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Neart na Gaoithe

# Neart na Gaoithe

## Marine Licence Application for Marine Growth Deposition

## Supporting Environmental Information Report

DOCUMENT REFERENCE: NNG-NNG-PMG-REP-0695

# Document Control

| SIGN OFF | | |
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| DOCUMENT CONTROL | | | | | |
|---|---|---|---|---|---|
| Document Number | | NNG-NNG-PMG-REP-0695 | | | |
| Document Title | | Marine Licence Application for Marine Growth Deposition - Supporting Environmental Information Report | | | |
| Rev. | Date [dd mmm yyyy] | Description | Prepared | Checked | Approved |
| 0.1 | 06 October 2025 | First draft | Victoria Rutherford | Michelle Elliott | Stuart McCallum |
| 0.2 | 09 October 2025 | Second draft addressing internal review comments | Victoria Rutherford | Stuart McCallum | Stuart McCallum |
| 1.0 | 16 October 2025 | Issue to MD-LOT | Victoria Rutherford | Stuart McCallum | Stuart McCallum |
| | | | | | |

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# 1 Introduction

## 1.1 Project Background

The Neart na Gaoithe (NnG) Offshore Wind Farm is located to the northeast of the Firth of Forth, 15.5 kilometres (km) directly east of Fife Ness on the east coast of Scotland in depths ranging from 40 m to 60 m lowest astronomical tide (LAT). The Wind Farm Area comprises 54 wind turbines with jacket foundations, covering an area of approximately 105 $km^2$. Offshore Export Cables are located within the 300 metre (m) wide Offshore Export Cable Corridor, running in an approximately southwest direction from the Wind Farm Area, making landfall at Thorntonloch beach to the south of Torness Power Station in East Lothian. Construction began in Quarter three of 2020 and the Project is fully commissioned, however is considered to be under construction until the inter-array cable rock placement is complete (anticipated early 2026).

The Project has Marine Licences for the construction, operation and maintenance of the NnG Offshore Wind Farm and transmission assets under two separate Marine Licences, namely:

- 06677/19/0 – the Generating Station Marine Licence, (dated 4 June 2019); and
- MS-00009831 – the Transmission Works Marine Licence (dated 26 May 2022).

As part of the routine maintenance of the wind farm, inspections must be carried out on fatigue-critical welds anodes on the jacket foundation structures of the turbines and offshore substations, as detailed in the NnG Operation and Maintenance Programme (OMP). Inspections are fundamental to ensuring the structural integrity of the foundations, and therefore safety of personnel onboard. Inspections of low fatigue life welds are prescribed in DNV standards, as well as being recommended in industry best practice and guidelines. Good structural integrity management throughout life increases the likelihood of enabling life extension of the asset, which would provide a significant contribution to the Scottish Governments Net Zero targets. Prior to inspection, any marine growth that has established on the structure around each target weld must be removed to increase the likelihood of crack detection.

## 1.2 Purpose of this Supporting Environmental Information Report

Consultation with the Marine Directorate Licensing Operations Team (MD-LOT) was undertaken in September 2025, which confirmed that NnG Offshore Wind Limited (NnGOWL) is licenced for the removal of marine growth under its Marine Licences (06677/19/0 and MS-00009831) (as the activity was assessed in the Environmental Impact Assessment (EIA) submitted as part of the Marine Licence application). However, it is the view of MD-LOT that the subsequent settling of the removed marine growth on the seabed is a separately licensable activity (i.e. a deposit).

NnGOWL is therefore applying for a Marine Licence from MD-LOT for the deposition of the marine growth onto the seabed following its removal (as it is not considered feasible to capture and remove it), under section 21 of the Marine (Scotland) Act 2010.

This Supporting Environmental Information (SEI) Report is submitted alongside the Marine Licence application, to provide an overview of the baseline environment and any potential environmental impacts arising from the *in-situ* settlement of marine growth fragments arising from the licensed removal activities. As advised by MD-LOT, the assessment includes an Invasive Non-Native Species (INNS) assessment.

The report is structured as follows:

- Section 1: Introduction.
- Section 2: Scotland's National Marine Plan.
- Section 3: Description of the Works.
- Section 4: Assessment of Potential Impacts.
- Section 5: INNS Risk Assessment.
- Section 6: Summary and Conclusion.
- Section 7: References.

## 1.3 Legislative and Policy Considerations

### 1.3.1 The Marine (Scotland) Act 2010

NnGOWL is satisfied that the existing marine licences cover the act of removing the marine growth (and MD-LOT confirmed in September 2025 that it is content with this).

MD-LOT also confirmed in September 2025 that it considers the deposit of marine growth on the seabed a marine licensable activity under Section 21 the Marine (Scotland) Act 2010 (0-12nm) and Section 66 of The Marine and Coastal Access Act 2009 (12-200nm). Section 21 of the Marine (Scotland) Act 2010 is provided below for reference:

*'Article 21(1)(2): To deposit any substance or object anywhere in the sea or on or under the seabed from a vehicle, vessel, aircraft, marine structure or floating container which was loaded with the substance or object either—(a) in Scotland, or (b) in the Scottish marine area.'*

### 1.3.2 The Convention for the Protection of the Marine Environment of the North-East Atlantic (the "OSPAR Convention")

The OSPAR Convention is the current legislative instrument regulating international cooperation on environmental protection in the North-East Atlantic. The UK is a signatory party to the OSPAR Convention.

Disposing ("dumping") of most wastes or other matter at sea is prohibited by the OSPAR Convention (OSPAR Commission, 1992). "Dumping" means any deliberate disposal in the maritime area of wastes or other matter from vessels or aircraft or from offshore installations and any deliberate disposal in the maritime area of vessels or aircraft or offshore installations and offshore pipelines[1].

"Dumping" does not include:

- The disposal in accordance with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL Convention) relating thereto, or other applicable international law, of wastes or other matter incidental to, or derived from, the normal operations of vessels or aircraft or offshore installations other than wastes or other matter transported by or to vessels or aircraft or offshore installations for the purpose of disposal of such wastes or other matter or derived from the treatment of such wastes or other matter on such vessels or aircraft or offshore installations; and
- The placement of matter for a purpose other than the mere disposal thereof, provided that, if the placement is for a purpose other than that for which the matter was originally designed or constructed, it is in accordance with the relevant provisions of the Convention.

The OSPAR Convention states that the Contracting Parties shall in accordance with the provisions of the Convention, take all possible steps to prevent and eliminate pollution and take the necessary measures to protect the maritime area against the adverse effects of human activities so as to safeguard human health and to conserve marine ecosystems and, when practicable, restore marine areas which have been adversely affected. "Pollution" is defined as the introduction by man, directly or indirectly, of substances or energy into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, damage to amenities or interference with other legitimate uses of the sea.

The compatibility of the marine growth deposit into the sea with the OSPAR Convention must be considered to ensure the activity is permitted. While the marine growth has grown in situ, and a small amount will be deposited in situ, the deposit of the material could potentially be considered dumping, i.e. "deliberate disposal in the maritime area of waste or other matter from vessels", if the use of an ROV that connects to a vessel via a cable is considered the source of the dumping. Regardless of the interpretation of the sources of the marine growth, dumping does not include "placement of matter for a purpose other than the mere disposal thereof". The purpose of the placement of the marine growth in the sea is to facilitate the inspection of jacket foundation structures of the turbines and offshore substations to maintain jacket foundation integrity. The deposit is not carried out for the sole purpose of

[1] "Offshore installation" means any man-made structure, plant or vessel or parts thereof, whether floating or fixed to the seabed, placed within the maritime area for the purpose of offshore activities. "Offshore activities" means activities carried out in the maritime area for the purposes of the exploration, appraisal or exploitation of liquid and gaseous hydrocarbons. A wind turbine generator and the associated cable therefore do not meet the definition of an offshore installation under the OSPAR Convention.

disposal, and as such can be permitted under the OSPAR Convention rules. Furthermore, the OSPAR Convention's main purpose is to prevent and eliminate pollution and protect the maritime area against the adverse effects of human activities. As the OSPAR Convention considers pollution to be the introduction of substances into the maritime area which results, or is likely to result, in hazards to human health, harm to living resources and marine ecosystems, and the assessment carried out shows that the deposit of marine growth in situ is unlikely to result in any harm to the marine ecosystem, the proposal is not considered to breach the OSPAR Convention obligations.

### 1.3.3 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (the "London Convention") and London Protocol 1996

The London Convention and the associated 1996 London Protocol update is an agreement to control pollution of the sea by dumping and covers the deliberate disposal at sea of wastes or other matter from vessels, aircraft, and platforms. The UK is a contracting party to the London Convention/Protocol.

"Dumping" in the London Protocol means any deliberate disposal into the sea of wastes or other matter from vessels, aircraft, platforms or other man-made structures at sea, any deliberate disposal into the sea of vessels, aircraft, platforms or other man-made structures at sea, any storage of wastes or other matter in the seabed and the subsoil thereof from vessels, aircraft, platforms or other man-made structures at sea and any abandonment or toppling at site of platforms or other man-made structures at sea, for the sole purpose of deliberate disposal (International Maritime Organization, 1996). "Dumping" does not include:

- The disposal into the sea of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or other man-made structures;
- Placement of matter for a purpose other than the mere disposal thereof, provided that such placement is not contrary to the aims of the Protocol; and
- Abandonment in the sea of matter (e.g., cables, pipelines and marine research devices) placed for a purpose other than the mere disposal thereof.

"Wastes or other matter" means material and substance of any kind, form or description under the London Protocol

The London Protocol prohibits the dumping of any wastes or other matter with the exception of those listed in Annex 1 of the protocol. The wastes or other matter that may be considered for dumping (as long as the general objectives of the London Protocol are met) includes organic material of natural origin. As the London Protocol allows for "organic material of natural origin" to be dumped, the removal and subsequent deposit of the marine growth in the marine environment can be considered compliant with the London Protocol. The general objective of the London Protocol is that Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter. "Pollution" means the introduction, directly or indirectly, by human activity, of wastes or other matter into the sea which results or is likely to result in such deleterious effects as harm to living resources and marine ecosystems, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities.

As the assessment of the marine growth shows that the material does not contain any harmful materials or INNS, the material to be deposited is not likely to introduce any pollution to the sea. Therefore, the activity is compliant with the London Convention/Protocol obligations.

### 1.3.4 International Convention for the Prevention of Pollution from Ships 1973 as modified by the Protocol of 1978, (the "MARPOL Convention")

The MARPOL Convention is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The UK is a contracting party to the MARPOL Convention. The MARPOL Convention includes several categories of wastes/pollution but the most relevant one to the current application is the annex governing pollution from garbage (International Maritime Organization, 1973). Garbage includes food, domestic and operational waste, plastics, cargo residues, incinerator ashes, cooking oil, fishing gear, and animal carcasses and is not relevant to the current application. The marine growth deposit is, therefore, considered to be MARPOL Convention compliant.

### 1.3.5 Waste Framework Directive

"Waste" is defined in Article 3 of the EU Waste Framework Directive (2008/98/EC) as 'any substance or object which the holder discards or intends or is required to discard' (European Parliament and of the Council, 2008). The Waste (Scotland) Regulations 2012 implement the Waste Framework Directive obligations in Scotland. Furthermore, the Environmental Protection Act 1990 section 34 makes it the duty of everyone who produces, keeps or manages controlled waste, or as a broker or dealer has control of such waste, to take all such measures available to that person as are reasonable in the circumstances to apply the waste hierarchy set out in Article 4(1) of the Waste Directive. "Controlled waste" means household, industrial and commercial waste or any such waste. As the collection of marine growth is not feasible, the *in-situ* deposit of marine growth is considered the best management option. Additionally, the deposit is natural in origin and is not being removed from the location where it originated, therefore, the marine growth deposit is considered to be compliant with the Waste Framework Directive.

# 2 Scotland's National Marine Plan

Scotland's National Marine Plan (Scottish Government, 2015) sets out the policies for sustainable management of Scotland's seas, in line with the UK High Level Marine Objectives. All marine licensing decisions in Scotland are required to consider and align with the policies. The General Policies (GEN) provide high level objectives of the plan that all proposals must take into account. For the purposes of this marine licence application, the following policies have been considered as relevant to this work (Table 1).

*Table 1 : Scotland's National marine Plan – General Policies Relevant to this Marine Licence Application for the Removal and Deposit of Fragments Arising from Jetting Activities.*

| GEN POLICY | CONSIDERATION OF THE POLICY |
|---|---|
| **GEN 5 Climate change**<br><br>Marine planners and decision makers must act in the way best calculated to mitigate and adapt to climate change | The work to be undertaken is at the NnG Offshore Wind Farm which is a constructed, operational offshore wind farm, generating and delivering sustainably generated energy to Scotland, under the UK plans to achieve energy security and carbon reduction objectives.<br><br>Should the marine growth deposits not be released into the immediate environment, it would require the collection of all fragments (which is not considered feasible) and transportation to an alternative location, requiring additional vessel time and fuel use resulting in increased emissions. As no environmental impacts are predicted from the deposit of the material, immediate deposition *in-situ* remains in line with GEN 5. |
| **GEN 9 Natural heritage**<br><br>Development and use of the marine environment must:<br>(a) Comply with legal requirements for protected areas and protected species<br>(b) Not result in significant impact on the national status of Priority Marine Features (PMFs)<br>**(c)** Protect and, where appropriate, enhance the health of the marine area. | This SEI undertakes a designated sites assessment (Section 4.3) in order to comply with GEN 9. The assessment has shown that there are no impacts on any protected areas or species, PMFs, Annex I habitat due to the *in-situ* deposit of biological material on the seabed. The work is highly localised and the material to be deposited (if it is not transported on currents) will remain within the vicinity of where it was removed. The material subject to removal does not contain any harmful components which have the potential to lead to significant effects on the environment. |
| **GEN 10 Invasive non-native species**<br><br>Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practice of existing activity should be taken when decisions are being made. | This SEI (Section 4.2.2.2) provides an assessment of INNS in the area, based on existing evidence. The assessment demonstrates that no INNS have been detected at the site and the deposition of the marine growth will not lead to an introduction or spread of INNS in the marine environment.<br><br>Furthermore, NnGOWL has an EMP (NNG-NNG-ECF-PLN-0006) (Neart na Gaoithe, 2020) in place with stringent INNS requirements and mitigation. |
| **GEN 11 Marine litter**<br><br>Developers, users and those accessing the marine environment must take measures to address marine litter where appropriate. Reduction of litter must be taken into account by decision makers. | The material to be deposited from the substructures will be organic in nature and is comprised of naturally forming marine growth. The material does not constitute litter and will not be harmful or detrimental to the marine environment in any way. |

# 3 Description of the Works

The purpose of the marine growth removal activity (that will lead to the *in-situ* deposit of marine biological material) is to remove growth from the jacket foundations to enable visual inspection of critical welds as well as to allow for contact cathodic protection (CP) testing, in order to maintain the structural integrity of the jackets. As mentioned in Section 1.2, the marine growth removal activity is already licenced under the Projects existing Marine Licences (06677/19/0 and MS-00009831) (as the activity was assessed in the EIA), however this information is included here for completeness. It is the view of MD-LOT that the subsequent settling of the removed marine growth on the seabed is a separately licensable activity (i.e. a deposit).

The methodology will follow best practice guidelines and will be performed in line with BS EN ISO 8501-1:2007 (Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness. Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings).

Cleaning methods vary depending on water depth, size and geometry of area to be cleaned and the type of marine growth, plus the desired level of cleaning. The cleaning method which will be used for the work at NnG will be either high-pressure jetting or mechanical removal via ROV, noting both methods are already Licenced for the project.

## 3.1 Key Parameters

The following parameters have been used in this assessment, in order to take a precautionary approach to assessment:

- A maximum estimated 300 kg of marine biological material has the potential to be deposited on the seabed. This is based upon inspections at 11 locations, with 29 welds in total and very localised cleaning for CP contact testing at 15 locations on each jacket. The total estimated weight of marine growth being removed is 222.7 kg and as such this assessment is based on a worst-case of 300 kg to allow for contingency.
- The material originating from the marine environment will be non-hazardous organic material of natural origin. The material, which will be removed via jetting or ROV will never leave the water and will be dispersed into the water column before potentially settling onto the seabed.

## 3.2 Methodology

The marine growth removal works will be carried out by a specialist subcontractor.

### 3.2.1 Programme

Ideally, this work will commence as soon as possible in 2025 but may take place in 2026 dependent on the timing of securing the Marine Licence and weather restrictions. The marine growth removal works are expected to take place over a period of approximately 11 days.

### 3.2.2 Marine Growth Removal Procedure

The procedure for removing the marine growth from localised areas of the jacket structures is typically as follows:

- A function test of the power washer system to be carried out prior to launch
- The ROV will fly to the locations that require cleaning and operations will commence.
- The inspection coordinator will give guidance using local references to confirm the correct areas to be cleaned to a suitable standard.
- During cleaning operations tether operator to monitor the equipment: i.e. supply pressure, fuel levels, hoses for leaks, kinks, components of the pump to ensure they remain tight. Whip-checks should be used at hose connections.
- Good communication must be adopted and agreed between the ROV pilot and CTV crew to call out “make system Hot (on) or make system cold (off) when using the power washer system.
- Performance testing of the level of cleaning capabilities shall be conducted, pressure washer system pressure output should be adjusted to suit, similarly the lance and bracket may need adjusting to increase the success rate of marine growth removal, great care must be implemented to not cause any detrimental damage on any of the welds.

- Cleaned/agitated areas will disperse mud, clay, silt and marine growth reducing visibility, during this time the system should be made cold to review the extent of the cleaning before proceeding on with cleaning operations.

## 3.3 Embedded Environmental Management Measures and INNS Mitigation

All work will be carried out in accordance with the NnGOWL EMP (NNG-NNG-ECF-PLN-0006) which sets out measures to prevent any objects or spills from entering the marine environment and for the management of INNS.

Requirements for pollution prevention and reporting (including dropped objects) are included in the projects existing licence which covers the removal activity.

### 3.3.1 Pollution Control

Precautions will be taken to avoid accidental spillages of noxious substances, fuel, lubricants, chemicals, waste refuse or any polluting liquid or solid. Any location storing chemicals or other hazardous liquids will be adequately sealed and bunded to general bunding rule of 110% of the volume being stored. When a polluting substance or material is accidentally discharged, this will be immediately contained and emergency clean-up procedures will be initiated along with appropriate disposal of the spill, clean-up, waste, recovery, and clearance. For removing the marine growth from localised areas of the jacket structures only seawater will be used in the cleaning system.

Any spills will be immediately reported to enable support to be provided by any means to ensure the safety of any persons and the environment as a priority. Local authorities will be advised where required, in line with statutory compliance. A report will be submitted to NnG, containing all the relevant details of the incident within one working day of the incident occurring. The report will include the proposed remedial measures which have or are to be undertaken, as well as the actions to be put in place to avoid reoccurrence of similar incidents and updated risk assessments. No works will continue unless they are authorised to re-commence.

### 3.3.2 Dropped Objects

All necessary steps will be taken to avoid objects being dropped onto the seabed. Dropped objects have been identified as a potential hazard in a variety of offshore operational activities and the prevention of dropped objects is an important component of safeguarding the global oceans, habitats and environment. Statistical data shows that dropped objects are one of the leading causes of safety incidents and the upmost efforts are needed to reduce the associated risks to health, safety, environment. Dropped objects will be covered under the wider Health and Safety aspects of the project however further steps are needed where these objects have the potential to enter the sea. Dropped objects can occur from any activity taking place above the waterline and the objects can be of any size or material. Policies and Procedures will be in place to manage dropped objects, this will include an overview of Prevention, Risk Management, Training, Statutory Obligations and Reporting (To Authorities), Reporting and Recovery Plans and Continual Improvements. Additionally, any supporting procedures will be provided such as but not limited to Housekeeping, Tethering, Tools/Equipment/Plant Registers (Accountability/book out and in) which reduce the likelihood of Dropped Objects.

### 3.3.3 INNS

NnGOWL are committed to implementing the following management measures to prevent the introduction of INNS through:

- The requirement for all Contractors to adopt relevant legislation and good practice requirements
- The requirement of all Contractors to produce EMPs / adhere to NnG EMPs setting out in detail, procedures to prevent the introduction of INNS; and
- Ensuring the NnG ECoW reviews Contractor EMPs / audits / monitors contractor procedures for compliance.

Specific measures NnG will require to be adopted by Contactors are:

- Vessels > 400 gross tonnes to be in possession of a current international Anti-Fouling System (AFS) certificate;
- Vessels of 24 m or more in length (but less than 400 gross tonnes) to carry a declaration on AFS signed by the owner or authorised agent accompanied by appropriate documentation;
- details of all ship hull inspections and biofouling management measures be documented by the Contractors and, where applicable, recorded in the Planned Maintenance System;

- requirement for all submersible / immiscible equipment e.g., Remote Operated Vehicles (ROVs) (if required) to be subject to pre-use and post-use checks including checks for the presence of marine growth following check-clean-dry principles. All equipment will be required to be free of marine growth prior to mobilisation; and
- requirement for all vessels to be compliant (where applicable) with the International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention, developed and adopted by the International Maritime Organisation (IMO, and which entered into force on the 8th September 2017)) (i.e., ships 400 gross tonnes and above designed/constructed to carry ballast water and operating in the waters of more than one Member State).

The environmental management measures that will be applied by NnGOWL and Contractors, incorporate a variety of good working practice and legislative standards in relation to activities such as the control of INNS.

# 4 Assessment of Potential Impacts

## 4.1 Assessment of Potential Impacts Methodology

The EIA that was submitted alongside the existing Marine Licences covers the methods and equipment of the marine growth removal activity, and as such these are not discussed further in this document.

Prior to the assessment being undertaken, it is important to screen potential receptors for full assessment. It is considered that there is no potential impact pathway to marine mammals, fish and birds due to the proposed deposit of *in-situ* marine growth. No seabed disturbance is anticipated, as the equipment to be used is not anticipated to come into contact with the seabed. Other than the marine growth (i.e., biological material) deposited into the marine environment, no other material or substance will be deposited on the seabed.

Considering the highly localised, temporary and transient nature of the proposed marine growth removal work, no significant noise or vessel disturbance is anticipated and there will be no potential impacts on other users.

The only impact pathway is the deposition of marine growth on the seabed and the potential dispersal of INNS should they be present in the marine growth being removed. As such it is considered that the only potential impacts that may arise from deposition of organic material are:

- Temporary increases in organic particulate matter in the water column and smothering once settled; and
- Possible dispersal of INNS from the removal of marine growth and its deposition on the seabed, should they be present.

However, for context, it should be noted that only a relatively small amount (maximum 300 kg) of marine growth is proposed to be removed across the 105 $km^2$ NnG wind farm area.

## 4.2 Benthic Ecology Assessment

### 4.2.1 Baseline

The baseline benthic and metocean characteristics of the offshore environments in the wider area of the wind farm site were provided in the Benthic Ecology and Physical Processes chapters of the EIA (Mainstream Renewable Power Limited, 2012).

In the Firth of Forth region, typical habitats and species include the biotopes SS.SMx.CMx (circalittoral mixed sediments) and mud with seapens (e.g., *Virgularia mirabilis*) and polychaetes together with muddy sands with infaunal brittlestars (e.g., *Amphiura filiformis*) and the gastropod *Turritella communis*. Characteristic epibenthic species, including the hydroid *Hydrallmania falcata* and soft coral dead man's fingers *Alcyonium digitatum*, have been observed alongside a mobile assemblage (common starfish *Asterias rubens*, brown shrimp *Crangon allmani* and the hermit crab *Pagurus bernhardus*). The *Sabellaria spinulosa* is also reported to be common in the North Sea and has been recorded in the region of the offshore site although there are no records of Annex I *Sabellaria* reef habitats (EMU, 2010).

Further biotopes are found around the Isle of May and Bass Rock. Around the Isle of May, 30 rock and mixed sediment biotopes have been recorded in the coastal and shallow subtidal areas (Moore *et al.,* 2009). The benthic habitats in the vicinity of Bass Rock are mainly sublittoral fringe habitats supporting dense kelp forests. Around Bass Rock are steep underwater cliffs that extend to 15–40 m. These are characterised by dense populations of dead man's fingers *Alcyonium digitatum* and the plumose anemone *Metridium senile* (Moore *et al*., 2009).

A Benthic Ecology Characterisation Survey of the wind farm area was undertaken to support the EIA (Mainstream Renewable Power Limited, 2010). The benthic survey found the dominant sediment type within the offshore wind farm area to be slightly gravelly muddy sand with patches of coarser sediment (e.g., sandy gravel and gravelly sand). The biotope SS.SMu.CSaMu.AfilNten (*Amphiura filiformis* and *Nuculoma tenuis* in circalittoral and offshore sandy mud) covers over 73% of the seabed within the wind farm area. The second most extensive habitat present in the offshore works area was a mix of soft and hard sediments including SS.SCS.CCS (circalittoral coarse sediment) and SS.SSa.OSa (offshore circalittoral sand). Pockets of circalittoral fine sand sediment habitats (SS.SSa.CFiSa) are also present including isolated areas of SS.SSa.CFiSa.ApriBatPo (*Abra prismatica*, *Bathyporeia elegans* and polychaetes in circalittoral fine sand). The offshore sand biotope SS.SSa.OSa.OfusAfil (*Owenia fusiformis* and *Amphiura filiformis* in offshore circalittoral sand or muddy sand) is also present in discrete patches.

Subtidal benthic habitats of ecological and conservation interest (Annex I features, PMFs, Scottish Biodiversity List) identified within the NnG Offshore Wind Farm Area during the 2010 benthic survey were:

- Stony or cobble reef (small areas within the site with characteristics like those of 'stony reef' as listed in the EC Habitats Directive Annex I).
- Burrowed mud (SS.SMu.CSaMu, SS.SMu.CFiMu.SpnMeg).
- Circalittoral and coarse sediments (CCS, OfusAfil, ApriBatPo).
- Brittlestar beds (SS.SMx.CMx.OphMx).

There were also some occurrences of species of conservation importance, these were:

- Ocean quahog (*Arctica islandica*) – Priority Marine Feature, OSPAR threatened and/or declining species, Scottish MPA Project search feature.
- Lesser sandeel (*Ammodytes tobianus*) – Priority Marine Feature, Scottish MPA Project search feature and Scottish Biodiversity List species.
- Common sea urchin (*Echinus esculentus*) - IUCN Red List Species.
- Gastropod (*Simnia patula*) - Scottish Biodiversity List species.
- Bivalve mollusc (*Devonia perrieri*) - Scottish Biodiversity List species.

No INNS were recorded in the NnG Offshore Wind Farm Area.

A desk-based study, collected field data and modelling using a dedicated hydrodynamic and spectral wave modelling system (Mainstream Renewable Power Limited, 2011), was undertaken for the EIA to determine the baseline metocean conditions of the offshore development site. It was found that across the site, there was an almost complete absence of bedforms (e.g. megaripples and sandwaves), except for scour features associated with localised flow accelerations around numerous seabed mound structures (mostly 4 – 6 m shallower than surrounding water at depths of 40 – 48 m) identified within the site. Bedforms are an immediate indicator of sediment transport and therefore of a more dynamic sediment regime. Across most of the site, bedforms are not found, suggesting the site has a largely stable seabed.

### 4.2.2 Benthic Ecology Assessment

The assessment of the impact of increased suspended sediment concentrations (SSC) and smothering from the installation of the Wind Farm Project itself (Mainstream Renewable Power Limited, 2012) found that no impacts were predicted beyond *circa* 5 km of the activity. As such, it is not anticipated that organic material released into the water column from the marine growth removal activity will be dispersed more than 5 km.

#### 4.2.2.1 Increases in Organic Particulate Matter in the Water Column Leading to Smothering

##### 4.2.2.1.1 Sediment Habitat

The majority of the NNG Offshore Wind Farm Area is comprised of sedimentary biotopes (Section 4.2.1), with the MarESA sensitivity assessment for SS.SMu.CSaMu.AfilNten (*Amphiura filiformis* and *Ennucula tenuis* in circalittoral and offshore sandy mud)[2] showing that the habitat has high resistance and resilience, and is therefore not sensitive to changes in suspended sediments in the water column. Similarly, the habitat has a high resistance and resilience, and therefore considered not sensitive, to light smothering, up to 5 cm. The biotope is more sensitive to heavy smothering and siltation rate changes up to 30 cm, with low resistance and medium resilience, the habitat is considered to be of medium sensitivity (De-Bastos and Watson, 2023) due to the impact on burrowing organisms and suspension feeders present.

The other sedimentary biotopes present within the NnG Offshore Wind Farm Area (including SS.SCS.CCS, SS.SSa.OSa.OfusAfil, and SS.SSa.CFiSa.ApriBatPo) show low sensitivity or are not sensitive to changes in water quality. However, these habitats do show medium and low sensitivity, respectively, to high smothering and siltation rate changes (i.e., greater than 30 cm) and low smothering and siltation rate changes (i.e., up to 5 cm) (De-Bastos, 2023; Tillin, 2022). The biotopes are characterised by robust infaunal

[2] Name change in biotope since baseline characterisation.

polychaetes (CCS) (JNCC, 2022) and the species present can be broadly characterised as either opportunistic species that rapidly colonise disturbed habitats and increase in abundance, or species that are larger and longer-lived that may be more abundant in mature settings (ApriBatPo) (Tillin, 2022). Species characteristic of OfusAfil occur buried in muddy sands and reproduce annually, with recovery through juvenile recruitment occurring within two years (De-Bastos, 2023).

Deposited material that reached the seabed would initially lie on the seabed, with organic material released during decomposition of body tissues, causing localised nutrient enrichment, biological oxygen demand (BOD) increase, and proliferation of the many types of organism involved in the breakdown of organic material (Oil and Gas UK, 2013). This breakdown would be aided by natural processes, including consumption by marine organisms, cell breakdown, micro biodegradation, dispersion by currents and incorporation into marine sediment (Oil and Gas UK, 2013).

Considering the limited amount of material which is predicted to reach the seabed and given the considerable extent of these biotopes, and the dynamic nature of the North Sea, combined with the low to medium sensitivity of these habitats to changes in siltation and smothering, it is considered that there is no potential for significant effects on the sedimentary habitat features arising from the proposed deposition of marine growth.

#### 4.2.2.1.2 Protected features

In addition to those observed during the site-specific benthic survey in 2010, there are a number of PMFs surrounding the Isle of May including: seapens and burrowing megafauna, maerl on coarse shell gravel with burrowing sea cucumbers, kelp forests, and kelp and seaweed communities on sublittoral sediment (Figure 4.1).

**Annex I Reef**

There were small areas of the site with characteristics like those of Annex I 'stony reef' identified by video survey within the Wind Farm area during the site-specific benthic survey in 2010, however video data showed these areas were not extensive and coincided with small areas of elevation and ridges arising from areas of exposed bedrock. Further analysis found these areas could not be conclusively classified as Annex I cobble reef, with assessments of resemblance concluded to be either 'not reef' or 'low' (Mainstream Renewable Power Limited, 2012). Considering this and the limited amount of material which is predicted to reach the seabed it is considered that there is no potential for significant effects on the Annex I Reef features, should feature be present, within the Wind Farm area arising from the proposed marine growth deposit activities.

The closest mapped Annex I benthic habitat feature is bedrock and stony reef approximately 9 km to the northwest of the NnG Wind Farm Area. This is beyond the potential 5 km impact range (Mainstream Renewable Power Limited, 2012).

South of the NnG Offshore Wind Farm Area, there is mapped Annex I bedrock and stony reef, the features are greater than 10 km away (i.e., greater than the 5 km potential range of effect) and therefore it is considered there is no potential for effect.

**PMF Habitat – Offshore Subtidal Sands and Gravels**

Whilst the distance to the mapped offshore subtidal sands and gravels PMF habitat, is approximately 1 km, there is a considerable extent of this PMF, and any potential organic material transported to the area characterised as PMF habitat (via physical processes), would be imperceptible in relation to the wider area of this habitat (i.e., the majority of the English and Scottish North Sea).

Considering the limited amount of material which is predicted to reach the seabed and given the considerable extent of these PMF habitats, and the dynamic nature of the North Sea, combined with the low to medium sensitivity of these habitats to changes in siltation and smothering (De-Bastos, 2023; Tillin, 2002), it is considered that there is no potential for significant effects on the offshore subtidal sands and gravel PMF features arising from the proposed marine growth deposit activities.

**OSPAR Habitat – Seapens and Burrowing Megafauna**

There were occurrences of burrowed mud habitat, comprised of the biotope seapens and burrowing megafauna (SS.SMu.CFiMu.SpnMeg), observed during the site-specific benthic survey in 2010.

This biotope is considered to be not sensitive to changes in siltation and smothering as the characteristic burrowing megafauna (mud-shrimp and *Nephrops*) are unlikely to be affected adversely as they are active burrowers (Hill *et al*., 2023). Characterising seapens, such as *Pennatula phosphorea* and *Virgularia mirabilisi*, also burrow and move into and out of their own burrows, therefore deposition of 30 cm of fine sediment will have little effect other than to temporarily suspend feeding and the energetic cost of burrowing (Hill *et al*., 2023). Given that the proposed marine growth deposit activities are predicted to deposit a limited amount of

material on the seabed, it is considered that there is no potential for significant effects on the seapen and burrowing megafauna biotope arising from the proposed marine growth deposit activities.

**HPI – Brittlestar Beds**

The biotope '*Ophiothrix fragilis* and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment' (SS.SMx.CMx.OphMx) was observed in seabed image data taken during the site-specific benthic survey in 2010.

This biotope is considered to have medium sensitivity to smothering occurring from light and heavy siltation rate changes, effects can include abrasion and clogging of gills (De-Bastos *et al*., 2023). However, brittlestars within SS.SMx.CMx.OphMx are passive suspension feeders and can also favour an increase in sedimentation as this can lead to the introduction of organic materials which is found in greater proportions in fine sediments.

While consistent, long-term smothering is likely to result in the death of most individuals, the proposed marine growth deposit activities are predicted to deposit a limited amount of material on the seabed. Considering this and the ability of the biotope to recover quickly (fast colonisers, characterised by rapid growth and early reproduction), it is considered that there is no potential for significant effects on the '*Ophiothrix fragilis* and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment' arising from the proposed marine growth deposit activities.

**PMF Species**

There were also occurrences of ocean quahog and lesser sandeel PMF species observed within the Wind Farm area during the site-specific benthic survey in 2010 and there are also recorded ocean quahog locations > 7 km north (including to the north-east, within the Firth of Forth Banks Complex NCMPA) and south of the NnG Offshore Wind Farm Area.

Ocean quahog are a long-lived species that are largely motionless, remaining buried (or part buried). Ocean quahog has high resilience and resistance to changes in suspended sediments (linked to water quality) and smothering (both light up to 5 cm and heavy up to 30 cm) and siltation changes and are therefore considered not sensitive (Tyler-Waters and Sabatini, 2017). Therefore, it is considered that there is no potential for effects on the ocean quahog features arising from the settlement of material from the marine growth removal activities.

Lesser sandeel are a demersal species (bottom feeders that live on or near the seabed) and have the potential to be sensitive to increases in organic particulate matter in the water column leading to smothering. However, the site-specific benthic survey found the Wind Farm area to have a relatively high mud content, and therefore habitats are unlikely to be suitable for sandeel populations. This was supported by catch records indicating that no sandeel were being caught at the time of the site-specific benthic survey, and the total number of sandeel recorded during faunal analysis was very low (five individuals were captured across entire survey area) (Mainstream Renewable Power Limited, 2012). Considering the limited amount of material which is predicted to reach the seabed and low presence of sandeel in the Wind Farm area, it is considered that there is no potential for effects on the lesser sandeel features arising from the settlement of material from the marine growth removal activities.

**Other Species of Conservation Importance**

Two Scottish Biodiversity List species, *Simnia patula* (gastropod) and *Devonia perrieri* (bivalve mollusc), and one IUCN red list species *Echinus esculentus* (common sea urchin) were identified within the Wind Farm area during the site-specific benthic survey in 2010.

Particle size distribution (PSD) analysis of grab samples collected as part of the site-specific benthic survey showed most samples exhibited high fine sediment content; therefore, it is likely that the benthic communities currently present in this area are adapted to high levels of deposited sediment (Mainstream Renewable Power Limited, 2012). The impact of increased sediment settlement leading to smothering was predicted to be of 'minor significance', as the vulnerability of the fish and shellfish populations (such as *Simnia patula* and *Devonia perrieri*) was assessed as 'negligible' and the impact magnitude was 'low' during the EIA assessment (Mainstream Renewable Power Limited, 2012).

Considering this, and the limited amount of material predicted to be deposited on the seabed, it is considered that there is no potential for effects on *Simnia patula, Devonia perrieri* and *Echinus esculentus* arising from the settlement of material from the marine growth removal activities.

#### 4.2.2.2 INNS

No INNS were found in the NnG Offshore Wind Farm Area during baseline surveys (Section 4.2.1 and Section 0). The method of removing marine growth also results in the organisms being broken up and they are unlikely to survive this process.

This, in addition to the mitigation proposed (see Section 3.3), ensures that INNS risk is reduced to as low as reasonably practicable, ensuring no significant impacts will arise from the redistribution of INNS. Nevertheless, to provide increased information on the risk, an INNS risk assessment has been undertaken (Section 0).

## 4.3 Designated Sites

Designated sites (Special Areas of Conservation (SAC), and Nature Conservation Marine Protected Areas (NCMPAs) within the vicinity of the NnG Offshore Wind farm are:

- Firth of Forth Banks Complex NCMPA (3.3 km);
- Isle of May SAC (15.6 km);
- Berwickshire and North Northumberland Coast SAC (28.5 km);

Further detail is provided on the designated sites with benthic features, below. Sites are shown on Figure 4.1.

### 4.3.1 Firth of Forth Banks Complex NCMPA

The Firth of Forth Banks Complex NCMPA is 3.3 km from the NnG Offshore Wind Farm Area with the NCMPA covering an area of 2,130 km$^2$.

The Firth of Forth Banks Complex NCMPA has two features relevant to this assessment:

- Ocean quahog (*Artica islandica*); and
- Offshore subtidal sands and gravels.

The conservation objectives for the Firth of Forth Banks Complex NCMPA (JNCC, 2018), are to ensure for:

- ***Offshore subtidal sands and gravels***
  - *the extent is stable or increasing; and*
  - *the structures and functions, quality, and the composition of characteristic biological communities (which includes a reference to the diversity and abundance of species forming part of or living within the habitat) are such as to ensure that they remain in a condition which is healthy and not deteriorating;*

*Any temporary deterioration in condition is to be disregarded if the habitat is sufficiently healthy and resilient to enable its recovery from such deterioration. Any alteration to that feature brought about entirely by natural processes is to be disregarded.*

- ***Ocean quahog***
  - *the quality and quantity of its habitat and the composition of its population in terms of number, age and sex ratio are such as to ensure that the population is maintained in numbers which enable it to thrive.*

*Any temporary reduction of numbers is to be disregarded if the population of ocean quahog aggregations is sufficiently thriving and resilient to enable its recovery. Any alteration to that feature brought about entirely by natural processes is to be disregarded*.

#### 4.3.1.1 Assessment of potential effects

**Offshore subtidal sands and gravels**

Increases in organic particulate matter will be highly localised and temporary (taking place over an estimated maximum of 35 days). The predicted movement of any sediment in the water column assessed for the construction of the wind farm was determined to move in a generally southerly and westerly direction i.e., away from the Firth of Forth banks Complex NCMPA. INNS risk is managed through the application of suitable mitigation (Section 3.3).

It can be concluded that increases in organic particulate matter and associated smothering, or redistribution of INNS, arising from the marine growth removal, and subsequent deposition of organic material is not capable of affecting, other than insignificantly the offshore subtidal sands and gravel protected feature of the Firth of Forth Banks Complex NCMPA.

**Ocean quahog**

Ocean quahog has high resilience and resistance to changes in suspended sediments (linked to water quality) and smothering (both light up to 5cm and heavy up to 30 cm) and siltation changes and are therefore considered not sensitive (Tyler-Waters and Sabatini, 2017). The material which is not immediately transported via currents, is expected to rapidly fall and settle on the seabed in the immediate vicinity of the activity. The work will be highly localised, temporary, and is outside (approximately 14 km (NatureScot, 2023)) of any potential effect range (5 km) and therefore it can be concluded that the introduction of INNS arising from the marine growth removal, and subsequent deposition of organic material is not capable of affecting, other than insignificantly the ocean quahog protected feature of the Firth of Forth Banks Complex NCMPA.

### 4.3.2 Isle of May SAC

The Isle of May SAC is 15.6 km from the NnG Offshore Wind Farm Area with the Isle of May SAC covering an area of 3.6 km$^2$.

The Isle of May SAC has one feature relevant to this assessment:

- 1170 -Annex I reef.

The conservation objectives for the Isle of May SAC (NatureScot, 2024), are:

*1. To ensure that the qualifying features of Isle of May SAC are in favourable condition and make an appropriate contribution to achieving Favourable Conservation Status.*

*2. To ensure that the integrity of Isle of May SAC is maintained in the context of environmental changes by meeting objectives 2a, 2b and 2c for each qualifying feature:*

*2a. Maintain the extent and distribution of the habitat within the site*

*2b. Maintain the structure and function of the habitat and the supporting environment on which it relies.*

*2c. Maintain the distribution and viability of typical species of the habitat*

#### 4.3.2.1 Assessment of potential Effects

**Annex I Reef**

The Isle of May SAC supports a diverse range of Annex I reef habitats, comprising approximately 90% of the island coastline (NatureScot, 2024). Rocky reefs are most sensitive to disturbance, smothering and siltation, blocking water flow and the exchange of nutrients, oxygen and also food for filter feeders, however once the pressure is removed, they are considered to recover quickly (NatureScot, 2024). The Isle of May SAC (15.6 km from the NnG Offshore Wind Farm Area) falls outside of the stated potential range of effect (5 km), and although reef features are sensitive to increases in organic matter within the water column, and associated smothering, considering the temporary and highly localised nature of the marine growth removal methods, and the general current direction (i.e., south to south south west of the NnG Offshore Wind Farm Area), combined with the small quantities of the organic material with the potential to be deposited, it can be concluded will be no potential for Likely Significant Effects (LSE) to occur on the Isle of May SAC reef features as a result of the marine growth removal activity and subsequent deposition of material on the seabed. INNS risk is managed through the application of suitable mitigation (Section 3.3) with no potential for LSE considering the distance.

### 4.3.3 Berwickshire and North Northumberland Coast SAC

The Berwickshire and North Northumberland Coast SAC is 28.5 km from the NnG Offshore Wind Farm Area with the Berwickshire and North Northumberland Coast SAC covering an area of 652.3 km$^2$

The Berwickshire and North Northumberland Coast SAC has one feature relevant to this assessment:

- 1170 -Annex I reef.

The conservation objectives for the Berwickshire and North Northumberland Coast SAC (Natural England and NatureScot, 2023), are:

*To ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the Favourable Conservation Status of its qualifying features, by maintaining or restoring:*

- *the extent and distribution of qualifying natural habitats and habitats of the qualifying species*

- *the structure and function (including typical species) of qualifying natural habitats*
- *the structure and function of the habitats of the qualifying species*
- *the supporting processes on which qualifying natural habitats and the habitats of qualifying species rely*
- *the populations of each of the qualifying species*
- *the distribution of qualifying species within the site*

#### 4.3.3.1 Assessment of Potential Effects

**Annex I Reef**

The Berwickshire and North Northumberland Coast SAC hosts an extremely diverse range of Annex I reef habitats, with the Farne Islands of particular importance due to them providing the only rocky islands with extensive reefs in the North Sea (Natural England and NatureScot, 2023). The Berwickshire and North Northumberland Coast SAC (28.5 km from the NnG Offshore Wind Farm Area) falls outside of the realistic potential range of effect (5 km). although reef features are sensitive to increases in organic matter within the water column, and associated smothering, considering the temporary and highly localised nature of the marine growth removal methods, and the general current direction (i.e., south to south south west of the NnG Offshore Wind Farm Area), combined with the small quantities of organic material with the potential to be deposited, it can be concluded will be no potential for LSE to occur on the Berwickshire and North Northumberland Coast SAC Annex I reef features as a result of the marine growth removal activity and subsequent deposition of material on the seabed. INNS risk is managed through the application of suitable mitigation (Section 3.3) with no potential for LSE considering the distance.

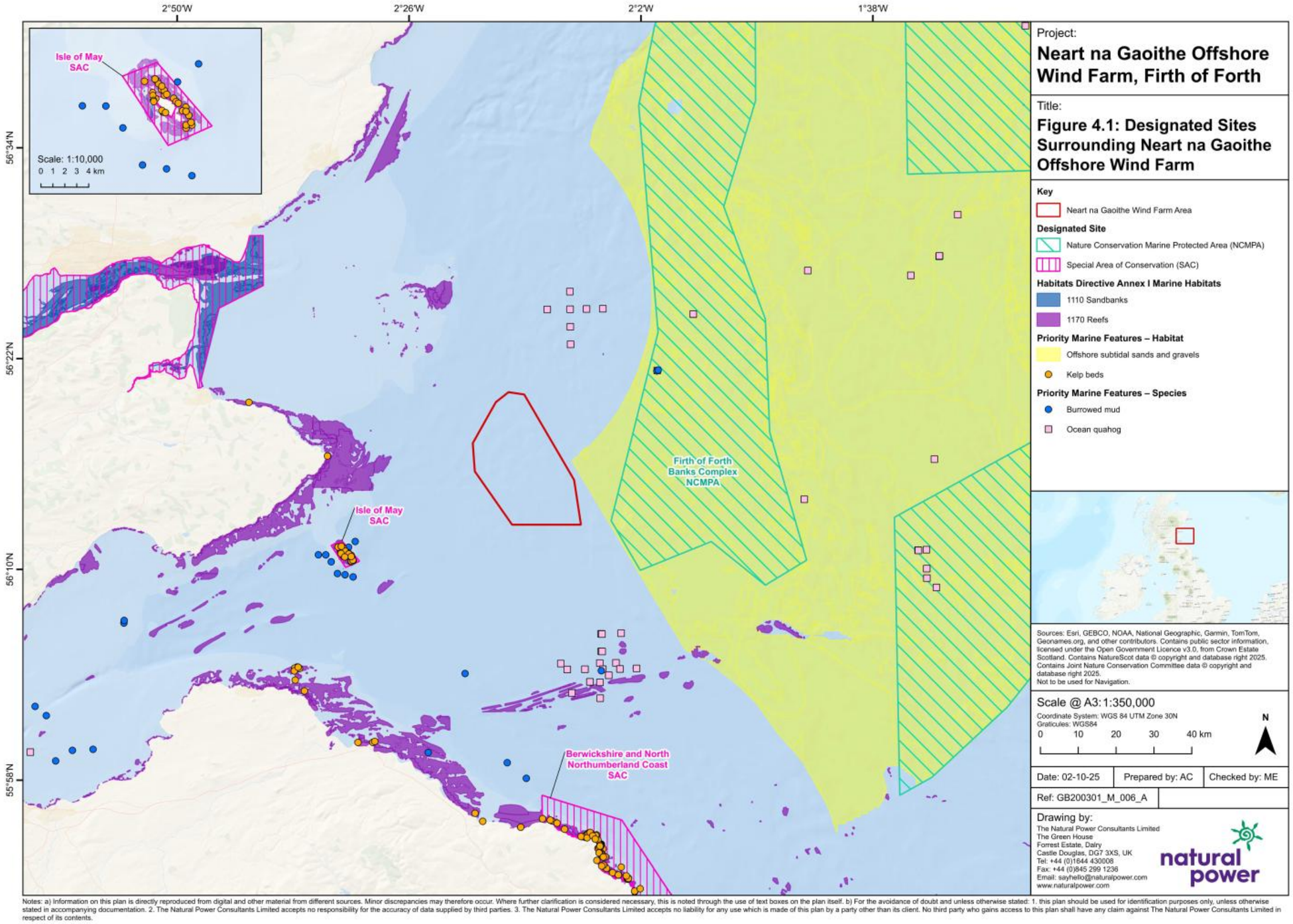


*Figure 4.1: Designated Sites Surrounding Neart na Gaoithe Offshore Wind Farm*

# 5 INNS Risk Assessment

NatureScot (2025) and the Scottish Government (2025) provide a list of INNS which have been recorded in Scottish waters and are now widespread and well established (Table 2).

*Table 2 : Invasive Non-Native Species Found in Scottish Waters (information extracted from NatureScot, 2025; Scottish Government, 2025; GB Non-Native Species Secretariat, 2025; NBN Trust, 2025).*

| SPECIES | HABITAT | UK (AND IRELAND) DISTRIBUTION |
|---|---|---|
| Wireweed (*Sargassum muticum*) | A branched alga found on hard surfaces in shallow coastal water, rarely deeper than 5 m | Originally introduced into the Isle of Wight, now spreading along whole of south coast of England, additional locations in west Wales and some parts of Scotland and Ireland. |
| Green sea-fingers (*Codium fragile subsp. tomentosoides)* | A dark green alga found on rock and coralline algae in pools and on open rock from the mid- to lower shore. In shallow subtidal waters it can be found attached to cobbles, in seagrass beds and on oyster reefs. It also grows on artificial structures including ropes, seawalls, piers and pontoons. It mainly inhabits protected bays and estuaries but also occurs on semi-exposed shores. | The alga occurs throughout the British Isles. It is common in the Scilly Isles, along the south coast of England, west coast of Scotland, Orkney and throughout Northern Ireland. There are scattered recordings from Turnpoint and the east coast of England. |
| Red alga (*Dasysiphonia japonica*) | This red alga is generally found subtidally in sheltered to semi-exposed sites, such as natural shores or in artificial habitats such as marinas and harbours. It can grow on rocks, boulders, cobbles or shells, often as a dense turf, or epiphytically on other species of algae. It is frequently found free floating or washed up on beaches. The species is tolerant of a wide range of environmental conditions including variations in temperature, salinity and wave exposure. | The alga has been recorded from all around the coast of GB, in England, Wales and Scotland (except along the southeast and east coasts between Southampton and Inverness). It has now spread to Orkney and Shetland. |
| Acorn (Darwin's) Barnacle (*Austrominius modestus*) | The barnacle can inhabit almost the entire intertidal zone, but is most common from mid-shore to shallow subtidal areas of estuarine and sheltered marine habitats. It attaches to a variety of substrates including rocks, stones, hard-shelled animals and artificial structures including ships, and tolerates a wide range of temperature and salinity. | The barnacle is distributed around most English and Welsh coasts, with a few locations around Scotland and some Scottish Isles. |
| Japanese skeleton shrimp *(Caprella mutica)* | Typically found on a range of natural substrata including hydroids and attached or drifting macro-algae, and also artificial substrata such as ropes, buoys, boat hulls and floating pontoons. Often found associated with areas of human activity; marinas, harbours, aquaculture sites. | In GB the Japanese skeleton shrimp has been recorded from southern and south west England, the west coast of Scotland and the Western Isles. |

| | | |
|---|---|---|
| Leathery Sea Squirt (*Styela clava*) | Leathery sea squirts are found on hard surfaces in shallow, sheltered water on wrecks and natural rock bottoms. | Leathery sea squirts have been recorded around the coast of England, Wales and western Scotland. Principally in harbours and marinas, from the Clyde (Scotland) around south coast of England and to the Humber, with scattered localities in Ireland. |
| Orange-tipped sea squirt (*Corella eumyota*) | Found mainly in marinas and harbours, but capable of colonising natural habitats. Also occurs sub-tidally in native range. | Established from Oban around the south coast of England to Lowestoft, e.g. shores in Plymouth Sound and the Yealm Estuary, Devon. Also known as an introduced species in a few marinas around the coast of Ireland |
| Orange ripple bryozoan (*Schizoporella japonica*) | Worldwide it is usually found in harbours and marinas, on hard substrates such as pilings and hulls; or intertidally on rocks, boulders and on shellfish such as oysters and mussels. It is tolerant of salinities 18-34 and temperatures 7-19 $^{o}$C. | Found in the Orkney and Shetland Isles, at various other locations along the Scottish coast and various locations in England (Blyth, Plymouth). |
| American Lobster (*Homarus americanus*) | Most likely to be found in shallow coastal waters among boulders, but other habitats and deep water. Uncommon in GB waters with limited confirmed reports. | Few isolated records along the Southern and Eastern English coast and in the Moray Firth. |
| Carpet sea squirt (*Didemnum* species) | Found mostly in sheltered, low energy coastal areas on hard substrates up to 65 m below sea level (Gibson-Hall and Bilewitch, 2018). They can tolerate temperatures from -2°C to 24°C but have been collected only at salinities above 26 parts per thousand. | Limited records from the UK, presence recorded north-west Wales. First found in Scotland in Firth of Clyde and also confirmed in Loch Creran. Also isolated records in Ireland. |
| Pacific oyster (*Magallana gigas*) | Lives permanently attached to any hard substrate in intertidal and shallow subtidal zones of estuaries and coastal waters. In muddy or sandy areas Pacific oysters will settle on small rocks, shells or other oysters and can create reefs by cementing their shells to each other, forming dense layers. | In GB the Pacific oyster is farmed at several locations around GB coasts and estuaries. Escapees have established populations in estuaries in the south-west and south-east of England, and sparse settlements are known from the north coast of Wales near Conwy. |
| Japanese kelp (*Undaria pinnatifida*) | May be found on hard surfaces, including man-made structures from the low tide mark down as far as 15 metres in clear water. May also attach to bottom dwelling creatures, empty shells, loose cobbles and other seaweed species. | The species has also been found throughout the UK and Ireland. The species has isolated recordings in the Firth of Forth, in Scotland., but is mostly distributed along the English (southern) coastline and Northern Ireland. |
| Slipper limpet (*Crepidula fornicate*) | The slipper limpet is found on a wide range of habitats, particularly in wave protected bays, estuaries or sheltered sides of wave exposed islands, up to 60 m depth (Rayment, 2008) | Found sporadically in Scotland in the Moray Firth and the Firth of Forth. More commonly found in south-west, south and south-east Britain as far north as Pembrokeshire on the west coast, and Yorkshire on the east coast. Although accidentally introduced to locations in Ireland, no population has persisted. |

This assessment only considers those species within Scottish waters and discounts species present in the British Isles which have yet to reach Scotland.

In light of the distribution and habitat characteristics presented in Table 2, including depth distribution, distance from shore and type of preferred substrate, and considering the work will mostly be undertaken at depths greater than 45 m, the only two species with the potential to be present in and around the NnG Offshore Wind Farm Area (i.e., subtidal depths between 40 m and 60 m and sediment comprised predominantly of SS.SMx.CMx (circalittoral mixed sediments)) are the carpet sea squirt and the slipper limpet. Both the slipper limpet and the carpet sea squirt have the ability to outcompete native species by displacing other filter feeding invertebrates (slipper limpet) (Non Native Species Secretariat, 2019) and the potential to colonise and smother spawning grounds and other hard substrata, altering habitat and out competing other species for space (carpet sea squirt) (Non Native species Secretariat, 2012).

There were no records of INNS in the biotopes recorded within the offshore site (Mainstream Renewable Power, 2012) and the likelihood of non-native species establishing and dominating on wind turbines within the NnG offshore site is reduced by the existing (long term) presence in the region of both natural and man-made hard substrata (e.g., Torness breakwater) which already support established epibenthic communities (Lindeboom *et al*., 2011). In light of this, the vulnerability of the biotopes to colonisation of INNS was considered negligible. The magnitude of the effect was considered to be negligible and the overall impact assessed to be not significant with low uncertainty (Mainstream Renewable Power, 2012).

Given the age of the baseline data, a further high level data gathering exercise has revealed that the slipper limpet has been recorded on the Isle of May (NAFC Marine Centre, 2019 via NMPI), approximately 16 km from the NnG Offshore Wind Farm.

For completeness, a number of other INNS (as identified in Table 2) were noted (NMPi, 2025) along the coastline, however these species lack the potential to be present at the NnG Offshore Wind Farm given the sessile nature of these organisms, the reproductive biology, and the distance from the site. These include the orange tipped sea squirt (Firth of Forth and north Northumberland coastline), Japanese wireweed (Dunbar, and Japanese kelp (Wakame) (Queensferry, Firth of Forth).

The slipper limpet has a depth range of low water (intertidal) to 60 m (Rayment, 2008) and is tolerant of a wide range of temperature conditions (Non Native species Secretariat, 2019), although it has been suggested that presence may be limited by high mortalities associated with cold winter temperatures in northern Europe (Thieltges *et al.,* 2004). There is evidence of the slipper limpet on offshore wind farms in the North Sea, including Horns Rev (Denmark) and Egmond aan Zee (Netherlands) (IOC-UNESCO and GEF-UNDP-IMO GloFouling Partnerships. 2024; Kerckhof *et al.,* 2011; Bouma and Langkeek, 2009; Kerckhof *et al.,* 2009). The slipper limpet's gregarious chain-forming characteristic renders it susceptible to disturbance as chains are more likely to be broken up, leaving some individuals exposed to predation, furthermore, displacement would certainly lead to the mortality of the bottom individual in the chain as it would become very vulnerable to predation (Rayment, 2008).

The carpet sea squirt has a depth range from the shallow subtidal to 65 m, usually found in low energy environments where water motion is limited (Gibson-Hall and Bilewitch, 2018). Although the ES (Mainstream Renewable Power, 2012) determined that the ambient tidal current regime is not powerful enough to generate significant sediment transport on either spring or neap tides (Chapter 9 – Physical Processes), the site was classified as slightly mobile, under combined wave and current i.e., not sheltered and experiencing a degree of water motion.

It is considered that the risks of either slipper limpet or carpet sea squirt either a. establishing on infrastructure, or. b. being displaced by the work, are low (with a high degree of confidence) for both species at the NnG Offshore Wind Farm. This is due to the lack of existing presence in the immediate NnG Offshore Wind Farm area, and extremely limited isolated evidence of presence in the wider area. Coupled with the mitigation measures listed (Section ) it is considered the risk is reduced as far as is reasonably practicable.

It can therefore be concluded that the risk of encountering the slipper limpet or the carpet sea squirt at the NnG Offshore Wind Farm is low, the method of removal is likely to lead to mortality of any INNS that are present and given the evidence presented above, and the risk of introduction or spreading of INNS resulting from the marine growth removal activities, is extremely low, particularly considering the mitigation measures which will be adhered to (Section ).

# 6 Conclusion

A maximum of 300 kg of marine growth removal across the 105 km$^2$ NnG wind farm area is not expected to result in increases in organic particulate matter in the water column and smothering at levels that can impact, other than insignificantly, habitats or features within the NnG wind farm area or surrounding areas.

No INNS were recorded within the NnG wind farm during the site-specific surveys (Mainstream Renewable Power, 2012). Given the distribution and habitat characteristics of the INNS present in Scottish waters, the distance from shore and type of preferred substrate, and depths at which the works are taking place, only two species were assessed to have the potential to be present in and around the NnG wind farm area; the carpet sea squirt and the slipper limpet. The method of removal is likely to lead to mortality of any INNS that are present. Therefore, it is not expected that the deposition of marine growth from the licenced removal activity will result in the dispersal of INNS to a degree that can impact, other than insignificantly, habitats or features within the NnG wind farm area or surrounding areas.

No impacts are anticipated to occur on any designated sites or protected species or habitats as a result of the deposition of marine growth following removal.

# 7 References

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