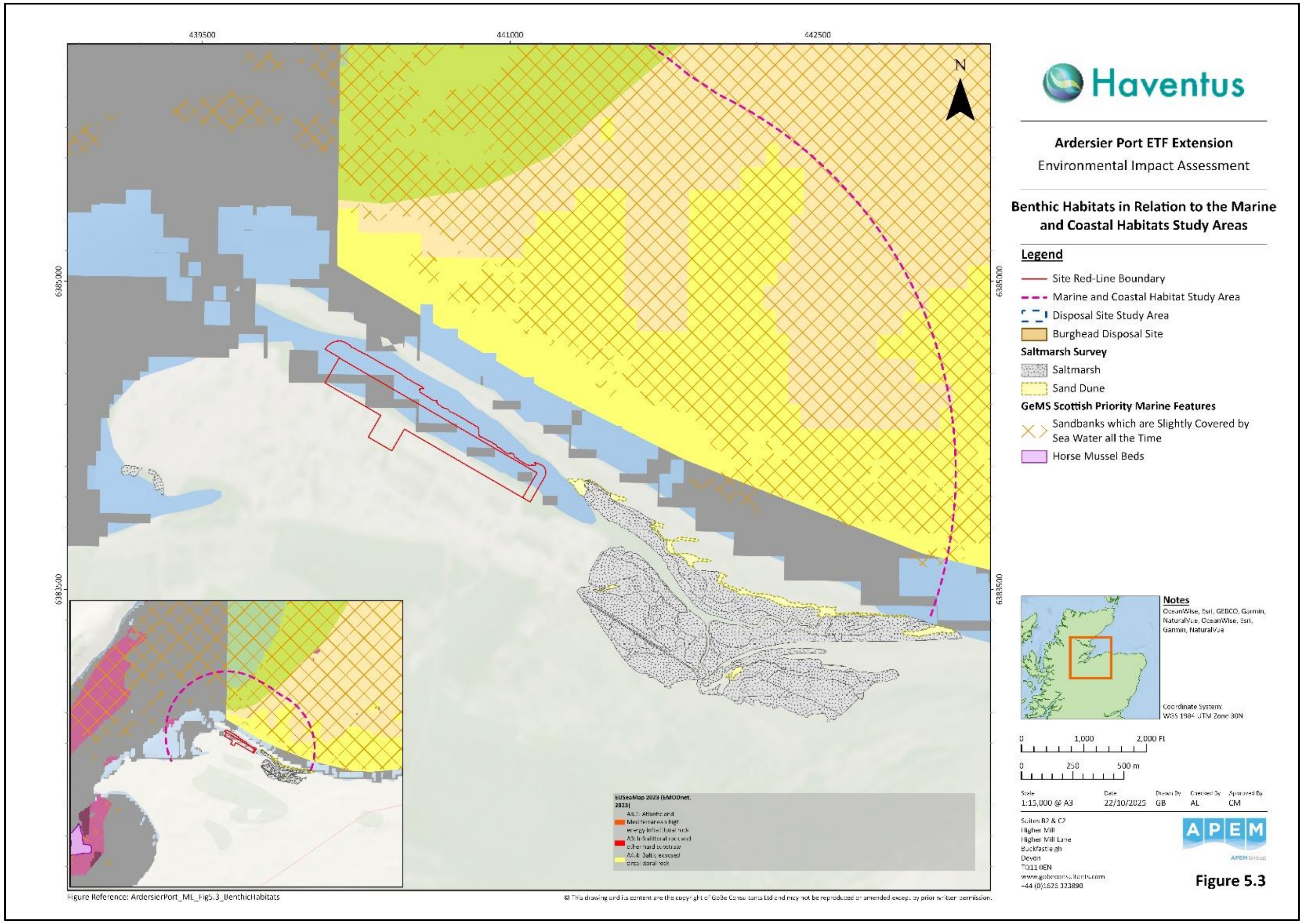

Figure 5.3. Benthic Habitats in relation to the Marine and Coastal Habitats Study Area.

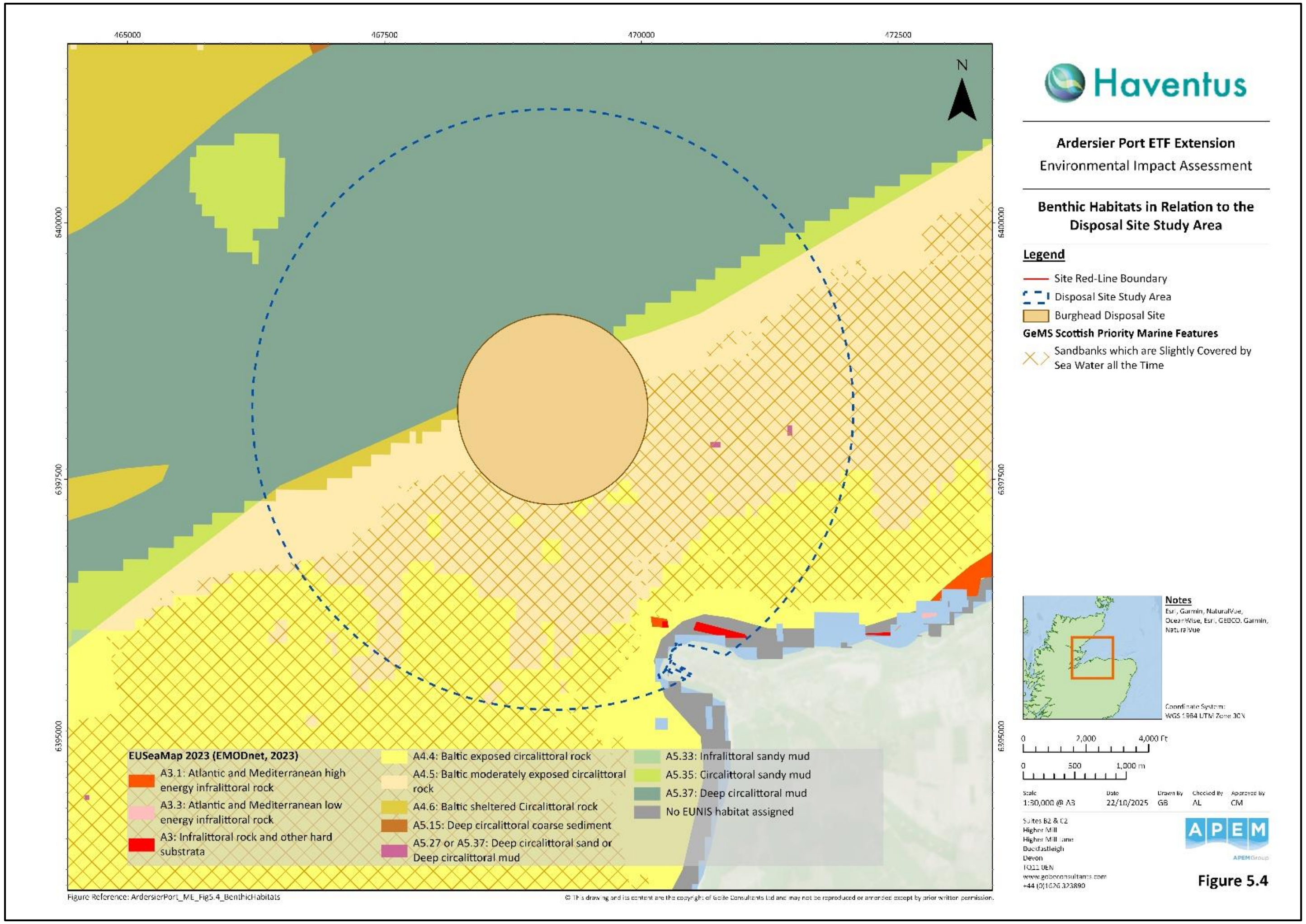

Figure 5.4. Benthic Habitats in Relation to the Disposal Site Study Area.

4.5 Invasive Non-Native Species

Non-Native Species (NNS) posing a threat to Scotland are listed by NatureScot (2025b). Of these, those that are widespread and well established in Scottish seas include wireweed (*Sargassum muticum*), green sea-fingers (*Codium fragile* subsp. *fragile*), the red algae (*Dasysiphonia japonica*), modest barnacle (*Austrominius modestus*), Japanese skeleton shrimp (*Caprella mutica*), leathery sea squirt (*Styela clava*), orange tipped sea squirt (*Corella eumyota*) and orange ripple bryozoan (*Schizoporella japonica*) (NatureScot, 2025b).

NNS only found in patchy locations in Scotland include American lobster (*Homarus americanus*), carpet sea-squirt (*Didemnum vexillum*), Pacific oyster (*Magallana gigas*), wakame (*Undaria pinnatifida*), and slipper limpet (*Crepidula fornicata*) (NatureScot, 2025b).

Species present in the British Isles but yet to reach Scotland include Chinese mitten crab (*Eriocheir sinensis*), Australian tubeworm (*Ficopomatus enigmaticus*), Asian shore crab (*Hemigrapsus sanguineus*), brush-clawed crab (*Hemigrapsus takanoi*), and American oyster drill (*Urosalpinx cinerea*) (NatureScot, 2025b).

Eight NNS have been recorded within the Moray Firth: Bonnemaison's hook weed (*Bonnemaisonia hamifera*); modest barnacle; Japanese skeleton shrimp; orange ripple bryozoan; slipper limpet; the soft-shelled clam (*Mya arenaria*); the orange cloak sea squirt (*Botrylloides violaceus*); and siphoned Japan weed (*Dasysiphonia japonica*) (NBN Atlas, 2025). Further information on NNS within the Moray Firth is provided in Chapter 5: Supporting Information and Assessments, which includes a marine INNS biosecurity management plan as an Appendix.

The intertidal walkover survey conducted as part of the previous EIAR for the construction and dredging works for the proposed development in 2018, noted that wireweed was present on the north shore of the Whiteness Head spit exposed to the Moray Firth. The species was washed up on the shore and not attached to substrate (EnviroCentre, 2018a).

Five of these species, wireweed, Japanese skeleton shrimp, orange ripple bryozoan, Bonnemaison's hookweed and slipper limpet are considered UK Priority marine INNS (GB NNSS, 2020).

No NBN Atlas marine INNS records were present within the Study Area (NBN Atlas, 2025).

4.6 Diadromous Fish

Migratory fish are species that spend part of their life cycle in freshwater and part in seawater; such species are termed diadromous (migrate between freshwater and saltwater) and can be anadromous (migrating up rivers from the sea to spawn) or catadromous (migrating from rivers to the sea to spawn).

Several migratory fish species have the potential to occur within the diadromous fish Study Area and disposal site Study Area, migrating to and from rivers and other freshwater bodies which have connectivity to the Study Areas, or transiting the Study Areas as part of their foraging activity. Migratory fish species that have the potential to traverse the Study Areas and exist in the nearby rivers and estuaries include Atlantic salmon, sea trout, European eel (*Anguilla Anguilla*), twaite shad (*Alosa fallax*), allis shad (*Alosa alosa*), river lamprey (*Lampetra fluviatilis*) and sea lamprey (*Petromyzon marinus*). Atlantic salmon, sea trout, twaite shad, allis shad and lampreys spend most of their adult lives in the oceans but return to freshwater to reproduce (anadromous). European eel are also migratory diadromous fish, but their lifestyle differs from anadromous fish; adult eels migrate out to sea to spawn, and their larvae make the return journey (catadromous).

4.6.1 Atlantic Salmon

Atlantic salmon are listed under Appendix II of the Bern Convention, which provides protection for species requiring strict conservation measures across Europe. In the UK, freshwater populations of Atlantic salmon are protected under the Conservation of Habitats and Species Regulations 2017, where they are recognised as a species of interest, particularly in SACs designated for salmon. The River Moriston SAC lies approximately 60 km from the Inverness Firth (56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), and has Atlantic salmon listed as a qualifying feature, but not a primary reason for site selection. Whilst this site doesn’t lie within the defined Study Areas, there is potential for connectivity as Atlantic salmon migrate out of the designated river and into the Inverness and Moray Firth. The site, its relevant qualifying feature, and Conservation Objectives are summarised in Table 5.4 and shown relative to the proposed development in Figure 5.2. Atlantic salmon are also recognised as a priority species in the UK Biodiversity Framework and are Scottish PMF. Furthermore, the International Union for the Conservation of Nature (IUCN) classifies Atlantic salmon as “Endangered” in Europe, and “Near Threatened” on a global scale.

Salmon typically spawn in upper reaches of rivers or where suitable spawning gravel is located (Vladić and Petersson, 2015) (see Figure 5.5Figure 5 which shows rivers within the vicinity of the Proposed Development within which salmon are present). Atlantic salmon are referred to as Alvins after they hatch. Alvins are roughly 10 millimetres (mm) in size, still have a yolk sac and remain in interstitial gravel (Thorstad *et al*., 2011). After Alvins have used their yolk sac and grown to roughly 20 mm they are then referred to as fry and are found to inhabit slightly larger rocks and stones in river. After approximately one year after hatching Atlantic salmon are referred as par. They then undergo metamorphosis (often called smoltification) after two to three years, to survive in the marine environment and are referred to as smolts (Thorstad *et al*., 2011). External triggers are believed to be the cue for downstream smolt migration and include water discharge (flow and velocity) and temperature (McCormick *et al*., 1998; Thorstad *et al*., 2011).

The timing of the spring smolt migration is believed to significantly influence marine survival, ensuring that smolts arrive at the sea when ocean conditions, such as temperature and prey availability, are optimal. In Scottish rivers in proximity to the proposed development, smolt migration generally occurs between mid-April and mid-May. This aligns with the precautionary 'sensitive window for development activity' of day 103 of the year (April 13) to day 145 (May 25), as defined by Malcolm *et al*. (2015) to encapsulate the duration wherein large numbers of smolts are likely to be migrating into coastal waters. Although, the majority of smolts tend to migrate within a more concentrated period of one to two weeks. Smolts frequently travel downstream in groups or shoals, potentially providing them with some protection against predators. The smolt migration period, especially when smolts enter estuaries, is often marked by high mortality rates, primarily due to predation (Kocik *et al*., 2009; Thorstad *et al*., 2012). Upon reaching the sea, the movement of salmon smolts can be complex. Some smolts head directly out to sea, while others move in various directions, yet the overall movement is consistently seaward and active rather than passive (Thorstad *et al*., 2007).

The duration salmon spend at sea before returning to their natal rivers varies; in most Scottish west coast rivers, the majority return after a single winter at sea, and these fish are called grilse or single winter salmon (SWS). Two and three-sea winter salmon, also referred to as multi-sea-winter (MSW) salmon also exist but are generally less abundant than grilse. In the past ten to fifteen years, telemetry has provided insights into the movements of salmon at sea. Studies have shown that adult salmon are typically surface-oriented (Davidsen *et al*., 2013; Holm *et al*., 2006). Studies by Marine Scotland Science (MSS) into salmon swimming depth, confirmed that salmon spend most of their time near the surface (Godfrey *et al*., 2014; 2015). Despite their surface orientation, salmon were found to still utilise the full range of available depths. It is important to note however, that MSS studies mainly focus on salmon in the open sea and Pentland Firth.

Salmon in the open sea travel quickly, covering 50 to 100 km per day relative to the ground (Stewart *et al*., 2006). However, their migration speed decreases in coastal areas, likely because they need time to identify their natal region and river. In fact, salmon might not home directly to their natal river and sometimes enter other rivers where they may remain for a variable period before moving downstream to find their natal river (Stewart *et al*., 2006). Upon reaching the natal river, salmon can wait around the estuarine reaches for many days or even weeks until conditions, usually increased discharge, are suitable for them to pass into freshwater (Solomon and Sambrook, 2004). Many salmon die after spawning and those that survive will return to sea as kelts, and some of these will regain condition and spawn again (Mills, 1989).

A study by Newton *et al*. (2017) investigated the movements of Atlantic salmon smolt in the Cromarty and Moray Firths; the study observed relatively rapid downstream migration, with the fish taking an average of eight days to travel approximately 62 km. An eastern movement of smolt was observed from the Cromarty Firth, with observations made up to 30 km from shore in the marine environment, and less than 60 km from the river mouth. This is supported by Thorstad *et al*. (2004) and Finstad *et al*. (2005) who noted that smolts undergo rapid migrations towards open marine areas, away from their river of origin and in general do not follow nearby shores. However, contradictory evidence from Malcolm *et al*. (2010), suggests that smolt utilise nearshore areas at the commencement of their marine migration. A study investigating the migratory routes of adult Atlantic salmon in Scotland observed a general migratory pattern, whereby salmon migrate through the North Sea, and then travel along the coast back to their home river (Malcolm *et al*., 2010).

As aforementioned, Atlantic salmon are known to be present in several rivers which have been given SAC designation due to their presence. Additionally, Atlantic salmon are known to be present in several other non-designated rivers and water bodies which enter the Inverness and Moray Firth. To support the Conservation of Salmon (Scotland) Regulations 2016, the conservation status of Scottish salmon stocks in individual rivers is assessed each year, and gradings applied depending on the outcomes. This process is used to apply restrictions (such as catch and release) where stocks are in poor condition. Those rivers assessed as being of 'good' (grade 1), 'moderate' (grade 2) and 'poor' (grade 3) status, reflecting the vulnerability of the salmon stocks, are identified in Figure 5.5 below. Rivers of 'poor' status (and therefore highest vulnerability) are characterised by a probability of less than 60% to achieve their conservation limit, which is based on the chance that the salmon stock reached its egg requirement during each of the last five years. The allocation of a 'poor' status to a river, leads to the enforcement of mandatory catch and release regulations as a measure to support conservation objectives within these river systems (Scottish Government, 2025).

The proposed development lies in proximity to, or within the migratory pathway for salmon to the River Ness, the River Moriston and the River Beauly. All three rivers show an increased likelihood of meeting their egg requirements targets in 2024 compared to 2023. The River Ness holds a 'moderate' (grade 2) status, with a 78.8% chance of meeting the egg requirement. This classification also reflects the influence of the presence of the River Moriston SAC. The River Moriston shares the same 'moderate' status but has a higher probability of 91.71%. In contrast, the River Beauly is classified as 'good' (grade 1), with a

76.77% chance of meeting the target. The development is also close to the River Nairn, which is rated ‘good’ (grade 1). However, its 82.72% chance of meeting the egg requirement in 2024 represents a decrease from the previous year. The Burghead disposal site, where dredge spoil will be deposited, lies approximately 9 km east of the River Findhorn and 13 km west of the River Lossie. The River Findhorn is rated ‘good’ (grade 1), with a 90.12% chance of meeting the egg requirement in 2024, an improvement from 2023. In contrast, the River Lossie is classified as ‘poor’ (grade 3), with only a 5.06% chance of meeting its target, marking a significant decline from 62.05% in 2020 (Scottish Government, 2025).

Figure 5.5, shows all rivers known for the presence of Atlantic salmon as well as the River Moriston SAC, designated for Atlantic salmon, relative to the proposed development and the Burghead disposal site.

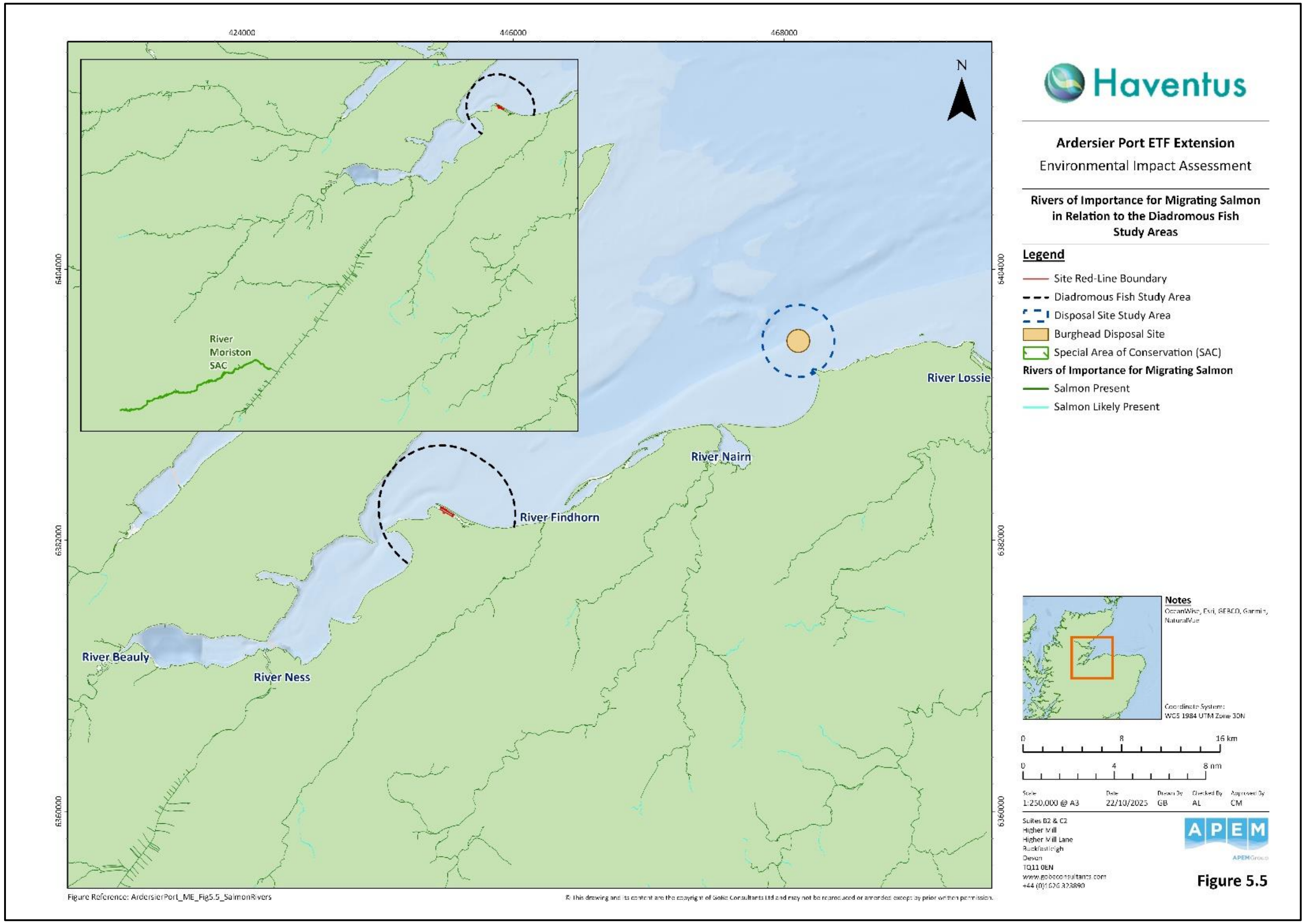

Figure 5.5. Rivers of Importance for Migrating Salmon in Relation to the Diadromous Fish Study Areas.

According to the Scottish Salmon and Sea Trout Fishery Statistics (2024), the total reported rod catch of wild salmon in Scottish rivers in 2024 was 46,978, 114% of the previous five-year average. Whilst the 2024 catches reflect an increase, they remain the among the lowest catches since records began in 1952. In 2024, catch and release accounted for 98% of the total rod catch in 2024, and 99% of the rod-caught spring MSW salmon. The reported spring MSW salmon catch was 2,593, the fourth lowest catch on record, but 104% of the previous five-year average. Figure 5.6 shows the temporal trends in annual total rod caught wild Atlantic Salmon from 1952 to 2024. Whilst there is interannual-variation in the total number of Atlantic salmon caught in Scottish waters, there is an overall observable decline since 2010. A report by Marine Scotland and Fisheries Management Scotland (2023) identified the key pressures acting on salmon in Scotland, with an aim to inform management and policy at local and national scales. The key pressures identified on Atlantic salmon populations in the east of Scotland were considered to be bird predation, and barriers to upstream migration. Pressures relating to climate change were identified as the greatest emerging threat to Atlantic salmon, with developing pressures also considered to be arising from marine developments and invasive crayfish, although the severity was concluded to be low, with uncertainty over their impacts.

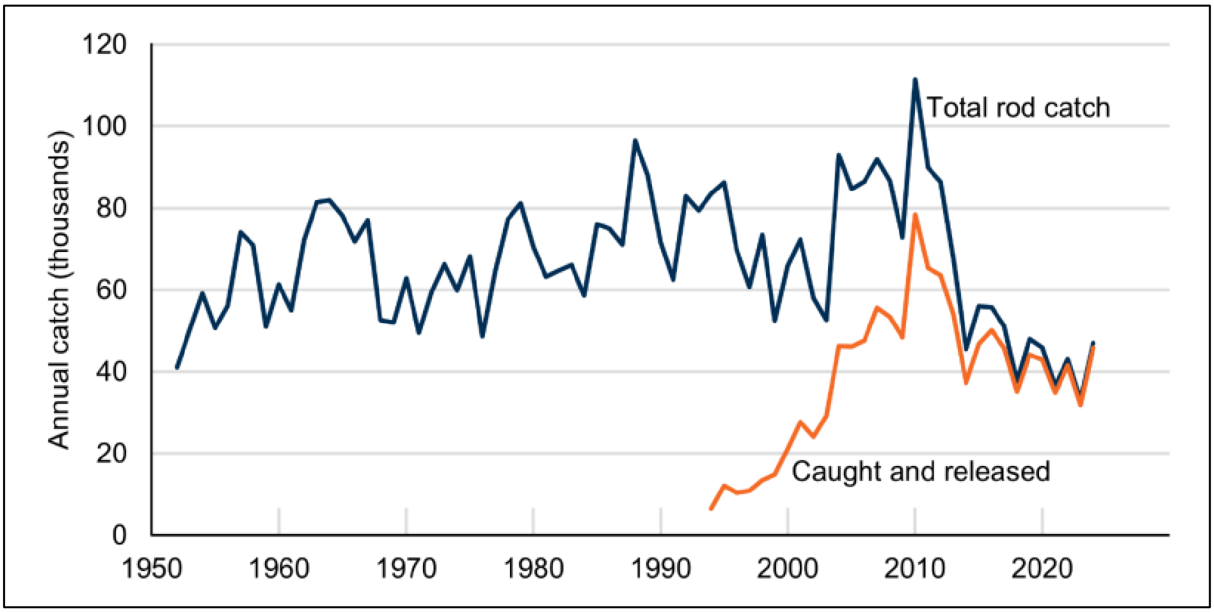

Figure 5.6. Annual number of salmon reported caught by rod fisheries since 1952, and annual number of salmon reported caught and released by rod fisheries since 1994 (Data source: 2024 Scottish salmon and sea trout fishery statistics, Supplementary Tables, Table 1, from the Scottish Government's Marine Directorate).

Taking the above into account, it can be considered with confidence that Atlantic salmon will be present within the Study Areas during their migration to and from their spawning rivers.

4.6.2 Sea Trout

Sea trout are found throughout Scotland, inhabiting headwater streams, lowland rivers, estuaries and some coastal marine waters (Scottish Wildlife Trust, 2018). Sea trout spend a number of years in freshwater before migrating out to coastal waters.

Sea trout often return to freshwater to spawn; netting and tracking data for post-smolt sea trout suggest that the species typically remain close to the coast for the first couple of months before moving further offshore (Finstad *et al*., 2005; as cited in Malcolm *et al*., 2010). There is little consistency in observed migratory patterns of adult sea trout, with studies on the west coast of Scotland suggesting locally constrained areas and contrasting studies suggesting wide range migrations supported by offshore fishing vessel catches of the species suggesting offshore movement and migrations (Malcolm *et al*., 2010). Sea trout are known to be present in several rivers and water bodies which enter the Inverness and Moray Firth. Notably, the proposed development lies in proximity to the River Nairn, with the Burghead disposal site located between the River Findhorn and the River Lossie, all three of which are considered important rivers for sea trout.

According to the Scottish Salmon and Sea Trout Fishery Statistics (2024), the total reported rod catch of sea trout in Scottish waters in 2024 was 13,876, 93% of the previous five-year average, and a decrease of 12% when compared to 2023 where 15,802 sea trout were caught. In 2024, the total rod catch of finnock was 7,329, 102% of the previous five-year average, and an increase of 11% when compared to 2023, where 6,593 were caught. The reported retained catch and release of sea trout in 2024, accounted for 94% of the total rod catch, reflecting the highest percentage of released rod caught sea tout since recorded began in 1994. Figure 5.7 shows temporal trends in annual rod caught wild sea trout in Scottish waters from 1952 to 2024. There is large interannual-variation in the total number of sea trout caught, however there is an observable decline in the number caught.

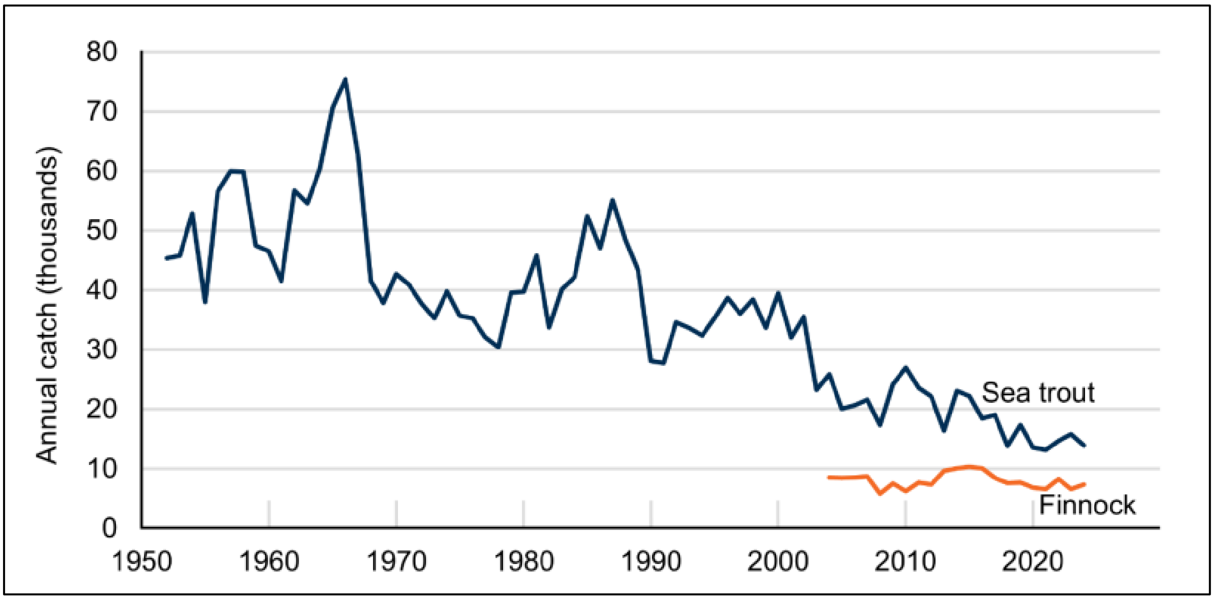

Figure 5.7. Annual number of sea trout caught by rod fisheries since 1952, and annual number of finnock reported since by rod fisheries since 2004 (data source: 2024 Scottish salmon and sea trout fishery statistics, Supplementary Tables, Table 7, from the Scottish Government's Marine Directorate).

Taking the above into account, it can be considered with confidence that sea trout will be present within the Study Area during their migration to and from their spawning rivers.

4.6.3 European Eel

European Eel are listed as critically endangered on the IUCN Red List and are UK Biodiversity Action Plan (BAP) priority fish species. In addition, the Scottish Eel Management Plan was established in 2010 in response to the Eel Recovery Plan (formed under European Commission Council Regulation No 1100/2007) with the aim of improving the European eel stocks (Defra, 2010). European eel are catadromous, feeding in freshwater and spawning at sea. The movements of juveniles migrating from the spawning grounds in the Sargasso Sea are thought to be primarily dictated by the course of prevailing currents, and there is a general assumption that proximity to Atlantic currents is associated with high eel numbers (Malcolm *et al.*, 2010), and due to the location and direction of the North Atlantic Drift current, the migratory movements of juvenile European eel are assumed to follow a southern movement along the coast. In contrast to this, the migration routes of adult eels do not appear to hug the UK coastline, however, data on the understanding of European eel movements are scarce (Malcolm *et al.*, 2010).

Whilst European eel are not exploited in Scottish waters, MSS undertakes monitoring of European eel stocks as part of the Scotland Eel Management Plan. Adult silver eels are measured at trap sites in Scotland, to estimate the biomass of adult silver eels leaving Scotland to breed (Scottish Government, 2020). The outputs of the monitoring (2008-2018), show annual variation in silver eel escapement, peaking in 2014, and showing an observable decline from 2015-2018, although escapement levels have remained above the defined escapement threshold (set by European Regulation 1100/2007) since 2013 (Scottish Government, 2020).

Considering the conservation importance of European eel, and taking a precautionary approach (based on their migratory nature), it is assumed that there is the potential for European eel to transit the Study Areas.

4.6.4 Allis and Twaite Shad

The allis shad and the twaite shad are both anadromous fish species found in the northeast Atlantic Ocean, including the North Sea and coastal waters of Scotland. The habitat requirements of twaite shad are not fully understood, but they are known to spawn at night in shallow areas near deeper pools, with their eggs sinking into the spaces between coarse gravel and cobble substrates (JNCC, 2021a). Allis shad also have poorly understood habitat needs, spending most of their adult lives in coastal waters and estuaries before migrating into rivers to spawn, sometimes traveling up to 800 km upstream in continental Europe. Allis shad spawn at night, releasing their eggs into the current where they settle among gaps in gravelly substrates, with shallow, gravelly areas adjacent to deep pools thought to represent optimal spawning habitat (JNCC, 2021b). Little is known about the adult distribution of allis shad and twaite shad in Scottish waters, although sparse records from the NBN Atlas, indicate the presence of twaite shad off of Fraserburgh.

Considering both twaite shad and allis shad are both listed on the Scottish Biodiversity list and taking a precautionary approach (based on their migratory natures), it is assumed that there is the potential for allis shad and twaite shad to transit the Study Areas.

4.6.5 River and Sea Lamprey

River lamprey and sea lamprey are designated under Appendix III of the Bern Convention, The Conservation of Habitats and Species Regulations (2017), Schedule 5 of the Wildlife and Countryside Act and are on the Scottish Biodiversity List.

River lamprey are widespread in the UK, typically occurring close to the coast (Barnes, 2008a). River lamprey are an anadromous species which grow to maturity in estuaries around Britain and then move into fresh water to spawn in clean rivers and streams. The larvae spend several years in silt beds before metamorphosing and migrating downstream to estuaries (Maitland, 2003).

Sea lamprey occur offshore throughout the UK, migrating upstream of rivers to spawn (Barnes, 2008b). Spawning in British rivers usually occurs in late May or June. After hatching, the larvae drift downstream, distributing themselves among suitable silt beds. The larvae spend several years in silt beds before metamorphosing and migrating downstream. Relatively little is known about them after they reach the sea, where they have been found in both shallow coastal and deep offshore waters (Maitland, 2003).

Considering their widespread distribution, and their migratory nature, it is assumed that there is the potential for river and sea lamprey to transit the Study Areas.

4.7 Valued Ecological Receptors

The value of ecological features is dependent upon their biodiversity, social, and economic value within a geographic framework of appropriate reference (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018). The most straightforward context for assessing ecological value is to identify those species and habitats that have specific biodiversity importance recognised through international or national legislation or local, regional or national conservation plans (e.g., OSPAR 'Threatened' and/or 'Declining' habitats/species, habitats/species on the Scottish Biodiversity List, and PMFs). Table 5.5 presents the Valued Ecological Receptors (VERs), the importance of each VER, and justification with reference to their conservation status.

Table 5.5. VERs within the Study Area.

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
Marine and Coastal Habitats			
Qualifying feature of SSSI and Ramsar Sites			
Mudflats Polychaete / bivalve dominated muddy sand shores (MA525)	International (for Inner Moray Firth Ramsar)	• Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004. • Qualifying feature of the Inner Moray Firth Ramsar as per the Ramsar Convention, 1971. • Mudflats and sandflats not covered by seawater at low tide are an Annex I habitat as per the Conservation of Habitats and Species Regulations, 2017.	• Located within the marine and coastal habitat Study Area, but beyond the footprint of the proposed development.
Sandflats 'Barren or amphipod-dominated mobile sand shores' (MA523) 'Barren littoral coarse sand' (MA5231) 'Polychaetes in littoral fine sand' (MA5241)	International (for Inner Moray Firth Ramsar)	• Qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar as per the Nature Conservation (Scotland) Act, 2004 and the Ramsar Convention, 1971 respectively. • Mudflats and sandflats not covered by seawater at low tide are an Annex I habitat as per the Conservation of Habitats and Species Regulations, 2017.	• Located within the marine and coastal habitat Study Area, but beyond the footprint of the proposed development.
Saltmarsh	International (for Inner	• Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004.	• Located within the marine and coastal habitat Study Area, but

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
'*Puccinellia maritima* salt-marsh community'	Moray Firth Ramsar)	• Qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar as per the Nature Conservation (Scotland) Act, 2004 and the Ramsar Convention, 1971 respectively. • Annex I habitat (Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) as per the Conservation of Habitats and Species Regulations, 2017	beyond the footprint of the proposed development.
Sand dune	National	• Qualifying feature of the Whiteness Head SSSI as per the Nature Conservation (Scotland) Act, 2004 and the Ramsar Convention, 1971 respectively.	• Located within the marine and coastal habitat Study Area, but beyond the footprint of the proposed development.
Shingle 'Barren littoral shingle' (MA3211)	International (for Inner Moray Firth Ramsar)	• Qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar. as per the Nature Conservation (Scotland) Act, 2004 and the Ramsar Convention, 1971 respectively.	• Located within the marine and coastal habitat Study Area, but beyond the footprint of the proposed development.
Annex I habitat features of SACs			
Sandbank '*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand' (MB5233)	International	• Annex I habitat (Moray Firth SAC designated for Sandbanks which are slightly covered by sea water all the time) as per the Conservation of Habitats and Species Regulations, 2017; • Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004.; • Habitat of Conservation Interest as per the Conservation of Habitats and Species Regulations, 2017;	• Located within the marine and coastal habitat Study Area, but beyond the footprint of the proposed development.

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
PMF			
Horse mussel beds ‘*Modiolus modiolus* beds with hydroids and red seaweeds on tide-swept circalittoral mixed substrata’ (MC2231)	International	• Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004; • Habitat of Conservation Importance as per the Conservation of Habitats and Species Regulations, 2017; • OSPAR list of threatened and/or declining species and habitats as per the OSPAR convention, 1998; • PMF (Scotland) as per the Marine Scotland Act, 2010. • *Modiolus modiolus* beds are considered an Annex I biogenic reef habitat as per the Conservation of Habitats and Species Regulations, 2017	• Located approximately 6 km from the marine and coastal habitat Study Area.
Subtidal habitat			
Atlantic Infralittoral Sand ‘Sublittoral sand in low or reduced salinity (lagoons)’ (MB52) ‘Infralittoral mobile clean sand with sparse fauna’ (MB5231) ‘Nephtys cirrosa and Bathyporeia spp. in	National	• Recorded within regional surveys (Savills, 2013); • Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004; • Habitat of Conservation Importance as per the Conservation of Habitats and Species Regulations, 2017.	• Located within the marine and coastal habitat Study Area, with the potential to be present within the footprint of the proposed development.

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
infralittoral sand' (MB5233)			
Atlantic littoral sand Polychaete/bivalve-dominated Atlantic littoral muddy sand' (MA525)	National	• Recorded within regional surveys (Savills, 2013); • Habitat of Principal Importance as per the Nature Conservation (Scotland) Act, 2004.	• Located within the marine and coastal habitat Study Area, with the potential to be present within the footprint of the proposed development.
Diadromous Fish			
Atlantic salmon	International	• OSPAR list of threatened and/or declining species and habitats; • 'Vulnerable' on the IUCN Red List of threatened species; • Protected under the Convention on the Conservation of European Wildlife and Natural Habitats ('BERN') convention; • Protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003; • Protected under the Salmon Act (1986); • PMF (Scotland) as per the Marine Scotland Act, 2010; • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004); and • Qualifying feature of the nearby River Moriston SAC (as designated under the EU Habitats Directive (Directive 92/43/EEC))	• Potential for adult and juvenile receptors to transit the Study Areas during migration. • Salmon spawn in rivers and streams, and therefore there is no potential for eggs and larvae to be present within the Study Areas.
Sea trout	National	• PMF (Scotland) as per the Marine Scotland Act, 2010; • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004);	• Potential for adult and juvenile receptors to transit the Study Areas during migration.

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
		• Protected under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003; and • Protected under the Salmon Act (1986).	• Sea trout spawn in rivers and streams, and therefore there is no potential for eggs and larvae to be present within the Study areas.
European eel	International	• OSPAR list of threatened and/or declining species and habitats; • ‘Critically endangered’ on the IUCN Red List of threatened species; • Protected under the Scottish Eel Management Plan (2010); • PMF (Scotland) as per the Marine Scotland Act, 2010; • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004); • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004).	• Potential for adult and juvenile receptors to transit the Study Areas during migration. • European eel spawn in the Sargasso Sea, and therefore there is no potential for eggs and larvae to be present within the Study Areas.
Allis shad	International	• OSPAR list of threatened and/or declining species and habitats; and • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004).	• Potential for adult and juvenile receptors to transit the Study Areas during migration. • Allis shad spawn in rivers and streams, and therefore there is no potential for eggs and larvae to be present within the Study Areas.
Twaite shad	National	• Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004).	• Potential for adult and juvenile receptors to transit the Study areas during migration. • Twaite shad spawn in rivers and streams, and therefore there is no

VER / Representative Biotope(s)	Value	Justification	Interaction with Study Areas
			potential for eggs and larvae to be present within the Study areas.
Sea lamprey	International	• OSPAR list of threatened and/or declining species and habitats; • Protected under the BERN convention; • Protected under the Salmon Act (1986); • PMF (Scotland) as per the Marine Scotland Act, 2010; • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004).	• Potential for adult and juvenile receptors to transit the Study Areas during migration. • Sea lamprey spawn in rivers and streams, and therefore there is no potential for eggs and larvae to be present within the Study Areas.
River lamprey	National	• PMF (Scotland) as per the Marine Scotland Act, 2010; and • Scottish Biodiversity list (as established by the Nature Conservation (Scotland) Act 2004).	• Potential for adult and juvenile receptors to transit the Study Areas during migration. • River lamprey spawn in rivers and streams, and therefore there is no potential for eggs and larvae to be present within the Study Areas.

5. Assessment Methodology

The overall aim of this Technical Appendix is to assess the potential impacts arising from the proposed development, on key issues raised within the scoping opinion relating to marine and coastal habitats and diadromous fish.

5.1 Guidance

The impacts and criteria used to determine sensitivity, magnitude and significance of effect on marine and coastal habitats and diadromous fish outlined in this Technical Appendix, have been undertaken in accordance with the following guidance documents:

- The CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018):
  - The CIEEM guidance considers the importance of ecological features. Ecological features can be important for a variety of reasons and may relate, for example, to the quality, rarity or extent of habitats/species, and/or the extent to which they are threatened throughout their range, or to their rate of decline.
- Marine Life Information Network (MarLIN) on the Marine Evidence-based Sensitivity Assessment (MarESA) four-point scale (high – medium – low – not sensitive) (Tyler-Walters *et al*., 2023):
  - The scale takes account of the resistance and recoverability (resilience) of a species or biotope in response to a stressor. Specific benchmarks (duration and intensity) are defined for the different impacts for which sensitivity has been assessed (e.g., smothering, abrasion, habitat alteration etc.). Detailed information on the benchmarks used and for further information on the definition of resistance and resilience can be found on the MarLIN website.

5.2 Criteria for Assessment

The process for determining the likely significance of effects is a two-stage process that involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

5.2.1 Sensitivity

Sensitivity has been considered in the assessment of effects, taking into account factors such as receptor tolerance, resilience, and recovery potential. Information on receptor sensitivity to potential impacts is clearly described in the assessment narrative where relevant, and the criteria used to define sensitivity in this Technical Appendix are presented in Table 5.6. The MarLIN MarESA categories[6] have been used to support the definition of sensitivity within the assessment, where appropriate.

Table 5.6. Sensitivity criteria.

Sensitivity	Criteria
High	**Vulnerability:** The receptor cannot or has very low capacity to avoid, adapt or tolerate the impact. **Recoverability:** Partial recovery is only likely to occur after about 10 years and full recovery may take over 25 years.
Medium	**Vulnerability:** The receptor has limited capacity to avoid, adapt or tolerate the impact. **Recoverability:** Only partial recovery is likely within 5 years and full recovery is likely to take up to 10 years.
Low	**Vulnerability:** The receptor has a reasonable capacity to avoid, adapt or tolerate the impact. **Recoverability:** Full recovery will occur but will take many months (or more likely years) but should be complete within about five years.
Negligible	**Vulnerability:** The receptor has a high capacity to avoid, adapt or tolerate the impact. **Recoverability:** The receptor is anticipated to recover immediately (seconds to days).

5.2.2 Magnitude

The magnitude of an impact is defined by a series of factors, including the spatial extent, duration frequency and reversibility. Magnitude of impact has been assessed taking into account primary mitigation measures (i.e. embedded mitigation) designed into the proposed development to avoid or minimise environmental effects. Where an impact could reasonably be assigned to more than one level of magnitude, professional judgement has been used to determine which level is applicable. The magnitude criteria for marine and coastal habitat and diadromous fish receptors are defined in Table 5.7.Table 5.7. Magnitude criteria.

Table 5.7. Magnitude criteria.

Magnitude	Criteria
High	Fundamental, permanent/irreversible changes, over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness.

[6] MarLIN - The Marine Life Information Network - Marine Evidence based Sensitivity Assessment (MarESA)

Magnitude	Criteria
Medium	Considerable, permanent/irreversible changes, over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Low	Discernible, temporary change, over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness.
Negligible	Discernible, temporary change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptors character or distinctiveness.

5.2.3 Significance

Assessment of the significance of effect on marine and coastal habitat and diadromous fish receptors has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 5.8. In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached. The magnitude of the impact is correlated against the sensitivity of the receptor to provide a level of significance. On this basis, potential impacts are assessed as Negligible, Minor, Moderate or Major.

For the purposes of this assessment, any effects with a significance level of major and/or moderate have been deemed significant in EIA terms, while those of minor or negligible are deemed non-significant.

Table 5.8. Significance of effect matrix.

Significance of Effect		**Sensitivity of Receptor**			
		Negligible	Low	Medium	High
Magnitude of Effect	Negligible	Negligible	Negligible	Negligible	Negligible
	Low	Negligible	Negligible	Minor	**Moderate**
	Medium	Negligible	Minor	**Moderate**	**Major**
	High	Negligible	**Moderate**	**Major**	**Major**

5.3 Embedded Mitigation

As the design of the proposed development has evolved, environmental constraints and considerations have been identified, enabling avoidance or reduction of potential environmental impacts where practicable (i.e. embedded mitigation measures) for marine and coastal habitats, and diadromous fish. These measures are presented below in Table 5.9.

Table 5.9. Embedded mitigation measures.

Embedded Mitigation	Rationale
Bunkering procedures, and Port Oil Spill Contingency Plans	Identify potential pollution sources and how the proposed development will respond to these spill events.
Construction Environmental Management Plan (CEMP)	Identifies the measures and procedures that will be in place on chemical usage, waste management, and any port related environmental policies.
Marine Environmental Policy	Marine Environmental Policy will set measurable environmental objectives and targets supported by a management programme that measures and monitors performance. It will involve and consult interested parties on environmental issues where appropriate, and systematically identify and assess environmental risks associated with port related activities. Marine Environmental Policy will also strive to achieve continual improvement in environmental management systems and performance.
Marine Mammal Mitigation Plan (MMMP)	The MMMP will include details of procedures to be implemented (e.g. soft starts and ramp up procedures) during piling activity. These measures will reduce the risk of injurious effects from UWN, on sensitive fish receptors.
Marine INNS biosecurity plan (Chapter 5: Supporting Information and Assessments)	The biosecurity management plan outlines activities at the port which pose risk of INNS introduction and/or spread, and recommends targeted, practical mitigation measures. Implementation of the developed biosecurity management plan therefore reduces the risk of INNS introduction into, and/or spread within, Ardersier Port.
Port Waste Management Plan (PWMP)	The PWMP will reduce environmental impact, promote resource efficiency, and maintain compliance with the Waste Framework Directive and national waste regulations.
Dredge Strategy/Method	Pre-construction sediment sampling of contaminants within the capital dredge area of the proposed development was conducted in 2025. The results of this will be reported within the Best Practice Environmental Option (BPEO). Subject to the results of contaminant analysis of sediment within the capital dredge area, a suitable dredge strategy/method will be developed (if necessary). The dredge strategy will ensure that no spread of material with elevated concentrations of contaminants will occur during dredging, and that no material with elevated concentrations of contaminants will be disposed of at the Burghead disposal site.

5.4 Assumptions and Limitations

- No dredge plume modelling has been undertaken for the proposed development in relation to potential impacts on marine and coastal ecology. As such, any assessment of effects on sensitive receptors is based on qualitative analysis, available baseline information (including sediment transport modelling undertaken by EnviroCentre between August 2023 and June 2025 and turbidity data collected by Haventus between March and August 2025, taken prior to, and during the phase 1 capital dredge), and hydrodynamic. spectral wave and sand transport modelling for the proposed development undertaken by EnviroCentre (Chapter 9: Hydrology and Hydrogeology; Chapter 10: Coastal Processes and Geomorphology).
- Site-specific survey data is limited in relation to the presence of intertidal and subtidal benthic habitats and species present. As such, any assessment of effects on sensitive receptors is based on available baseline information provided by historic intertidal and subtidal benthic surveys of the site, site-specific NVC surveys and publicly available datasets.

Data limitations have been managed by ensuring accurate interpretation of the data and clear understanding of its scope, together with cross-referencing between data sources. As data forms only part of the evidence base, the limitations identified are not considered to significantly affect the certainty, or reliability, of the impact assessments presented in Section 6.

5.5 Impacts Scoped In / Out of Assessment

The impacts that have been scoped in and out of the assessment for marine and coastal habitats and diadromous fish are presented in Table 5.10 and

Table 5.11 respectively. Key parameters for the proposed development are as described within the EIA (Chapter 2: Project Description). However, for the purpose of this Technical Appendix, key parameters for the assessment of concerns raised within the scoping opinion related to marine and coastal habitats and diadromous fish to impacts of the proposed development, are provided below in Table 5.10 and

Table 5.11. The key project parameters detailed in Table 5.10 represent worst-case assumptions to ensure a conservative and robust evaluation. This approach allows for a comprehensive assessment of potential risks and impacts, providing confidence that actual outcomes are likely to be more favourable than those presented.

Table 5.10. Impacts proposed to be scoped into, and out of, the assessment for marine and costal habitats.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
Construction			
Loss of habitat from capital dredging	**Capital dredging of the main harbour area** • Dredging of the inner harbour, using Cutter Suction Dredger (CSD) and Trailing Suction Hopper Dredger (TSHD). • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 mCD, with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Approximate dredging footprint area of 199,504 m^2 to take place on the seabed. • Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **Potential capital dredging to the west of 'Tern Island'** • Dredging of a channel spanning approximately 100 m in length, with a width of approximately two meters and depth of approximately one meter. • Approximate dredging footprint area of 200 m^2. • Dredging of approximately 200 – 500 m^3.	Scoped In	Loss of habitat will occur as a result of capital dredging within the marine environment.
Temporary habitat loss/disturbance	**Removal of old sheet piles**	Scoped In	Temporary habitat loss/disturbance will occur as a result of construction activities

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
	• Where water on the outside of the quay is deep, temporary sand bunds on the waterside of the quay wall may be required. • Approximately 150,000 m^3 of sand would be required to create sand bunds. **<u>Installation of mooring dolphins</u>** • Installation of mooring dolphins via jack-up barge, in which spud cans will be placed on the seabed. • The installation of mooring dolphins is expected to take place over approximately 19 days.		(e.g. presence of a jack-up barge for the installation of mooring dolphins and potential placement of temporary sand bunds for the removal of old sheet piles) that could have an impact on marine and coastal habitats.
Temporary increases in SSC and sediment deposition from capital dredging and disposal	**<u>Capital dredging of main harbour area</u>** • See key parameters above for 'loss of habitat from capital dredging'. **<u>Capital dredge spoil disposal</u>** • Disposal of approximately 2,000,000 m^3 of sediment, at Burghead disposal site. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • See key parameters above for 'loss of habitat from capital dredging.	Scoped In	Temporary increases in SSC may occur as a result of capital dredging of the inner harbour during construction. Increased SSC and subsequent deposition can lead to the smothering of habitats, resulting in disruption of the normal functioning of breathing and filter feeding apparatus for species, making respiration and feeding difficult.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
Seabed disturbance leading to release of sediment contaminants	**<u>Capital dredging of main harbour area</u>** • See key parameters above for 'loss of habitat from capital dredging'. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • See key parameters above for 'loss of habitat from capital dredging.	Scoped In	Seabed disturbance from construction activities could lead to the mobilisation of existing sediment contaminants that could have an impact on marine and coastal habitats.
Increased risk of introduction and/or spread of marine INNS	**<u>Capital dredging of main harbour area</u>** • See key parameters above for 'loss of habitat from capital dredging'. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • See key parameters above for 'loss of habitat from capital dredging. **<u>Construction of rock armour</u>** • Installation of rock armour within the harbour to the west of the new quay wall. • Approximately 150 m of rock armour length will be required, extending down to below MLWS. • Approximate rock armour footprint area of 2,906 m^2.	Scoped In	Introduction and/or spread of marine INNS may occur as a result of the introduction of hard structure (e.g. rock armour and rock mattress) into the marine environment, increased presence of vessels, dredging, and use of equipment and machinery during construction.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
	Construction of rock mattress • Installation of approximately 300 - 500 mm of crushed rock layer at -6 mCD adjacent to the quay. • Approximate rock mattress footprint area of 14,400 m^2. **Vessel movements** • Vessel movements within the port during construction.		
Accidental pollution	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Accidental releases of pollutants may arise as a result of accidental spills from vessels or other equipment and have detrimental effects on marine and coastal habitats. However, the risk and impact of accidental releases of hazardous substances will be reduced through the implementation of Bunkering Procedure and Port Oil Spill Contingency Plans and CEMP. In this manner, accidental release of potential contaminants from construction vessels will be strictly controlled and procedures will be in place to minimum the impact of any accidental release if it occurs, and hence the impact has been scoped out of this assessment.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
O&M			
Permanent and/or long-term habitat loss/alteration from introduction of hard structures	**<u>Presence of rock armour</u>** • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'. **<u>Presence of rock mattress</u>** • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'.	Scoped In	Permanent and/or long-term habitat loss will occur as a result of the presence of structures (e.g. rock armour and rock mattress) within the marine environment.
Changes in physical processes resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)	**<u>Capital dredging of main harbour area</u>** • See key parameters above for 'loss of habitat from capital dredging'. **<u>Potential dredging operations to the west of 'Tern Island'</u>** • See key parameters above for 'loss of habitat from capital dredging'. **<u>Presence of rock armour</u>** • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'.	Scoped In	Potential effects from changes in physical processes due to capital dredging and presence of hard structures within the water column (i.e. rock armour, rock mattress and mooring dolphins) may arise, such as changes in wave action and tidal current regimes. Changes in physical processes has the potential to alter the extent of marine and coastal habitats.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
	Presence of rock mattress • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'.		
Increased introduction and/or spread of marine INNS	**Presence of rock armour** • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'. **Presence of rock mattress** • See key parameters above for 'increased risk of introduction and/or spread of marine INNS during construction'. **Vessel movements** • The vessel calls to the Port are anticipated to be between 250-350 per annum, with up to 400 vessel calls per year at peak periods in the short-term.	Scoped In	Introduction and/or spread of marine INNS may occur as a result of maintenance dredging, and port infrastructure maintenance and associated activities such as movement of structures, cleaning and use of equipment.
Accidental pollution	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Accidental releases of pollutants may arise as a result of accidental spills from vessels or other equipment and have detrimental effects on marine and coastal habitats. However, the risk and impact of accidental releases of hazardous substances will be reduced through the implementation of a

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
			Bunkering Procedures and Port Oil Spill Contingency Plans, and CEMP. In this manner, accidental release of potential contaminants from construction vessels will be strictly controlled and procedures will be in place to minimum the impact of any accidental release if it occurs, and hence the impact has been scoped out of this assessment.
Increased SSC and deposition from maintenance dredging	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Maintenance dredging was considered within the 2018 EIA, and an application has been submitted to the Marine Directorate for a maintenance dredge licence for the main harbour approach. Impacts from these proposed works are therefore not considered further in this Technical Appendix.
Accidental pollution events during maintenance dredging activity			
Direct habitat disturbance from maintenance dredging			
Increased vessel presence from maintenance dredging activities			

Table 5.11. Impacts proposed to be scoped into, and out of, the assessment for diadromous fish.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
Construction			
Mortality, injury, behavioural changes and auditory masking arising from noise and vibration	**Removal of old sheet piles** • Excavation of sheet piles to at least below MHWS. • Removal of sheet piles using a vibratory piling rig and lay on platform. **Installation of mooring dolphins** • Installation of piles through combination of vibropiling and impact piling. • Installation is expected to take place over approximately 19 days with piling occurring for 12 days during that period.	Scoped In	Potential effects from construction activities may arise from noise and vibrations from the removal of sheet piles and installation of dolphin moorings. UWN has the potential to cause significant impacts to diadromous fish, ranging from lethal trauma to behavioural changes (such as disturbance to migration events) in susceptible fish species.
Disturbance to migration from increases in SSC and sediment deposition from capital dredging in the port and disposal of material	**Capital dredging of main harbour area** • Dredging of the inner harbour, using CSD and TSHD. • Dredging will take place approximately 800 m to 1,800 m inside the current harbour entrance. • Dredging to approximately 12.4 mCD, with a small section in the east of the harbour to approximately -6 mCD. • Dredging of approximately 2,000,000 m^3 of sand and gravel. • Approximate dredging footprint area of 199,504 m^2 to take place on the seabed.	Scoped In	Sediment plumes from dredging operations, and sediment disposal can act as barriers to migration for diadromous fish. These plumes can disrupt the natural pathways of diadromous fish, which may lead to negative impacts on their migration routes.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
	• Dredging will be between March and November inclusive. Estimated to take approximately 12 weeks. **<u>Capital dredge spoil disposal</u>** • Disposal of approximately 2,000,000 m^3 of sediment, at Burghead disposal site **<u>Potential dredging operations to the west of 'Tern Island'</u>** • Removal of 200 - 500 m^3 of sand. • Approximate dredging footprint area of 200 m^2. • Sand could either be removed by conventional land-based plant (excavator and dumper) and taken ashore, or if in less readily accessible areas (further from shore) be excavated by barge mounted backhoe and disposed of at the sea disposal ground. Alternatively, this material could be used to create the proposed extension to Tern Island described above or maintain it if in the future.		
Seabed disturbance leading to release of sediment contaminants	See key parameters above for 'Disturbance to migration from increases in SSC and sediment deposition from capital dredging in the port and disposal of material'.	Scoped In	Seabed disturbance from construction activities could lead to the mobilisation of existing sediment contaminants that could have an impact on diadromous fish.

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
Disturbance to migration from increased vessel presence	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Vessel movements to and from the Port are consented under the 2018 consent application. This indicated that approximately 340 vessels a year were anticipated to call at the Port. Although the extension area would give access to more land it is not expected to generate significantly more marine traffic. The vessel calls to the Port are anticipated to be between 250-350 per annum, comparable to the predicted 340 vessel calls per year in the 2018 application. As the increase in vessel numbers is minor, and considering the continuous nature of vessel noise, and the mobile nature of the diadromous fish receptors, this impact is scoped out of the assessment.
Accidental pollution events during construction activities		Scoped Out	Accidental releases of pollutants may arise as a result of accidental spills from vessels or other equipment and have detrimental effects on diadromous fish. However, the risk and impact of accidental releases of hazardous substances will be reduced through the implementation of a Bunkering Procedures and Port Oil Spill Contingency Plans, and CEMP. In this

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
			manner, accidental release of potential contaminants from construction vessels will be strictly controlled and procedures will be in place to minimise the impact of any accidental release if it occurs, and hence the impact has been scoped out of this assessment.
Temporary habitat disturbance from capital dredging in the harbour		Scoped Out	The diadromous fish receptors do not rely on the seabed within the study area for spawning or feeding, and subsequently there is no pathway for effect. This impact has therefore been scoped out of this assessment.
O&M			
Increased SSC and deposition from maintenance dredging	No relevant project parameters have been identified for further assessment, as the potential impact has been scoped out.	Scoped Out	Maintenance dredging was considered within the 2018 EIA, carried out for the planning permission renewal in 2019, and a Marine Licence application has been submitted to the Marine Directorate for dredging of the main harbour approach. Impacts from these proposed works are therefore not considered further in this Technical Appendix.
Accidental pollution events during maintenance dredging activity		Scoped Out	
Direct habitat disturbance from maintenance dredging		Scoped Out	
Increased vessel presence from maintenance dredging activities		Scoped Out	
Permanent and/or long-term habitat loss/alteration due to the addition of new hard substrates		Scoped Out Scoped Out	The diadromous fish receptors do not rely on the seabed within the study area for spawning or feeding, and subsequently

Impact Pathway	Key Project Parameters	Scoped In/Out	Justification
(such as scour protection, rock mattress or stone placement)			there is no pathway for effect from these impacts. These impacts have therefore been scoped out of the assessment.

6. Assessment

6.1 Marine and Coastal Habitats

6.1.1 Construction

6.1.1.1 Loss of habitat from capital dredging

Capital dredging activities are proposed within the inner harbour at the proposed development to deepen the port basin and approach channel to accommodate larger vessels. Capital dredging is also proposed to the west of Tern Island. These works are expected to result in the long-term loss of habitat within the footprint of the dredge during the construction and O&M phase of the proposed development.

Magnitude of impact

The capital dredging will deepen the inner harbour (approximately 800 m to 1,800 m inside the harbour entrance) to 12.4 mCD, with an area in the east of the inner harbour dredged to approximately -6 mCD. These works will result in the removal of approximately 2,000,000 m^3 of sediment, with an approximate dredging footprint area of 199,504 m^2 on the seabed. Additional capital dredging is also proposed to west of Tern Island located just outside of the harbour entrance, with approximately 200 - 500 m^3 of sand to be removed and an approximate dredging footprint area of 200 m^2.

The impact of capital dredging will directly affect receptors, causing the removal of habitat. However, the impact will take place in an area which has undergone significant disturbance including historic capital and maintenance dredging. As such, the impact is anticipated to result in a limited, but discernible, alterations to key characteristics of receptors. Furthermore, the capital dredging will be localised i.e. restricted to a small area of seabed habitat within the inner harbour (241,326 m^2), within the context of the marine and coastal habitat Study Area. Therefore, the magnitude of impact from loss of habitat from capital dredging is considered to be **low**.

Sensitivity of VERs

The sensitivity of VERs within the marine and coastal habitat Study Area has been assessed in relation to the following the MarLIN MarESA pressures relevant to loss of habitat from capital dredging:

- Habitat structure changes - removal of substratum (extraction).

Representative biotopes of the VERs 'Atlantic Infralittoral Sand' and 'Atlantic littoral sand' which were recorded within subtidal benthic surveys conducted in 2013 (Savills, 2013), and may be present within the footprint of the proposed development have a medium sensitivity to habitat structure changes (removal of substratum), (Tillin and Tyler-Walters, 2023; Tillin et al., 2023a; Tillin et al., 2023b). These biotopes are characterised by sedimentary infaunal communities, whereby the removal substrate via dredging, will be removed. However, characterising species are likely to recover through transport of adults in the water column or migration from adjacent patches of the same habitat (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). As such, the sensitivity of the biotopes is considered to be **medium**.

As highlighted in Table 5.5, the VERs, including 'sandflats', 'saltmarsh', 'shingle', (qualifying features of the Whiteness Head SSSI and Inner Moray Firth Ramsar), 'sand dune' (qualifying feature of the Whiteness Head SSSI), 'mudflat' (qualifying feature of the Inner Moray Firth Ramsar), 'sandbank' (a qualifying feature of the Moray Firth SAC), and 'horse mussel beds', are not present within the footprint of the proposed capital dredge. As such, it is considered that there will be no pathway for effect from loss of habitat from capital dredging. Therefore, these VERs have not been considered further.

Significance of effect

Overall, the magnitude of impact of loss of habitat from capital dredging on marine and coastal habitat receptors is assessed as **low**. The sensitivity of receptors affected is assessed as **medium**. The significance of the effect is therefore concluded to be **minor**, which is not significant in EIA terms.

6.1.1.2 Temporary habitat loss/disturbance

Temporary habitat loss and disturbance will likely occur during the construction phase of the proposed development as a result of the use of a jack-up barge for the installation of mooring dolphins on the existing westernmost quay area within the existing harbour channel. The potential placement of temporary sand bunds may also be required within the water column for the removal of old sheet piles, located parallel to the location of the new quay wall.

Magnitude of impact

During the construction phase, the installation of mooring dolphins will require the use of a jack-up barge for piling activities. It is anticipated that a single jack-up barge will be required during construction, however, the footprint area of spud cans is not yet known. It is anticipated that the installation of mooring dolphins will take place over approximately 19 days during construction and that jack-up barges will be in place during this period.

Additionally, temporary sand bunds may need to be installed on the seabed during construction to facilitate the removal of existing sheet piles and will be removed following the completion of the removal of sheet piles. The overall footprint of temporary sand bunds to be installed is not yet known. However, it is estimated that approximately 150,000 m^3 of sand will be required. While the overall footprint of temporary habitat loss is not known, the impact is predicted to be highly localised in spatial extent (covering a small area of seabed habitat within the existing port and in the context of the wider Study Area), be of short-term duration and reversible over time. Therefore, the magnitude of the impact of temporary habitat loss/disturbance is considered to be **negligible**.

Sensitivity of VERs

The sensitivity of VERs within the marine and coastal habitat Study Area has been assessed in relation to the following MarESA pressures relevant to loss of habitat from capital dredging:

- Abrasion/disturbance of the surface of the substratum or seabed.

Representative biotopes of the VERs 'Atlantic Infralittoral Sand' and 'Atlantic littoral sand' which were recorded within subtidal benthic surveys conducted in 2013 (Savills, 2013), and may be present within the footprint of the proposed development have a low sensitivity to abrasion/disturbance of the surface of the substratum or seabed (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). Abrasion and compaction of the surficial layer of sediment may damage certain individuals, such as those that are present within the surface layers of sediment. However, charactering species that burrow deeply into sediments will be more intolerant to the impact (Tillin and Tyler-Walters, 2023). For the biotopes, 'Infralittoral mobile clean sand with sparse fauna' (MB5231) and '*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand' (MB5233), characterising species are generally present in low abundances and adapted to frequent disturbance suggesting that resistance to surface abrasion would be high. As such, the sensitivity of the biotopes is considered to be **low**.

As highlighted in Table 5.5Table 5, the VERs, including 'sandflats', 'saltmarsh', 'shingle', (qualifying features of the Whiteness Head SSSI and Inner Moray Firth Ramsar), 'sand dune' (qualifying feature of the Whiteness Head SSSI), 'mudflat' (qualifying feature of the Inner Moray Firth Ramsar), 'sandbank' (a qualifying feature of the Moray Firth SAC), and 'horse mussel beds', are not present within the footprint of proposed temporary habitat loss/disturbance. As such, it is considered that there will be no pathway for effect from temporary habitat loss/disturbance. Therefore, these VERs have not been considered further.

Significance of effect

Overall, the magnitude of the impact of temporary habitat loss/disturbance on marine and coastal habitat receptors is assessed as **negligible**. The sensitivity of receptors affected is assessed as **low**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.1.1.3 Temporary Increases in SSC and sediment deposition from capital dredging and disposal

Capital dredging activities are proposed within the inner harbour at the proposed development to deepen the port basin and approach channel to accommodate larger vessels. Additional capital dredging is also proposed to the west of Tern Island just outside of the harbour entrance. Disposal of arisings is anticipated to occur at Burghead disposal site (a licenced disposal ground, located approximately 32 km from the proposed development). These works are expected to result in temporary and localised increases in SSC and associated sediment deposition on marine and coastal habitats.

Magnitude of impact

The proposed dredging within the port will deepen the inner harbour (approximately 800 m to 1,800 m inside the harbour entrance) to 12.4 mCD, with an area in the east of the harbour dredged to approximately -6 mCD. These works will result in the removal of approximately 2,000,000 m^3 of sediment, which will be disposed of approximately 2 km offshore, at a licenced disposal site near Burghead. A discrete area to the west of Tern Island is also proposed to be dredged (with approximately 200 - 500 m^3 of sand to be removed and an approximate dredging footprint area of 200 m^2). The dredging is proposed to take place between March and November in either 2027 or 2028 with an approximate duration of 12 weeks. The works will be undertaken using a CSD and/or TSHD, both of which are known to generate sediment plumes.

In the absence of sediment plume modelling for the proposed development, the tidal excursion distances in the vicinity of the proposed development, and the disposal site at Burghead have been used as proxies, to determine the maximum extent at which sediments may be transported after disturbance, and deposition. The tidal excursion distance surrounding the Riff Bank (in proximity to the proposed development), is approximately 1.1 km, and the tidal excursion distance at the Burghead disposal site is approximately 1.3 km. It is therefore assumed that sediments disturbed through dredging operations, within the proposed development, could be transported up to 1.1 km from the port, with sediments deposited at the existing Burghead disposal site being transported up to 1.3 km from the site, although most suspended sediments are expected to be deposited much closer to the disturbance activity. Sediment characteristics within the port support the expectation of limited plume dispersion from dredging and disposal activities. The seabed is largely composed of sands, with gravel also present, with only around 2% silt. Given the relatively coarse nature of the dredge material, the limited extent of the tidal excursions in proximity to both the Proposed Development, and the Burghead disposal site, it is considered that any plumes generated as a result of the dredging works in the port, and spoil disposal will be very localised and short term in duration.

Further to this, EnviroCentre conducted sediment transport monitoring at five sites at Whiteness Sands (located just beyond the entrance of Ardersier Port) between 2022 and 2025. The monitoring analysed baseline conditions of TSS up to March 2025, just prior to the phase 1 capital dredge of the outer harbour, which commenced in April 2025. TSS was then analysed again in June 2025, during the phase 1 capital dredge operations. The results indicated that TSS concentrations recorded during the phase 1 capital dredge were within the lower end of the baseline range, indicating no significant increases in TSS from dredging operations (Chapter 9: Hydrology and Hydrogeology; Chapter 10: Coastal Processes and Geomorphology). Additionally, turbidity data has also been collected from a monitoring buoy installed in March 2025, located just beyond the entrance of Ardersier Port. Results of turbidity data indicated that during the phase 1 capital dredge, concentrations fluctuated, with an average of 3.9 NTU (turbidity) recorded. These fluctuations could be the result of a range of factors including weather, tidal or wave conditions or the phase 1 capital dredge. However, the majority of readings fell with the range of baseline readings and concentrations remained generally low, following the capital dredge.

Considering the limited tidal excursion distances proximal to the proposed development, the coarse nature of the sediments within the port, and the outputs of the monitoring, the magnitude of impact from sediment discharge and dispersion from dredging operations at the Proposed Development is considered to be **low**. The material removed from the proposed development during dredging operations will largely consist of sand and gravel, which will be disposed of at an existing disposal site at Burghead. Given the coarse nature of these substrates, and the limited tidal excursion, it is anticipated that the sediment will fall out of suspension rapidly, with any generated plumes being of short term duration, and localised to the disposal event. The magnitude of impact from sediment discharge and dispersion from disposal at the Burghead disposal site is therefore also considered to be **low**.

Sensitivity of VERs

The sensitivity of VERs within the marine and coastal habitat and disposal Study Areas has been assessed in relation to the following MarESA pressures relevant to temporary increases in SSC and deposition:

- Changes in suspended solids (water clarity)
- Smothering and siltation rate changes (heavy)

Representative biotopes of the VERs ‘Atlantic Infralittoral Sand’ and ‘Atlantic littoral sand’ which were recorded within subtidal benthic surveys conducted in 2013 (Savills, 2013), and may be present within the footprint of the proposed development have a not sensitive to low sensitivity to changes in suspended solids and a low sensitivity to smothering and siltation rate changes (heavy) (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). The representative biotopes occur is depositional environments where, where sedimentation is likely to occur and an event of heavy deposition may result in some mortality of individuals. However, sediment removal by wave action will likely mitigate the effect of overall smothering, allowing for recovery to occur (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). As such, the sensitivity of the VERs is considered to be **low**.

The representative biotope of the VER ‘mudflats’, which is also a qualifying feature of the Inner Moray Firth Ramsar has a very low sensitivity to increases in suspended sediment and low sensitivity to smothering (Tyler and Marshall, 2006). Smothering of the habitat is unlikely to affect characterising species that can burrow through the sediment, although it may adversely affect the feeding of suspension feeding organisms. However, recovery of any intolerant species is likely to be high (Tyler and Marshall, 2006). Similarly, changes SSC may interfere with the feeding apparatus of suspension feeders, although, the majority of fauna would be unaffected and with a high capacity to tolerate the impact with good recoverability (Tyler and Marshall, 2006). As such, the sensitivity of the VER is considered to be **low**.

The representative biotopes of the VER ‘sandflats’, which is also a qualifying feature of the Whiteness Head SSI and Inner Moray Firth Ramsar are not sensitive to changes in suspended solids and have a not sensitive to low sensitivity to smothering and siltation rate changes (heavy) (Tillin, 2018; Tillin and Budd, 2016; Ashley, 2024). Representative biotopes such as ‘Barren or amphipod-dominated mobile sand shores’ (EUNIS code: MA523) and ‘Barren littoral coarse sand’ (EUNIS code: MA5231) are characterised by the absence of species which would be exposed to suspended solids. In such dynamic areas, suspended solids are likely to rapidly dissipate through wave action, limiting the potential for prolonged suspension and associated ecological effects (Tillin, 2018; Tillin and Budd, 2016). The characterising species of the representative biotope ‘Polychaetes in littoral fine sand’ (EUNIS code: MA5241)’ are unlikely to be affected by increased SSC and are considered to have a high capacity to tolerate varying levels of suspended solids and sediment deposition with good recoverability (Ashley, 2024). As such, the sensitivity of the VER is considered to be **low**.

The representative biotope of the VER 'shingle', which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar is not sensitive to changes in suspended solids or smothering and siltation rate changes (heavy) (Tillin *et al*., 2019). The representative biotope 'Barren littoral shingle' (EUNIS code: MA3211) occurs in scoured habitat and is likely to be frequently exposed to suspended solids. The biotope is also characterised by the absence of species, as such, changes in suspended solids will therefore not alter the character of this biotope. This biotope is therefore considered to have a high capacity to tolerate varying levels of suspended solids and sediment deposition with good recoverability. As such the sensitivity of the VER is considered to be **negligible**.

The representative biotopes of the VER 'sandbank', which is also a qualifying feature of the Moray Firth SAC ('sandbanks which are which are slightly covered by sea water all the time') have low sensitivity to changes in suspended solids and smothering and siltation rate changes (heavy) (Tillin *et al*., 2023a). The biotope '*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand' (EUNIS code: MB5233) is associated with wave exposed habitats or those with strong currents, mitigating any effects of deposition, whilst characterising species such as the white catworm *Nephtys cirrosa* and amphipods are mobile and able to burrow through deposited sediment (Tillin *et al*., 2023a). Increases in SSC within the water column may have some effects on filter feeding species which characterise the biotope, however, it is unlikely the infaunal species of the biotope will be directly affected (Tillin *et al*., 2023a). The biotope is therefore considered to have a high capacity to tolerate varying levels of suspended solids and sediment deposition with good recoverability. As such the sensitivity of the VER is considered to be **low**.

The representative biotope of the VER 'saltmarsh', which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar has a low sensitivity to increases in suspended sediment and smothering and siltation rate changes (heavy) (Tyler-Walters, 2004). Saltmarsh habitats are dependent on accretion and erosion, where under suitable sedimentation conditions pioneer or low marsh species establish, gain height and increase in seaward extent (Tyler-Walters, 2004). Furthermore, burrowing infaunal species which characterise the habitat are unlikely to be significantly affected by smothering. However, suspension feeders may be more vulnerable to elevated levels of suspended solids (Tyler-Walters, 2004). As such the sensitivity of the VER is considered to be **low**.

MarLIN does not provide representative biotopes for the VER 'sand dune' for assessment of sensitivity to temporary increases in SSC and sediment deposition. However, the VER 'sand dune', which is also a qualifying feature of the Whiteness Head SSSI, is present above MHWS.

As such, it is considered that there will be no pathway for effect from temporary increases in SSC and sediment deposition. As such, this VER has not been considered further in the assessment.

As highlighted in Table 5.5Table 5, the VER ‘horse mussel beds’ is not present within the marine and coastal habitat Study Area, with horse mussel beds known to be present off the coast of Chanonry Point approximately 6 km from the proposed development (Figure 5.3). As such, it is considered that there will be no pathway for effect from temporary increase in SSC and deposition. Therefore, this VER has not been considered further.

Significance of effect

Overall, the magnitude of impact of temporary increases in SSC and sediment deposition, on marine and coastal habitat receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **negligible** to **low**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.1.1.4 Seabed disturbance leading to release of sediment contaminants

Capital dredging, and spoil disposal will re-suspend sediments into the water column. While in suspension, there is the potential for sediment-bound contaminants, such as metals, hydrocarbons and organic pollutants, to be released into the water column, which could lead to an impact on marine and coastal habitat receptors.

Magnitude of impact

Sediment sampling undertaken within the boundary of Ardersier Port in 2013, identified the presence of fine to medium sand, and gravelly substrates within the port, with sampling in 2018 also identifying the presence of gravelly silt (EnviroCentre, 2018b). Contaminants analysis in 2013 revealed no sediment contaminants exceeding Cefas Action Level 2, with Cefas Action Level 1 exceedances recorded in five grab samples for Polyaromatic Hydrocarbons (PAHs) and one sample with an exceedance in zinc concentration (EnviroCentre, 2018b). Pre-construction sediment sampling of contaminants within the capital dredge area of the proposed development has been completed in 2025 with the results reported in the BPEO submitted along with the disposal licence application.

Following sediment disturbance resulting from dredging activities, the majority of re-suspended sediments are expected to settle within the immediate vicinity of the works due to the predominance of coarse material. Contaminants, where present, typically adsorb to the finer silt and clay fractions of sediment. However, these finer fractions constitute only a small proportion of the seabed substrate in the area (approximately 2%), thereby limiting the potential for contaminant mobilisation. Any contaminants released from these fine sediments are expected to disperse rapidly through tidal and current-driven mixing. Notwithstanding this, if contaminants are recorded as present within the proposed dredge area (as reported in the BPEO (sediment risk assessment)), a suitable dredge strategy will be developed to ensure no spread of material with elevated concentrations of contaminants. Consequently, the impact is predicted to result in either a very slight or no measurable change to baseline conditions, given its localised spatial extent, short-term duration and proposed measures if contaminants are present. The magnitude of impact is therefore considered to be **low**.

Regarding disposal at the Burghead disposal site, as aforementioned, the dredged material will predominantly consist of coarse materials (sands and gravels), which contaminants do not typically adsorb to, which thereby limits the potential for deposition of contaminants at the disposal site. Furthermore, if contaminants are recorded as present within the proposed dredge area (as informed by the analysis of the site-specific pre-construction sediment sampling within the BPEO), a suitable dredge strategy will be developed if necessary, whereby no material with elevated concentrations of contaminants will be disposed of at the Burghead disposal site. This will be secured within the Marine Licence application. Therefore, the impact is not predicted to result in a measurable change to baseline conditions at the disposal site, and therefore the magnitude of impact from spoil disposal is considered to be **low**.

Sensitivity of VERs

Construction activities leading to the resuspension of sediments will have varying levels of impact dependent on the species present and pollutants involved.

The MarESA assessment does not provide an assessment of the relevant chemical pressures for the identified marine and coastal habitat VERs in Table 5.5Table 5, due to limited evidence, with the exception of the VERs ‘saltmarsh’ and ‘horse mussel beds’. Where an assessment is available for VERs, sensitivity has been assessed in relation to the following MarESA pressures relevant to release of seabed contaminants:

- Transitional elements and organo-metal contamination
- Hydrocarbon and PAH contamination
- Synthetic compound contamination

The MarESA evidence base considers the effects of pollutants and chemicals should they be accidently released at concentrations that exceed environmental protection standards.

Representative biotopes of the VERs identified within Table 5.5Table 5, are largely characterised by sessile or low mobility species which will be unable to avoid any contaminants released from sediment. Additionally, many of these suspension feeding species may absorb contaminants directly from the water column by taking in suspended particulate matter.

Bivalve species accumulate heavy metals into their tissues at levels much higher than environmental levels, indicating a degree of tolerance (Widdows and Donkin, 1992). However, sub-lethal levels of heavy metals may cause a range of effects including siphon retraction, valve closure, inhibition of byssal thread production, disruption of burrowing behaviour, inhibition of respiration, inhibition of filtration rate and suppressed growth (Aberkali and Trueman, 1985). Echinoderms are considered to be intolerant of heavy metals, whilst polychaetes are more tolerant (Bryan, 1984; Kinne, 1984). Echinoderms and amphipods are also regarded as being intolerant of hydrocarbons, whilst polychaetes are considered to be tolerant of elevated hydrocarbon levels (Suchanek, 1993; Cabioch *et al*., 1978).

Recoverability of VERs from chemical contamination will vary considerably between species. For instance, bivalves and crustaceans typically have high fecundity and may recover fully. However, it should be noted that even with good annual recruitment/reproduction, this may take several years (Tyler-Walters, 2008; Sabatini and Hill, 2008). It is anticipated that, following cessation of any potential impact, re-colonisation of affected areas would occur via adult migration and larval settlement. Consequently, VERs are considered to be vulnerable to contaminants but may have a reasonable capacity to adapt and/or tolerate the impact, with good capacity to recover. As such, the sensitivity of the VERs is considered to be **medium**.

The representative biotope of the VER ‘saltmarsh’, which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar has a sensitivity of very low for heavy metal contamination and sensitivity of moderate for synthetic compound and hydrocarbon contamination (Tyler-Walters, 2004). Sheltered areas of saltmarsh, like those present within the eastern extent of Ardersier Port, may act as a sink for pollutants including synthetic compounds, heavy metals and hydrocarbons. Uptake of heavy metals occurs through the roots of saltmarsh plants and is species specific, where heavy metals are either excluded or accumulated. Overall, saltmarsh is considered relatively tolerant of heavy metals. However, some characterising marine infaunal species may be lost leading to a reduction in species richness (Tyler-Walters, 2004). As such, the sensitivity of the VERs is considered to be **medium**.

MarLIN does not provide representative biotopes for the VER ‘sand dune’ for assessment of sensitivity to seabed disturbance leading to release of sediment contaminants. However, the VER ‘sand dune’ which is also a qualifying feature of the Whiteness Head SSSI is present above

MHWS. As such, it is considered that there will be no pathway for effect from seabed disturbance leading release of sediment contaminants and has not been considered further.

As highlighted in Table 5.5Table 5, the VER 'horse mussel beds' is not present within the marine and coastal habitat Study Area, with horse mussel beds known to be present off the coast of Chanonry Point approximately 6 km from the proposed development (Figure 5.3). As such, it is considered that there will be no pathway for effect from temporary habitat loss/disturbance. Therefore, this VER has not been considered further.

Significance of effect

Overall, the magnitude of impact of seabed disturbance leading to release of sediment contaminants, on marine and coastal habitat receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **medium**. The significance of the effect is therefore concluded to be **minor**, which is not significant in EIA terms.

6.1.1.5 Increased risk of introduction and/or spread of marine INNS

NNS are those which have been introduced to a new location, outside of their native range, as a result of anthropogenic activity. INNS are NNS that cause negative ecological, economic and/or social impacts. Which NNS are 'invasive' is often context-dependant and can change over time.

Marine INNS impacts are wide ranging, including direct impacts such as food and space competition, predation and disease (Gallardo *et al*., 2015; Tsirintanis *et al*., 2022). It is important to note that indirect impacts can also occur, such as changes in nutrient levels, ecosystem functioning or trophic cascades, which can have knock-on effects on benthic communities (Gallardo *et al*., 2015; Dimitriadis, 2021). The impacts of marine INNS and receptors affected are therefore difficult to predict.

The majority of known marine INNS occupy hard surfaces and/or benthic environments in coastal intertidal and subtidal habitats (Wasson *et al*., 2005; Ruiz *et al*., 2011; 2015). This impact assessment will therefore focus on benthic habitats, although it is important to note that marine INNS can also be pelagic (e.g., Green *et al*., 2012) and can be found in a wide diversity of environments (Carlton 2002; 2003; Carlton and Schwindt, 2023).

The introduction and spread of INNS may occur during the construction phase of the proposed development due to the introduction of hard substrate into the marine environment (e.g. rock armour), the movement and presence of vessels (due to ballast water exchange, and biofouling of vessel hulls and infrastructure), dredged material and equipment (Hewitt *et al.*, 2009; Dey and Stebbing, 2024; Nall *et al*., 2015).

Magnitude of Impact

During construction, rock armour will be installed within the harbour, located to the west of the newly constructed quay wall. Approximately 150 m of rock armour is anticipated, extending below MLWS, with an approximate footprint area of 2,906 m^2. In addition, a rock mattress will also be installed within the harbour. This is expected to comprise a crushed rock layer positioned at approximately -6 mCD, adjacent to the quay wall, with an approximate footprint area of 14,400 m^2 and a total linear extent of approximately 300 to 500 m. The number of vessels required during construction of the proposed development is not known at this stage. However, any increase in vessel presence during construction is anticipated to be small in the context of vessels which already operate within the port.

Eradication of INNS is challenging, especially in open systems such as the marine environment. Therefore, if marine INNS were to be introduced and/or spread and consequently establish, and/or their populations were to increase in fitness, successful removal and consequent return to baseline conditions is unlikely in most scenarios. Any negative impacts caused by established marine INNS, particularly those at high densities, would be long-term, and potentially widespread and severe, in a worst-case scenario.

However, embedded mitigation measures include the development of an INNS biosecurity management plan (Chapter 5: Supporting Information and Assessments). This will outline measures to be taken to prevent the introduction and/or spread of INNS and will ensure that the risk of potential introduction and spread of marine INNS is reduced as far as practicable. Therefore, the magnitude of this impact at the construction phase, assuming the mitigation measures outlined in the biosecurity management plan are implemented, is considered to be **negligible**, indicating that there is unlikely to be anything over a very minor loss or detrimental alteration to one or more characteristics, features or elements.

Sensitivity of VERs

Assessing the sensitivity of marine and coastal habitat receptors to marine INNS impacts would require comprehensive knowledge of multiple dynamic and uncertain factors. These include: the current and potential future presence of marine INNS, their spatial distribution and abundance, the full suite of direct and indirect ecological impacts associated with each INNS, and the specific response of each receptor to those impacts. Given the inherent challenges in detecting marine INNS and the complex, often context-dependent nature of their ecological effects (e.g., Gallardo *et al*. 2015; Dimitriadis *et al*. 2021), such an assessment is not realistically achievable at the level of individual species-receptor combinations.

Therefore, on a precautionary basis, a resistance value of low to none has been assigned to all marine and coastal habitat receptors, acknowledging that some species will be more tolerant than others. Similarly, resilience is considered low to very low for all marine and coastal habitat receptors since a return to 'normal' conditions is highly unlikely if a marine INNS introduction and establishment occurred.

The sensitivity of VERs to the introduction or spread of marine INNS is deemed to be at worst-case **high**.

Significance of Effect

Overall, the increased risk of introduction or spread of marine INNS is considered to be **negligible** magnitude due to the development of an INNS biosecurity management plan which will outline measures to be taken to prevent the introduction and/or spread of INNS. The sensitivity of receptors affected is predicted to be at worst-case **high**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.1.2 O&M

6.1.2.1 Permanent and/or long-term habitat loss/alteration from introduction of hard structures

The installation of both rock armour and rock mattress is proposed during construction, which would result in long-term habitat loss and alteration of habitat during O&M.

Magnitude of impact

During the O&M phase, the completed development will include the presence of rock armour within the harbour, located to the west of the newly constructed quay wall. Approximately 150 m of rock armour is anticipated, extending below MLWS, with an approximate footprint area of 2,906 m^2. In addition, a rock mattress will be installed within the harbour. This is expected to comprise a crushed rock layer positioned at approximately -6 mCD, adjacent to the quay wall, with an approximate footprint area of 14,400 m^2 and a total linear extent of approximately 300 to 500 m. While the impact will directly affect receptors and comprise a long-term change in seabed habitat, the impact will be highly localised (covering a small area of seabed habitat within the context of Ardersier Port and the wider marine and coastal habitat Study Area). Therefore, the magnitude of impact from permanent and/or long-term habitat loss/alteration as a result of the installation of hard structures is considered to be **negligible**.

Sensitivity of VERs

The sensitivity of VERs within the marine and coastal habitat Study Area has been assessed in relation to the following MarESA pressures relevant to permanent and/or long-term habitat loss/alteration from introduction of hard structures:

- Physical change (to another seabed type).

Representative biotopes of the VERs 'Atlantic Infralittoral Sand' and 'Atlantic littoral sand' which were recorded within subtidal benthic surveys conducted in 2013 (Savills, 2013), and may be present within the footprint of the proposed development have a high sensitivity to physical change to another seabed type (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). These biotopes are characterised by sedimentary habitat. Therefore, a change to artificial or rock substratum would alter the character of the biotope, resulting in the loss of the sedimentary community including the characterising bivalve, polychaete and amphipod species (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). As such, the sensitivity of the biotopes is considered to be **high**.

As highlighted in Table 5.5Table 5, the VERs, including 'sandflats', 'saltmarsh', 'shingle', (qualifying features of the Whiteness Head SSSI and Inner Moray Firth Ramsar), 'sand dune' (qualifying feature of the Whiteness Head SSSI), 'mudflat' (qualifying feature of the Inner Moray Firth Ramsar), 'sandbank' (a qualifying feature of the Moray Firth SAC), and 'horse mussel beds', are not present within the footprint of the proposed development. As such, it is considered that there will be no pathway for effect from permanent and/or long-term habitat loss/alteration. Therefore, these VERs have not been considered further.

Significance of effect

Overall, the magnitude of impact of permanent and/or long-term habitat loss/alteration on marine and coastal habitat receptors is assessed as **negligible**. The sensitivity of receptors affected is assessed as **high**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.1.2.2 Changes in physical processes resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)

Changes to physical processes (wave and current regimes) may occur as a result of changes in bed levels and water depths due to capital dredging activities proposed within the harbour as well as from the presence of associated rock armour, rock mattress and mooring dolphin structures on the seabed. These changes have the potential to alter tidal exchange volumes within the port, which could, in turn, influence the distribution and extent of adjacent marine and coastal habitats.

Magnitude of impact

The capital dredging will deepen the inner harbour (approximately 800 m to 1,800 m inside the harbour entrance) to 12.4 mCD, with an area in the east of the inner harbour dredged to approximately -6 mCD. These works will result in the removal of approximately 2,000,000 m^3 of sediment, with an approximate dredging footprint area of 199,504 m^2 on the seabed. The dredging is proposed to take place between March and November in either 2027 or 2028 with an approximate duration of 12 weeks.

During the O&M phase, the completed development will include the presence of rock armour within the harbour, located to the west of the newly constructed quay wall. Approximately 150 m of rock armour is anticipated, extending below MLWS, with an approximate footprint area of 2,906 m^2. Rock mattress will also be installed within the harbour. This is expected to comprise a crushed rock layer positioned at approximately -6 mCD, adjacent to the quay wall, with an approximate footprint area of 14,400 m^2 and a total linear extent of approximately 300 to 500 m. In addition, two mooring dolphin structures will be present during the O&M phase on the existing westernmost quay area.

Coastal processes modelling has been undertaken for the proposed development with respect to hydrodynamic and spectral wave modelling (Chapter 10: Coastal Processes and Geomorphology). Modelling results indicate that there will be no significant impacts are predicted to water levels or tidal phasing/durations and current speeds as a result of the proposed development. Additionally, no significant impact is predicted to wave heights within areas of saltmarsh, with only very minor increases observed within the harbour under north-westerly winds (Chapter 10: Coastal Processes and Geomorphology). It is considered that any changes to coastal processes would be long-term, however, would be localised, resulting in barely discernible changes over a small area. Therefore, the magnitude of impact from changes in coastal processes is considered to be **negligible**.

Sensitivity of VERs

The sensitivity of VERs within the study area have been assessed in relation to the following MarESA pressures relevant to changes in coastal processes:

- Water flow (tidal current) changes (local)

- Wave exposure changes

Representative biotopes of the VERs ‘Atlantic Infralittoral Sand’ and ‘Atlantic littoral sand’ which were recorded within subtidal benthic surveys conducted in 2013 (Savills, 2013), and may be present within the footprint of the proposed development have a not sensitive to medium sensitivity to water flow changes and a not sensitive to high sensitivity to wave exposure changes (Tillin and Tyler-Walters, 2023; Tillin *et al*., 2023a; Tillin *et al*., 2023b). For the biotope ‘Sublittoral sand in low or reduced salinity (lagoons)’ (MB52) occurs in weak to very weak flows, where an increase in flows may result in a change to sediment (Tillin and Tyler-Walters, 2023). For the biotope ‘Polychaete/bivalve-dominated Atlantic littoral muddy sand’ (MA525), an increase in wave exposure would alter the sediment and therefore, the habitat may be intolerant to the impact (Tyler-Walters and Marshall, 2006). As such, the sensitivity of the VERs is considered to be **high**.

The representative biotope of the VER ‘mudflats’, which is also a qualifying feature of the Inner Moray Firth Ramsar has a moderate sensitivity to increase in water flow rates and a high sensitivity to increase in wave exposure (Tyler-Walters and Marshall, 2006). Changes in the water flow rate may change sediment structure leading to the removal of the upper layer of fine silty sediment in muddier sediments and some habitat loss (Tyler-Walters and Marshall, 2006). Furthermore, increased water flow and wave exposure may require some characterising species to re-burrow more frequently, adversely affecting the energy budgets (Tyler-Walters and Marshall, 2006). As such, the sensitivity of the VER is considered to be **high**.

The representative biotopes of the VER ‘sandflats’, which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar are not sensitive to water flow changes and wave exposure changes (Tillin, 2018; Tillin and Budd, 2016; Ashley, 2024). For the representative biotopes ‘Barren or amphipod-dominated mobile sand shores’ (EUNIS code: MA523) and ‘Barren littoral coarse sand’ (EUNIS code: MA5231), it is unlikely that changes in water flow would lead to any alterations in the biotopes as wave exposure would still result in sediment mobility, preventing the establishment of a more species rich biotope (Tillin, 2018; Tillin and Budd, 2016). Additionally, representative biotopes are typically subject to moderately exposed, exposed or very exposed wave action and any increases in wave action is unlikely to lead to alterations to the biotopes (Tillin, 2018; Tillin and Budd, 2016). The representative biotope ‘Polychaetes in littoral fine sand’ (EUNIS code: MA5241), occurs on moderately exposed beaches where increased water flow and wave action is likely to resuspend finer material and may lead to reduced abundance of characterising species. However, recovery of the biotope would be rapid (Ashley, 2024). As such, the sensitivity of the VER is considered to be **negligible**.

The representative biotope of the VER ‘shingle’, which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar is not sensitive to water flow changes and wave exposure changes (Tillin *et al*., 2019). The representative biotope ‘Barren littoral shingle’ (EUNIS code: MA3211) is found on shores that are typically moderately exposed, exposed or very exposed to wave action, where any changes to water flow and wave action is unlikely to lead to an alteration to the biotope (Tillin *et al*., 2019). As such, the sensitivity of the VER is considered to be **negligible**.

The representative biotopes of the VER ‘sandbank’, which is also a qualifying feature of the Moray Firth SAC (‘sandbanks which are which are slightly covered by sea water all the time’) is not sensitive to water flow changes and wave exposure changes (Tillin *et al*., 2023a). For the representative biotope ‘*Nephtys cirrosa* and *Bathyporeia* spp. in infralittoral sand’ (EUNIS code: MB5233), the sediments characterising the biotope are mobile sands, where increased water flows and wave action may lead to minor changes in sediment sorting. However, the biotope is not considered to be sensitive to increases in water flow (Tillin *et al*., 2023a). As such, the sensitivity of the VER is considered to be **negligible**.

Representative biotope of the VER ‘saltmarsh’, which is also a qualifying feature of the Whiteness Head SSSI and Inner Moray Firth Ramsar has a moderate sensitivity to increase in water flow rates and a low sensitivity to increase in wave exposure (Tyler-Walters, 2004). Increases in water flow rates and wave exposure will result in changes to the accretion and erosion rates in the saltmarsh, particularly at lower areas of the marsh exposed to immersion for longer periods of time, adversely affecting invertebrate marine species of the biotope (Tyler-Walters, 2004). Rates of recovery and recolonisation will vary depending on the level of damage or disturbance caused by increases in water flow and wave action (Tyler-Walters, 2004). However, pioneer species of the saltmarsh may be expected to recover rapidly (i.e. in a matter of months) where disturbance is slight, or longer (up to 10 years) where sediment is significantly disturbed. As such, the sensitivity of the VER is considered to be **medium**.

MarLIN does not provide representative biotopes for the VER ‘sand dune’ for assessment of sensitivity to changes in coastal processes including water flow and wave exposure changes. The VER is a qualifying feature of the of the Whiteness Head SSSI, where changes in coastal processes including any increased water flow and wave action, may result in the loss of extent to sand dune habitat. As such, the sensitivity of the VER is considered to be **high**.

As highlighted in Table 5.5Table 5, the VER ‘horse mussel beds’ is not present within the marine and coastal habitat Study Area, with horse mussel beds known to be present off the coast of Chanonry Point approximately 6 km from the proposed development (Figure 5.3). As such, it is considered that there will be no pathway for effect from changes in physical processes. Therefore, this VER has not been considered further.

Significance of effect

Overall, the magnitude of impact of changes in physical processes, on marine and coastal habitat receptors is assessed as **negligible**. The sensitivity of all receptors affected is assessed as **negligible** to **high**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.1.2.3 Increased Risk of Introduction and/or Spread of Marine INNS

An overview of marine INNS has been provided within Section 4.5. During the O&M phase of the proposed development, the introduction and spread of INNS may occur due to presence of vessels (due to ballast water exchange, and biofouling of vessel hulls and infrastructure). Additionally, the presence of new artificial hard substrate at the port, such as mooring dolphin structures, rock mattress, and a rock armour, will increase the hard substrate habitat available for INNS to colonise.

Magnitude of Impact

During O&M, the proposed development will include the presence of 150 m of rock armour extending below MLWS, with an approximate area of 2,906 m^2. Rock mattress with also be present, with an approximate footprint of 14,400 m^2 and a total linear extent of approximately 300 to 500 m. Additionally the presence of mooring dolphins structures within the water column will also provide hard substrate for INNS to colonise. While the total footprint of hard structures is not known at this stage, the impact will be highly localised (covering a small area of seabed habitat for INNS to colonise).

Vessel calls to the Port during O&M are anticipated to be between 250-350 per annum, with up to 400 vessel calls per year at peak periods in the short-term. This is similar to vessel calls per year in the 2018 application for Ardersier Port.

Furthermore, embedded mitigation measures include the implementation of the INNS biosecurity management plan. This will outline measures to be taken to prevent the introduction and/or spread of INNS, will ensure that the risk of potential introduction and spread of marine INNS is reduced as far as practicable. Therefore, the magnitude of this impact during the O&M phase of the proposed development is considered to be **negligible**, indicating that there is unlikely to be anything over a very minor loss or detrimental alteration to one or more characteristics, features or elements.

Sensitivity of Receptor

Assessing the sensitivity of marine and coastal habitat receptors to marine INNS impacts would require comprehensive knowledge of multiple dynamic and uncertain factors. These include: the current and potential future presence of marine INNS, their spatial distribution and abundance, the full suite of direct and indirect ecological impacts associated with each species, and the specific response of each receptor to those impacts. Given the inherent challenges in detecting marine INNS and the complex, often context-dependent nature of their ecological effects (e.g., Gallardo *et al*. 2015; Dimitriadis *et al*. 2021), such an assessment is not realistically achievable at the level of individual species-receptor combinations.

Therefore, on a precautionary basis, a resistance value of low to none has been assigned to all marine and coastal habitat receptors, acknowledging that some species will be more tolerant than others. Similarly, resilience is considered low to very low for all marine and coastal habitat receptors since a return to 'normal' conditions is highly unlikely if a marine INNS introduction and establishment occurred.

The sensitivity of VERs to the introduction or spread of marine INNS is deemed to be at worse case **high**.

Significance of Effect

Overall, the increased risk of introduction or spread of marine INNS is considered to be **negligible** magnitude due to the development of an INNS biosecurity management plan which will outline measures to be taken to prevent the introduction and/or spread of INNS. The sensitivity of receptors affected is predicted to be at worst-case **high**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

6.2 Diadromous Fish

6.2.1 Construction

6.2.1.1 Mortality, injury, behavioural changes and auditory masking arising from noise and vibration

UWN can potentially have a negative impact on diadromous fish receptors, ranging from behavioural effects (such as disturbance to migration) to physical injury/mortality. In general, biological damage as a result of sound energy is either related to a large pressure change (barotrauma) or to the total quantity of sound energy received by a receptor. Barotrauma injury can result from exposure to a high intensity sound even if the sound is of short duration (i.e., a single strike of a piling hammer). However, when considering injury due to the energy of an exposure, the time of the exposure becomes important. Fish are also considered to be sensitive to the particle motion element of UWN. However, research into this impact on fish populations is scarce, representing a source of uncertainty in the assessment process. Despite the lack of thresholds for particle motion, the criteria detailed within Popper *et al*. (2014) remain the best available evidence to inform the assessment of UWN impacts to fish receptors (Popper and Hawkins, 2021).

The worst case impacts from UWN will arise from the installation of three mooring dolphins through impact piling, vibratory (vibro) piling or a combination of both techniques, and deepening of the inner harbour through the use of TSHD or CSD. For the purposes of the assessment, UWN modelling has been undertaken to predict the received sound pressure levels and sound exposure levels generated during the proposed construction works. Chapter 11: Marine Mammals, Appendix 11.5: Construction Works – Port of Ardersier: Underwater Noise Modelling Assessment, presents the outputs of the modelling for a range of noise levels, representing the worst case scenario for the proposed piling and dredging activities (Table 5.12 summarises the parameters used to inform the modelling).

Table 5.12. Parameters used to inform the UWN modelling and impact assessment.

Proposed Activity	Relevant worst case parameters
Impact piling of piles for mooring dolphins	Pile: Steel Tubular Piles, 1,200 mm diameter Strike rate: 34 blows per minute Piling time per pile: 10 hours (including surveying and pile positioning etc.) (since the active piling time is unknown at the time of writing, 10 hours of continuous piling is assumed as a worst-case scenario to remain precautionary) Soft Start: 20 minutes (assumed at 20% energy) Maximum hammer energy: 294 kilojoules (kJ) Installation is expected to take place over approximately 19 days with piling occurring for 12 days during that period.
Vibropiling of piles for mooring dolphins	Since no project specific details were provided for vibropiling equipment, the proxy used to inform the modelling is described in Chapter 11: Marine Mammals, Appendix 11.5: Construction Works – Port of Ardersier: Underwater Noise Modelling Assessment. Piling time per pile: 10 hours (including surveying and pile positioning etc.) (since the active piling time is unknown at the time of writing, 10 hours of continuous piling is assumed as a worst-case scenario to remain precautionary) Installation is expected to take place over approximately 19 days with piling occurring for 12 days during that period.
Dredging	Although TSHD and CSD are proposed to be used, CSD is louder than TSHD, and therefore, only CSD was considered in the assessment, as a worst-case scenario. Since no project specific details were provided for CSD equipment, the proxy used to inform the modelling is described in Chapter 11: Marine Mammals, Appendix 11.5: Construction Works – Port of Ardersier: Underwater Noise Modelling Assessment. Since the active dredging time is unknown at the time of writing, CSD was

Proposed Activity	Relevant worst case parameters
	assumed to take place continuously for 24-hours, to remain precautionary)

The impact ranges, from piling and dredging activities, as derived from the UWN modelling, are used to inform the impact assessment for diadromous fish receptors. For impact piling, the modelling has used the criteria from Popper *et al*. (2014) for pile driving (summarised in Table 5.14). Since vibropiling and dredging are non-impulsive, continuous sound sources, the modelling uses the criteria from Popper *et al*. (2014) for shipping and continuous sounds (summarised in Table 5.15).

Popper *et al*. (2014) classifies receptors based on their hearing system; the diadromous fish VERs within the Project Study Area have therefore been grouped accordingly (see Table 5.13). It is important to note that there are differences in impact thresholds for the different hearing groups (see Table 5.14 and Table 5.15).

Table 5.13. Hearing categories of fish receptors (Popper *et al*., 2014) (*denotes uncertainty or lack of current knowledge with regards to the potential role of the swim bladder in hearing).

Category	VERs relevant to the Project
Group 1 (least sensitive): No swim bladder (particle motion detection)	Sea lamprey and river lamprey.
Group 2: Swim bladder is not involved in hearing (particle motion detection)	Atlantic salmon, sea trout.
Group 3 (most sensitive): Swim bladder involved in hearing (primarily pressure detection)	European eel*, twaite shad, allis shad
Eggs and larvae (considered separately by Popper *et al*. (2014) due to their potential vulnerability, reduced mobility, and small size.	Atlantic salmon, sea trout, twaite shad, allis shad, sea lamprey and river lamprey all spawn in rivers and streams, and European eel spawn in the Sargasso Sea. These receptors are therefore not present within the Study Areas, and potential impacts to eggs and larvae from UWN are therefore not assessed further as there is no pathway for effect.

Table 5.14. Impact piling threshold criteria from Popper *et al*. (2014).

Impact threshold noise level (sound pressure level (SPL) (Lp,pk)/ sound exposure level (SEL) (LE,p,24h)) and qualitative criteria (near-field (N), intermediate field (I) and far-field (F))					
Category	**Mortality and potential mortal injury**	**Recoverable injury**	**TTS**	**Masking**	**Behaviour**
Group 1	219dB $L_{E,p}$ 213dB $L_{p,pk}$	216dB $L_{E,p}$ 213dB $L_{p,pk}$	>>186dB $L_{E,p}$	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Group 2	210dB $L_{E,p}$ 207dB $L_{p,pk}$	203dB $L_{E,p}$ 207dB $L_{p,pk}$	>186dB $L_{E,p}$	(N) Moderate (I) Low (F) Low	(N) High (I) Moderate (F) Low
Group 3	207dB $L_{E,p}$ 207dB $L_{p,pk}$	203dB $L_{E,p}$ 207dB $L_{p,pk}$	186dB $L_{E,p}$	(N) High (I) High (F) Moderate	(N) High (I) High (F) Moderate

Table 5.15. Continuous noise threshold criteria from Popper *et al*. (2014).

Impact threshold noise level Popper *et al*. (2014) quantitative criteria ($L_{p,RMS}$) and qualitative criteria (near-field (N), intermediate field (I) and far-field (F))					
Category	**Mortality and potential mortal injury**	**Recoverable injury**	**TTS**	**Masking**	**Behaviour**
Group 1	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Group 2	(N) Low (I) Low (F) Low	(N) Low (I) Low (F) Low	(N) Moderate (I) Low (F) Low	(N) High (I) High (F) Moderate	(N) Moderate (I) Moderate (F) Low
Group 3	(N) Low (I) Low (F) Low	170 dB $L_{p,48h}$	158 dB $L_{p,12h}$	(N) High (I) High (F) High	(N) High (I) Moderate (F) Low

The modelling of cumulative sound exposure levels ($L_{E,p}$) provides outputs for both fleeing receptors, and stationary receptors, to account for species diversity and varying responses to noise. Most fish receptors are likely to swim away from harmful sounds (Dahl *et al*., 2015), and these speeds are likely to vary widely across species, therefore, a conservative swim speed of 1.5 ms^{-1} (Hirata, 1999) is used in fleeing animal models.

The noise modelling for injury ranges for fleeing and stationary diadromous fish receptors is presented in Chapter 11: Marine Mammals, Appendix 11.5 Construction Works - Port of Ardersier: Underwater Noise Modelling Assessment and referred to as appropriate in the following assessments. Table 5.16, Table 5.17 and Table 5.18 below summarise the results for each of the relevant criteria for the proposed construction works. The impact ranges for stationary receptors are also presented in Figure 5.8, Figure 5.9 and Figure 5.10[7].

Table 5.16. Predicted impact ranges associated with impact piling.

Hearing Group	Threshold	Estimated impact ranges (m) (fleeing/stationary)
Mortality and potentially mortal injury		
Group 1	219dB $L_{E,p}$	<10 m / 40 m
	213 dB $L_{p,pk}$[8]	20 m
Group 2	210dB $L_{E,p}$	<10 m / 180 m
	207dB $L_{p,pk}$	30 m
Group 3	207dB $L_{E,p}$	<10 m / 420 m
	207dB $L_{p,pk}$	30 m
Recoverable Injury		
Group 1	216 dB $L_{E,p}$	<10 m /60 m
	213 dB $L_{p,pk}$	20 m
Group 2	203 dB $L_{E,p}$	<10 m / 520 m
	207 dB $L_{p,pk}$	30 m
Group 3	203 dB $L_{E,p}$	<10 m / 520 m
	207 dB $L_{p,pk}$	30 m
TTS		
Group 1	>>186dB $L_{E,p}$	<10 m / 1,760 m
Group 2	>186dB $L_{E,p}$	<10 m / 1,760 m
Group 3	186 dB $L_{E,p}$	<10 m / 1,760 m

Table 5.17. Predicted impact ranges associated with vibropiling.

Hearing Group	Threshold	Estimated impact ranges (m)
Recoverable Injury		
Group 3	170 dB $L_{p,48h}$	20 m
TTS		

[7] It should be noted that due to the limited impact ranges for fleeing receptors (<10 m for all receptor groups), these haven't been presented in Figure 5.8, Figure 5.9 and Figure 5.10, as the extent of the noise contours is too small to show relative to the proposed development, wider Study Areas and rivers of importance to receptors. Noise contours for stationary receptors have therefore only been shown.

[8] The modelling of Lp,pk does not provide outputs for fleeing/static responses to noise

Hearing Group	Threshold	Estimated impact ranges (m)
Group 3	158 dB $L_{p,48h}$	80 m

Table 5.18. Predicted impact ranges associated with dredging activities.

Hearing Group	Threshold	Estimated impact ranges (m)
Recoverable Injury		
Group 3	170 dB $L_{p,48h}$	<10 m
TTS		
Group 3	158 dB $L_{p,48h}$	20 m

The following paragraphs provide the assessment of potential impacts on each VER for the spatial and temporal impacts from UWN associated with impact piling. Initial consideration is given to characterisation of the scale and magnitude of effect from the proposed works, before the sensitivity of each VER to UWN is determined. The significance of effect is then concluded, based on the matrix in Section 5.2.3.

Magnitude of impact, impact piling

The area over which potential impacts from UWN from impact piling may occur has been determined through UWN modelling, based on the sound pressure thresholds recommended by Popper *et al*. (2014). As summarised in Table 5.16, for peak pressure noise levels ($L_{p,pk}$ metric), Group 1 receptors are predicted to exceed their mortality and recoverable injury threshold if they are within 20 m of the impact piling activities. For the cumulative sound exposure ($L_{E,p}$ metric), mortality and recoverable injury of stationary Group 1 receptors is predicted to occur up to 40 m and 60 m from the source respectively, and TTS is predicted to occur up to 1,760 m from the source (see Figure 5.8).

Group 2 receptors are predicted to exceed their mortality and recoverable injury threshold if they are within 30 m from the impact piling activities. For the cumulative sound exposure ($L_{E,p}$ metric), mortality and recoverable injury of stationary Group 2 receptors is predicted to occur up to 180 m and 520 m from the source respectively, and TTS is predicted to occur up to 1,760 m from the source. The impact ranges for injurious effects however assume the receptors remain stationary for the maximum potential piling duration of 10 hours.

Given the mobile nature of Group 1 and Group 2 receptors (sea lamprey, river lamprey, sea trout and Atlantic salmon), the range of injurious effects and TTS is anticipated to be localised to the piling activities which will be undertaken within the confines of the harbour (<10 m based on a receptor fleeing at 1.5 ms^{-1}).

Regarding the potential for masking and behavioural effects on Group 1 and Group 2 receptors, the risk of masking effects are estimated to be moderate in the nearfield (10s of metres), with a high to moderate risk of behavioural effects in the near, and intermediate (100s of metres) fields respectively.

Considering the localised range of impacts from UWN, and the temporary and intermittent nature of piling operations, the magnitude of impact for the piling activities for Group 1 and 2 receptors is **low**.

Regarding the potential impacts to Group 3 receptors (European eel, allis shad and twaite shad), for peak pressure noise levels ($L_{p,pk}$ metric), Group 3 receptors are predicted to exceed their mortality and recoverable injury threshold if they are within 30 m from the impact piling activities. For the cumulative sound exposure ($L_{E,p}$ metric), mortality and recoverable injury of stationary Group 3 receptors is predicted to occur up to 420 m and 520 m from the source respectively, and TTS is predicted to occur up to 1,760 m from the source (see Table 5.16). However, this assumes a stationary receptor, and considering the mobile nature of European eel, allis shad and twaite shad the range of impact is likely to be localised to piling activity (<10 m based on a receptor fleeing at 1.5 ms^{-1}). Regarding masking and behavioural effects (such as disturbance to migration) the risks of effects are slightly higher, estimated as high in the near and intermediate fields, and moderate in the far field (1,000s’ of metres). Considering the localised range of the impact for mobile receptors, and the temporary and intermittent nature of piling operations, the magnitude of impact for Group 3 receptors is **low**.

Magnitude of impact, vibropiling

As summarised in Table 5.17Table 5., the risk of mortality and potential mortal injury and recoverable injury from continuous noise activities such as vibropiling to Group 1 and Group 2 receptors is considered to be low at all distances from the source (although it should be acknowledged, that there is no direct evidence of mortality or potential mortal injury in fish from continuous noise sources). The risk of impacts from TTS, masking and behavioural effects are comparatively higher, with moderate impacts in the nearfield (10’s of metres) from TTS, high risk of masking effects up to the intermediate field (100s of metres), and moderate risk of behavioural effects also up to the intermediate field. It is therefore apparent, that a small degree of disturbance to Group 1 and Group 2 receptors (from auditory masking and behavioural effects) may occur during vibropiling activities, however, any impacts from UWN will largely be restricted to within the vicinity of the works and considering the temporary and intermittent nature of piling activities, and the mobile nature of the receptors (reducing their exposure to UWN), the magnitude of impact for Group 1 and Group 2 receptors is **low**.

With regard to Group 3 receptors (European eel, allis shad and twaite shad), the risk of mortality and potential mortal injury from vibropiling is also considered to be low at all distances from the source. As summarised in Table 5.17Table 5., recoverable injury and TTS are anticipated to occur up to 20 m and 80 m from the source respectively. As summarised in Table 5.16, there is a high risk of masking effects of Group 3 receptors at all distances from the source (up to 1,000s of metres), and a high risk of behavioural effects in the nearfield (10's of metres). It is therefore apparent, that a small degree of disturbance to Group 3 receptors (from auditory masking and behavioural effects) may occur during vibropiling activities, however, any impacts from UWN will largely be restricted to within the vicinity of the works and considering the temporary and intermittent nature of the proposed works, and the mobile nature of the receptors, the magnitude of impact for Group 3 receptors is therefore **low.**

Magnitude of impact, dredging activities

Like vibropiling, UWN generated from dredging activities is also continuous, and subsequently the range of impact is the same as those associated with vibropiling for Group 1 and Group 2 receptors (as the same qualitative Popper *et al*. (2014) criteria apply), and subsequently the magnitudes of impact for these receptors are also anticipated to be **low**. The range of impact from mortality and potential mortal injury, masking effects and behaviour effects from dredging activities for Group 3 receptors will also be the same as those from vibropiling. Recoverable injury and TTS are anticipated to occur up to 20 m from the source (as summarised in Table 5.18). Considering the continuous nature of the noise (there is no direct evidence of mortality or potential mortal injury in fish from continuous noise sources), the intermittent nature of the proposed activities, and the mobile nature of the receptors, the magnitude of impact from dredging noise for Group 3 receptors is anticipated to be **low**.

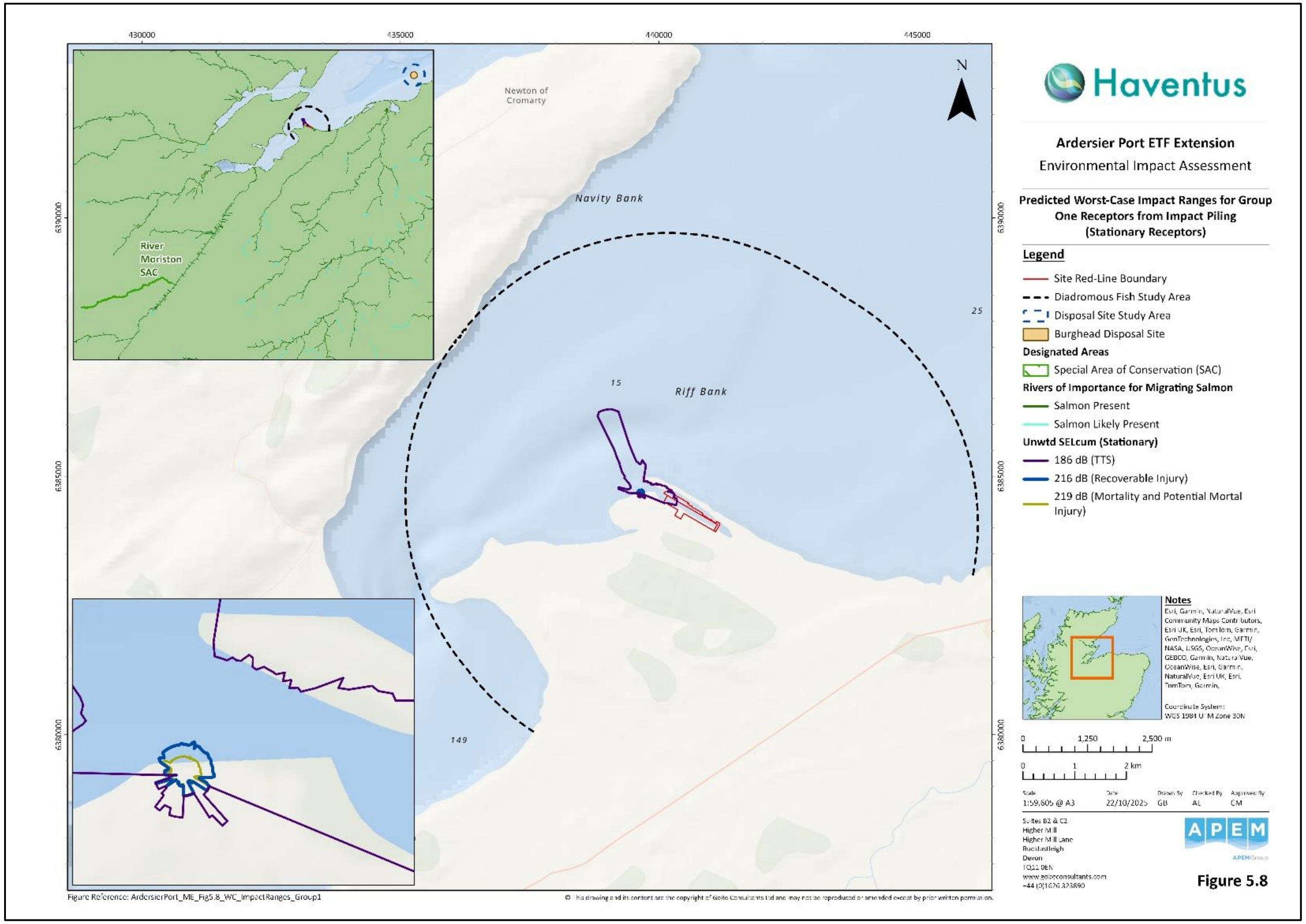

Figure 5.8. Predicted Worst-case Impact Ranges for Group One Receptors from Impact Piling (Stationary Receptors).

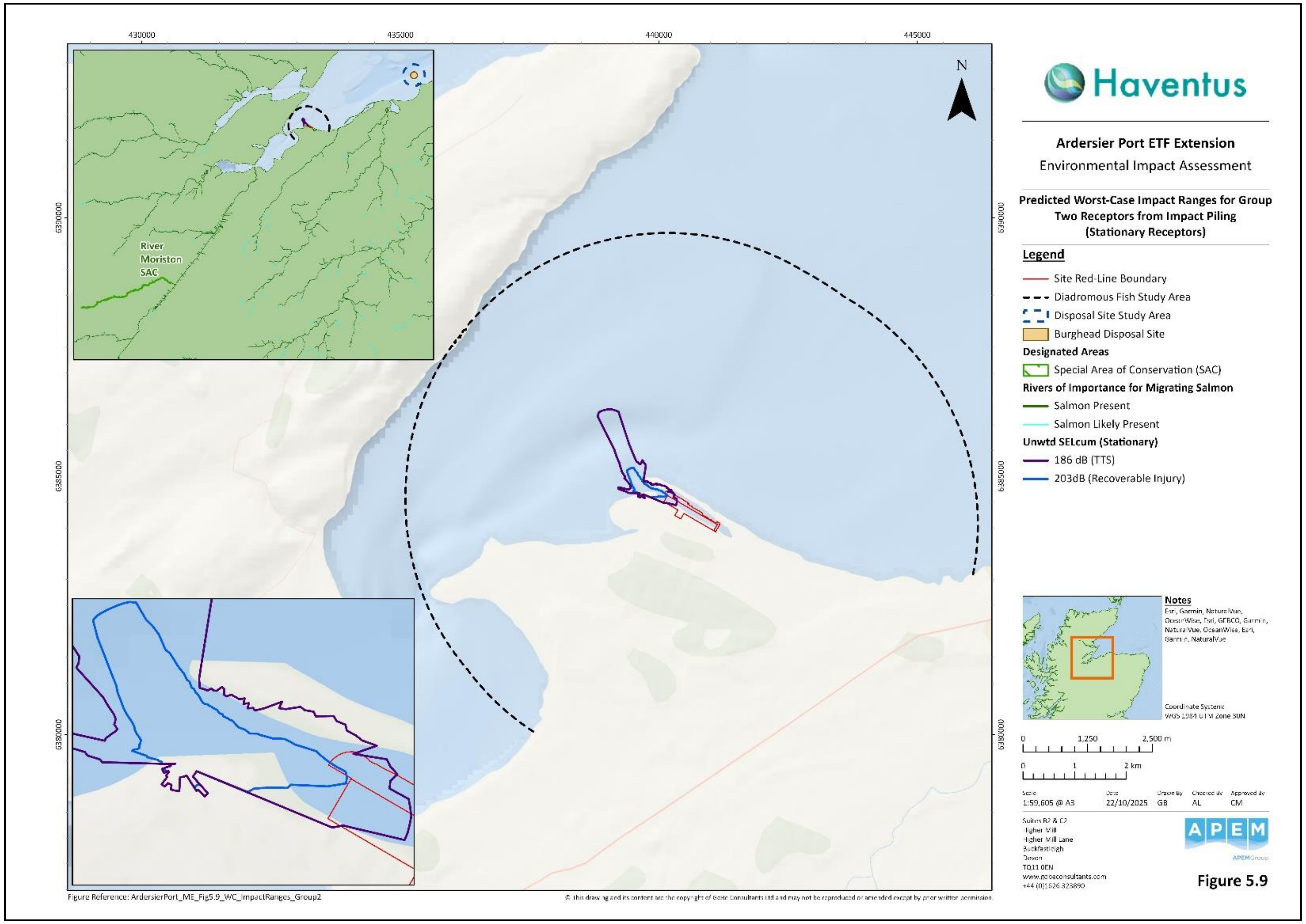

Figure 5.9. Predicted Worst-Case Impact Ranges for Group Two Receptors from Impact Piling (Stationary Receptors).

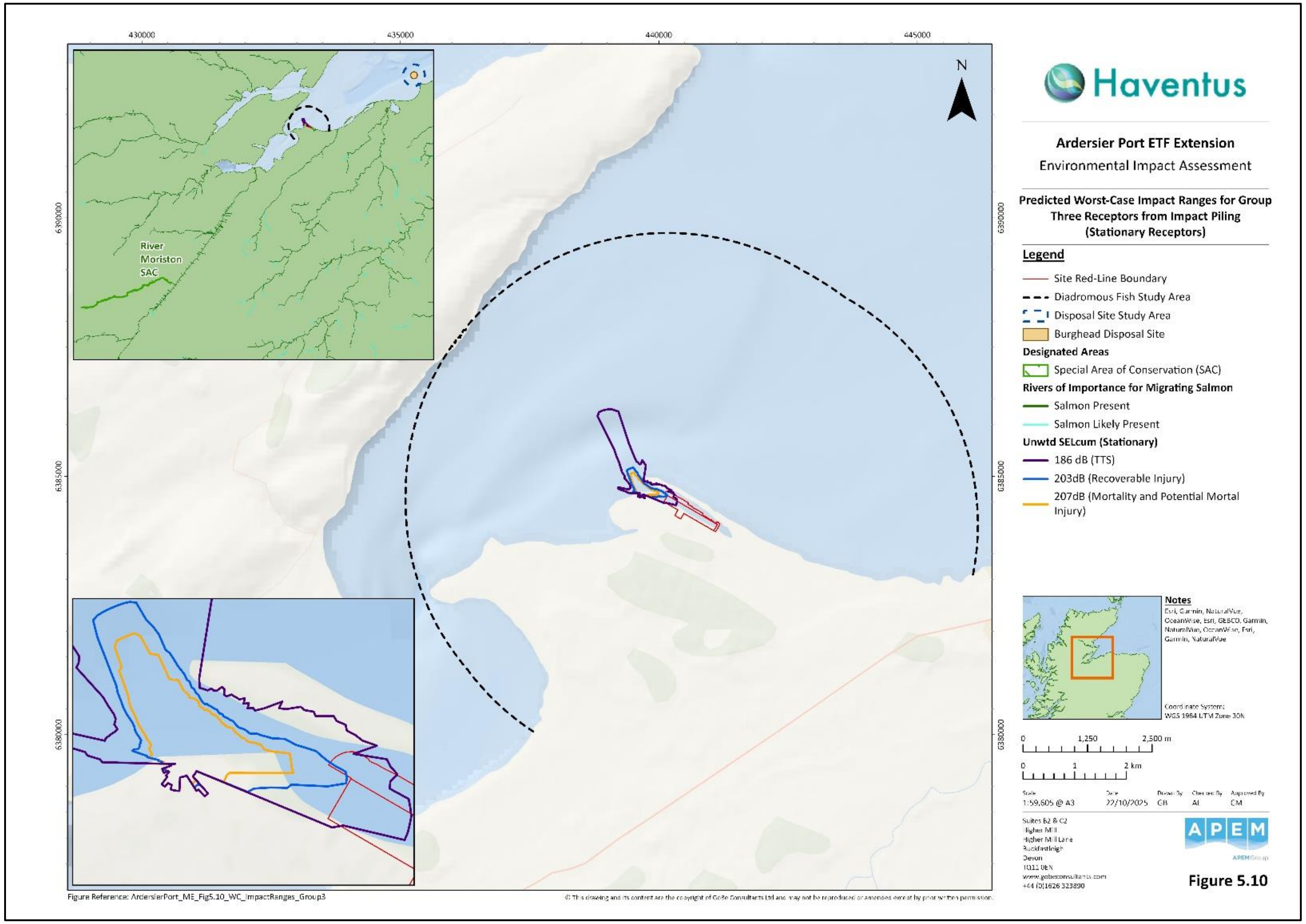

Figure 5.10. Predicted Worst-Case Impact Ranges for Group Three Receptors from Impact Piling (Stationary Receptors).

Sensitivity of VERs

Sea lamprey and river lamprey (Group 1 receptors, as classified using the Popper *et al*. (2014) criteria) lack a swim bladder and are therefore considered less sensitive to UWN than other species. Based on their low vulnerability to UWN impacts, and their mobile nature (potentially transiting the Study Areas during migration), these receptors are expected to recover quickly following exposure to UWN. Taking this into account, the receptors are deemed to be of low vulnerability, high recoverability, and of national to international importance. The sensitivity of these receptors to UWN impacts is therefore considered to be **low**.

Atlantic salmon and sea trout are Group 2 receptors (as classified using the Popper *et al*., (2014) criteria) and are therefore considered to primarily sense UWN through particle motion despite the presence of a swim bladder (Popper *et al*., 2014). Given the mobile nature of Atlantic salmon and sea trout (potentially transiting the Study Areas during migration), they are anticipated to be able to adapt their behaviour and move away from the piling location during soft-start and ramp-up procedures (as detailed in the MMMP) prior to the use of the highest hammer energies, which will reduce the number of individuals at risk of injurious effects. Few studies have investigated behavioural reactions of Atlantic salmon and sea trout to piling noise, providing inconclusive results, with some studies showing a lack of behavioural responses and others reporting changes in the abundance and distribution of Atlantic salmon due to avoidance reactions (reviewed by Gillson *et al*. (2022)). There is, however, evidence that behavioural responses in fish as a result of UWN might be reduced when fish are engaged in life history critical activities such as spawning and feeding (e.g. Doksaeter *et al*., 2009; Pena *et al*., 2013; Skaret *et al*., 2005). While a similar damping of behavioural reactions might occur in Atlantic salmon and sea trout during migration, the implications of experiencing temporary avoidance or stress responses remain not fully understood, and it cannot be excluded that such responses could delay migration in the short-term. However, given the transient nature of the receptors through the Study Areas around the Proposed Development and the Burghead disposal site, and the availability of unaffected waters within the broader migratory corridor (the entrance to the Inverness Firth is approximately 4 km wide at the port entrance, and the Moray Firth is approximately 22.5 km wide at Burghead) any temporary displacement from disturbance would not result in a barrier effect to any upstream or outgoing migration, as the available space would ensure free passage to migrating receptors. Taking this into account, and considering the international importance of Atlantic salmon, the sensitivity of this receptor to UWN is rated as **medium**. Considering the regional importance of sea trout, the sensitivity of sea trout to UWN from impact piling is deemed to be **low**.

European eel, allis shad and twaite shad are all Group 3 receptors (as classified using the Popper *et al*. (2014) criteria) and are therefore considered to be sensitive to UWN, with direct detection of sound pressure, rather than just particle motion. The presence of a swim bladder makes them highly susceptible to tissue damage, and given their good hearing ability, they are also at higher risk to physiological and behavioural effects ((Popper *et al*. (2014); Popper and Hawkins (2019)). Given the mobile nature of these receptors (transiting the Study Area during migration), they are anticipated to be able to adapt their behaviour and move away from the piling location during soft-start and ramp-up procedures (detailed within the MMMP) prior to the use of the highest hammer energies, which will reduce the number of individuals at risk of mortal or recoverable injuries. Further to this, given the transient nature of the receptors through the Study Areas around the Proposed Development and the Burghead disposal site, and the availability of unaffected waters within the broader migratory corridor any temporary displacement from disturbance would not result in a barrier effect to any upstream or outgoing migration, as the available space would ensure free passage to migrating receptors. Taking this into account and considering the international importance of European eel and allis shad, and the national importance of twaite shad, the sensitivity of these receptors to UWN is rated as **medium**.

Significance of Effect

Overall, the magnitude of impact of UWN, on diadromous fish receptors is assessed as **low** for all noisy activities (impact piling, vibropiling and dredging). The sensitivity of all receptors affected is assessed as **low** to **medium**. The significance of the effect is therefore concluded to be **negligible** to **minor**, which is not significant in EIA terms.

Atlantic salmon are a qualifying feature of the River Moriston SAC (located 56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), which has connectivity to the Inverness Firth. Considering the mobile nature of Atlantic salmon across the Study Areas (which reduces their exposure to UWN), and the localised nature of the impacts from UWN from impact piling, vibro-piling and dredging activities, relative to the width of the Inverness Firth at the port entrance (approximately 4 km wide), the available space in the Inverness Firth is considered to be suitable to ensure free passage to migrating smolts, juveniles and adults during the migration period (should piling or dredging occur during this period). Therefore, no significant effects are anticipated on salmon as a qualifying feature of this designated site.

6.2.1.2 Temporary increases in SSC and sediment deposition from capital dredging and disposal

Capital dredging activities are proposed within the harbour at the proposed development to deepen the port basin and approach channel to accommodate larger vessels. Additional capital dredging is also proposed to the west of Tern Island located just outside of the harbour entrance. Spoil disposal is anticipated to occur at Burghead disposal site (a licenced disposal ground, located approximately 32 km from the proposed development, and 2km offshore of Burghead). These works are expected to result in temporary and localised increases in SSC and associated sediment deposition. Sediment plumes from dredging operations, and spoil disposal have the potential to cause barrier effects to the migration of diadromous fish.

Magnitude of impact

The proposed dredging within the port will deepen the inner harbour (approximately 800 m to 1,800 m inside the harbour entrance) to 12.4 mCD, with an area in the east of the harbour dredged to approximately -6 mCD. These works will result in the removal of approximately 2,000,000 m^3 of sediment, which will be disposed of approximately 2 km offshore, at a licenced disposal site near Burghead. A discrete area to the west of Tern Island is also proposed to be dredged (with approximately 200 - 500 m^3 of sand to be removed and an approximate dredging footprint of 200 m^2). The spoil from dredging operations at Tern Island may be removed by conventional land-based plant (excavator and dumper) and taken ashore, or if in less readily accessible areas (further from shore) be excavated by barge mounted backhoe and disposed of at the Burghead disposal ground.

The dredging operations are proposed to take place between March and November in either 2027 or 2028, over an approximate duration of 12 weeks. The dredging operations will be undertaken using a CSD and/or TSHD, both of which are known to generate sediment plumes.

In the absence of sediment plume modelling for the proposed development, the tidal excursion distances in the vicinity of the proposed development, and the disposal site at Burghead have been used as proxies, to determine the maximum extent at which sediments may be transported after disturbance, and deposition. The tidal excursion distance surrounding the Riff Bank (located proximal to the proposed development), is approximately 1.1 km, and the tidal excursion distance at the Burghead disposal site is approximately 1.3 km. It is therefore assumed that sediments disturbed through dredging operations within the proposed development could be transported up to 1.1 km, with sediments deposited at the existing Burghead disposal site being transported up to 1.3 km from the site, although most suspended sediments are expected to be deposited much closer to the disturbance activity. Sediment characteristics within the port support the expectation of limited plume dispersion from dredging and disposal activities. The seabed is largely composed of sands, with gravel also present, with approximately 2% silt. Given the relatively coarse nature of the dredge material, the limited extent of the tidal excursions at both the proposed Development, and the Burghead disposal site, it is considered that any plumes generated as a result of the dredging works in the port, and spoil disposal at Burghead will be very localised and short term in duration.

Further to this, EnviroCentre conducted sediment transport monitoring at five sites at Whiteness Sands (located just beyond the entrance of Ardersier Port) between 2022 and 2025. The monitoring analysed baseline conditions of TSS up to March 2025, just prior to the phase 1 capital dredge of the outer harbour, which commenced in April 2025. TSS was then analysed again in June 2025, during the phase 1 capital dredge operations. The results indicated that TSS concentrations recorded during the phase 1 capital dredge were within the lower end of the baseline range, indicating no significant increases in TSS from dredging operations (Chapter 9: Hydrology and Hydrogeology; Chapter 10: Coastal Processes and Geomorphology). Additionally, turbidity data was also collected from a monitoring buoy installed in March 2025, located just beyond the entrance of Ardersier Port. Results of turbidity data indicated that during the phase 1 capital dredge, concentrations fluctuated, with an average of 3.9 NTU recorded. These fluctuations could be the result of a range of factors including weather, tidal or wave conditions, or the phase 1 capital dredge. However, the majority of readings fell with the range of baseline readings, and concentrations remained generally low following the capital dredge.

Considering the limited tidal excursion distances proximal to the proposed development and Tern Island, the coarse nature of the sediments within the port, and the outputs of the sediment transport monitoring and turbidity data, the magnitude of impact from sediment discharge and dispersion from dredging operations at the Proposed Development is considered to be **low**.

The material removed from the proposed development and west of Tern Island during dredging operations will largely consist of sand and gravel, which will be disposed of at an existing disposal site at Burghead. Given the coarse nature of these substrates, and the limited tidal excursion at the disposal site, it is anticipated that the sediment will fall out of suspension rapidly, with any generated plumes being of short term duration, and localised to the disposal event. The magnitude of impact from sediment discharge and dispersion from disposal at the Burghead disposal site is therefore also considered to be **low**.

Sensitivity of VERs

Diadromous fish species, including Atlantic salmon, European eel, sea lamprey, river lamprey, allis shad and twaite shad, migrate through estuarine environments as part of their life cycles. These habitats are naturally dynamic and often characterised by elevated SSC, meaning that these diadromous receptors are generally adapted to turbid conditions. Further to this, diadromous fish species are highly mobile and would be able to relocate to nearby unimpacted areas. Localised avoidance reactions have the potential to occur in areas of high SSC during the duration of the plumes. A study by Carlson *et al*. (2001) documented the behavioural responses of salmonids to dredging activities and observed avoidance responses of migrating salmon upon encountering sediment plumes. However, given the transient nature of the diadromous receptors through the Study Areas around the Proposed Development and the Burghead disposal site, and the availability of unaffected waters within the broader migratory corridor (the entrance to the Inverness Firth is approximately 4 km wide at the port entrance, and the Moray Firth is approximately 22.5 km wide at Burghead) any displacement would not result in a barrier effect to any upstream or outgoing migration, as the available space should ensure free passage to migrating receptors. Taking this into account, diadromous fish are considered to have **low** sensitivity to increased SSC and deposition as a result of the proposed development construction activities.

Significance of effect

Overall, the magnitude of impact of increased SSC and deposition from dredging operations at the Proposed Development and Tern Island, on diadromous fish receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **low**. The significance of the effect from dredging operations is therefore concluded to be **negligible**, which is not significant in EIA terms.

The magnitude of impact of increased SSC and deposition from spoil disposal at the Burghead disposal site, on diadromous fish receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **low**. The significance of the effect from spoil disposal is therefore concluded to be **negligible**, which is not significant in EIA terms.

Atlantic salmon are a qualifying feature of the River Moriston SAC, (located 56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), with connectivity to the Inverness Firth. Considering the mobile nature of Atlantic salmon, and the localised nature of the impacts from increased SSC and deposition from dredging activities and spoil disposal, relative to the width of the Inverness Firth at the port entrance (approximately 4 km wide) and the width of the Moray Firth (approximately 22.5 km wide at Burghead), the available space is considered to be suitable to ensure free passage to migrating smolts, juveniles and adults during the migration period. Therefore, no significant effects are anticipated on salmon as a qualifying feature of the River Moriston SAC.

6.2.1.3 Seabed disturbance leading to release of sediment contaminants

Capital dredging, and spoil disposal will re-suspend sediments into the water column. While in suspension, there is the potential for sediment-bound contaminants, such as metals, hydrocarbons and organic pollutants, to be released into the water column, which could lead to an impact on diadromous fish receptors.

Magnitude of impact

Sediment sampling undertaken within the boundary of Ardersier Port in 2013, identified the presence of fine to medium sand, and gravelly substrates within the port, with sampling in 2018 also identifying the presence of gravelly silt. Contaminants analysis in 2013 revealed no sediment contaminants exceeding Cefas Action Level 2, with Cefas Action Level one exceedances recorded in five grab samples for PAHs and one sample with an exceedance in zinc concentration. Pre-construction sediment sampling of contaminants within the capital dredge area of the proposed development has been completed in 2025 with the results reported in the BPEO submitted along with the disposal licence application.

Following sediment disturbance resulting from dredging activities, the majority of re-suspended sediments are expected to settle within the immediate vicinity of the works due to the predominance of coarse material. Contaminants, where present, typically adsorb to the finer silt and clay fractions of sediment. However, these finer fractions constitute only a small proportion of the seabed substrate in the area (approximately 2%), thereby limiting the potential for contaminant mobilisation. Any contaminants released from these fine sediments are expected to disperse rapidly through tidal and current-driven mixing. Notwithstanding this, if contaminants are recorded as present within the proposed dredge area (as reported in the BPEO (sediment risk assessment)), a suitable dredge strategy will be developed to ensure no spread of material with elevated concentrations of contaminants. Consequently, the impact is predicted to result in either a very slight or no measurable change to baseline conditions, given the localised spatial extent, short-term duration and proposed measures if contaminants are present. The magnitude of impact from dredging operations is therefore **low**.

Regarding disposal at the Burghead disposal site, as aforementioned, the dredged material will predominantly consist of coarse materials (sands and gravels), which contaminants do not typically adsorb to, which thereby limits the potential for deposition of contaminants at the disposal site. Furthermore, if contaminants are recorded as present within the proposed dredge area (as informed by the upcoming analysis of the site-specific pre-construction sediment sampling within the BPEO), a suitable dredge strategy will be developed if necessary, whereby no material with elevated concentrations of contaminants will be disposed of at the Burghead disposal site. This will be secured within the Marine Licence application. Therefore, the impact is not predicted to result in a measurable change to baseline conditions at the disposal site, and therefore the magnitude of impact from spoil disposal is **low**.

Sensitivity of VERs

Construction activities leading to the resuspension of sediments will have varying levels of impact dependent on the species present and pollutants involved. Due to their increased mobility while transiting the Study Areas during migration, juvenile and adult diadromous fish are less likely to be affected by marine pollution and are therefore not considered to be vulnerable to the release of sediment bound contaminants, and as such the sensitivity of these VERs is **low**.

Fish eggs and larvae are likely to be particularly sensitive, with pollutants having potentially toxic impacts on fish eggs and larvae (Westerhagen, 1988). The resuspension of sediment-bound contaminants (e.g., heavy metals and hydrocarbon pollution) have been found to impact fish eggs and larvae and can lead to abnormal development, delayed hatching and reduced hatching success (Bunn *et al*., 2000). However, given that all diadromous VERs (with the exception of European eel which spawn in the Sargasso Sea) spawn in rivers and streams, eggs and larvae will not be present in the defined Study Areas. The potential for impacts to eggs and larvae are therefore not assessed further as there is no pathway for effect.

Significance of effect

Overall, the magnitude of impact on diadromous fish from the release of sediment bound contaminants is assessed as **low** for both dredging at the proposed development and disposal at the Burghead disposal site. The sensitivity of all receptors is assessed as **low**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

Atlantic salmon are a qualifying feature of the River Moriston SAC, located 56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), which has connectivity to the Inverness Firth. Considering the mobile nature of Atlantic salmon, and the localised nature of the impacts from the release of sediment bound contaminants from dredging and disposal activities, relative to the width of the Inverness Firth at the port entrance (approximately 4 km wide), the available space in the Inverness Firth is considered to be suitable to ensure free passage to migrating smolts, juveniles and adults during the migration period. Therefore, no significant effects are anticipated on salmon as a qualifying feature of this designated site.

6.2.2 O&M

No impacts have been scoped in for diadromous fish receptors during the operation and maintenance phase of the proposed development.

7. Cumulative Effects Assessment

Impacts from the proposed development alone are generally spatially restricted to the inner harbour area, however, certain impacts have the potential to be observed over a wider area. Cumulative effects are effects of the proposed development, combined with the effects from other projects, on the same receptor or group of receptors. Chapter 14: Cumulative Effects Assessment details how potential cumulative effects will be assessed for the proposed development through a Cumulative Effects Assessment (CEA).

Certain impacts assessed for the proposed development alone are also not considered in the cumulative assessment, due to the following reasons:

- The highly localised nature of the impacts; and
- Mitigation measures (embedded commitments (see Section 5.3)) in place at the proposed development and on other projects will reduce the risk of cumulative effects occurring.

The impacts excluded from the marine and coastal ecology CEA are listed in Table 5.19, for marine and coastal habitats and diadromous fish respectively.

Table 5.19. Impacts screened out from further consideration in the CEA with justification for screening.

Impact	Justification
Marine and coastal habitats	
Loss of habitat from capital dredging (construction phase)	Potential loss of habitat is expected to be highly localised across all projects. As such, the potential for significant cumulative effects is minimal and, therefore, this impact was not considered further.
Temporary habitat loss/disturbance (construction phase)	Potential disturbance or loss of habitat is expected to be highly localised across all projects. As such, the potential for significant cumulative effects is minimal and, therefore, this impact was not considered further.
Seabed disturbance leading to release of sediment contaminants (construction phase)	Due to the coarse nature of the substrates within the proposed development, and the proposed measures that will be implemented if contaminants are present, the potential for contaminant mobilisation from the proposed development alone is highly limited, and therefore there is minimal potential for cumulative effects from other projects or plans in the area. This impact was therefore not considered further.
Increased risk of introduction and/or spread of marine INNS (construction and	Due to the development of an INNS biosecurity management plan which will outline measures to be taken to prevent the introduction and/or spread of INNS, there is not considered to be any potential for cumulative effects from

Impact	Justification
operation and maintenance phases)	other projects or plans in the area. This impact was therefore not considered further.
Permanent and/or long term habitat loss/alteration from introduction of hard substrates	Permanent and/or long term habitat loss/alteration from introduction of hard substrates is expected to be highly localised across all projects. As such, the potential for significant cumulative effects is minimal and, therefore, this impact was not considered further.
Changes in physical processes resulting from capital dredging and installation of hard substrates (e.g. changes in wave/tidal current regimes	Changes in physical processes is expected to be highly localised across projects. As such, the potential for significant cumulative effects is minimal and, therefore, this impact was not considered further,
Diadromous fish	
Seabed disturbance leading to release of sediment contaminants (construction phase)	Due to the coarse nature of the substrates within the proposed development, and the proposed measures that will be implemented if contaminants are present, the potential for contaminant mobilisation from the proposed development alone is highly limited, and therefore there is minimal potential for cumulative effects from other projects or plans in the area. This impact was therefore not considered further.

Certain impacts have the potential to affect marine and coastal habitats or diadromous fish over a larger area and therefore have the potential to result in cumulative effects. The impact considered in the marine and coastal habitats CEA is therefore as follows:

- Cumulative temporary Increases in SSC and sediment deposition from capital dredging and disposal.

The impacts that are considered in the diadromous fish CEA are as follows:

- Cumulative temporary Increases in SSC and sediment deposition from capital dredging and disposal; and
- Cumulative mortality, injury and behavioural changes resulting from UWN.

A CEA screening process has identified the relevant other plans, projects, and activities which are to be included in the assessment. Those plans/projects relevant to the CEA for marine and coastal habitats and diadromous fish receptors are indicated in Table 5.20 and Table 5.21 respectively, and shown in Figure 5.11 relative to the proposed development and the Burghead disposal site. For each of these relevant plans/projects, the most up-to-date publicly available project parameters have been used to inform the CEA. These plans or projects may present different levels of potential cumulative effect when combined with the proposed development, informed by other plan/project's readiness and likelihood for actual operation.

This CEA has considered the worst-case design scenario for each of the proposed development plans and activities. For potential effects on marine and coastal habitats and diadromous fish, planned projects were screened into, or out of the assessment based on screening ranges that encapsulate the defined Study Areas (for both marine and coastal habitats and diadromous fish), and potential cumulative impacts from UWN on diadromous fish receptors (from the proposed development). A screening range of 2 km has therefore been applied around the Burghead disposal site (a precautionary screening range to encapsulate potential cumulative impacts from sediment dispersion and deposition, as informed by the tidal excursion distances at the site), and a screening range of 15 km has been applied around the proposed development (to encapsulate potential cumulative UWN impacts). These screening ranges are shown in Figure 5.11 below.

Each project, plan or activity within the screening ranges, have been considered and screened in or out based on effect–receptor pathways, data confidence and the temporal and spatial scales involved. Projects were therefore screened out, if they had the following:

- No temporal overlap with the proposed works at the proposed development site (2027-2028);
- No physical effect-receptor overlap; and
- No effect-receptor pathway.

Operational/active projects were also screened out, as they were considered to be existing impacts included within the baseline (this includes all shipping ports, shipping routes and oil and gas pipelines), or if no construction timeline was available.

Table 5.20 Other plans/projects included in the marine and coastal habitats CEA.

Plan/Project	Summary	Distance from the proposed development	Distance from the Burghead disposal site	Dates of proposed works	Operational by (if relevant)	Summary of interaction with proposed development
Ardersier ETF Expansion	Port Expansion	N/A	N/A	Piling operations – 2027 Piling and dredging- 2028	2030	N/A
Port of Cromarty Firth	Maintenance Dredging	9.45 km	30.49 km	Dredging operations- 2025-2028	2029	Dredging operations have a temporal interaction with dredging operations at the proposed development in 2026-2028.

Table 5.21. Other plans/projects included in the diadromous fish CEA.

Plan/Project	Summary	Distance from the proposed development	Distance from the Burghead disposal site	Dates of proposed works	Operational by (if relevant)	Summary of interaction with proposed development
Ardersier ETF Expansion	Port Expansion	N/A	N/A	Piling operations – 2027 Piling and dredging- 2028	2029	N/A
Port of Cromarty Firth	Maintenance Dredging	9.45	30.49 km	Dredging operations- 2025-2028	2029	Dredging operations have a temporal interaction with dredging and piling operations at the proposed development in 2026-2028.
Invergordon Phase 5	Dredging operations and Quay extension	14.32 km	38.95 km	Dredging operations- 2025 Piling operations - 2026-2027	2028	Piling operations have a temporal interaction with piling operations at the proposed development.

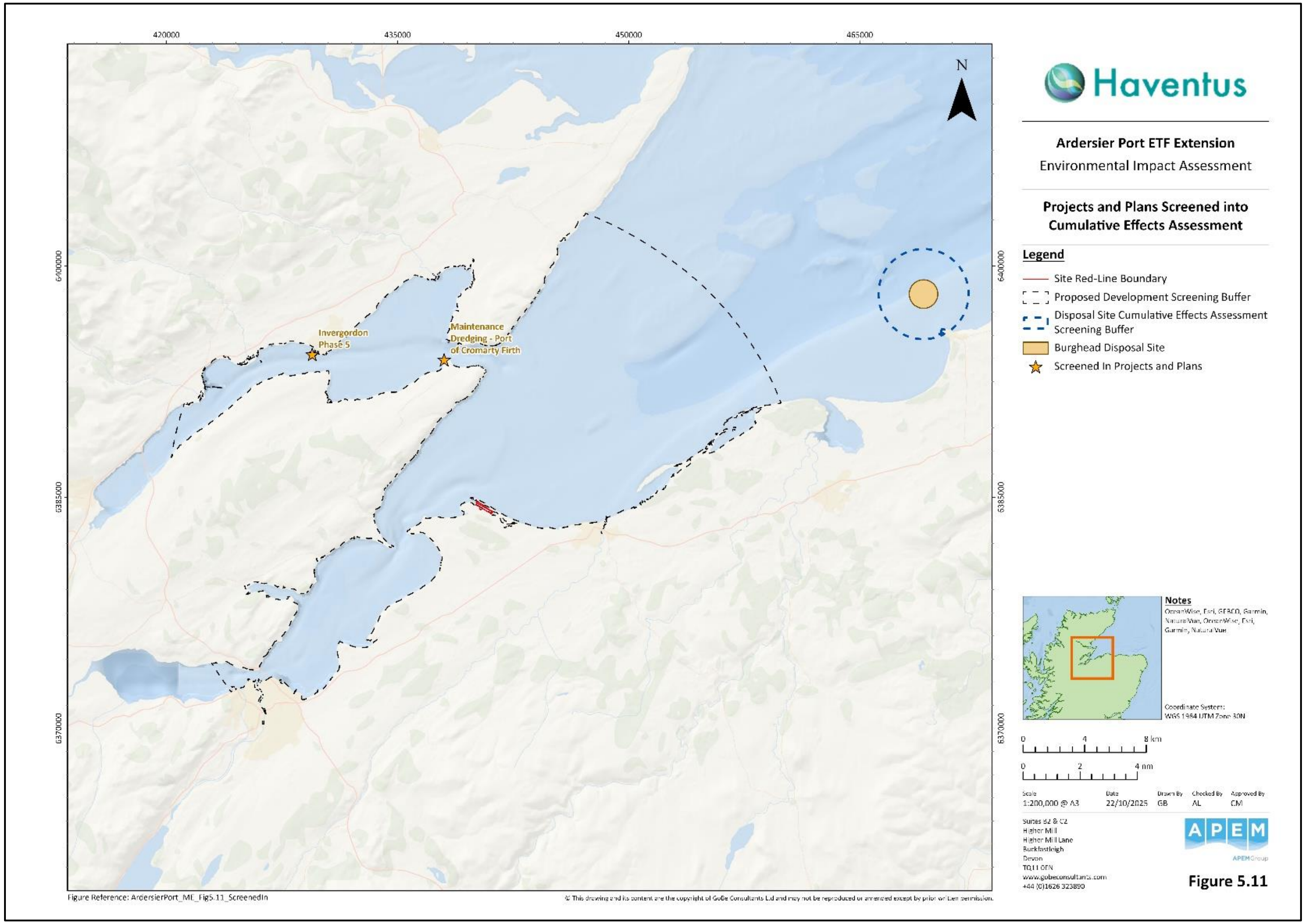

Figure 5.11. Projects and Plans Screened into Cumulative Effects Assessment.

7.1 Marine and Coastal Habitats CEA

Projects which were screened into the CEA for marine and coastal habitats are detailed Table 5.20 and displayed in Figure 5.11.

7.1.1 Cumulative increases in SSC and deposition of disturbed sediments to the seabed

There is potential for cumulative increases in SSC and deposition of disturbed sediments to the seabed as a result of construction activities associated with the proposed development and all stages of other projects.

Magnitude of impact

Dredging and disposal operations will result in temporary and localised increases in SSC and also associated sediment deposition. Sediment plumes from dredging and disposal operations have the potential to adversely affect marine and coastal habitats. Dredging and disposal operations at the proposed development alone, and dredging at the Port of Cromarty Firth, have the potential to result in cumulative impacts on marine and coastal habitat receptors.

Maintenance dredging works at the Port of Cromarty Firth are proposed to be undertaken at the same time as the dredging operations at the proposed development (located 9.45 km from the proposed development). The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which dredging works at the proposed development are proposed. As detailed in the Port of Cromarty Firth EIAR (Affric Limited, 2018), observations of the Phase 3 development construction operations at the Port of Cromarty Firth, reported the creation of sediment plumes at both the dredging and disposal sites, although the observed plumes were relatively small, dispersed quickly and at no point occluded the Cromarty Firth.

Given the highly localised spatial extent of impacts from the dredging works at the proposed development alone (see Section 6.1.1.3), and at the Port of Cromarty Firth, and the distances between the projects (the Port of Cromarty Firth is located 9.45 km from the proposed Development), the magnitude of cumulative impacts is considered to be **low**.

Sensitivity of receptors

The sensitivity of marine and coastal habitat receptors to increased SSC and deposition are detailed in Section 6.1.1.3 of this Technical Appendix and is assessed as **negligible** to **low** sensitivity depending on the receptor.

Significance of Effect

Overall, the magnitude of impact of cumulative effects from increased SSC and deposition on marine and coastal habitat receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **negligible** to **low**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

7.2 Diadromous fish

Projects which were screened into the CEA for diadromous fish receptors are detailed in Table 5.21 and displayed in Figure 5.11.

7.2.1 Cumulative Mortality, injury and behavioural changes resulting from UWN

There is potential for cumulative mortality, recoverable injury, TTS, masking and behavioural changes from noise and vibration as a result of construction activities associated with the proposed development and all stages of other projects (see Table 5.21).

Magnitude of Cumulative Impact

The Port of Cromarty Firth is the closest project that is also undertaking construction works at the same time as the proposed development (located 9.45 km from the proposed development). The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which piling works at the proposed development are proposed. As detailed in Section 6.2.1.1 of this Technical Appendix, dredging operations can cause an increase in UWN, although any UWN from dredging operations is anticipated to be highly localised (as noise from dredging operations is continuous rather than impulsive).

Piling operations are proposed at Invergordon Phase 5 (located 14.32 km from the proposed development), from 2026-2027, during which piling operations at the proposed development are proposed. As detailed in the Invergordon Phase 5 EIAR (Affric Ltd. 2024), recoverable injury and avoidance behaviour of diadromous fish (the impact assessment focussed on potential impacts to migrating sea trout and Atlantic salmon) from UWN from impact piling has the potential to occur up to 370 m from the source, with mortality and potential mortal injury anticipated to occur up to 50 m from the source, although these impact ranges are based on a stationary receptor (i.e. not a mobile receptor transiting the site during migration) and so are inherently precautionary.

On account of the localised range of impacts from the proposed works at the proposed development alone (see Section 6.2.1.1), and from the screened in projects, and the distances between the proposed development and the screened in projects (the nearest project is located 9.45 km from the Port), the cumulative magnitude of cumulative impact is considered to be **low**.

Sensitivity of Receptors

The sensitivities of the diadromous fish receptors to UWN are detailed in Section 6.2.1.1 of this Technical Appendix and are assessed as having a **low** to **medium** sensitivity.

Significance of Effect

Overall, the magnitude of impact of cumulative impacts from UWN on diadromous fish receptors is assessed as **low**. The sensitivity of all receptors affected is assessed as **low** to **medium**. The significance of the effect is therefore concluded to be **negligible** to **minor**, which is not significant in EIA terms.

Atlantic salmon are a qualifying feature of the River Moriston SAC, SAC (located 56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), which has connectivity to the Inverness Firth. Considering the mobile nature of Atlantic salmon, and the localised nature of the impacts from UWN from the proposed development alone, and cumulatively from other developments, relative to the width of the Inverness Firth at the port entrance (approximately 4km wide), the available space in the Inverness Firth is considered to be suitable to ensure free passage to migrating smolts, juveniles and adults during the migration period. Therefore, no significant cumulative effects are anticipated on the receptor of this designated site.

7.2.2 Cumulative increases in SSC and deposition of disturbed sediments to the seabed

There is potential for cumulative increases in SSC and deposition of disturbed sediments to the seabed as a result of construction activities associated with the proposed development and disposal and the Burghead disposal site, and all stages of other projects.

Magnitude of Cumulative Impact

Dredging and disposal operations will result in temporary and localised increases in SSC and associated sediment deposition. Sediment plumes from dredging and disposal operations have the potential to result in barrier effects to the migration of diadromous fish. Dredging operations proposed at the proposed development alone, disposal at the Burghead disposal site, and dredging at the Port of Cromarty Firth have the potential to result in cumulative impacts on diadromous fish receptors.

Maintenance dredging works at the Port of Cromarty Firth (located 9.45 km from the proposed development) are proposed to be undertaken at the same time as the proposed works at the proposed development and at the Burghead disposal ground. The proposed works at the Port of Cromarty Firth will consist of dredging operations undertaken between 2025-2028, during which piling and dredging works at the proposed development, and disposal at the Burghead disposal site are proposed. As detailed in the Port of Cromarty Firth EIAR (Affric Ltd, 2018), observations of the Phase 3 Development construction operations at the Port of Cromarty Firth, reported the creation of sediment plumes at both the dredging and disposal sites, although the observed plumes were relatively small, dispersed quickly and at no point occluded the Cromarty Firth.

On account of the localised range of impacts from the proposed works at the proposed development and the Burghead disposal ground (see Section 6.2.1.2), and at the Port of Cromarty Firth, and the distances between the projects (the Port of Cromarty Firth is located 9.45 km from the Port), the magnitude of cumulative impact is considered to be **low**.

Sensitivity of Receptors

The sensitivities of the diadromous fish receptors to increased SSC and deposition are detailed in Section 6.2.1.2 of this Technical Appendix and are assessed as having **low** sensitivity.

Significance of Effect

Overall, the magnitude of impact of cumulative impacts from increased SSC and deposition on diadromous fish receptors is assessed as **low**. The sensitivity of all receptors affected is also assessed as **low**. The significance of the effect is therefore concluded to be **negligible**, which is not significant in EIA terms.

Atlantic salmon are a qualifying feature of the River Moriston SAC, SAC (located 56.24 km from the proposed development, and 85.71 km from the Burghead disposal site), which has connectivity to the Inverness Firth. Considering the mobile nature of Atlantic salmon, and the localised nature of the impacts from increased SSC and deposition from the proposed development alone and at the disposal site, and cumulatively from other developments, relative to the width of the Inverness Firth at the port entrance (approximately 4km wide), the available space in the Inverness Firth is considered to be suitable to ensure free passage to migrating smolts, juveniles and adults during the migration period. Therefore, no significant cumulative effects are anticipated on the receptor of this designated site.

8. Assessment Summary

A summary of the assessment of impacts alone undertaken in Section 6, and the CEA undertaken in Section 7 is provided in Table 5.22 and

Table **5.23** respectively.

Table 5.22. Summary of assessment of effects of marine and coastal habitats, and diadromous fish.

Impact	Receptor	Magnitude	Sensitivity	Significance
Construction				
Loss of habitat from capital dredging	Marine and coastal habitats	Low	Medium	Minor (not significant)
Temporary habitat loss/disturbance	Marine and coastal habitats	Negligible	Low	Negligible (not significant)
Temporary increases in SSC and sediment deposition from capital dredging and disposal	Marine and coastal habitats	Low	Negligible to Low	Negligible (not significant)
	Diadromous fish	Low	Low	Negligible (not significant)
Seabed disturbance leading to release of sediment contaminants	Marine and coastal habitats	Low	Medium	Minor (not significant)
	Diadromous fish	Low	Low	Negligible (not significant)
Increased risk of introduction and/or spread of marine INNS	Marine and coastal habitats	Negligible	High	Negligible (not significant)
Mortality, injury, behavioural changes and auditory masking arising from noise and vibration	Diadromous fish	Low	Low to Medium	Negligible to Minor (not significant)
Operation & Maintenance				
Permanent and/or long-term habitat loss/alteration from introduction of hard structures	Marine and coastal habitats	Negligible	High	Negligible (not significant)
Changes in physical processes resulting from capital dredging and installation of hard structures (e.g., changes in wave/tidal current regimes)	Marine and coastal habitats	Negligible	Negligible to High	Negligible (not significant)
Increased risk of introduction and/or spread of marine INNS	Marine and coastal habitats	Negligible	High	Negligible (not significant)

Table 5.23. Summary of Assessment of Cumulative Effects on marine and coastal habitats, and diadromous fish.

Impact	Receptor	Magnitude	Sensitivity	Significance
Cumulative increases in SSC and deposition of disturbed sediments to the seabed	Marine and coastal habitats	Low	Negligible to Low	Negligible (not significant)
	Diadromous fish	Low	Low	Negligible (not significant)
Cumulative mortality, injury and behavioural changes resulting from UWN	Diadromous fish	Low	Low to Medium	Negligible to Minor (not significant)

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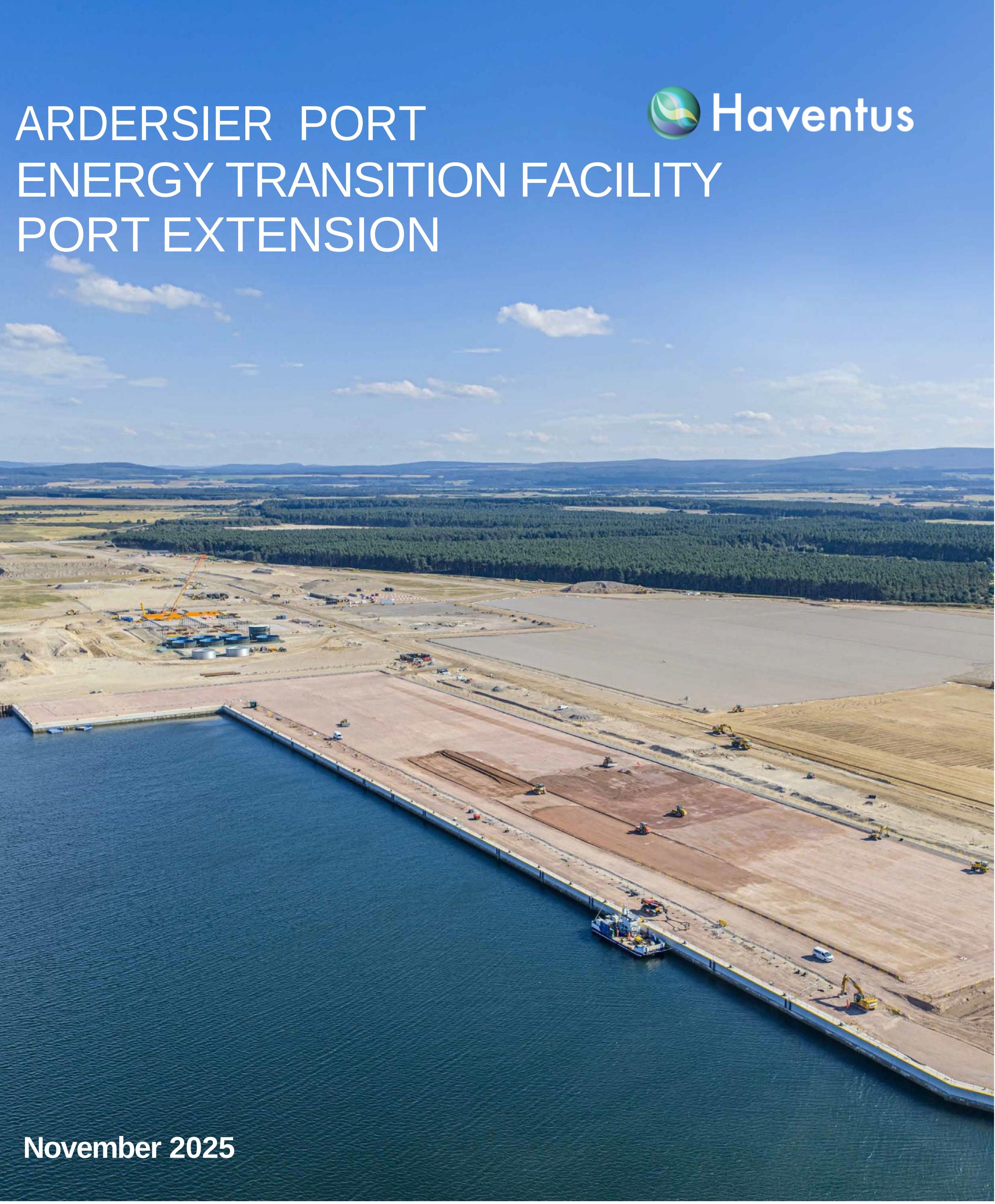
Haventus

ARDERSIER PORT
ENERGY TRANSITION FACILITY
PORT EXTENSION



November 2025

Appendix 5.9 Interim Biosecurity Plan

Haventus

Interim Marine Invasive Non-Native Species Biosecurity Management Plan

APEM Group Ltd.

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Date of issue:	**November 2025**

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Revision and Amendment Register

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
v1.0	10/10/2025	All	All	Draft	APEM Ltd.
v2.0	04/11/2025	All	All	Addressed client comments on draft	APEM Ltd.
v3.0	13/11/2025	All	All	Additional client comments addressed	APEM Ltd.

Contents

List of Tables

Acronyms and Abbreviations

Term	Definition
AFS	Antifouling system
BWMP	Ballast Water Management Plan
CSD	Cutter Suction Dredger
eDNA	Environmental DNA
EIA	Environmental Impact Assessment
ETF	Energy Transition Facility
GB	Great Britain
GEF	Global Environment Facility
IMO	International Maritime Organisation
INNS	Invasive Non-Native Species
JUV	Jack-up Vessel
MBA	Marine Biological Association
MCA	Maritime and Coastguard Agency
NBN	National Biodiversity Network
nm	Nautical Miles
NNS	Non-Native Species
OWF	Offshore Wind Farm
PPE	Personal Protection Equipment
ROV	Remotely Operated Vehicle
TSHD	Trailer Suction Hopper Dredger
UK	United Kingdom
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation

1. Scope

Invasive non-native species (INNS) have major impacts on the environment and can also have financial implications for industry. For clarity, Non-Native Species (NNS) are those which occur outside of their natural (i.e., native) range. INNS are those which have known negative impacts, although all NNS have the potential to become INNS.

This document is an interim marine INNS biosecurity plan for Ardersier Port, located in the Moray Firth, Scotland. It covers both operational activities and the proposed development (Phase 2). This plan will be used as the foundation for a specific, succinct Ardersier Port action plan.

The document provides a summary of NNS recorded in the Moray Firth (Section 2), an overview of activities undertaken at the port and an assessment of the risks of INNS introduction and spread via these activities (Section 3). This document is underpinned by best practice guidance to reduce the risk of the introduction and spread of INNS in the form of practical and feasible biosecurity actions to be undertaken by port users and development contractors (Section 4). This approach is precautionary and proactive, focussing on prevention of introduction and spread to reduce current and future risks, even if those risks are somewhat uncertain (i.e due to limited INNS monitoring). The biosecurity actions referenced are those which are deemed feasible and practical to implement by Ardersier Port. For completeness, the document also includes relevant information on INNS awareness raising (Section 5), monitoring and reporting (Section 6), and contingency planning (Section 7).

2. Non-Native Species in the Moray Firth

Eight NNS have been recorded within the Moray Firth: Bonnemaison's hook weed (*Bonnemaisonia hamifera*); Darwin's barnacle (*Austrominius modestus*); Japanese skeleton shrimp (*Caprella mutica*); orange ripple bryozoan (*Schizoporella japonica*); slipper limpet (*Crepidula fornicata*); the soft-shelled clam (*Mya arenaria*), the orange cloak sea squirt (*Botrylloides violaceus*) and siphoned Japan weed (*Dasysiphonia japonica*). For further information on these species and data sources please see Annex 1.

An intertidal walkover survey conducted to inform an Environmental Impact Assessment (EIA) of Ardersier Port in 2018, noted that wireweed (*Sargassum muticum*) was present on the north shore of the Whiteness Head spit exposed to the Moray Firth. This species was washed up on the shore and not attached to substrate (EnviroCentre Limited, 2018), therefore establishment is not confirmed, but considered likely. For further information on this species see Annex 1. Subtidal benthic sampling was also conducted to inform a previous EIA for construction and dredging at Ardersier Port in 2013 (Savills, 2013), however, no NNS were recorded.

Five of the species outlined above are considered UK Priority marine INNS (GBNNSS, 2020) due to their high risk of spread, establishment and negative impact: Japanese skeleton shrimp, orange ripple bryozoan, Bonnemaison's hook weed, slipper limpet and wireweed. While not all the recorded NNS have known negative impacts, their presence indicates that activities and pathways for the introduction and spread of INNS exist in the area. Furthermore, there is a risk that activities that take place at Ardersier Port could spread INNS to, within and from the site (see Section 3).

2.1 Horizon Invasive Species Desktop Study

Horizon species are INNS predicted to arrive, become established and impact biodiversity and ecosystem services in the future. A horizon scanning exercise which involved analysis of pathways of INNS introduction into Scotland was conducted in 2023 to identify INNS with the highest likelihood of arrival and establishment, and assess their impact (Scottish Government, 2023). The worm wart weed (*Agarophyton vermiculophyllum*) and the American lobster (*Homarus americanus*) were identified as potential horizon INNS for Scotland.

For more information on NNS found within the Moray Firth and those posing potential future threat, see Annex 1.

It should be noted that different INNS pose different levels of risk in terms of potential impacts on local ecological communities. Species-specific risk management requires specialist data and knowledge. In the absence of such data and knowledge, this biosecurity plan adopts a precautionary pathway-focused approach (as opposed to a species-based approach) in which all potential INNS are treated with the same level of precaution.

3. Hazard Identification and Risk Analysis

Ardersier Port Energy Transition Facility (ETF) is a facility with a commercial focus. Potential hazards, i.e. occurrences or activities which pose a risk of introducing INNS to Ardersier Port or risk of spreading INNS within or outside of Ardersier Port, if not controlled, can be broadly grouped into four categories: i) vessel movements, ii) dredging, iii) assembly and deployment of floating wind turbine foundations, and iv) general port maintenance and construction (including the introduction, relocation and maintenance of infrastructure).

Table 3-1 provides an overview of each category and the factors influencing the potential risk of introduction and spread of INNS. In line with the precautionary approach and biosecurity best practice, all potential risks factors are described, which may or may not be realised.

Fishing, particularly potting and creeling, occurs within the local vicinity of Ardersier Port. Additionally, recreational activities occur within the wider Moray Firth, including boating, supported by clubs including Nairn Sailing Club and Chanonry Sailing Club, sea kayaking, rowing, angling, wildlife watching tours and swimming. While fishing and recreational water use are known pathways that lead to the introduction/spread of INNS, they will not be considered further in this document due to these activities occurring outside of the Ardersier Port limits. However, it should be highlighted that these activities can lead to the introduction of INNS into the local area, which may then spread via natural dispersal into the Ardersier Port limits.

Table 3-1. Hazards and risk factors associated with activity categories within the Ardersier Port Energy Transition Facility (ETF) which influence the potential risk of introduction and spread of Invasive Non-Native Species (INNS).

Category	Overview	Risk Factor	Hazard/Risk Factor Description
Vessel movements	Vessel activity within the Ardersier Port includes a wide variety of vessel types, supported by berthing facilities: carrier vessels (e.g., general cargo vessels), construction vessels associated with energy sectors (e.g., foundation and turbine installation vessels, heavy lift vessels, cable-laying vessels), support vessels (pilot boats, barges, tugboats), dredging vessels (trailer suction hopper dredger (TSHD) and cutter suction dredger (CSD)), floating structures (e.g., jack-up vessels (JUVs), offshore drilling and production units, sheerleg cranes, and floating wind turbine foundations). Floating structures, including floating wind turbine locations, are considered vessels while not connected to the seabed. Generally, vessel movements in relation to energy sector operations are anticipated to be between 250-350 per annum (possibly up to 400). Some vessel activity is expected to be higher during months of better weather (March to September), particularly dredging and floating wind turbine deployment.	**Ballast water**	INNS may be transported in ballast water used to maintain the stability of vessels. There is risk of INNS introduction and spread if INNS are taken up in ballast water and released with discharged ballast in a different location. Risk of INNS spread through ballast water exchange is mitigated for ships operating internationally via compliance with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations 2022 which require ballast water to be treated to remove viable organisms, or exchanged at least 200 nautical miles (nm) from land in water at least 200 m deep, or in a designated ballast water exchange area. More specifically, vessels operating in international waters are required to have a Ballast Water Management Plan (BWMP) detailing their ballast water treatment protocol, and Record Book which documents their ballast water uptake, treatment and discharge. Vessels which carry out ballast water management in accordance with the Regulations are issued with an International Ballast Water Management Certificate. The Maritime and Coastguard Agency (MCA) is responsible for monitoring a vessel's compliance with these Regulations. Vessels which only operate within UK waters or on the high seas do not need to comply with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022. For full details on the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022 please see the published regulations[1]
		Biofouling	INNS may be attached to (i.e. foul) the hull or other submerged niche areas (e.g. seawater intake and outflows, positioning thrusters, vents and grills, prop shafts and other complex hull structures) of vessels arriving into, moving within, and leaving Ardersier Port. There is risk of INNS introduction and spread if attached

[1] https://www.legislation.gov.uk/uksi/2022/737/pdfs/uksi_20220737_en.pdf

Category	Overview	Risk Factor	Hazard/Risk Factor Description
			organisms detach from vessels (including release of viable fragments and life stages) in locations where the INNS have not previously been recorded. For larger vessels, risk of INNS spread through biofouling is mitigated by following the International Maritime Organisation (IMO) Guidelines for the Control and Management of Ships' Biofouling to Minimise the Transfer of Invasive Aquatic Species 2023.
		Vessel origin and route	The origin of the vessel influences which INNS may be transported. Vessels from points of origin with a similar biogeographic region (or similar climate) to Ardersier Port (i.e. cold temperate regions) are considered higher risk as species are more likely to survive transportation and become established within Ardersier (Challinor *et al*., 2014). Vessel origin and geographic scale of operation also affect the need to comply with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations 2022. These regulations do not legally require vessels which only operate within the UK (and high seas) to undertake ballast water management.
		Vessel speed / time stationary	Organisms are more likely to attach and stay attached to stationary and slow-moving vessels (including those stored outside of their seasonal operation). The longer a vessel is stationary in the water, the more likely biofouling is to occur, and to occur at higher levels. Therefore, vessels that can remain stationary for prolonged periods, such as JUVs, may be particularly prone to biofouling. Vessels travelling slowly, and/or stationary for long periods of time, present higher risk of INNS transfer.

Category	Overview	Risk Factor	Hazard/Risk Factor Description
		Vessel maintenance and cleaning	Maintenance and cleaning of vessels, in particular the removal of biofouling organisms, can pose risk of introduction and spread of INNS if dislodged debris or wastewater containing INNS is allowed to re-enter the marine environment.
		Vessel dry-docking schedule	Specialist vessels such as JUVs may be less regularly dry-docked than standard vessels due to some docking facilities being impractical for such vessels, or due to operational requirements, potentially making them more susceptible to biofouling (UNESCO and GEF-UNDP-IMP GloFouling Partnerships, 2024).
		Vessel antifouling system presence/ schedule	An antifouling system (AFS) is a coating, paint, surface treatment, surface or device that is used on a vessel to control or prevent attachment of unwanted organisms. Specialist vessels that have components that are in contact with the seabed for prolonged periods of time, such JUVs, may be partly coated with abrasion/corrosion-resistant epoxies (as opposed to an AFS), since protection of the foundations is a high operational priority (UNESCO and GEF-UNDP-IMP GloFouling Partnerships 2024). AFS's typically require maintenance/reapplication as dictated by manufacturer instructions to minimise biofouling risk: deviation from this schedule can increase the likelihood and level of biofouling.
		Seasonality of vessel movement	Some vessel activity is expected to be higher during months of better weather (March to September), particularly vessels associated with dredging and floating wind turbine deployment. Heightened periods of vessel activity may increase the risk of INNS introduction during those times.
Dredging	Dredging (i.e. the removal of sand and gravel from the seabed) is carried out within Ardersier Port to deepen and maintain the channels and berths for safe navigation. Specifically, a capital dredging campaign is planned to deepen the harbour mouth,	**Excavation, extraction and transportation**	Excavation to loosen aggregate/material may dislodge INNS or disperse larvae, thereby increasing the risk of spreading any INNS present at the dredging site. All life-history stages (i.e. adults, juveniles, larvae and eggs) may be extracted from the seabed within the dredged material (which may include large volumes of water) and transported to new locations.

Category	Overview	Risk Factor	Hazard/Risk Factor Description
	and routine maintenance dredging of the approach channel is undertaken as needed. Dredged material disposal may include offshore sea disposal and beneficial use. Also, dredged sediment has previously been pumped into settlement lagoons onsite for construction use at the port. It should be noted that dredged material is typically subject to sampling and testing, and that dredging activity requires a marine licence which would usually include conditions to prevent the spread of INNS.		The method of dredging may affect the likelihood of INNS being extracted and surviving the extraction process. For example, forces experienced by organisms extracted via suction dredging may include mechanical buffeting, high velocity and changes in hydrostatic pressures which could result in mortality. INNS may be transported within dredged material to new locations. Transport conditions and duration (influenced by the proximity of the disposal site to the dredge site) may influence the likelihood of INNS surviving. For example, organisms may be smothered by, or crushed under, the dredged material, or may suffer desiccation, starvation or anoxia during transport. The environmental tolerances of the INNS may also impact the likelihood of them surviving excavation, extraction and transportation.
		Disposal of material	INNS may be introduced into a new location when dredged material is disposed of or deposited for beneficial use. INNS may be crushed or smothered during disposal. Establishment of an INNS at the disposal site will also be affected by conditions such as temperature, salinity, depth and current speed, which may differ markedly from the dredge site.
Assembly and deployment of floating wind turbine foundations	It is anticipated that offshore wind turbines and their foundations (including floating foundations) will be assembled at Ardersier Port and deployed to offshore wind farm (OWF) array areas (it is also possible that floating foundations are deployed to an intermediate in-water storage area i.e., a “wet storage” area before moved to the array area). Wind turbine and associated foundation components are transported to Ardersier Port on transport vessels	**Biofouling**	INNS may become attached to floating foundations which are submerged in water prior to deployment (biofouling can occur in a matter of hours and days). There is risk of INNS introduction and spread if fouling organisms detach from foundations (including release of viable fragments and life stages) in locations where the INNS have not previously been recorded. When being towed, floating foundations are categorised as vessels and so biofouling is mitigated by following IMO Guidelines for the Control and Management of Ships’ Biofouling to Minimise the Transfer of Invasive Aquatic Species 2023 (see Vessel Movements category).

Category	Overview	Risk Factor	Hazard/Risk Factor Description
	or via land for assembly. Once assembled, offshore wind turbines and associated foundations will be deployed from Ardersier Port on a transport vessel or will be towed in water. It is anticipated that wind turbine foundations are primarily fabricated/assembled on land. The expected timeframe from launch to tow out is expected to be 1-3 days. For floating foundations, the final assembly stage will occur in-water, where foundations may remain for a few days up to two weeks depending on the structure type and assembly method. Floating foundations will then be towed out to an intermediate or destination. It is important to note that any offshore wind structures being towed in water or under self-propulsion are considered vessels (see Vessel Movements category).	**Ballast water**	Some floating foundations, such as semi-submersibles and spar buoys, contain ballast water for stabilisation during in-water transport and/or at the installation site. There is risk of INNS introduction and spread if INNS are taken up in ballast water and released with discharged ballast in a different location. Ballast discharge could be intentional (e.g., the planned exchange of water ballast for solid ballast at the offshore wind farm (OWF) array area) or accidental (i.e., leakage on route to, or at, the OWF array area). When being towed in water, floating foundations are categorised as vessels (see Vessel Movements category).
General port maintenance and construction (including the introduction, relocation and maintenance of infrastructure)	Infrastructure at the port includes moored ancillary plants (and associated mooring systems and marker buoys), Aids to Navigation and a recently installed pontoon. General maintenance of port infrastructure could involve the inspection, cleaning and localised movement of any port infrastructure (e.g. if additional pontoons are required or existing pontoons require replacement, and if marker buoys	**Biofouling**	INNS can attach to artificial hard substrate. Movement of port infrastructure risks introducing INNS to locations where they have not previously been recorded.
		Contamination	Contamination refers to the instance of marine INNS being caught on temporarily immersed surfaces, for instance construction equipment or PPE (or non-PPE clothing) that has been previously immersed in seawater before reaching the location of use. Marine INNS may be caught on the surface or in water absorbed by or trapped within the equipment/ PPE. Movement of equipment/PPE risks introducing INNS to locations where they have not previously been recorded.

Category	Overview	Risk Factor	Hazard/Risk Factor Description
	require replacement to reflect changes to controlled areas).	**Maintenance and cleaning of structures**	Maintenance and cleaning of structures may result in the detachment of biofouling containing INNS, facilitating their spread on tidal currents or via human mediated pathways.
	As of 2025, construction of the quay wall and main port activity area is being undertaken to enhance the port's capacity to support the renewable energy sector. This will involve the extraction and installation of a range of materials and hard structures. Specifically, it is anticipated that old sheet piles to the north of the new quay wall will be removed which may involve the use of temporary sand bunds. Old sheet piles will be pulled onto land and recycled. Piled berthing structures (mooring dolphins) will also be installed as well as a crushed rock mattress in the east of the harbour. It is also possible that a slipway will be constructed, and that scour protection (rock armour) will be installed in the inner harbour. It is anticipated that construction materials will not have been in-water prior to use (i.e., they will be "new" and of terrestrial origin) and will therefore present no risk of marine INNS introduction. However, the construction phase will involve the use of a range of equipment, including plant, handheld tools and personal protective equipment (PPE) which could present an INNS risk if it has previously been in contact with water (PPE that is never exposed to water is not a concern).	**Construction equipment origin**	Most plant is expected to be based at the Ardersier Port, although it is possible that some specialist equipment comprising floating structures and/or temporarily immersible equipment, would need to be sourced from elsewhere for a period of time. The origin of equipment influences which INNS may be transported. Equipment from points of origin, and following routes, from a similar biogeographic region (or similar climate) to Ardersier Port (i.e. cold temperate regions) are considered higher risk as species are more likely to survive transportation and become established within Ardersier Port (Challinor *et al*., 2014). When being towed or self-propelled in water, equipment is considered a vessel (see Vessel Movements category).
		Contamination	Contamination refers to the instance of marine INNS being caught on temporarily immersed surfaces, for instance construction equipment or PPE (or non-PPE clothing) that has been previously immersed in water before reaching the location of use. Marine INNS may be caught on the surface or in water absorbed by or trapped within the equipment/ PPE. Movement of equipment/PPE risks introducing INNS to locations where they have not previously been recorded.

4. Biosecurity

4.1 General Biosecurity Actions

The implementation of effective biosecurity actions will reduce the risk of introduction and spread of INNS within Ardersier Port. General biosecurity actions, for ongoing implementation are summarised in Table 4-1.

Table 4-1. General biosecurity actions that should be undertaken on an ongoing basis.

Biosecurity Action	How	Why	Responsibility
Assign a Biosecurity Lead and ensure roles and responsibilities are clearly communicated to all personnel.	See Awareness Raising (Section 5).	To oversee and coordinate biosecurity actions.	Ardersier Port
Develop and implement INNS monitoring.	See Monitoring and Reporting (Section 6).	To facilitate the detection of INNS, and the implementation of timely and thereby effective biosecurity action.	Ardersier Port
Raise awareness of INNS risks, as well as how to identify them and record/report them.	See Awareness Raising (Section 5), and Monitoring and Reporting (Section 6).	To facilitate the detection of INNS, and the implementation of timely and thereby effective biosecurity action.	All port staff
Report possible INNS or concerns regarding INNS risks to the Biosecurity Lead.	See Monitoring and Reporting (Section 6).	To facilitate the detection of INNS, assessment of the level of risk the movement of structures/equipment presents, and the implementation of biosecurity action.	All port staff
Identify and implement biosecurity actions relevant to activities you undertake.	See Activity-Specific Biosecurity Actions (Section 4.2).	To facilitate the implementation of biosecurity action.	All port staff

Biosecurity Action	How	Why	Responsibility
Follow check, clean, dry principles.	Follow CCD Biosecurity Guidance[2]: **Check:** for sediment, aquatic animals, plant material. Remove anything you find and leave it at the site. **Clean:** clean everything as thoroughly as you can, paying attention to areas that are damp or hard to access. Use hot water if possible. **Dry:** Dry everything for as long as you can before using elsewhere. (As a minimum, checking and cleaning should be carried out where drying is not possible.)	To reduce the likelihood of marine INNS being present on/in equipment. Some life stages of INNS are tiny and can be transported in/on damp material where they can potentially survive for days.	All port staff

[2] https://www.nonnativespecies.org/what-can-i-do/check-clean-dry

4.2 Activity-Specific Biosecurity Actions

Different activities, together with their associated risk factors, carry varying levels of risk with regards to the introduction and spread of INNS, and therefore require tailored biosecurity measures, although some measures will be common across activities. The proposed biosecurity actions to mitigate these activity-specific risks are presented in Table 4-2 to Table 4-10. These activities reflect those outlined in Table 3-1 and are defined as follows:

- Vessel Movements;
- Assembly and Deployment of Floating Wind Turbine Foundations;
- Dredging;
- General Port Maintenance and Construction; and
- Introduction/Relocation/Maintenance of Port Infrastructure (including tethered floating and mobile structures such as pontoons & buoys).

Although the likelihood of some risk scenarios occurring is low, they have been included on a precautionary basis to support biosecurity best practice.

Within the biosecurity tables, ’Potential Risk’ refers to the maximum potential risk of INNS introduction or spread associated with a defined scenario, considering both the nature of the hazard and the likelihood of that scenario occurring. ‘Risk with Control’ refers to the estimated risk level when control measures are fully implemented.

The anticipated risk with and without these biosecurity actions is indicated for each scenario, along with the timing for implementing the action(s) and the parties responsible. It crucial that all sectors and stakeholders play their part in ensuring effective biosecurity. To support this, the tables below can be used to develop action plans, where appropriate.

Vessel Movements

Table 4-2. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to vessel movements and ballast water.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Planned arrival of vessels from international origin.	High	Risk of transfer of INNS by ballast water differs between vessels, depending on their origin and the location of ballast water uptake, e.g. ballast from a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to Ardersier Port poses an increased likelihood of an INNS surviving and establishing in Ardersier Port if introduced.	Prior to arrival, the Marine Operations Manager or designate will request confirmation from the Vessel Master of their compliance with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022 – i.e. that they perform ballast water treatment (See Table 3-1 for information on compliance).	Low	Prior to vessel arrival.	Vessel Master & Marine Operations Manager or designate.
Planned arrival of vessels from domestic origin.	High	Risk of transfer of INNS by ballast water differs between vessels, depending on their origin and the location of ballast water uptake, e.g. ballast from a similar biogeographic region (or similar	Prior to arrival, the Marine Operations Manager or designate will request confirmation from the Vessel Master of their compliance with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022 – i.e. that they perform ballast water	Low	Prior to vessel arrival.	Vessel Master & Marine Operations Manager or designate.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
		climate) (Challinor *et al.*, 2014) to Ardersier Port poses greater risk.	treatment (See Table 3-1 for information on compliance). Note that vessels operating within international waters are required to comply with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022, even if their previous port is within UK waters.			
Unplanned / short notice vessel arrival (e.g., due to an emergency).	Moderate	Vessels may arrive into Ardersier Port with very little, or no, warning (i.e., not time to check vessel compliance with relevant legislation and guidelines). There is potentially a high risk of INNS being in the ballast water of the vessel. The risk of transfer of INNS is greater if the vessel originates from a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to Ardersier Port.	Vessels should be requested not to discharge ballast within Ardersier Port until the Vessel Master has confirmed their compliance with the Merchant Shipping (Control and Management of Ships' Ballast Water and Sediments) Regulations, 2022 (if applicable) or that they exchanged ballast water offshore prior to arrival.	Moderate (reactive rather than proactive control possible only)	On vessel arrival.	Vessel Master & Marine Operations Manager or designate.

Table 4-3. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to vessel movements and biofouling.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Planned vessel arrival.	High	The majority of vessels maintain clean hulls for efficient travel through the water. However, there is risk of INNS being attached to the hull and other submerged surfaces of vessels. The risk of successful transfer is greater for vessels from a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to Ardersier Port.	Prior to arrival, the Marine Operations Manager or designate will request confirmation from the Vessel Master of their adherence to the 2023 IMO Biofouling Guidelines.	Low	Prior to vessel arrival.	Vessel Master & Marine Operations Manager or designate.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Unplanned/ short notice vessel arrival (e.g., due to an emergency).	Moderate	Vessels may arrive into Ardersier Port with very little, or no, warning (i.e., no time to check vessel compliance with relevant legislation and guidelines). There is potentially a high risk of INNS being attached to a vessel's hull and other submerged surfaces and entering Ardersier Port. The risk of transfer of INNS is greater if the vessel originates from a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to Ardersier Port.	The Vessel Master should conduct a visual inspection of the hull / niche areas on arrival. If biofouling is seen, any vessel activities which could potentially result in detachment of fouling and its release into the marine environment should be minimised where possible (e.g. the vessel should not be manoeuvred more than is necessary).	Moderate (reactive rather than proactive control possible only)	On vessel arrival.	Vessel Master & Marine Operations Manager or designate.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Stationary and slow-moving vessels.	High	Biofouling, including attachment of INNS, is more likely on ships which are stationary or slow moving.	The Vessel Master should regularly inspect the hull and niche areas on their stationary or slow-moving vessel operating within Ardersier Port. Port Staff (i.e. he environmental advisor) may conduct random checks of slow moving or stationary vessels at 6-month intervals. See planned and unplanned vessel arrival sections for information on control measures required for the arrival of slow-moving vessel into Ardersier Port.	Low	At all times within Ardersier Port.	Vessel Master & Ardersier Port.

Assembly and Deployment of Floating Wind Turbine Foundations

Table 4-4. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to the assembly and deployment of floating wind turbine foundations and ballast water.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Movement of ballasted floating wind turbine foundations from Ardersier Port to wet storage area or to offshore wind farm (OWF) array area. Subsequent deballasting or accidental leakage at location of arrival.	High	Risk will depend on floating foundation type (only some designs, such as semi-submersible and spar-buoy, may contain ballast water). The risk of transfer of INNS is greater if the floating foundation is deployed to a location in a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to Ardersier Port (or where ballast water taken up).	When being towed in water, floating foundations are categorised as vessels (see Vessel movements category) and as such the requirements of the Merchant Shipping Regulations 2022 must be met. Domestically operating vessels (i.e., towed floating foundations) are not subject to the requirements of the Merchant Shipping Regulations 2022 (other exemptions may also apply under certain conditions).	Moderate	Prior to floating foundation	'Vessel' Master & Activity Operator (e.g., offshore wind operator).

Table 4-5. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to the assembly and deployment of floating wind turbine foundations and biofouling.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Movement of floating wind turbine foundations from Ardersier Port to wet storage area or to the OWF array area.	Low	INNS can be transferred on any structure that has been submerged for a period of hours, days or weeks. The risk of fouling is greater the longer the structure is submerged. The risk of transfer of INNS is greater if the structure originates from a location in a similar biogeographic region (or similar climate) (Challinor *et al.*, 2014) to the wet storage area of the OWF array. Floating foundations will likely be towed slowly which can further increase biofouling risk. However, the floating foundation components will be constructed from new materials (not previously exposed to water), and the expected timeframe from launch to tow-out is only 1–3 days, thus reducing biofouling risk.	Minimise the length of time during which floating foundations and offshore infrastructure are submerged in water at assembly locations before being moved to the installation site.	Low	Prior to floating foundation deployment	Vessel Master & Marine Operations Manager or designate.

Dredging

Table 4-6. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to dredging and excavation, extraction, transportation and disposal.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
Disposal of dredged material at disposal sites located within, adjacent to or outside of Ardersier Port.	Moderate	INNS may be dispersed during excavation and spread to new locations within / adjacent to / outside of Ardersier Port in dredged material.	If INNS are suspected to be present at the dredge site (in particular high-risk INNS) an INNS survey will be conducted at the site using appropriate methodology (e.g. Drop-Down Video (DDV) survey). If an INNS is detected via the survey, a species-specific dredge pathway risk assessment should be conducted and a mitigation strategy developed. Survey, risk assessment and mitigation strategy guidance can be sought from external experts as well as The Marine Directorate of Scottish Government[3].	Low	Prior to dredging.	Marine Operations Manager & Environmental Advisor.

[3] https://www.gov.scot/policies/wildlife-management/invasive-non-native-species/

General Port Maintenance and Construction

Table 4-7. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to general port maintenance and construction, and the use of machinery, equipment, Personal Protective Equipment (PPE) and/or non-PPE clothing.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Use of machinery, equipment, Personal Protective Equipment (PPE) and/or non-PPE[4] clothing from outside of Ardersier Port is used in Ardersier Port.	High	There is potential risk of introduction of INNS into Ardersier Port if they are attached to machinery, equipment, PPE and/or non-PPE clothing being used in Ardersier Port and become dislodged and enter the marine environment.	The origin of the machinery and equipment should be checked and enquiries regarding INNS at the origin location made. If there are concerns regarding INNS at the origin, machinery and equipment from a different location could be sought. Machinery, equipment, PPE and non-PPE clothing should be visually inspected for fouling/ dirt prior to being used. If fouling or dirt is present it should be cleaned and dried.	Low	Prior to use.	Contractor and/or user of machinery, equipment, PPE and/or non-PPE clothing.

[4] Only PPE and clothing that come into contact with the marine environment pose a risk of transferring INNS, including, for example, wet suits, life jackets and deck gear. Items that retain moisture, such as neoprene, heavy fabrics, or absorbent materials, present a higher risk because trapped organisms may survive longer on them.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
			Machinery, equipment, PPE and/or non-PPE clothing should be cleaned and dried after use also (cleaning should be conducted following the principles of the Check, Clean, Dry Biosecurity Guidance[2]). Wastewater and cleaning debris should not enter the marine environment.			
Machinery, equipment, PPE and/or non-PPE clothing is used at different locations within Ardersier Port.	Moderate	There is potential risk of localised spread of INNS if they are attached to machinery, equipment, PPE and/or non-PPE clothing being moved within Ardersier Port, and become dislodged and enter the marine environment.	The machinery, equipment, PPE and non-PPE clothing should be visually inspected for fouling/dirt prior to being used. If fouling or dirt is present, machinery, equipment, PPE and non-PPE clothing should be cleaned and dried. Machinery, equipment, PPE and/or non-PPE clothing should be cleaned and dried after use also (cleaning should be conducted following the principles of the Check, Clean, Dry Biosecurity Guidance[2]). Wastewater and cleaning debris should not enter the marine environment.	Low	Prior to use.	User of machinery, equipment, PPE and/or non-PPE clothing.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
Plant, equipment and PPE moved off site to elsewhere outside of Ardersier Port.	High	There is potential risk of localised spread of INNS if they are attached to machinery, equipment, PPE and/or non-PPE clothing being moved off site to elsewhere outside of Ardersier Port, and become dislodged and enter the marine environment.	All plant, equipment and PPE coming into contact with the water column should be inspected for biofouling after use and cleaned where possible. The principles of the Check, Clean, Dry Biosecurity Guidance[2] must be followed.	Low	Following use.	All staff working on site & Environmental Advisor.

Table 4-8. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to general port maintenance and construction, and the introduction and relocation of hard structures.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Hard structures, such as berthing structures, scour protection and a rock mattress are introduced are relocated within Ardersier Port.	Moderate	Potential risk of localised spread of INNS if they are attached to materials and become dislodged during relocation and installation.	Consider removing materials from water and drying on quay side for as long as possible prior to installation/relocation, allowing for the eradication of INNS, e.g. through drying and exposure to sunlight. Additionally, eradication guidance can be sought from The Marine Directorate of Scottish Government[3].	Low	Prior to the introduction of hard structures during construction.	All staff working on site & Environmental Advisor.

Introduction/Relocation/Maintenance of Port Infrastructure (including tethered floating and mobile structures such as pontoons & buoys)

Table 4-9. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to port structures and their introduction, and relocation.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
Structure is introduced into waters of Ardersier Port.	High	There is potential risk of the introduced structure being contaminated with INNS.	Structures should be visually inspected prior to introduction. If there is evidence of fouling on the structure, it should be cleaned and air-dried ensuring that wastewater and cleaning debris does not enter the marine environment.	Low	Prior to structure being introduced.	Contractor responsible for structure introduction.
Structure is moved within waters of Ardersier Port.	Moderate	There is a potential risk of localised spread of INNS if they are attached to the structure being moved and become dislodged.	Prior to movement, the structure should be visually inspected for fouling (e.g., using an underwater camera, or hauling onto a boat). If fouling is present and an INNS is suspected within the fouling community, movement of the structure should be delayed. If the presence of an INNS is confirmed, a risk assessment should be conducted to determine the risk of the INNS being dislodged during the relocation. If the risk is concluded to be very low, the relocation should proceed. If concluded to be	Low	Prior to structure being moved.	Contractor responsible for structure move; Marine Operations Manager or designate.

Risk			Biosecurity Considerations			
Scenario	Potential Risk	Scenario Risk Comment	Action	Risk with Control	Timing	Responsibility
			moderate or high risk, effort should be made to eradicate the INNS prior to its relocation. Survey, risk assessment and eradication guidance can be sought from external experts as well as The Marine Directorate of Scottish Government[3]. Note that when untethered, a structure is considered a vessel. In this instance control measures under the Vessel movements category.			

Table 4-10. Invasive Non-Native Species (INNS) hazard categories, scenarios and proposed biosecurity actions in relation to port structures and the maintenance and cleaning of structures.

Risk			Biosecurity Considerations			
Scenario	**Potential Risk**	**Scenario Risk Comment**	**Action**	**Risk with Control**	**Timing**	**Responsibility**
Structures within Ardersier Port are maintained and cleaned.	Moderate	There is potential risk of localised spread of INNS if they are attached to the structure being maintained/cleaned and become dislodged.	Prior to maintenance or cleaning, the structure should be visually inspected for fouling (e.g., using an underwater camera, or hauling onto a boat). If fouling is present and an INNS is suspected within the fouling community, maintenance or cleaning of the structure should be delayed. If the presence of an INNS is confirmed, a risk assessment should be conducted to determine the risk of the INNS being dislodged during the maintenance or cleaning activity. If the risk is concluded to be very low, the activity should proceed. If concluded to be moderate or high risk, effort should be made to eradicate the INNS prior to maintenance or cleaning. Survey, risk assessment and eradication guidance can be sought from external experts as well as The Marine Directorate of Scottish Government[3].	Low	Prior to structure being maintained and cleaned.	Contractor responsible for structure maintenance.

5. Awareness Raising

A strong awareness of INNS, biosecurity and this Plan among Port staff is needed. Awareness raising should focus on INNS and their impacts, biosecurity measures and roles and responsibilities. Increasing awareness of INNS and their impacts can improve speed of detection, potentially enhancing the effectiveness of subsequent responses. Greater awareness of biosecurity and its benefit can increase uptake of practical measures and compliance. Biosecurity implementation reduces risks associated with INNS, lessening their impact on the environment and key sectors, including reducing economic costs.

5.1 Nationally Produced INNS Identification Guides

Identification guides provide useful information on INNS, including visual guides to help with identification of suspected INNS detected within in and around Ardersier Port:

- Marine INNS identification guide (Cefas):https://www.nonnativespecies.org/assets/ID_guide_2020.pdf.
- Identification guide for selected marine NNS (MBA): MBA-NNS-Guide-2020-1.6-MB.pdf.
- GBNNSS identification sheets: https://www.nonnativespecies.org/non-native-species/id-sheets/.
- NatureScot's NNS of concern: https://www.environment.gov.scot/get-involved/submit-your-data/invasive-non-native-species/#concern.

5.2 Biosecurity Lead

The role of Biosecurity Lead will be covered by the Environmental Advisor or their delegate at Ardersier Port. The Environmental Advisor will help with information dissemination and aid streamlining of response to any concerns by members of staff. They will oversee biosecurity actions to ensure consistency of approach. The Environmental Advisor will also help facilitate training, e.g. outsourcing training and workshops if possible and appropriate, to improve INNS detection capacity.

The Environmental Advisor may wish to develop and implement a communications and awareness raising plan, to include sharing of this Plan, awareness raising of their role, the installation of signage and educational talks to key port staff/ contractors.

It is acknowledged that external expertise may be required to support INNS identification or incident response. It is the responsibility of the Environmental Advisor to seek this support as appropriate. Port contact details are included in Annex 2.

6. Monitoring and Reporting

In addition to surveys conducted as part of impact assessments, all staff of Ardersier Port can play a part in looking out for, or monitoring, INNS. Where possible, monitoring for INNS should be incorporated into routine checks and inspections which are already being conducted. For example, monitoring for INNS should be undertaken during vessel haul outs (where possible / if vessels are small enough), infrastructure surveys, mooring maintenance and around piers and slipways at low tide. Early identification can deliver swifter resolutions and minimise impacts to native wildlife.

A selection of monitoring methods and important considerations are presented in Table 6-1. Monitoring should focus on areas with hard substrates and high likelihood of species introduction, such as pontoon and berthing areas.

Identification guides are available (see Section 5.1) to help identify INNS.

Staff of Ardersier Port are requested to report:

- Any major changes in the abundance of INNS already recorded within the Moray Firth.
- INNS already in Ardersier Port if found in a new location.
- Potential newly introduced INNS, e.g. noting unusual growth patterns, or areas recently and rapidly overgrown (see Section 7 for additional information on what to do if you suspect you have found a new INNS).

To report an INNS:

- Take photos of the organism.
- Record location information such as a grid reference.
- Estimate the number of organisms / area covered.
- Report any concerns to the Environmental Advisor.
- With guidance from the Environmental Advisor, submit a record of the organism following instructions on the Scottish Government's website[5] or email Marine Scotland Science: marinescotland@gov.scot.

[5] https://www.environment.gov.scot/get-involved/submit-your-data/invasive-non-native-species/

Table 6-1. Methods than can be used for monitoring marine Invasive Non-Native Species (INNS), along with the respective primary target species group and key considerations.

Method	Primary Target Species Group	Key Considerations
Rapid Assessment Surveys	Sessile/fouling animals, attached plants	• Relatively quick and low cost, with surveyor time being the main expense. • Standardised and well-established method. • Requires taxonomic identification expertise. • Laboratory analysis may be necessary for certain species.
Settlement panels	Sessile/fouling animals, attached plants	• Panels can be self-built to reduce costs. • Deployment requires minimal expertise. • Panel analysis requires taxonomic identification skills. • Laboratory analysis may be necessary for certain species. • Placement location is critical for effectiveness. • Panels are sensitive to extreme weather, which can cause detachment and loss.
Trapping	All mobile/benthic animals	• Relatively low cost, with surveyor time as the main expense. • Requires a bespoke approach tailored to the target species. • Standardised and established trapping methods exist for some species. • Challenges include trapping non-target organisms or predation within traps. • Licences or certification may be required for trapping certain species.
Imaging	All species	• Can be as simple or sophisticated as required, depending on capabilities and cost. • Image quality directly affects data accuracy. • Image analysis requires some species identification expertise. • Processing images from camera stations can be time-consuming.

Method	Primary Target Species Group	Key Considerations
eDNA	All species	• Sample acquisition does not require specialist training. • Sample processing and analysis requires specific expertise, with associated costs. • The interpretation of a DNA signal of a species in the absence of physical sighting needs consideration for reporting.
Intertidal walkover survey	Intertidal species	• Quick and relatively inexpensive to implement. • Can be designed to target one or multiple species. • Requires specialist expertise for accurate species identification. • Not suitable for locations that are difficult to access.
Zooplankton trawls	Pelagic, including early life stages	• Relatively simple and low cost to deploy. • Very seasonally sensitive if deployed for the detection of early life stages. • Mesh size needs to account for target organism size. • Small mesh vulnerable to becoming blocked by non-target organisms / particles in the water body. • Samples often require laboratory analysis. • Samples need to be stored in a way that reduces sample degradation - e.g. in freezer.
Sediment grabs (e.g. Ekman) and bottom dredges	Benthic	• Specialist equipment needed. • Relatively straight forward to deploy, though some training on equipment use is needed. • Sieving and sample processing can take some time. • Samples may require laboratory analysis.
Kick sampling	Benthic	• Relatively straight forward to deploy. • Relies on water current. • Samples may require laboratory analysis.

Method	Primary Target Species Group	Key Considerations
Sweep netting	Benthic	• Relatively straight forward to deploy. • Can be deployed in still water. • Samples may require laboratory analysis.
Remotely Operated Vehicles (ROVs)	Mobile, sessile/fouling animals, anchored attached plants.	• Specialist equipment is required. • Specialist training is necessary. • High capital cost and potentially high maintenance costs. • Enables coverage of large areas quickly. • Provides high-quality, real-time imagery. • Water quality and visibility can affect data accuracy.

7. Contingency Planning

Contingency planning should also be in place to ensure effective and consistent response to both incidents associated with high risk of introduction and spread of INNS, and the detection of a new or priority INNS within the Moray Firth.

7.1 New INNS Detection

Even with good biosecurity procedures in place, there is potential for new INNS to be detected within Ardersier Port. Rapid response to eradicate or contain an INNS is fundamental to reducing the risk of its establishment, spread and potential impact on the local environment and wildlife. Instructions on what to do in the event that an INNS (not previously recorded in Ardersier Port) is detected within Ardersier Port are provided in Table 7-1. For INNS already present in the Moray Firth, the monitoring guidance above (see Section 6) should be followed.

Table 7-1. Contingency Plan for detection of new INNS within the Ardersier Port Energy Transition Facility (ETF).

Action	Responsibility
Take photographs of the organism suspected to be an INNS. If possible and safe to do so, collect the whole organism, or a sample, in a sealable vessel (zip lock bag, screw top jar).	All Ardersier Port staff.
Check organism against identification sheets (see the INNS Identification guide links within the Section 5 above). To report a suspected marine INNS, follow the instructions on the Scottish Government's website[6] or email Marine Scotland: marinescotland@gov.scot.	All Ardersier Port staff.
Make the relevant Ardersier Port Biosecurity Lead (i.e. the Environmental Advisor) aware of the incursion. With support from the Environmental Advisor (and external expertise if required), initiate immediate containment measures, including restricted vessel movements if possible, and make staff aware of the incursion.	All Ardersier Port staff & the Environmental Advisor.
Carry out wider survey of vessels and port infrastructure and equipment, as relevant.	Environmental Advisor.
Seek advice from external experts, Marine Scotland Science or GBNNSS on additional measures and appropriate management actions for longer term control, where appropriate.	Environmental Advisor.

[6] https://www.gov.scot/policies/marine-environment/invasive-non-native-species/

8. Plan Evaluation and Review

This Plan is considered a live document. It will be subject to an annual review and revised as required, for example, to reflect changes to operations and identified INNS within the Ardersier Port. Ardersier Port is responsible for this Plan.

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Annex 1 Non-Native Species and Horizon Species

Non-Native Species recorded within the Moray Firth


Credit: APEM

Darwin's barnacle (*Austrominius modestus*) is a small sessile barnacle native to Australasia. It is commonly found in mid-shore to subtidal areas of estuaries and sheltered marine habitats. It attaches to a variety of natural and artificial hard substrate including rocks, stones, hard shelled animals and submerged surfaces of ships. It has a wide salinity and temperature tolerance range. Its fast growth and development, high reproductive output and environmental tolerance gives it a competitive advantage over native species. It is known to displace native barnacles, and its fouling of vessels, equipment and infrastructure has resulted in increased cleaning and fuel costs. Attachment to vessel hulls is deemed the most likely pathway for its spread, with other potential pathways including movement of shellfish stock and equipment, and natural dispersal of larvae on ocean currents. It was first recorded in GB in 1946 in Chichester Harbour and is now widespread. With respect to the Moray Firth, it was recorded in Balintore, Avoch, Fortrose Invergordon and Cromarty in 2012. For further information see Nall *et al*, (2015) and the GB Non-Native Species Secretariat's (GBNNSS) Information Portal[7].


Credit: APEM

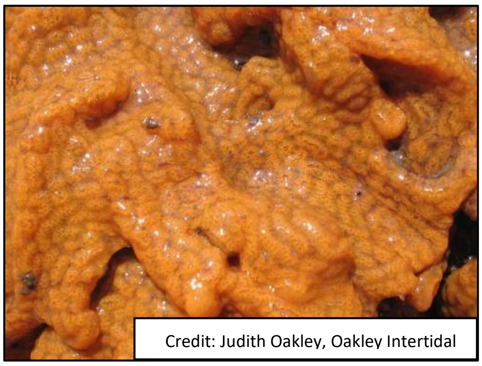
Japanese skeleton shrimp (*Caprella mutica*) is a large skeleton shrimp native to north-east Asia. It is typically found in areas of high human activity, attached to natural substrate such as seaweed and hydroids, and artificial hard substrate such as pontoons, buoys, ropes and submerged surfaces of ships. Japanese skeleton shrimp have been shown to display aggressive and competitive behaviour with potential to displace native species and impact benthic communities. They are also known to block intake pipes and foul mussel lines resulting in increased cleaning and maintenance costs. A number of potential pathways for translocation have been suggested, including attachment to ships hulls, in ballast water, or on shellfish stock and equipment. It was first recorded in GB in 2000, in the Lyne of Lorn near Oban. It has since been recorded in numerous locations throughout Scotland, England and

[7] https://www.nonnativespecies.org/non-native-species/information-portal/view/1301

Wales. With respect to the Mory Firth, it was recorded in Fortrose, Invergordon and Cromarty in 2012. For further information see NBN Atlas and the GBNNSS Information Portal[8].


Credit: Chris Wood. Marine Biological Association

Orange Ripple Bryozoan (*Schizoporella japonica*) is a bright orange encrusting bryozoan, native to the north-western Pacific. It is typically found on artificial substrates such as piers, buoys and ships, in harbours and marinas, and on rocks, boulders and shellfish in intertidal areas. It has broad environmental tolerances. It competes for space and inhibits the growth of species in close proximity. It can also foul aquaculture equipment and lines, and smother commercially grown species resulting in economic costs. The introduction and spread of this species has been attributed to aquaculture stock movements and transfer on vessel hulls. The species may also disperse by rafting on weed. This species was first recorded in GB in Wales in 2010. Its distribution remains limited across Wales, England and Scotland. With respect to the Moray Firth, it was recorded in Cromarty and Invergordon in 2012. For further information see NBN Atlas Nall *et al*, (2015) and the GBNNSS Information Portal[9].


Credit: Judith Oakley, Oakley Intertidal

Orange cloak sea squirt (*Botrylloides violaceus*) is an orange, colony-forming tunicate native to the north-western Pacific. It is commonly found in harbours and marinas on submerged man-made surfaces such as pontoons, ropes and fenders. It may also be found in sheltered natural shores, attached to seaweed and other solid surfaces. It forms very large colonies which overgrow existing sessile communities and reduce the abundance and habitat occupancy of shallow-water suspension feeding sessile invertebrates. This species can also foul aquaculture equipment and lines, smother commercially grown species and block intake pipes, resulting in economic impacts. The introduction and spread of this species is primarily associated with two pathways: the movement of shellfish stock and vessel hull fouling. This species may also disperse by rafting on weed and attached to mobile species such as crabs. The species was first recorded in GB in 2006 on the South Coast of England. It is now recorded throughout England, Wales and Scotland. With respect to the Moray Firth, it was recorded in Fortrose

[8] https://www.nonnativespecies.org/non-native-species/information-portal/view/647
[9] https://www.nonnativespecies.org/non-native-species/information-portal/view/4322

and Invergordon in 2012. For further information see NBN Atlas Nall *et al*, (2015) and the GBNNSS Information Portal[10].


Credit: M.D. Guiry, seaweed.ie

Siphoned Japan Weed (*Dasysiphonia japonica*) (Synonym: *Heterosiphonia japonica*) is a bushy red seaweed native to the north-west Pacific. It is typically found in sheltered to semi-exposed subtidal areas, either on natural shores or in artificial habitats such as marinas and harbours. It can grow as a dense turf on rocks, boulders and cobbles, or on other species of algae, and can also be found free floating. Its wide environmental tolerances and ability to establish dense populations rapidly negatively impacts native communities, reducing species richness and abundance, including species of conservation importance such as seagrass. It may also overgrow shellfish, resulting in loss of yield with financial implications for the aquaculture industry. Its spread is attributed to a number of different anthropogenic pathways including commercial shellfish movements, transfer on equipment, in ballast water and attached to ship's hulls. Fragments may also be transported on ocean currents or attached to drifting algae and marine debris. The species was first recorded in GB in 1999 in Wales. It has since been recorded in numerous locations throughout Wales, England and Scotland. With respect to the Moray Firth, it was recorded in Cromarty and Wick in 2012. For further information see NBN Atlas and Nall *et al*, (2015) and the GBNNSS Information Portal[11].

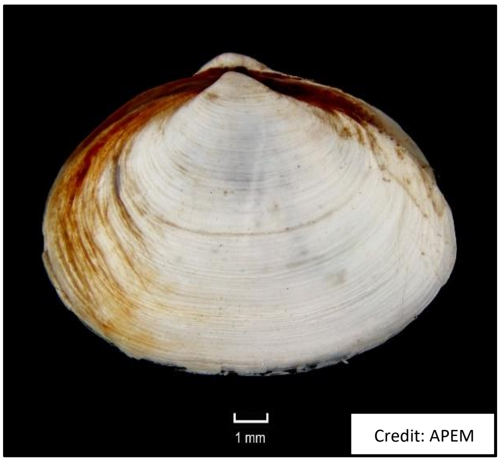

Credit: APEM

Slipper Limpet (*Crepidula fornicata*) is a filter-feeding, asymmetrical smooth-shelled sea snail native to the east coast of the Americas between Canada and Mexico. It is most commonly found in sheltered areas of muddy seabed with shells and cobbles. This species quickly dominates. It competes with native and commercially important species for food and habitat, and reduces the mobility and survival of organisms to which it attaches. At high abundances slipper limpets can disturb water flow and trap fine suspended particles. This species may be transported in ballast as larvae or attached to vessel hulls or man-made structures. The slipper limpet can also be transported when attached to mobile organisms. It was first recorded in GB in the early 1870s in Liverpool Bay. Though identified as a horizon

[10] https://www.nonnativespecies.org/non-native-species/information-portal/view/514
[11] https://www.nonnativespecies.org/non-native-species/information-portal/view/1716

species for Scotland in 2023, there have been reports of this species in Scotland in 2024 and 2025, including a reports of this species at Fortrose. For further information on this species see NBN Atlas the GBNNSS Information Portal[12] and a recent alert[13] produced following the increase in reports of this species.

Sand gaper (*Mya arenaria*) is a large soft-shelled long-lived clam native to North America. It is commonly found in intertidal and shallow subtidal areas, growing fastest in sand or sandy mud sediment. It has a broad environmental tolerance including tolerance to low salinities typical of estuaries. Its initial introduction into Europe (as far back as the 16th Century) has been attributed to its use as food or bait. Other potential pathways include transfer in ship's ballast and dispersal of larvae on ocean currents. The impact of this species is unknown. It was first recorded in GB in 1899 in Wales. It is widespread across GB. With respect to the Moray Firth, it has been widely recorded from Findhorn Bay to Beauly Firth and up to Loch Fleet, with the most recent record in 2008. For further information see NBN Atlas and the GBNNSS Information Portal[14].



Credit: APEM

Wireweed (*Sargassum muticum*) is a wiry-stemmed olive brown seaweed, which is highly distinctive. It is found in rockpools and on hard surfaces particularly in intertidal areas although it can tolerate estuarine/ brackish areas and can detach and float freely. Native to north western pacific region it was introduced potentially with commercial oysters into Europe before spreading either by fouling or natural dispersal and was first recorded in the UK in 1973 With respect to Ardersier Port locality, this species was recorded on the north shore of the Whiteness Head spit exposed to the Moray Firth, during walkover surveys conducted as part of previous EIA for Ardersier Port in 2018. For further information on the species see GBNNSS Information Portal[15].


Credit: APEM

[12] https://www.nonnativespecies.org/non-native-species/information-portal/view/1028
[13] https://www.nonnativespecies.org/assets/Uploads/Slipper-Limpet-poster.pdf
[14] https://www.nonnativespecies.org/non-native-species/information-portal/view/2274
[15] https://www.nonnativespecies.org/non-native-species/information-portal/view/3141

Horizon Invasive Non-Native Species

Two marine species were identified within the top 30 INNS predicted to arrive, establish and impact biodiversity and ecosystem services in Scotland: worm wart weed (*Agarophyton vermiculophyllum*) and the American lobster (*Homarus americanus*) (Scottish Government, 2023).

Worm wart weed has been recorded in England, Wales and Northern Ireland but is not widespread. For further information on this species see NBN Atlas[16] and the GBNNSS Information Portal[17].

American lobster has been recorded in England and Wales, and one record exists in Scotland, in the Moray Firth north of Buckie. The introduction of this species into UK waters is linked to deliberate release of animals. Given their risk to native lobsters and the potential financial impact of their establishment, an American lobster 'Retain and Report' campaign[18] has been in operation in Scotland (and England) since 2020. For further information on this species see NBN atlas and GBNNSS Information Portal[19].

There are also high impact species recorded in Scotland but not yet within the Moray. These include (but are not limited to) the carpet sea squirt (*Didemnum vexillum*), Chinese mitten crab (*Eriocheir sinensis*) (a species of special concern under the Invasive Alien Species Regulations), leathery sea squirt (*Styela clava*) *and* Wakame (*Undaria pinnatifida*).

It should be noted that in the absence of a comprehensive survey of the Moray Firth, there is limited confidence in INNS distribution data for the area. In addition, impacts of INNS are often not realised prior to their establishment, making assessment of threats on the horizon challenging. However, the biosecurity actions proposed within this Plan will mitigate the risk of introduction and spread of INNS not yet detected, as well as those already recorded.

Data Citations

All data is CC-BY Creative Commons Attribute 4 or similar and Open Government License (OGL).

Mya areanaria:

> DASSH Data Archive Centre Academic Surveys by Marine Biological Association under licence CC-BY Released under DASSH terms and conditions; See http://www.dassh.ac.uk/terms-and-conditions [Accessed 30 September 2025]

[16] https://species.nbnatlas.org/species/NHMSYS0021587687
[17] https://www.nonnativespecies.org/non-native-species/information-portal/view/4329
[18] https://blogs.gov.scot/marine-scotland/2021/05/24/american-lobsters-in-scottish-waters/#:~:text=Please%20report%20any%20suspected%20American,at%20UKFMC%40gov.scot
[19] https://www.nonnativespecies.org/non-native-species/information-portal/view/1736

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Caprella mutica, Botrylloides violaceus, Austrominius modestus, Schizoporella japonica:

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Crepidula fornicata:

Records provided by Invasive non-native species records from SEWeb, accessed through NBN Atlas website. [Accessed 30 September 2025]

Homarus americanus:

Verified marine records from Indicia-based surveys by Marine Biological Association and Biological Records Centre under licence CC BY. Released under DASSH terms and conditions. See http://www.dassh.ac.uk/terms-and-conditions [Accessed 30 September 2025]

Annex 2 Key Contacts and Additional Information

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Responsibility for marine INNS in Scotland lies with Marine Scotland Science, within the Marine Directorate of Scottish Government.

Further information on INNS distribution within Scotland can be found on the National Biodiversity Network www.nbnatlas.org.