Stornoway Deep Water South Scoping Report

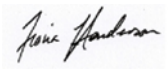
Date: 24/01/2024

113_REP_1_1

Document Control

	NAME	TITLE	SIGNATURE	DATE
Author	Sonja Brown et al.	Principal Environmental Consultant	S. Brown	15/12/23
Reviewer	Fiona Henderson	Managing Director		24/01/24
Authoriser	Innes Beaton	Operations Director		24/01/24

Date Effective:	24/01/24

Revision No:	Signature	Comments	Date
1		For Issue to Client	24/01/24

Contents

Executive Summary

This Scoping Report has been prepared to support a request for a formal Scoping Opinion from Marine Directorate and Transport Scotland in relation to the proposed Deep Water South (DWS) development in Glumaig Harbour, Stornoway. The development forms part of the Stornoway Port Masterplan, the first phase of which, Stornoway Deep Water Terminal, is nearing completion. DWS will provide additional deep-water berthing and laydown facilities to accommodate construction and maintenance needs of the offshore wind sector. With Stornoway being the nearest port to two ScotWind 1 floating offshore wind projects, the proposed development is strategically located to support tow-to-site and maintenance needs of the sector. A full description of the DWS project is provided in Section 3.

The proposed development falls under Schedule 2 of the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 and The Harbours Act (Scotland) 1964 (as amended). Schedule 2 projects require an Environmental Impact Assessment (EIA) if the size, nature, or location indicate that the project would likely have a significant effect on the environment. In this instance the proposed development scale in terms of area (port development greater than 1 hectare) and nature (maritime construction works capable of altering coastal processes) are such that without further assessment likely significant effects cannot be ruled out. DWS is also the next phase of development following on from Deep Water Terminal, which was subject to EIA. Therefore, it has been assumed by the project team that an EIA will be required and hence no request for screening has been submitted.

This Scoping Report has been produced to provide appropriate information to Marine Directorate, Transport Scotland and their consultees to allow them to respond to the request for a Scoping Opinion. A description of the project and its location is provided, and a full range of environmental topics has been considered. Where appropriate, reference has been made to previous assessment and mitigation developed as part of the EIA for the Deep Water Terminal.

Ultimately, the aim of this Scoping Report is to facilitate proportionate EIA, with production of the DWS EIA focussed on the key environmental topics relevant to the project. On this basis, and following the assessment detailed within this report, it is recommended that the following topic areas be taken forward for assessment within the DWS EIA: Land and Soil Quality; Coastal Processes; Landscape, Seascape and Visual Effects; Archaeology and Cultural Heritage; Population and Socioeconomics; Aviation; and Access, Traffic and Transport. For each of these scoped-in topics a proposed impact assessment methodology has been outlined for consideration by Marine Directorate, Transport Scotland and their consultees. For topics that are recommended to be scoped-out, mitigation has been proposed to minimise adverse effects where appropriate, in-line with that identified and successfully implemented for the Deep Water Terminal project.

1 Introduction

Stornoway Port Authority (SPA) are proposing further development of facilities in Glumaig Harbour to augment the Deep Water Terminal currently under construction. This will take the form of a land reclamation area and quayside. The new proposal, Deep Water South (DWS), will provide additional laydown space with heavy lift capabilities and deep-water berthing to facilitate requirements of the offshore wind sector. As elements of the proposal are below Mean High Water Springs (MHWS) the works will be subject to licensing under the Marine (Scotland) Act 2010. In addition, works including those onshore will require consent via a Harbour Revision Order under The Harbours Act (Scotland) 1964 (as amended).

Due to the characteristics, location and potential impacts of the proposed DWS development it is assumed that the project will require an Environmental Impact Assessment (EIA) to be undertaken to support the consenting processes. This will be in accordance with the Marine Works (EIA) (Scotland) Regulations 2017 (hereafter known as the 'EIA Regulations') and The Harbours Act (Scotland) 1964 (as amended).

On the basis that an EIA will be required a formal scoping opinion is sought from Marine Directorate and Transport Scotland in alignment with EIA Regulations. This opinion is sought by Affric Limited, acting as the agent for SPA for the proposed development. This scoping report provides information to support these processes. As per Paragraph 14 (2) of the EIA Regulations a description of the proposed location, and the nature and purpose of the development are provided in Sections 3.1 and 3.2 respectively. Information regarding the likely impacts of the development on the environment are presented in Sections 6 to 25.

The purpose of this scoping report is to allow Marine Directorate, Transport Scotland and their consultees to identify whether certain topics and/or aspects of the proposed development are to be included in the scope of the DWS EIA Report (EIAR), according to the principles of proportionate EIA. This allows the authors of the subsequent EIA to understand where to focus their efforts in the EIA process and in preparation of the resulting EIAR.

The approach to scoping is detailed in Section 5.1 of this report and ensures that all environmental topics are discussed in Sections 6 to 25, utilising the descriptors as outlined in Schedule 4 of the EIA Regulations.

2 Background

Situated on the east coast of Lewis, Stornoway is an important hub for maritime activities. Ready access to the Minch from the shelter of Glumaig Harbour and the wider Stornoway Harbour area contributes to its success as the main port for the Outer Hebrides. The majority of freight and people access the islands via Stornoway, and the area has well established maritime facilities including piers, slipways, marinas, associated infrastructure and businesses.

The DWS proposal forms part of SPA's 2017 Port Masterplan, developed in consultation with port users, the local community and public sector partners. The masterplan envisaged that deep water facilities would be built in phases in Glumaig Harbour. The Deep Water Terminal, currently nearing completion, is the first phase. A key aim of the masterplan is to contribute

to the socio-economic status of Stornoway and the Outer Hebrides. The purpose of the DWS project is to provide facilities that will support the development of offshore wind generation in general and in particular, the assembly of floating offshore wind turbines and development of local operations and maintenance activities.

Stornoway is the nearest port to two ScotWind 1 floating offshore wind projects: Magnora Offshore Wind Talisk (approximately 50 nautical miles (nm)) and Northland Power Havbredey (approximately 60nm). These short distances reflect the strategic location of Stornoway Port for enabling tow-to-site and ongoing operations and maintenance bases for these two sites and future floating offshore wind sites. These sites will have capacity of 1,995MW. Stornoway Harbour is ideally located to support the construction and maintenance of these sites.

The Deep Water Terminal development was subject to EIA as the Stornoway Deep Water Port (DWP), as it will be referred to throughout this document. DWP, inclusive of the access and link roads, has been fully consented under relevant Marine Licenses, Planning Consents and Harbour Revision Order, and construction is now nearing completion (Figures 2.1 and 2.2).

Improvement of the Arnish Road, which serves DWP and Arnish Point Industrial Estate, is currently at proposal stage.

Figure 2.1: DWP and Access Road Under Construction (September 2023)

Figure 2.2: DWP Construction Progress (September 2023)

As part of an evolving design process certain adaptations within the scope of the consented DWP project have arisen as the facility undergoes construction. Included with this report Drawing SDWP-WS2139-XX-00-DR-C-9022 (P01) shows the original layout as consented, and Drawing SDWP-WS2139-XX-00-DR-C-9062 (P08) the revised layout being constructed. A dolphin structure to assist with vessel berthing will be installed at the south-eastern corner of the DWP facility in place of a more extensive pier and pontoon originally consented, reducing the footprint of the development. Additionally, a separate bollard island immediately to the south of DWP has been replaced by a simple installation of three floating mooring buoys attached to the shoreline, to be used for mooring of large vessels alongside the main berthing area. The originally consented bollard island consisted of concrete bases, rock slope and rock armour, none of which will be installed under the current DWP construction programme.

The proposed DWS facility extension of the DWP through the addition of laydown area and facilities to support future needs of the offshore wind sector. The consented footprint of bollard island is entirely overlaid by the DWS proposal, and the three mooring buoys being installed in place of bollard island in the interim will be removed in full and replaced by bollard structures on the DWS facility.

Section 3 below sets out details of the DWS proposal, and Section 5 describes the approach taken throughout this scoping report with regards to information already gathered as part of the DWP EIA and construction processes.

3 Deep Water South Proposed Development

3.1 Location

The DWS development is proposed within the southern portion of Stornoway Harbour, on the western shore of Cala Ghlumaig, or Glumaig Harbour. The town of Stornoway lies across the water to the north and Arnish Point Industrial Estate is situated to the east, on the Arnish peninsula which forms the eastern shore of Glumaig Harbour. The proposed DWS facility is located immediately to the south of the current DWP development as illustrated in Figure 3.1 (DWP central grid reference NG 42634 31050). A possible layout for DWS is indicated in Figure 3.1 and Drawing WS2339-XX-XX-DR-C-9007 (P04), located with a central grid reference of NG 42420 31055.

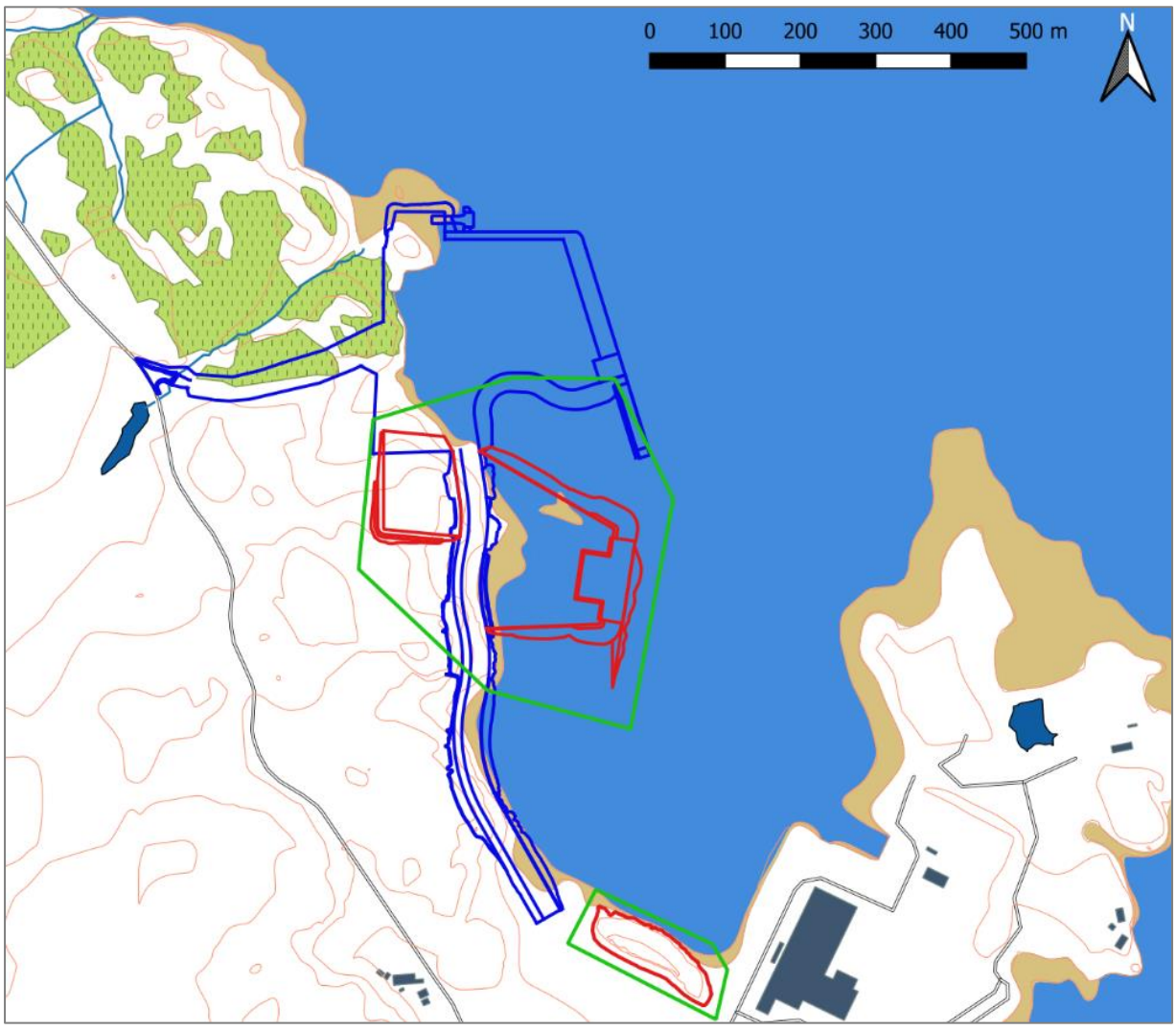


Figure 3.1: Indicative DWS Development Boundary (green) and Indicative Location/Layout (red) Relative to DWP (blue) as shown in Drawing 113_DRG_01_2 Indicative Development Boundary

3.2 Project Description

The proposed DWS development is envisaged to comprise the following main components:

- A deep-water berthing area, with a water depth -13m Chart Datum (CD);
- A reinforced concrete quay capable of housing a heavy-lift crane of up to 3500T capacity;
- Reclamation area bounded by rock armoured slope providing laydown space;
- Mooring bollards, ladders and associated services on the quayside; and
- Onshore laydown space.

Use of the facility is described in Section 3.3.2 below, however during operational use in support of offshore wind projects it is likely that temporary welfare, site office and lighting structures will be in place within the laydown areas.

3.3 Project Phases

3.3.1 Construction Methods

The construction techniques that have been considered throughout this report are as follows:

- Land-levelling activities, namely soil stripping, rock blasting and rock excavation;
- Land reclamation activities, namely rock crushing, rock processing and rock infilling;
- Vibration and impact piling;
- On-site concrete works;
- Dredging; and
- Dredge spoil disposal.

It is envisaged that rock material sourced in the vicinity of the site will be used to complete the majority of the reclamation area and rock armouring. Material won in the creation of the onshore laydown area will be used as infill for the reclamation area and rock armouring. Levelling of an area at the southern end of the link road joining DWP and Arnish Point Industrial Estate may also be used as a source of additional rock material.

To create the reclamation area, an initial rock access bund will be formed, from which construction will progress. On completion of the reclamation area the side slopes will be dressed to a 1 in 1.5 slope, and rock armour placed to prevent erosion of the core material.

At the eastern, seaward-side of the reclamation area, the reinforced concrete deck heavy lifting area and quayside will be constructed. The final design will be informed by ground investigations, but is anticipated to comprise of an open-piled structure with tubular steel piles supporting a suspended concrete deck and faced with fender panels. Piles will be installed by a combination of impact and vibration driving, and toe-pins will be installed where required to provide hold onto bedrock. The piles will be driven from a floating barge and/or from the reclamation area. Piles at the seaward-edge will require support from temporary steel piles and framing during installation. As per other areas of the reclamation perimeter, rock armour will be placed below the open-piled area to protect against erosion of infill.

The design and construction method for the reinforced concrete quay will be developed in light of results from ground investigations. It may be formed on-site using in-situ concrete pours a section at a time, or could comprise pre-cast soffits and beams placed on top of the piles with subsequent in-situ pouring of the top slab. Alternatively, the quay could be of solid construction with an in-situ poured reinforced concrete slab.

To achieve the necessary berthing depth an area of soft dredge will take place at the eastern side of the development. A Best Practical Environmental Option assessment will determine the appropriate route for dredge material be that re-use or disposal.

It is noted that the installation of various electrical, water and drainage services will also be required, however this is a relatively minor construction task and from experience is unlikely to give rise to any significant environmental effects.

3.3.2 Operation

As introduced in Section 1, DWS will provide facilities suitable for the renewable energy sector, enabling a range of activities associated with the development of offshore wind. An operational scenario has therefore been developed for the purpose of understanding what needs to be considered within the EIA for DWS. Although actual operations may vary from the scenarios described below, they are considered to be applicable to the range of offshore wind projects which the DWS development will be able to support.

The following main activities are envisaged at the DWS site:

- Mooring of floating wind turbine bases (whole or components of) at the quayside;
- On-site assembly of floating wind turbines;
- The delivery by sea of the main wind turbine components for on-site assembly and the delivery by road of other equipment, plant and tools;
- Assembly of the floating wind turbines, utilising lifting equipment located on the quayside;
- Wind turbine pre-commissioning and initial testing activities will be carried out at the quayside to ensure that turbines safely and effectively operate;
- Provision of temporary, moveable welfare and office facilities for staff undertaking works on site;
- Maintenance of turbines in need of repair; and
- Use as a base for offshore maintenance.

One fully assembled turbine could be berthed alongside the DWS quayside at any one time, with components for additional turbines within the laydown area.

During the operational phase of the windfarms that DWS will serve, the facility may be used for component replacement or other maintenance activities. However, this scenario is well within the envelope of the assembly and pre-commissioning process described above and hence, is not considered as a separate operational scenario.

The scenario of activities described above will be utilised for the assessment of effects such as noise (Section 9: In-Air Noise and Vibration) and landscape and visual impacts (Section 18: Landscape, Seascape and Visual Effects).

4 Consenting and Policy Context

4.1 Consenting

Consenting of the project will fall under two main legislative acts, the Marine (Scotland) Act 2010 and The Harbours Act (Scotland) 1964 (as amended), which require compliance with underpinning regulations. The main regulatory instruments are discussed here but this review is not exhaustive. In addition, there may be further licences and consents required to facilitate construction and operations.

4.1.1 Marine Licence

A number of activities listed under Part 4, Section 21 of the Marine (Scotland) Act 2010 require a Marine Licence issued by the Marine Directorate Licensing Operations Team (MD-LOT).

Any activity involving the deposit or removal of substances or objects in the sea, either on or under the seabed, or activity to construct, alter or improve any works in or over the sea or on or under the seabed, below MHWS, are all subject to marine licencing according to the Act. The DWS proposal falls within this category and therefore will require Marine Licenscs. Creation of the reclamation area and quayside will require a license to construct in the marine area, and the proposed dredge will require license for dredging and disposal.

4.1.2 Harbour Revision Order

Harbour developments are controlled under The Harbours Act (Scotland) 1964 (as amended). Stornoway Port Authority Harbour Revision Order (HRO) (Scottish Statutory Instrument no.192 2021) was made on the 21st April 2021 for the DWP developments currently under construction. The current DWS plans are outwith the scope of the current HRO; as such, an application will be made to Transport Scotland for a new HRO.

4.1.3 Marine Pre-Application Consultation

The Marine Licensing (Pre-application Consultation) (Scotland) Regulations 2013 prescribe the marine licensable activities that are subject to Pre-Application Consultation (PAC) and in combination with the Marine (Scotland) Act 2010, set out the nature of the pre-application process. The DWS development falls within these regulations under regulation 4(b) and 4(d) as a reclamation area exceeding 10,000m^2 and construction activity within the marine area that exceeds 1,000m^2. The project is therefore required to go through the PAC process with consultation, meeting requirements of the Marine Licensing (PAC) (Scotland) Regulations 2013.

4.1.4 Habitats Directive

The European Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, also referred to as the 'Habitats Directive', has the primary aim of maintaining biodiversity within Member States. The Habitats Directive is transposed into Scottish law by a combination of the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland) and the Habitats Regulations 2010 (in relation to reserved matters). These are commonly known as the 'Habitats Regulations'.

The Habitats Regulations identify several habitats or species whose conservation interest requires the designation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), which form a set of protected sites within the United Kingdom (UK) National Network.

In addition, the Regulations make it an offence to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. These listed species are commonly termed European Protected Species (EPS). Actions in relation to EPS can be made lawful through the granting of licenses by the appropriate authorities (see Section 4.1.3.2).

4.1.4.1 Habitats Regulations Appraisal

A Habitats Regulations Appraisal (HRA) will be required for the DWS development due to its proximity to multiple UK National Network sites. These include SACs and SPAs. The legislative context for this requirement is based on Article 6(3) of the Habitats Directive (92/43/EEC) and Article 4(4) of the Birds Directive (2009/147/EC) and is implemented in Scotland through the Habitats Regulations.

In Scotland, Scottish Planning Policy ensures that an additional type of protected site, Ramsar sites, overlap with UK National Network sites and hence, are protected under the same legislation. Therefore, Ramsar sites do not need consideration separately as part of any HRA.

An Appropriate Assessment (AA) is part of the HRA process and is undertaken by the competent authority. AA is required when a plan or project potentially affects a UK National Network site on the basis of 'likely significant effects' (LSEs).

An AA must demonstrate that there will be no adverse effect on site integrity, nor on the conservation objectives of the designated site. Should this requirement not be satisfied, a project would only receive consent if:

(1) Imperative Reasons of Overriding Public Interest are proved; and

(2) There are no satisfactory alternatives.

It is ultimately up to the competent authority to determine whether LSE are present and therefore whether an AA is needed for relevant designated sites. A Pre-screening HRA report will be provided as part of the application process. Based on the DWP development it is assumed that AA will be required for at least the:

- Inner Hebrides & The Minches Special Area of Conservation (SAC) which has a qualifying feature of harbour porpoise (*Phocoena phocoena*); and
- Lewis Peatlands Special Area of Conservation (SAC) in terms of otter (*Lutra lutra*).

Where there is a potential for LSE sufficient information will be provided within the EIA to allow the competent authority to undertake AA where they deem appropriate.

4.1.4.2 European Protected Species Licence

If it is determined that the development or construction activities will likely affect EPS listed under the Habitats Regulations, which includes dolphins, whales, harbour porpoise and

European otter, an EPS Licence will be required. An EPS licence will only be granted if it is proved that:

(1) The project is imperative for Reasons of Overriding Public Interest;

(2) There are no satisfactory alternatives; and

(3) The proposed action must not be detrimental to the maintenance of the species at 'favourable conservation status'.

Depending on the construction techniques there is a potential to disturb dolphins, whales and harbour porpoise. With evidence of European otter known in the area, EPS licence consideration will also be required with regards to otters.

4.1.5 Water Framework Directive

The Water Framework Directive (WFD) (Directive 2000/60/EC of the European Parliament) is transposed into Scottish law through the Water Environment and Water Services (Scotland) Act 2003 (WEWS Act). The directive aims to achieve a good quality status for all rivers, lochs, transitional waters (estuaries), coastal waters groundwater, and groundwater dependant wetlands. As such, the main aims of the WFD are to:

- Prevent deterioration and enhance status of aquatic ecosystems, including groundwater;
- Promote sustainable water use;
- Reduce pollution; and
- Contribute to the mitigation of floods and droughts.

To assess the impact of any development or activity on a water body, especially those which may pose a risk of reducing the quality status of a water body, a WFD Assessment is required. In a WFD assessment it must be demonstrated whether any activity or development will:

- Cause or contribute to deterioration of status; and/or
- Jeopardise the water body achieving good status.

A WFD Assessment will be required for the DWS development. This is discussed in greater detail in Section 8: Water Quality and Coastal Processes.

Under the WEWS Act, The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR) apply regulatory controls over activities which may affect Scotland's water environment. CAR covers activities relating to point-source and diffuse discharges, water abstraction, engineering within inland waterways and groundwater works which could impact upon water courses and water bodies including: rivers, lochs, estuaries, coastal waters, as well as groundwater, and groundwater dependant wetlands. Activities are controlled by the Scottish Environment Protection Agency (SEPA) under General Binding Rule (GBR), Registration and Licence level authorisations. While CAR does not apply to projects authorised by a Marine Licence, construction works above MHWS affecting the water environment and any permanent discharges to water from DWS will fall under CAR. Furthermore, relevant GBRs

should be followed where appropriate to minimise pollution risks in line with construction best practice.

4.2 Policy Context

4.2.1 Scottish Government Net-Zero and Decarbonisation Targets

In 2019, Scotland committed to achieving net-zero greenhouse gas emissions by 2045. This commitment will require the decarbonisation of all sectors, including industry. To address decarbonisation in industry, initial targets up to 2032 were established in the 2018 Climate Change Plan (CCP). The current CCP identifies seven key sectors and a summary of their targets/policies to contribute towards net-zero (Scottish Government, 2020). The sectors outlined in the CCP applicable to the proposed DWS development include:

- **Electricity**: Policies seek the further decarbonisation of energy generation by supporting the development of a wide range of renewable energy technologies, seeking improvements to electricity generation and network asset management. Development is encouraged of a range of technologies that aid system security, flexibility, and resilience, with innovative energy systems which improve efficiencies and deliver secure, clean and affordable electricity. The overall target is to reduce emissions by 28% over the plan period (2018 – 2032).
- **Industry:** Policies seek to reduce industry emissions through a combination of fuel diversification, cost-saving energy efficiency, heat recovery and participation in the EU Emissions Trading System. Additionally, policies seek to consider emerging Carbon Capture and Storage (CCS), Carbon Capture and Utilisation (CCU) and hydrogen opportunities. The overall target is to reduce industry emissions by 21% over the plan period (2018 – 2032).

As part of the commitment to achieve net-zero, the Scottish Government has also set out short, medium and long-term goals and when they are to be achieved by in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. These are as follows:

The Scottish Ministers must ensure that the net Scottish emissions account for the year:

(a) 2020 is at least 56% lower than the baseline;
(b) 2030 is at least 75% lower than the baseline; and
(c) 2040 is at least 90% lower than the baseline.

Each of the sectors outlined in the CCP are required to contribute to achieving the targets as set out by Scottish Ministers in the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

4.2.2 Local (UK) Content Targets

Scottish Ministers have identified the need for sufficient local content to be realised by Scottish offshore wind infrastructure projects. This will ensure that there are increased opportunities and benefits to the communities and businesses where an infrastructure project is taking place.

The Offshore Wind Sector Deal builds on the UK's global leadership in offshore wind, maximising the advantages for UK industry from the global shift to clean growth (UK

Government, 2019). Within this deal, the sector is committed to increase local (UK) content to 60 per cent by 2030, including increases in the capital expenditure phase. This includes improving access for Small-Medium Enterprises (SMEs) and the need for increasing the number of highly skilled workers in manufacturing areas throughout the supply chain.

4.2.3 Marine Policy

As the DWS development is in part below MHWS and within 12 nm of the Scottish Coastline, it falls within the remit of the Marine (Scotland) Act 2010 and the 2015 Scottish National Marine Plan (NMP) covering inshore waters as required by the Act (Scottish Government, 2015). The NMP lays out the Scottish Minister's policies for the sustainable development of Scotland's seas and provides General Planning Principles (GENs) and sector-specific policies, some of which apply to the construction and operations of DWS. Many GENs are specific to environmental topics and as such, those which are being considered in relation to DWS are identified as follows:

- GEN 2: Economic benefits;
- GEN 3: Social benefits;
- GEN 4: Co-existence;
- GEN 5: Climate change;
- GEN 6: Historic environment
- GEN 7: Landscape/seascape;
- GEN 8: Coastal process and flooding;
- GEN 9: Natural heritage;
- GEN 10: Invasive non-native species;
- GEN 12: Water quality and resource;
- GEN 13: Noise;
- GEN 14: Air quality;
- GEN 15: Planning alignment A;
- GEN 17: Fairness;
- GEN 18: Engagement;
- GEN 19: Sound Evidence;
- GEN 21: Cumulative Impacts; and
- TRANSPORT: Shipping, Ports, Harbours & Ferries

It is noted that work is underway on NMP2. The status of NMP2 will be monitored and if there are any new or different policies relevant to the development then these will be considered within the EIAR.

4.2.4 Planning Policies

Although the DWS development will not be subject to planning consent, rather a Harbour Revision Order, it is deemed appropriate to take account of the planning policy context. The development plan system in Scotland, which provides the framework for considering planning applications, is made up of two main documents:

- The National Planning Framework (NPF); and
- Local Development Plans (LDPs).

The National Planning Framework (NPF) is a requirement of the Planning (Scotland) Act 2006 and sets out the strategy for long-term development within Scotland. The fourth NPF (NPF4), published in February 2023, sets out the strategy for development for the next 20 years (Scottish Government, 2023). The DWS project forms part of the Outer Hebrides Energy Hub, which is one of the 18 national developments set out in NPF4. The DWS will provide a quay and laydown space to service renewable energy developments, which form part of the Energy Hub development.

In November 2018 Comhairle nan Eilean Siar (CnES) adopted the Outer Hebrides Local Development Plan (OHLDP) (CnES, 2018). The plan lays out visions and objectives for the Outer Hebrides and then goes on to detail policies, including those which planning applications would be assessed against. As a result of the Planning (Scotland) Act 2019 the development and lifecycle of LDPs has been revised, and the current OHLDP 2018 – 2023 is expected to undergo renewal is coming years following guidance from the Scottish Government during 2023.

As the updated OHLDP is unlikely to be updated in the Marine Licence and Harbour Revision Order submission timelines, it is proposed that the focus is put on considering policies laid out in NPF4.

The Scottish Government also provides advice and technical planning information in the form of Planning Advice Notes (PANs). Relevant PANs for the DWS development which will be used to support the EIA are identified in Sections 6 to 26.

5 The EIA Process

5.1 Overview and Aim

It is predicted that many of the construction techniques utilised for DWS will not differ notably from those considered for DWP currently under construction. It is therefore envisaged that the potential impacts of DWS on various environmental aspects associated with the development will be largely indistinguishable from those associated with DWP. As such, the potential impacts assessed as part of the DWP EIA have been used to inform this scoping exercise. Where assessments have been previously completed and conclude effects to be non-significantly in EIA terms, without or with mitigation, these topics can be scoped out on the basis that appropriate mitigation is employed. The exception to this is where DWS activities are introducing new potential impacts or could be adding to an effect associated with the DWP facility which additively could give rise to a significant effect (for example landscape and visual).

The aim of this approach is to focus the EIA onto topics which require further consideration to understand their effects, to allow negative effects to be minimised as far as practicable, and beneficial effects to be maximised.

5.2 Methodology

The methodology proposed to inform this scoping exercise is based on the Source-Pathway-Receptor model (Figure 5.1): the construction and operational activities are the sources, and the baseline of each Section topic provides receptor information.

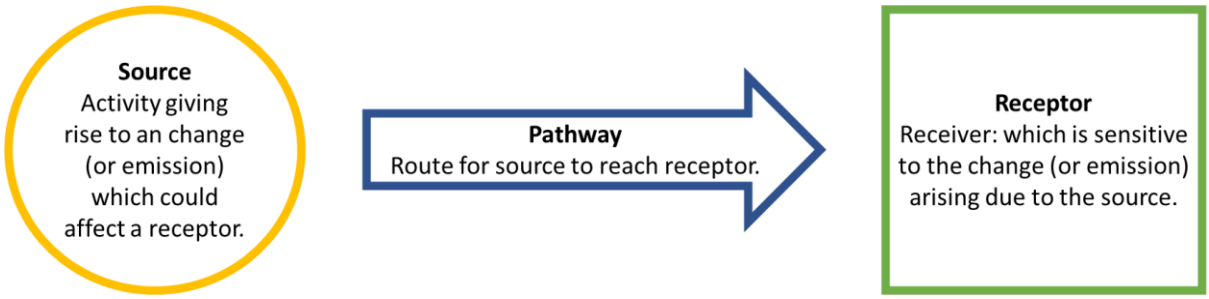


Figure 5.1: Source → Pathway → Receptor Model

Mitigation is utilised to minimise the degree of change or emissions associated with the activity or to break or reduce the pathway to the receptor.

As the DWP development was required to undergo EIA, the significance of potential source effects on the environment and appropriate measures/mitigation to avoid, prevent or reduce environmental harm/damage in relation to the DWS proposal is already well understood. This is particularly in terms of the proposed construction methodologies.

Taking into account knowledge previously gained in relation to DWP, the Source-Pathway-Receptor model has been followed to identify whether the relevant impacts identified as part of the DWP EIA are likely to change when considering activities applicable to DWS. This includes consideration of existing baseline information and knowledge of receptors, assessing sources of impact from DWS in relation to DWP, and the applicability and success of mitigation measures previously employed.

Where there is a change to the source, pathway or receptor, or if in additive effects could occur, consideration is given to whether there is a potential significant effect from DWS taking account of any reasonable mitigation. Where a potential significant effect is identified, and as such a topic is proposed as **scoped in** to the EIA, consideration is given to the appropriate assessment methodology.

Where an environmental topic is proposed to be **scoped out** of the EIA on the basis of mitigation, that mitigation is included in the Initial Schedule of Mitigation (Appendix 1). The mitigation outlined in Appendix 1 shall be included in any Construction Environmental Management Document (CEMD) developed for the DWS development. The CEMD will also include mitigation identified by the EIA process.

6 Air Quality

The focus of this section is potential local impacts on air quality as a result of the proposed DWS development. The primary consideration in this regard is potential dust emissions. While

there are Green House Gas (GHG) considerations associated with the proposal, including emissions and anticipated benefit through facilitation of the offshore wind sector, these are considered in Section 17: Climate Change and Flooding.

Although the location of DWS and construction methods are similar to DWP, changes to baseline identified in 6.2 below mean that direct comparison to previous assessment completed for DWP is not applicable in this section.

6.1 Policy and Guidance

Relevant guidance and information sources used in this section include:

- Air Quality in Scotland (2023) Air Quality Management Areas (AQMA);
- Guidance on the Assessment of Dust from Demolition and Construction by the Institute of Air Quality Management (IAQM) (IAQM, 2016);
- Guidance on Monitoring in the Vicinity of Demolition and Construction Sites (IAQM, 2018); and
- Stornoway Deep Water Port Environmental Impact Assessment Report (Affric, 2020).

Scottish Government policy as part of Scotland's National Marine Plan (NMP) includes:

- **GEN 14 Air quality:** *Development and use of the marine environment should not result in the deterioration of air quality and should not breach any statutory air quality limits* (Scottish Government, 2015).

While Paragraph 4.70 of the NMP states that:

'Some development and use may result in increased emissions to air, including particulate matter and gases. Impacts on relevant statutory air quality limits must be taken into account and mitigation measures adopted, if necessary, to allow an activity to proceed within these limits' (Scottish Government, 2015).

6.2 Baseline

The Air Quality in Scotland website provides a centralised source of air quality information for Scotland. Data and maps on Local Air Quality Management parameters and Air Quality Management Areas (AQMA) are provided (Air Quality in Scotland, 2023). Stornoway is not designated as an AQMA, with the nearest designated area being Inverness City Centre AQMA on the Mainland, some 95 miles away. Therefore, no AQMA will be affected by the DWS development.

In terms of human and ecological receptors, screening criteria set out in Step 1 of IAQM Guidance on the Assessment of Dust from Demolition and Construction states that detailed assessment is required if human receptors are present within 350m of the site boundary, and ecological receptors within 50m of the site boundary (IAQM, 2016). The DWP EIA identified no hospitals, schools or other potentially high-sensitivity human receptors or designated ecological receptors within these distances such that they could be significantly impacted by reduced air quality due to construction dust from the development (Affric, 2020).

Since that assessment, construction of DWP itself has begun, and it is anticipated that DWP will be operational prior to the proposed works at DWS commencing. Human receptors at the operational DWP will be within 350m of the DWS construction works, and therefore need to be considered. Following IAQM Guidance, people attending the DWP site for work or travel are identified as a medium-sensitivity receptor (IAQM, 2016).

Additionally, should levelling activities associated with DWS be undertaken in the area at the southern end of the link road joining DWP and Arnish Point Industrial Estate, human receptors at the industrial estate need to be taken into account. Facilities within 350m of the potential rock-take area include fabrication workshops, and as a place of work these are considered a medium-sensitivity human receptor (IAQM, 2016).

6.3 Potential Construction Impacts

The main impact of construction works on air quality is associated with small solids becoming airborne giving rise to dust. The term dust is taken to incorporate very small particulate matter (particle size of less than 10 microns) as well as larger solids which may become airborne for a short period of time due to the energy they are exposed to (for example blasting). Dust has the potential to impact human health through inhalation of particles or dust particles in eyes, and to affect vegetation by covering the leaves of plants preventing photosynthesis. Dust can also cause a nuisance by coating surfaces such as cars and windows.

To have an environmental impact there is the need for a source, pathway, and receptor. In terms of source and pathway, earthworks comprising of soil stripping, blasting and handling of dry materials during construction of DWS may result in dust emissions; these will travel through the air over a relatively small distance (<350m) before settling. Sourcing of bulk materials from the immediate vicinity of the development (e.g. reclamation infill and rock armour) reduces the need for use of the public road network and thus minimises the risk of vehicle track-out and dust from material transport. Minimal stock-piling of dry materials is envisaged, as use of rock and infill won local to point of use will facilitate delivery on an as-needed basis. Construction of the land-reclamation area will by definition take place in a wet environment, and therefore no significant dust emissions are expected from the early stages of this activity.

Receptors which are present within 350m of the identified dust sources are the medium-sensitivity human receptors detailed in 6.2. The focus of this section is therefore potential impacts on human receptors at the operational DWP and Arnish Point Industrial Estate from soil stripping, blasting and handling of dry materials. For clarity, these two receptors have been considered separately. Note that consideration of receptors at Arnish Point Industrial Estate only applies should levelling works be undertaken at the southern end of the of the DWP-Arnish Point Industrial Estate link road.

The output of assessment following IAQM Guidance is presented in Table 6.3.1.

Table 6.3.1: Assessment of DWS Construction Dust Risk According to IAQM Guidelines (IAQM, 2016)

IAQM Assessment Step	Assessment Outcome by Scenario	
	Levelling activities adjacent to DWP	Levelling activities at southern end of link road
1: Screen for Receptors	Human receptors at DWP within 350m.	Human receptors at Arnish Point Industrial Estate within 350m.
2a: Define the Potential Dust Emission Magnitude	Medium-Large scale of earthworks – area of works >10,000m^2, material coarse in nature (soil & rock).	Medium scale of earthworks – area of works <10,000m^2, material coarse in nature (soil & rock).
2b: Define the Sensitivity of the Area	Low-sensitivity area – Medium sensitivity receptor (place of work) >50m from the potential dust source.	Low-sensitivity area – Medium sensitivity receptor (place of work) >50m from the potential dust source.
2c: Determine Risk Outcome	Low Risk – Medium-Large scale source x Low-sensitivity area.	Low Risk – Medium scale source x Low-sensitivity area.

While both scenarios are concluded to be a low-risk, it is recognised that dust mitigation is desirable with regards to human receptors at both DWP, Arnish Point Industrial Estate and workers within the DWS construction site itself.

6.4 Potential Operational Impacts

Moving into the operational phase, impacts on air-quality will be determined by the nature of activities undertaken at the DWS facility. With expected use centring on the assembly, pre-commissioning and maintenance of floating wind turbine structures, no notable emissions to air are anticipated directly from these activities. Vehicle and plant movements associated with activity at DWS will be taking place on the concrete quayside or dressed surface of the laydown areas, and vehicle access to the site will be via a surfaced road. Any dust arisings from the dressed surfaces, for example during dry weather, are anticipated to remain localised. The risk of dust impact on human receptors at DWP is therefore negligible, with no specific mitigation required.

6.5 Mitigation Measures

A Dust Management Plan (DMP) will be developed for the DWS construction phase, as has been implemented for DWP. Construction works at DWP are well advanced in terms of earthworks, and no dust issues have arisen to date with implementation of the DMP.

Development of a DMP for DWS is in accordance with IAQM Guidance which states that a DMP is desirable even where low risk of dust issues is identified. The DMP will detail steps to minimise dust sources from soil stripping, blasting and handling of dry materials, and will be included within the CEMD for DWS. Further details are presented in the Initial Schedule of Mitigation provided in Appendix 1 of this scoping report.

6.6 Proposed Impact Assessment

It is recommended that construction and operational Air Quality be **scoped out** of the DWS EIA. This is on the premise that impacts are low risk and that the mitigation proposed in Section 6.5 and Appendix 1 is implemented.

7 Land and Soil Quality

The proposed DWS development includes shore-side earthworks to create levelled laydown space. Earthworks will involve the removal of topsoils prior to rock excavation. This activity is proposed to take place within an area well-characterised by investigations undertaken for the neighbouring DWP development and proposed Arnish Road upgrade. Impacts associated with removal of peat soils, known to be present in the area, is the primary focus of this section.

The methodology of the proposed DWS earthworks is analogous to those assessed for the adjacent DWP. With appropriate implementation of mitigation measures including an approved Peat Management Plan (PMP), impacts from construction of DWP were deemed to be non-significant (Affric, 2020). DWS works are anticipated to be no greater in scale than DWP, however construction of DWS does involve the removal of material additional to that affected by DWP. Therefore, while principles such as the PMP may apply, direct comparison to the previous assessment undertaken for DWP is not applicable within this section.

7.1 Policy and Guidance

Peatland has an important capacity to act as a carbon sink. The management of peat soils therefore has implications for carbon emissions and climate change, with a substantial body of associated policies and guidance. Relevant guidance and information sources include:

- Advising on Peatland, Carbon-Rich Soils and Priority Peatland Habitats in Development Management (NatureScot, 2023a);
- Scotland's National Peatland Plan Working for our future (SNH, 2015);
- Peatland Survey. Guidance on Developments on Peatland (Scottish Government, SNH, & SEPA., 2017);
- SEPA Regulatory Position Statement – Developments on Peat (SEPA, 2010);
- Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Scottish Renewables & SEPA, 2012); and
- Towards an assessment of the state of UK Peatlands (JNCC, 2011).

The Scottish National Planning Framework NPF4 (Scottish Government, 2023) outlines three overarching planning objectives up to 2045, supporting the development of sustainable, liveable and productive places. In relation to soils NPF4 sets out under Policy 5 the intent to '*protect carbon-rich soils, restore peatlands and minimise disturbance to soils from development*.' Specifically, '*Development proposals will only be supported if they are designed and constructed in accordance with the mitigation hierarchy by first avoiding and then minimising the amount of disturbance to soils on undeveloped land; and in a manner that protects soil from damage including from compaction and erosion, and that minimises soil sealing.*' Furthermore, Policy 5 states that development proposals on peatland will only be supported in certain circumstances, such as essential infrastructure, renewables and supporting fragile communities

in a rural or island area. It also details that development proposed on peatland will require site-specific assessment, including assessment of baseline, likely effects of soil disturbance and climate-related implications (Scottish Government, 2023).

7.2 Baseline

7.2.1 Ground Investigations

Onshore Ground Investigation were undertaken in 2018 by Causeway Geotech as part of the DWP design process, and were reported in the DWP EIAR (Affric, 2020). The investigations comprised boreholes, a trial pit and Russian peat cores. These investigations included the area of the proposed DWS onshore laydown area. Topsoil was found to a depth of 100-200mm, recent deposits (peat) to depths of up to 1.5 meters below ground level (mbgl), and bedrock at depths of 0.3-1.5mbgl. The bedrock included five main rock types: Gneiss, Metadiorite, Metadolerite, Metagabbro, and Metapegmatite (Affric, 2020).

7.2.2 Peat

A further two rounds of peat investigations were undertaken, by Fluid Environmental Consulting and Wallace Stone in 2019 and 2020, similarly reported in the DWP EIAR (Affric, 2020). Combined with the above these survey campaigns totalled 606 depth of penetration peat probes, which were mapped as investigation points and also synthesised into a depth of peat contour map, as shown on Drawing 113_DRG_02_1 Peat Depth Contour Map. Depth of penetration over the area of the proposed DWS onshore laydown is largely 0 - 0.5m and >0.5 – 1.0m; the former is considered to comprise soil cover only, and the latter will contain peat deposits. There are also three small areas of deeper peat cover apparent, with peat depth estimated to be >1.0 – 1.5m.

The potential for peat cover over the area identified for possible levelling at the south end of the DWP-Arnish link road has been assessed by an initial walk-over and probes. This indicates an average cover depth of 0.15m and no penetration greater than 0.5m (Wallace Stone, 2023). Thus, no peat cover is expected to be present in this area.

7.2.3 Contaminated Land

Other than the current works underway for DWP, which has initiated disturbance of some areas for construction access, the site of the proposed DWS onshore laydown area is undeveloped. No signs of contamination (visual or odour) have been observed during the ground investigations or DWP works to date, and as such it is assumed that no contaminated land is present in this area.

The area at the south end of the link road identified for possible levelling is also itself undeveloped. It is however adjacent to land where shot-blast waste stockpiles were previously held, having been generated by former oil-industry activities at the Arnish Point Industrial Estate. These stockpiles have been relocated under appropriate Waste Management License and the area developed into a laydown/yard space. As the site has been subject to remediation and subsequent development, it is not anticipated that further contaminated land is present in the area of the proposed levelling.

7.3 Potential Construction Impacts

A section of hillside within the development site will be levelled utilising blasting techniques. This will create the onshore laydown area west of the link road and provide rock materials for the construction of the DWS reclamation area. As outlined above, an additional area at the southern end of the link road may also be levelled to provide rock materials for the DWS construction.

Prior to blasting, topsoil and peat will need to be cleared from the footprint of the blasting area and around some of the perimeter to ensure stable slopes angles are achieved.

At this stage the exact specification of the area requiring topsoil and peat removal is to be confirmed. However, as an indication the maximum size of the levelled area west of the link road is expected to be in the region of 19,000m^2, inclusive of works to achieve a stable slope around the perimeter. The size of this area may be reduced depending on final design, operational need and availability of rock material from the location at the south end of the link road. Should the material source at the south end of the link road be used, the levelled area west of the link road could be reduced in size. Soil removal over the area at the southern end of the link road would be in the region of 8,550m^2.

Based on the largest anticipated size of the onshore laydown area, it is estimated that in the region of 2,000m^3 of topsoil and 8,000m^3 of peat will be removed. As previously stated, these figures are only indicative, and will be confirmed dependent on final design and findings of further ground investigations.

The intent is that removed peat will be reused/reinstated in the vicinity of the development.

Should levelling take place at the site located at the south end of the link road, appropriate pre-development investigation to confirm that peat or contaminated soils are not present. In the unlikely event peat is present, removed material will be reused/reinstated in the vicinity of the development, in the same manner as peat removed from other areas of soil stripping. Should contaminated soils be identified, management appropriate to the contamination type will be required to prevent release or spread of contaminants.

Note the ecological impacts of topsoil and peat removal are discussed in Section 15: Biodiversity - Terrestrial Ecology.

7.4 Potential Operational Impacts

No operational impacts on land or soil quality are identified as a result of the proposed DWS development. All activity will take place on made surfaces of the onshore laydown area, reclamation area and quayside.

7.5 Proposed Impact Assessment

It is proposed that construction impacts on Land and Soil Quality be **scoped in** to the EIA process for DWS.

A PMP based on the finalised DWS design will be outlined within the EIAR. This will be in-line with the PMP approved for DWP, and will outline details of peat removal, storage and reinstatement. Furthermore, additional pre-development ground investigations undertaken in

relation to the area at the southern end of the link road, if utilised, will be detailed within the EIAR.

8 Water Quality and Coastal Processes

The focus of this section is potential effects on water quality and coastal processes associated with the construction and operation of the proposed DWS development. It includes consideration of the project in terms of the Water Framework Directive (WFD).

As the DWS location and construction methodology are similar to that of the adjacent DWP, reference to the assessment undertaken for DWP has been utilised in this section. The exception to this is in respect of coastal processes and WFD assessment, as the proposed DWS development introduces new structures which will have an effect on the local waterbody additional to that of DWP.

8.1 Legislation, Policy and Guidance

Relevant guidance and information sources used in the section include:

- Guidance for Pollution Prevention (GPP) 5: Works and Maintenance in or Near Water (Natural Resources Wales, Northern Ireland Environment Agency & SEPA, 2018);
- GPP 2: Above Ground Oil Storage Tanks (Natural Resources Wales, Northern Ireland Environment Agency & SEPA, 2021);
- Pollution Prevention Guideline Note (PPG) 6: Work at Construction and Demolition Sites (Environmental Agency, NIEA & SEPA, 2012); and
- Stornoway Deep Water Port Environmental Impact Assessment Report (Affric, 2020).

Relevant legislative frameworks and legislation include:

- European Water Framework Directive (European Parliament, 2000);
- Water Environment and Water Services (Scotland) Act 2003 (Scottish Parliament, 2003);
- Environmental Liability (Scotland) Regulations 2009 (Scottish Parliament, 2009);
- Bathing Water Directive (2006/7/EC);
- The Water Environment (Shellfish Water Protected Areas: Environmental Objectives etc.)(Scotland) Regulations 2013; and
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).

Relevant Scottish Government policy as part of Scotland's National Marine Plan (NMP) includes:

- **GEN 8 Coastal Process and Flooding**: Developments and activities in the marine environment should be resilient to coastal change and flooding, and not have unacceptable adverse impact on coastal processes or contribute to coastal flooding**;**
- **GEN 10 Invasive Non-Native Species:** 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; and

- **GEN 12 Water Quality and Resource:** Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply (Scottish Government, 2015).

The Scottish Government also includes within the NMP a series of good environmental status descriptors as part of the plan's Strategic Objectives. These include:

- **GES 2:** Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems;
- **GES 5:** Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algal blooms, and oxygen deficiency in bottom waters;
- **GES 7:** Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems; and
- **GES 8:** Concentrations of contaminants are at a level not giving rise to pollution effects (Scottish Government, 2015).

8.2 Baseline

8.2.1 Sediment Loading

While data on sediment loading levels in the Minch and Western Scotland is limited, studies have identified that suspended particulate concentrations in Western Scotland are highly volatile and dependent on a range of physical forcing factors and seabed characteristics (UKMMAS, 2010). Lighter sediment types like silt are more readily mobilised if disturbed and stay suspended over longer periods, allowing greater geographical dispersal. Heavier sediment types like sand and gravels require greater kinetic energy to be resuspended and quickly fall back to the seabed, limiting geographic spread (Jones et al., 2016) .

Offshore Ground Investigations in Glumaig Harbour were undertaken in 2017, 2018, 2019 and 2020 as part of the DWP development process, the results of which are reported within the DWP EIAR (Affric, 2020). Particle Size Analysis (PSA) of sediment samples collected during the surveys indicates the area to be dominated by gravels. As detailed on the Marine Directorate Pre-Dredge Sampling Results Form submitted in support of the DWP dredge licence approximately 69.2% of the area is made up of gravel substrates of varying sizes. Sands contribute 26.4%, silts and clay 4.4%. Table 8.2.1 presents average sediment composition results across various depths below the seabed, as determined by PSA. Solids composition increases with depth due to compression from overlaying materials, and silt concentrations are highest at the seabed surface.

Table 8.2.1: Average Particle Fraction at Depths Below Seabed

Sample depth (m)	Average Total solids (%)	Average Gravel (>2mm) (%)	Average Sand (>63µm <2mm) (%)	Average Silt (<63µm) (%)
0-0.5	81.94	68.78	23.20	8.02
0.5-1	88.43	75.27	21.82	2.94
1-1.5	89.65	62.64	32.40	4.98
1.5-2	86.61	60.09	37.22	2.72
2-2.5	86.80	72.90	23.20	3.90
3-3.5	92.90	66.89	32.88	0.27
3.5-4	92.73	86.67	12.59	0.76

Currents within Stornoway Harbour are generally weak, and do not tend to exceed 0.1m/s (RPS, 2020). Coupled with the predominantly coarse nature of the seabed, this relatively low energy environment means that any material suspended in the water column would drop out quickly and hence inherent sediment loading within the area of the proposed development is likely to be low.

8.2.2 Sediment Contaminants

Samples obtained during the offshore Ground Investigations outlined in 8.2.1 were also subject to testing for a suite of chemical parameters, in line with MD-LOT Pre-Disposal Sampling Guidance (Marine Scotland, 2017). Tests were conducted for heavy metals, Organohalogens and Polyaromatic Hydrocarbons (PAHs). While heavy metal levels exceeding Marine Directorate's lower-threshold Action Level 1 were identified in some samples, none exceeded Action Level 2. Similarly, PAHs were identified in some samples above Action Level 1 threshold, however there are many naturally occurring PAH especially associated with peat. No exceedances were found for Organohalogens. As such, the sediment is not predicted to be contaminated. This will be confirmed by pre-disposal dredge sampling, undertaken to inform the Best Practicable Environmental Option (BPEO) assessment in support of the dredge license application for the proposed DWS works. Remobilisation of contamination is therefore not considered further.

8.2.3 Waterbody Status

The proposed DWS development lies within the SEPA water quality classification zone of Stornoway Harbour, Waterbody ID: 200191. Stornoway Harbour is an enclosed coastal water body approximately 3.14km^2 in area and includes 13km of shoreline. The condition of the

waterbody is categorised as 'Good' overall, with the most recent classification being for 2020 (SEPA, 2023a). This classification is required to be maintained in the long-term.

Baseline status of the waterbody must take into account the developments already underway for DWP, as assessed during the DWP EIAR process. To do this, the Transitional and Coastal Morphological Impact Assessment System (TraC-MImAS) support tool has been consulted. TraC-MImAS considers the impact of morphological pressures from a development on waterbody status. With inclusion of the consented DWP development, TraC-MImAS classifies Stornoway Harbour as 'High' in terms of Hydrodynamic status, and 'Good' for both Intertidal and Subtidal Zones. The overall classification is based on the lowest status given under the various element considered hence, in this instance the overall classification is 'Good'.

Beyond the immediate marine environment, the River Creed (Abhainn Ghrloda; Waterbody ID: 20753) is the primary watercourse which flows into Stornoway Harbour. This enters the harbour from the west, with the river mouth situated to the north of the proposed DWS development. The River Creed is situated in the Lewis and Harris Coastal Catchment of the Scotland river basin district and the main stem of the river is approximately 18.1km long. This watercourse has a 2020 'High' overall classification for waterbody condition, with 'High' for ecology, biological elements, fish, fish barrier, hydromorphology and hydrology classifications (SEPA, 2023a). No information could be found regarding classification of the River Glen which flows into the northern tip of Stornoway Harbour.

8.2.4 Bathing Waters

No designated bathing waters are located in the vicinity of the proposed DWS development. The nearest SEPA monitored bathing water is located some 65km away at Achmelvich, on the west coast of mainland Scotland (Grid Reference: NC 0556 2494) (SEPA, 2023b).

8.2.5 Shellfish Water Protected Areas & Classified Shellfish Harvesting Areas

Shellfish Water Protected Areas (SWPA) are used for commercial shellfish cultivation. Water quality in these designated areas is regularly monitored by Food Standards Scotland (FSS) and classified by SEPA. The closest designated shellfish waters are Loch Leurbost (SWPA 46) and Loch Erisort (SWPA 36), situated approximately ~12km and ~14.5km respectively by sea from the proposed development.

The most recent 2018 classifications published by SEPA are 'Good' for Loch Leurbost and 'Excellent' for Loch Erisort (SEPA, 2023c). While both locations may be subject to short-term temporary closures associated with seasonally raised levels of shellfish-toxin producing algae, the SEPA classifications represent the longer-term status of the waters. Both SWPAs contain shellfish rearing sites which are listed as currently active (Scotland's Aquaculture, 2023).

Both Loch Leurbost and Loch Erisort are also Classified Shellfish Harvesting Areas (IDs 339 & 607 respectively). A third area, Broad Bay Aiginish (ID 745) is located to the north (Scotland's Aquaculture, 2023), some 21km by sea from the proposed development. These areas are identified as important to commercial harvesting of wild shellfish and are similarly monitored by FSS for parameters relevant to water quality, assessed by microbiological loading in shellfish flesh. Each area is subject to annual classification (A to C/B) by FSS according to species

harvested there. Most recent classification shows lochs Leurbost and Erisort classified as status A for Common mussels, Loch Erisort B for Pacific oysters, and Broad Bay Aiginish B/C for Common cockles and A for Razor clams (Marine Scotland NMPi, 2023).

8.2.6 Non-Native Marine Species (NNMS)

The Western Isles is considered to provide suitable habitat for non-native invasive marine species present in the UK, including Wireweed (*Sargassum muticum*), Green sea-fingers (*Codium fragile* subsp. *Tomentosoides),* Japanese kelp *(Undaria pinnatifida),* Common cord-grass (*Spartina anglica),* Japanese skeleton shrimp *(Caprella mutica),* Leathery sea squirt *(Styela clava)* and Carpet sea squirt *(Didemnum vexillum).* NNMS are currently classified as High, Medium, Low or Unknown impact according to their likely impact on WFD biodiversity classification of a waterbody. High impact species identified as present in Scotland are Common cord-grass, Leathery sea squirt and Carpet sea squirt. Data presented in the Scottish Marine Assessment 2020, collated at the level of Scottish Marine Regions, classifies the Outer Hebrides as having 'Regions of some concern' with a verified record of High impact Common cord-grass (East coast of Harris) and also lower-impact species Japanese skeleton shrimp and Wireweed verified (Marine Scotland, 2020).

In terms of the proposed DWS site, no NNMS were recorded during the benthic survey undertaken as part of the DWP development (Ocean Ecology, 2020), and no NNMS identifications have arisen during the DWP works to date. This has included dive inspection of the '*Alabama*' steamship wreck, where review of photographs by a benthic ecologist identified sea squirts present on the structure to be native species rather than NNMS (Affric, 2020).

8.2.7 Drainage

Drainage at the proposed DWS site currently consists of swales and culverts under construction for the DWP link road which bounds the proposed DWS reclamation area to its western side. In line with the Sustainable Urban Drainage System (SuDS) Manual: CIRIA 753 swales either side of the link road provide conveyance and promote infiltration of surface water run-off. The culverts provide a route for surface water flowing off the surrounding hillside, conveying it under the link road towards the sea.

8.2.8 Coastal Processes

The outer reaches of Stornoway Harbour are open to The Minch and thus tidal and wave regimes are characteristic of open sea. However, modelling of wave regimes within Stornoway Harbour signifies that waves penetrating into the harbour area from the Minch would not affect the development site in Glumaig Harbour (RPS, 2020). The proposed DWS site will most likely be exposed to waves from local fetches, arriving from the north to northeast. It has no exposure from the west, and very short fetches from the east and southeast. Moreover, tidal currents within Stornoway Harbour are generally weak and do not tend to exceed 0.1m/s (RPS, 2020).

The status of Stornoway Harbour in terms of impact on coastal process from morphological changes to shoreline structure through developments can be captured using the TraC-MImAS support tool. As per Section 8.2.3 current status of Stornoway Harbour, taking into account

current consented DWP developments, is 'High' in terms of Hydrodynamic status and 'Good' for both Intertidal and Subtidal Zones, with a 'Good' overall classification.

8.3 Potential Construction Impacts

Water quality may be affected during construction by increased sediment loading from dredging and infilling activities and surface water run-off from stripped land. Impacts may also arise from any sources of contamination, biological or chemical, introduced by construction activities.

Construction methods for DWS are expected to be largely indistinguishable from those of the adjacent DWP development. As such, it is anticipated that sources potentially affecting water quality during construction of DWS will be the same as those previously assessed in the DWP EIAR. Furthermore, the proposed location of DWS, immediately to the south of DWP and within the same waterbody, is considered unlikely to introduce any new receptors or means by which they could be affected by the construction activities.

As per DWP the potential construction impacts identified for DWS are:

- Increased sediment in water column from dredging/dredge disposal;
- Increased sediment in water column from infilling of land reclamation area;
- Increased sediment in water column from surface water run-off;
- Loss of containment: fuel, oil & Control of Substances Hazardous to Health (COSHH) storage, refuelling, fuel, hydraulic fluid & oil leak from vehicles, vessel and plant;
- Loss of containment: concrete and concrete washings; and
- Introduction of NNMS.

Table 8.3.1 details the significance of the construction impacts identified for DWP, as determined in the EIAR (Affric, 2020). It also indicates how the current DWS proposal relates to the DWP development in terms of scale. Where the scale of a source is no greater than that already assessed, given similar receptors and pathways, it can be reasonably concluded that the significance of the effect will not increase. This is on the basis that mitigation previously specified for DWP is similarly applied to the DWS activity, as discussed further in Section 8.6.

Table 8.3.1: Summary of Construction Impacts from DWP and Comparison to DWS

Impact	Significance of Impact – DWP EIAR	Comparison of Scale
Increased sediment loading in water column from dredging	Minor: Non-Significant	The proposed DWS dredge is much smaller in magnitude than DWP, being approximately 2% of the DWP volume.
Increased sediment loading in water column from dredge disposal	Minor: Non-Significant	As above, the proposed DWS dredge is much smaller than DWP. For DWP 90% re-use of dredge material was planned, however the 10% disposal volume is still larger than the total anticipated DWS dredge.

Impact	Significance of Impact – DWP EIAR	Comparison of Scale
Increased sediment loading in water column from infill of land reclamation.	Minor: Non-Significant	The area of land reclamation proposed for DWS is smaller than DWP, being in the order of 60% of the DWP area.
Increased sediment loading in water column from surface water run-off.	Minor: Non-Significant	The area of soil stripping proposed at DWS is smaller than for DWP, with a smaller overall development footprint and no construction of an associated access road.
Loss of containment: fuel & COSHH storage, refuelling, fuel, hydraulic fluid & oil leaks from vehicles, plant and vessels.	Minor: Non-Significant	Similar vehicles, vessels and plant are anticipated to be operating on site during construction of DWS as for DWP. Duration of the DWS operations is anticipated to be less, due to the smaller scale of the DWS project.
Loss of containment: concrete and concrete washings.	Negligible: Non-Significant	The quantity of concrete proposed for DWS construction is anticipated to be no greater than for DWP.
Introduction of NNMS.	Minor: Non- Significant	Similar vehicles, vessels and plant are anticipated to be operating on site during construction of DWS as for DWP.

8.4 Potential Operational Impacts

8.4.1 Coastal Processes

The land reclamation structure and, to a lesser extent, the dredging proposed for the DWS development has the potential to alter the wave and tidal climate, wave directions and geomorphological processes within Stornoway Harbour. It is recognised that the location and shape of the development will influence hydrographics, sediment transport, and thus, potentially coastal processes within the harbour. Modelling is required to identify areas of potential impact and refine the design where necessary.

8.4.2 Operational Activities

The potential impacts on water quality from operational activities at DWS are within the scope of those considered previously for DWP, namely:

- Containment: fuel & COSHH storage, refuelling, hydraulic fluid, oil & fuel leaks from vehicles, plant & vessels;
- Introduction of NNMS due to marine vessel movements;
- Foul drainage outfall from temporary welfare accommodation; and
- Surface water run-off from made surfaces at the quayside.

As per DWP, operations at the proposed DWS facility will be under the governance of SPA. The potential operational impacts identified above represent a 'business as usual' scenario, managed by the Port's environmental management system. This includes procedures and

protocols for minimising risks to water quality, and for dealing with pollution incidents such as SPA's Maritime and Coastguard Agency approved Oil Pollution Response Plan. It is anticipated that operators undertaking activities at the DWS facility will be required to adhere to these measures.

It is of note that activities envisaged for the DWS facility are likely to be of a lesser scale than those assessed for DWP. While activities of vessel berthing and the handling, laydown and storage of renewables components are common between the two facilities, proposed activity at DWS does not include the discharging of gas and oil into onshore storage tanks, storage and/or onward distribution of renewable energy sources (e.g. hydrogen or ammonia) or routine handling of bulk cargo materials. In this respect activities at DWS are therefore of lesser risk to water quality.

An appropriate surface water management system will be designed and employed for the DWS. A packaged treatment plant may be installed to serve temporary welfare facilities. Compliance with the Water Environment (Controlled Activities) (Scotland) Regulations 2011 as amended (CAR) will be ensured, that may be by compliance with GBR, registration or simple licence application depending on the final drainage and outfalls design.

Addition of the DWS development to the existing DWP scheme does create interaction with the planned drainage system around the DWP link road, with the DWS reclamation area sited over the exit point of two culverts at the northern-most end of the link road. This will be taken into account in the DWS design process and will be addressed through extension of the culverts and alternative positioning of their outlets.

8.5 Water Framework Directive Assessment

As detailed in Section 8.2.3, the proposed DWS development sits within Stornoway Harbour (Waterbody ID: 200191). The waterbody's current status has been determined from the TraC-MImAS assessment undertaken as part of the DWP EIAR. This includes pre-DWP baseline information provided by Marine Directorate, to which modifications arising from DWP have been added. The current status includes the Newton Marina development, and assumes DWP to be in place in full, as consented, including the bollard island which DWS is proposed to replace. It shows the waterbody to be classified as 'High' status for Hydrodynamics, and 'Good' for both Intertidal and Subtidal zones with an overall classification of 'Good'.

Further modifications proposed to the waterbody as a result of the DWS scheme have been added to the TraC-MImAS tool as an initial assessment of the degree of potential impact on the waterbody's status. The details entered into the TraC-MImAS tool are summarised in Table 8.5.1; these measurements have been derived from an indicative layout of the DWS reclamation area and quayside, as illustrated in Drawing WS2339-XX-XX-DR-C-9007 (P04). Note a worst-case scenario in terms of dredge area has been assumed for the purposes of this initial assessment, and in practice the dredge area may be smaller than described.

Table 8.5.1: Development Detail for Initial TraC-MImAS Assessment

Pressure / unit	Pressure Source	Intertidal Area/length	Subtidal Area/Length
Land Claim - High Impact (km^2)	Land reclamation (laydown area)	0.007	0.027
Dredging – High Impact (km^2)	-13m CD dredge	N/A	0.004
Shoreline reinforcement – Hard engineering (high) (km)	Rock armour surrounding land reclamation	0.016	0.444
Piled Structures (high) (km^2)	Open-piled quay	N/A	0.000133

Table 8.5.2 provides a summary of the outputs of the TraC-MImAS assessment tool, including the percentage of deemed capacity used with respect to Hydrodynamic, Intertidal and Subtidal zones.

Table 8.5.2: Summary of Initial TraC-MImAS Output

Area	Baseline		DWS Development	
	Capactiy Usage (%)	Status	Capacity Usage (%)	Status
Hydrodynamics	2.8	High	3.2	High
Intertidal Zone	8.4	Good	9.4	Good
Subtidal Zone	12.7	Good	14.6	Good
Overall		**Good**		**Good**

The proposed DWS development increases the degree of capacity used across all assessment classes, with the greatest increase seen in the subtidal zone. However, this does not result in a reduction in status classification in any one zone, nor a deterioration of overall waterbody status, which remains Good.

The TraC-MImAS 'HOW TO USE' page states that:

'If the pressure activity is bigger than local unit size (i.e. 0.5km^2) or larger than 1.5% of the water body size, then an expert assessment MUST be undertaken.'

The total anticipated development area of DWS below MHWS is 0.038km^2. Stornoway Harbour waterbody covers an area of 3.14km^2. The development is therefore less than the 0.5km^2 threshold and 1.21% of the whole waterbody, including the maximum expected dredge area. As such, it is not anticipated that assessment beyond use of the TraC-MImAS tool will be required.

It is however noted that this initial assessment has been completed on the basis of an indicative layout of DWS, and the design may well be refined during the EIA process. As such, assessment of the final DWS design using the TraC-MImAS tool will be required.

8.6 Mitigation Measures

The mitigation developed for the DWP project currently under construction will be adopted for the proposed DWS development, alongside the adoption of relevant guidance as detailed in Section 8.1. These measures represent best practice and are summarised in Appendix 1 Initial Schedule of Mitigation. Construction mitigation measures will be incorporated into the CEMD for the DWS development.

Operational mitigation measures will be covered within SPA's environmental management system. This includes appropriate arrangements for fuel and COSHH materials, procedures for dealing with pollution incidents and biosecurity requirements for visiting vessels.

8.7 Proposed Impact Assessment

It is proposed that construction impacts on Water Quality be **scoped out** of the DWS EIA, on the basis that the mitigation outlined in 8.6 and Appendix 1 is implemented.

Similarly, it is recommended that impacts on Water Quality from DWS operations be **scoped out** of the EIA process. This is on the basis that routine operational considerations of containment, surface water drainage, foul drainage arrangements and NNMS management are considered to be covered by SPA's environmental management system and compliance with CAR.

It is recommended that Coastal Processes be **scoped in** to the DWS EIA. The proposed DWS development is an expansion of existing structures in Glumaig Harbour and will further alter the dimensions of Stornoway Harbour waterbody. Modelling is required to understand the potential impacts of the DWS design on wave climate and sediment transport, and the potential knock-on effects on coastal processes. As such, it is proposed that modelling updated to include the DWS development be presented in the EIA.

It is also proposed that the topic be **scoped in** relative to Water Framework Directive Assessment. A TraC-MImAS assessment should be undertaken for the finalised DWS design and included within the EIAR.

9 In-Air Noise and Vibration

This section aims to understand the potential construction and operational in air noise and vibration impacts of the proposed DWS development.

9.1 Policy and Guidance

Relevant guidance and information sources used in this section include:

- Planning Advice Notes (PAN) 1/2011: Planning and Noise (Scottish Government, 2011a);

- Technical Advice Note (TAN) – 'Assessment of Noise' (Scottish Government, 2011b);
- BS 5228-1:2009, Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (+A1:2014) (British Standard Institute, 2014); and
- BS4142+A1:2019: Methods for rating and assessing industrial and commercial sound (British Standards Institute, 2019); and
- Stornoway Deep Water Port Environmental Impact Assessment Report (Affric, 2020).

9.2 Baseline

The proposed DWS development is approximately 2.2km south across the water from the town of Stornoway and is situated within Glumaig Bay. The proposed development is otherwise in a quiet rural location, with residential receptors being more than 1km across the water in Stornoway. Noise in Stornoway is largely related to traffic movements, with particular reference to ferry loading/unloading, and is situated next to a national airport with flight paths above the town centre. Stornoway is also a busy fishing/cargo port, with multiple boats landing per day. As previously mentioned, the DWS development is approximately 2.2km south across the water from Stornoway, and around 200m further away than the DWP.

Due to the proposed DWS development's close proximity to DWP and orientation in relation to the town of Stornoway, residential Noise Sensitive Receptors (NSRs) are considered to be the same as those identified within the DWP EIAR, albeit some 200m further away. The NSRs for DWS can be found in Table 9.2.1.

Table 9.2.1: Residential NSR's for Construction & Operation of DWS

NRS ID	NSR Descriptor	Grid Reference	Distance & Direction from Nearest Point of DWS
01	South Beach	NB42170 32730	1.9km NNW
02	Newton Street	NB42638 32548	1.6km N
03		NB42805 32437	1.5km N
04		NB42948 32393	1.6km N
05	Seaview Terrace	NB43096 32312	1.5km N
06	Builnacraig Street	NB43275 32138	1.4km NNE

In the immediate vicinity of the proposed development, there is the Arnish Point Industrial Estate (containing a quay, fish harvesting station and a seaweed processing factory) and the DWP. The DWP is currently under construction during the writing of this report, but it must be noted that it is expected to be fully operational prior to the construction of the DWS development. These developments are not considered sensitive due to their context and industrial nature.

There are also some Traffic Noise Sensitive Receptors (TNSRs) associated with the proposed DWS development. As the access of DWS is identical in road traffic terms to DWP and routing for deliveries by road and personnel traffic anticipated to be the same, the scope of the assessment undertaken for DWP is considered to be applicable to DWS. This is particularly with regards to Heavy Goods Vehicle (HGV) deliveries of materials from the nearby Marybank Quarry via the A859 and Arnish Road. It must be noted that deliveries by sea will be delivered to the DWP, as opposed to the town of Stornoway, once the DWP is operational. TNSRs

identified within the DWP EIA, and thus applicable to the proposed DWS development can be seen in Table 9.2.2.

Table 9.2.2: TNSR for Construction and Operation of DWS

NSR ID	NSR Descriptor	Grid Reference
01	House by Macaulay Farm	NB40148 32192
02	House at Marybank	NB40144 32604
03	Perceval Road South; West of A857	NB42455 33965
04	A857/Macaulay Road; North of Perceval Road South	NB42512 34095
05	Perceval Road South; East of A857	NB42616 33970
06	A857/Macaulay Road; South of Perceval Road South	NB42519 33935

With regard to vibration, the NSRs identified in Table 9.2.1 can be considered potentially sensitive to vibration and are 1.3km from the area where blasting will take place. Vibration at the receptors will likely arise from traffic movements. In addition, industrial receptors at Arnish Point require consideration with regard to vibration.

9.3 Potential Construction Impacts

9.3.1 In-air Noise

The scale of noise impacts will be determined by noise source, duration, and location of construction activities in relation to the closest NSRs and the time at which they are undertaken. Noise generating activities relevant to the proposed DWS development include the following:

- Pile installation;
- Rock blasting;
- Rock crushing;
- HGV and construction plant movements;
- Dredging (likely to be backhoe or trailed suction); and
- General construction activities.

Using a worst-case approach, multiple scenarios were assessed in the Noise Assessment Report (NAR) to inform the DWP EIA process (Affric, 2020a). The scenarios were assessed in line with the 'A B C Category' method in BS5228-1:2009+A1:2-014, using a 3D modelling approach to calculate construction noise at the NSRs identified in Table 9.2.1. The magnitude and significance were then determined using guidance provided in TAN 1/2011.

All scenarios were determined as having neutral significance at each NSR, with exception to NSR06 during two scenarios whereby dredging (backhoe and cutter suction) took place during the evening and night at the dredge pocket closest to the NSRs.

The NAR conducted for the DWP EIA utilised the 'A B C Category' method from BS5228-1:2009+A1:2014. Thus, using the 'A B C Category' thresholds for a worst-case Category A dwelling and simple noise attenuation calculations, the sound pressure levels (SPLs) 10m from a noise source that are required to exceed the thresholds can be seen in Table 9.3.1.

It must be noted that the threshold levels are $L_{Aeq,t}$ (logarithmic average over time) values over night-time, evenings and daytime periods. This means that the noise levels would need to be continuous over 1 hour during the day, or 5 minutes at night to breach the threshold values.

Table 9.3.1: Noise Source from DWS Required to Exceed BS5228-1:2009+A1:2-014 Thresholds

Period	Threshold Value for Category A (dB)	SPL at 10m from Noise Source at DWS Required to Exceed Threshold (dB)
Night-time	45	91.85
Evenings	55	101.85
Daytime	65	111.85

SPLs at 10m from the noise source for some typical items of plant likely to be utilised during the proposed DWS development, as detailed within BS5228-1:2009+A1:2-014 can be found in Table 9.3.2.

Table 9.3.2: SPL at 10m from Plant Items as per BS5228-1:2009+A1:2-014

Plant Item	Continuous SPL at 10m from Plant Item (dB)
50t Dump truck	82
Wheeled excavator/loader	82
Pneumatic breaker	86
Tipper lorry`	85
Compacter rammer	92
50 x Compacter rammer	109

As can be seen in the tables above, the majority of the plant items do not exceed an SPL at 10m of 91.85dB. As a worst case, it is also demonstrated than even in the non-feasible scenario whereby 50 compactor rammers were operating at the same time, it would not breach the daytime threshold levels. There may be instances whereby these noise levels are instantaneously exceeded, but the plant items will not be operating and generating these noise levels continuously throughout the daytime, evening and night-time periods. Hence taking account plant operating times, $L_{Aeq,t}$ are highly unlikely to be exceeded. Thus, the significance of noise impacts during the daytime, evening, and night-time will be neutral at all NSRs.

The NAR determined that noise due to construction traffic at TNSRs has slight significance. However, as the scale of the proposed works at DWS are no greater than DWP (for example concrete quantity for DWS an estimated 65% of that used for DWP), the assessment parameters used for DWP can be considered to represent a worst-case indication of increased HGV movements on the road network associated with the DWS construction. Additionally, there is more opportunity for materials for DWS to be delivered by sea, as the DWP will be operational during the construction phase of DWS. This has the potential to reduce HGV movement associated with the delivery of materials to the proposed development. Thus, there will be no significant effects in relation to TNSRs during the construction phase of DWS.

9.3.2 Vibration

The blasting for DWS will take place in close proximity to the blasting carried out for DWP. Blasting is instantaneous and will not give rise to a continuous source of vibration. Furthermore, it is not expected to cause significant vibration effects at receptors due to the

1.3km distance between the rock blasting and the nearest receptor. There is potential for blasting to have effects on the industrial receptors at Arnish Point without appropriate mitigation, as they are within relatively close proximity to the blasting site.

9.4 Potential Operational Impacts

9.4.1 In-air Noise

Operational noise from the proposed DWS will be variable dependent on the activities being carried out at any one time. During the NAR for DWP, operational noise significance was mostly neutral, with the exception of being neutral/slight as NSR01 & NSR06. As the distance from DWS is an additional 200m away from identified NSRs than the DWP, operational activities are highly unlikely to cause noise levels to be significant at the NSRs. Reference can be made to Table 9.3.1, which also shows that extremely high noise sources would be required to exceed threshold levels during operations.

Any increase in noise due to operational traffic movements will primarily be associated with a small commuting workforce. Unlike DWP, there will be no passenger coaches and few HGV movements arising from vessels at port, as DWS is being constructed to primarily facilitate the offshore wind industry. The majority of deliveries to and dispatches from DWS during operations are anticipated to be by sea.

The assessment parameters used for DWP can therefore be considered to represent a worst-case indication of operational traffic movements on the road network associated with the operations of DWS. Thus, there will be no significant impacts.

9.4.2 Vibration

There are no known notable sources of vibration expected during operations of the DWS development.

9.5 Mitigation Measures

9.5.1 In-air Noise

Due to the distance between the proposed DWS and NSRs, no significant effects with regards to construction noise are expected. This is line with conclusions of the DWP EIAR which assessed similar construction methodologies in closer proximity to the NSRs. However, it is proposed that the timing restrictions for rock blasting applied during DWP works be similarly adopted for DWS (9am – 7pm Monday to Saturday, with blasting normally taking place prior to 5pm). Additionally, relevant best practice guidance as identified in PAN1/2011 and in Section 8 of BS5228 will be implemented as detailed in the Initial Schedule of Mitigation provided in Appendix 1.

Similar to the DWP, no significant noise effects are predicted for the operational phase of DWS, however, general good practice to minimise noise levels from an employee health perspective will aid in ensuring any effects are minimised.

Mitigation identified during the proposed Transport Assessment (refer to Section 24: Access, Traffic and Transport) will also ensure any traffic related noise impacts are minimised during the construction and operational phases.

It is worth mentioning that thus far during the construction of DWP, there has only been one complaint with respect to noise. The complaint was received on 5th January 2023 and originated from a local resident at NSR06 Builnacraig Street. It was in relation to night-time trailer-suction dredging works within the DWP dredge area and a lack of notification. The works were also during a particularly cold, still night, which would have contributed to enhanced noise levels at NSR06. After discussions with the local resident and pre-emptive letter drops prior to further dredging at night, dredging continued at night without further complaints, indicating the mitigation was successful. For DWS, dredging will only take place in the immediate vicinity of the proposed quay, with greater distance between NSRs and the dredge area.

9.5.2 Vibration

Mitigation outlined within Part 2 of BS5228-1:2009+A1:2014, and as detailed in Appendix 1, will be implemented in order to minimize any vibration impacts.

9.6 Proposed Impact Assessment

It is proposed that construction and operational In Air Noise and Vibration is **scoped out** of the DWS EIA, on the basis that mitigation measures outlined in the Initial Schedule of Mitigation (Appendix 1) are implemented and that noise impacts will have neutral significance.

10 Underwater Noise

The focus of this section is to provide an understanding of underwater noise and vibration associated with the construction and operation of the proposed DWS development. Effects of underwater noise on marine mammals and fish are considered in Sections 12 and 13 respectively, taking account of the noise levels discussed in this section.

The construction noise sources from DWS are similar to those considered for the DWP. DWS is located further south in Glumaig Harbour than DWP and hence more enclosed from the open sea by Arnish Point than DWP. As such, reference to the assessment undertaken for DWP has been utilised in this section as it is likely to present the worst-case scenario.

10.1 Policy and Guidance

Scottish Government policy as part of Scotland's National Marine Plan includes:

- ***GEN 13 Noise:*** *Development and use of the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects* (Scottish Government, 2015).

The Scottish government has released a series of good environmental status (GES) descriptors within Scotland's National Marine Plan. These include:

- ***GES 11:*** *Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment* (Scottish Government, 2015a).

10.2 Baseline

No baseline data has been collected and no published data is available for the existing underwater noise levels within Glumaig Harbour. Underwater noise levels were predicted for the piling and dredging activities associated with the DWP construction. These activities are now complete and hence are not considered to be part of the baseline.

The main source of underwater noise within the Stornoway Harbour area is associated with vessel movements, including the ferries, commercial and recreational vessels. Facilities in Glumaig Harbour that vessels will regularly utilise include the newly constructed DWP, the Arnish facility and fish harvesting station. The pontoon serving the fish harvesting station is utilised six days per week, by live fish carrier vessels attending the facility from fish farms. The DWP has been built to accommodate larger vessels such as cruise ships and includes a freight ferry quay. The freight ferry quay will be utilised almost daily all year round while cruise vessels visits will peak in the summer months with potentially multiple visits a week.

Ships give rise to sound frequencies from around 10Hz up to and above 1kHz which is within the hearing ranges of both cetaceans and pinnipeds (as discussed in Section 12). Sound produced by ships is typically over 160dB re 1µPa at 1m, but varies depending on the vessel type, size and how it is operating. Larger ships (>100m) generate lower frequency noise at louder levels (180-190dB re 1µPa) (International Maritime Organisation, 2023).

10.3 Potential Construction Impacts

The main sources of noise during construction are associated with dredging and pile driving. Both of these activities were considered for the DWP, as such the previously completed assessment has informed this section. General marine construction techniques such as infilling and rock armour placement also give rise to underwater noise. However, experience from previous projects has shown that these activities do not result in underwater noise emissions of a magnitude that has the potential to cause significant negative impacts on marine receptors and are therefore not considered further.

10.3.1 Dredging

There are three main dredging techniques available, backhoe, cutter suction and plough dredging, with cutter suction being the noisiest of the three. The DWP EIAR considered both backhoe and cutter suction dredgers, both of which were ultimately utilised. Cutter suction was utilised for the bulk of the dredge, with backhoe employed to remove material in the later stages from discrete locations.

For the DWS project, it would be appropriate to allow for all three dredge techniques. The bulk of dredging is likely to utilise cutter suction or backhoe, and any remedial dredge to remove high spots could use either backhoe or plough techniques.

Cutter suction gives rise to the highest underwater noise levels and hence is considered as worst-case scenario. Broadband source noise levels for the cutter suction dredger were identified to be in the region of 175dB$_{RMS}$ re 1µPa by Irwin Carr Consulting who undertook the

underwater noise assessment for DWP included as appendix K.1 of Volume 3 of the DWP EIAR (Affric, 2020). Their modelling of dredge activities showed that noise levels higher than the Impulse Temporary Threshold Shift (TTS) for Low Frequency (LF) hearing cetaceans such as minke whales (168dB$_{SEL-24}$) was limited to an area within 200m of the dredge vessel, and within 100m for other species. It could, however, be argued that dredging is a non-impulsive noise in which case the TTS for LF cetaceans of 179dB$_{SEL-24}$ is not breached at all.

The location of DWS on the western shores of Glumaig Harbour is well away from the mouth of both Glumaig Harbour and the mouth of Stornoway Harbour which opens up into the Minch. The land around Glumaig Harbour, including Arnish Point to the east of the dredge area, acts as a noise barrier and hence prevents dredge noise reaching the Minch.

It is appropriate to assume that dredging associated with the DWS has the potential to give rise to noise levels that can cause TTS to stationary cetaceans in the immediate vicinity of a dredge vessel and could cause disturbance to marine mammals especially LF cetaceans within Glumaig Harbour. It is less likely to be at a level that will cause disturbance in the wider Stornoway Harbour area and will not cause be loud enough to cause disturbance in the Minch.

10.3.2 Piling

Underwater sound arising from piling activities is determined by the pile diameter and the piling technique utilised. The larger the diameter of the pile, the more surface area there is in contact with the water and hence, the higher the sound levels produced during pile driving. The piling technique employed determines the nature and level of noise produced. Vibro piling, carried out using a vibrating hammer, results in a continuous broadband noise, which in general has a reduced sound pressure level compared to impact piling (Nedwell et al., 2003; Affric, 2015; Graham et al., 2017). In contrast, impact piling is a loud impulsive noise source. Table 10.3.1 taken from Chapter 11 of the DWP EIAR provides an understanding of source noise levels associated with piling for both piling techniques and a variety of pile diameters.

Table 10.3.1: Derived Pile Source Levels for Various Diameters (Affric, 2020)

Pile Diameter (cm)	Impact Piling		Vibratory Piling	
	Single Strike dB$_{z-p}$	Single Stirke dB$_{SEL}$	dB$_{z-p}$ re 1 µPa	dB$_{RMS}$
220	231.6	203.2	217.7	204.8
123	227.5	198.6	213.1	200.2
80	225.0	196.6	211.1	198.2
30	218.0	189.6	204.1	191.2

The initial design of the DWS utilises tubular steel piles with an expected diameter in the region of 100cm. However, to allow for potential changes in design it is assumed that 123cm diameter piles like those utilised for DWP could be employed. It is assumed that piles will be installed using a combination of vibro and impact piling.

As discussed in Sections 12 and 13, underwater noise can cause harm and disturbance to marine mammals and fish. This may be in the form of permanent or temporary hearing effects (Permanent Threshold Shift (PTS) and TTS respectively), masking of animals' communications or disturbance of normal behaviour. Hence there is a need to understand over what area piling noise will dissipate to levels below which harm or disturbance could occur.

Underwater noise modelling was undertaken by Irvin Carr Consulting for early designs of the DWP, the output of which is included as Appendix K.1 of Volume 3 of the DWP EIAR (Affric, 2020). It considered 220cm diameter piles for impact (single and multiple strike) and vibro piling. The modelling took into account marine mammal and fish hearing group sensitivities.

Figure 10.3.1 is extracted from Appendix K.1 of the DWP EIAR, it shows impact areas of PTS, TTS and Masking for marine mammal and fish species during impact piling. It is noted that since the publication of Marine Mammal Noise Exposure Criteria: Updated Scientific Recommendation for Residual Hearing Effects was published in 2019, hearing groups have been changed. Cetaceans previously classed as Mid Frequency (MF) and High Frequency (HF) are now being noted as HF and Very High Frequency (VHF) respectively to better reflect their regions of best hearing sensitivities (Southall et al, 2019). Figure 10.3.1 utilises the old convention, hence, MF should be read as HF and HF as VHF.

Figure 10.3.1 shows the risk zones for a stationary mammal; if a mammal is moving away from the noise source the risk zones would be smaller. The figure does illustrate that for impact driving of a 220cm pile a VHF mammal such as a harbour porpoise would have to have swum out of the harbour by the 100th strike to avoid auditory injury.

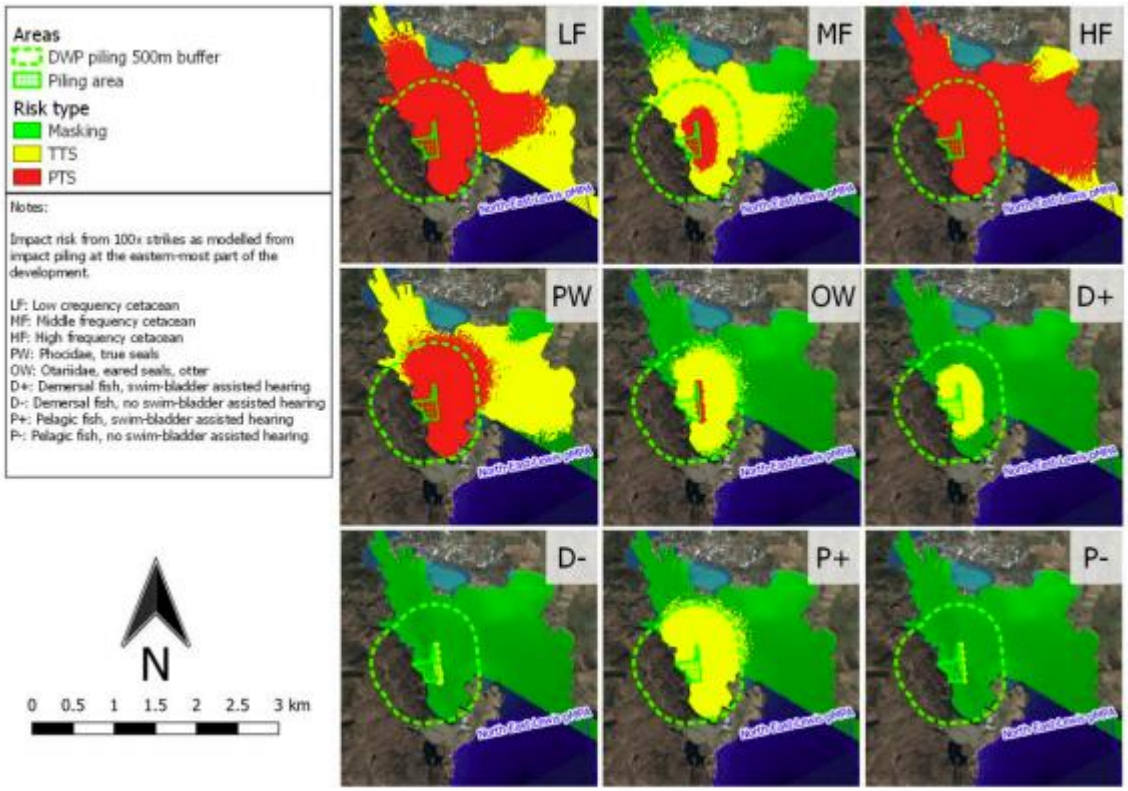


Figure 10.3.1: Impact Pilling Stationary Risk Zones for 220cm Pile Struck 100 Times

The modelling was utilised in the DWP EIAR to understand the impacts associated with piling 123cm piles noting that the source noise levels would be 4.6dB lower than a 220cm pile as detailed in Table 10.3.1. Irwin Carr Consulting note that a reduction in noise by 3dB reduced the impact range by up to 50%. As the likely noise reduction between a 220cm and 123cm

pile is more than 3dB it was safely assumed that the impact ranges modelled and illustrated in Figure 10.3.1 would be halved.

As discussed in Section 10.3.1 Arnish Point acts as a noise barrier stopping noise from reaching the Minch, as is clearly shown in Figure 10.3.1 in relation to DWP. The location of DWS further south in Glumaig Bay will mean that increased noise levels from piling will only occur within the Stornoway Harbour Area and not extend to the Minch.

Impacts on marine mammals and fish associated with increased noise levels within Stornoway Harbour associated with piling are discussed further in Sections 12 and 13 respectively.

10.4 Potential Operational Impacts

Underwater noise sources associated with operations are limited to vessel movements. It is not anticipated that routine maintenance dredges will be necessary at DWS however, if they were the impacts would be less than to those associated with construction dredge.

10.4.1 Vessel Movements

The creation of an additional berth at DWS will facilitate additional vessel use of Stornoway Harbour which will in theory add to the overall soundscape. However, as discussed in Section 10.3 and demonstrated in Figure 10.3.1, noise arising within Glumaig Harbour is screened by Arnish Point and does not impact upon the wider Minch.

It could be argued that vessel movements to and from DWS pass through the Minch, potentially the Little Minch and the North Atlantic increasing the soundscape in these waters. However, as discussed in Section 3.3.2, the aim of the development is to support the construction and operational phases of offshore wind developments in the area. As such, the availability of a suitable port facility close to the developments will reduce overall distances of vessel travel associated with construction and operation of offshore wind sites. Hence overall, the proposed DWS development will help minimise increases in the marine soundscape associated with the move towards net-zero.

10.5 Mitigation Measures

No construction mitigation to reduce noise impacts has been identified. It is recognised that the design of elements such as pile size has an impact on source noise levels and hence smaller pile diameters are preferred. This will be taken account of during the development of the design however, design requirements such as deck loading will take precedence to ensure the appropriate functionality of DWS.

10.6 Proposed Impact Assessment

Due to the existing understanding of underwater noise sources and the dissipation of noise within Glumaig Harbour and noise barrier effects of Arnish Point, there is no need to undertake any new underwater noise modelling to inform the consideration of underwater noise impacts upon ecological receptors. As such, it is proposed that Underwater Noise be **scoped out** from the DWS EIAR.

11 Biodiversity

11.1 Introduction

This section lays out the guidance and regulations relevant to ecological receptors and the impact assessment methodology that the following topic-specific chapters then utilise:

- Section 12: Marine Mammals;
- Section 13: Fish Ecology;
- Section 14: Benthic Ecology; and
- Section 15: Terrestrial Ecology and Ornithology.

11.2 Legislation, Policy, and Guidance

11.2.1 Marine (Scotland) Act 2010

The Act sets out duties on Scottish Ministers to ensure Scotland's seas are sustainably managed and contains provisions for new Marine Protected Areas (MPAs) in Scottish territorial waters. In order to help meet this requirement, the Joint Nature Conservation Committee (JNCC) and NatureScot have produced a list of habitats and species occurring in Scottish waters which are noted for their conservation importance; these are referred to as Priority Marine Features (PMFs) (Tyler-Walters et al. 2016). These encompass benthic and intertidal habitats, marine mammal, fish and invertebrate species. Inclusion in the PMF list itself does not provide legal protection, however due consideration must be provided in Impact Assessments, and as such, all PMFs are considered sensitive for the purpose of this assessment. A subset of the PMFs, called MPA search features, will be used to help identify possible areas for MPAs and develop the network in Scottish waters. MPAs are discussed further in Section 11.3.2.2.

The 2015 Scottish National Marine Plan (NMP), a requirement of the Marine (Scotland) Act 2010, lays out the Scottish Minister's policies for the sustainable development of Scotland's seas and provides General Planning Principles (GENs), most of which apply to the construction and operations of the proposed DWS development. GENs specifically relevant to biodiversity include:

- **GEN 9 Natural heritage:** *Development and use of the marine environment must comply with legal requirements for protected areas and protected species; Not result in significant impact on the national status of Priority Marine Features; and protect, and where appropriate, enhance the health of the marine area;* and
- **GEN 10 Invasive non-native species:** *Opportunities to reduce the introduction of invasive non-native species to a minimum or proactively improve the practise of existing activity should be taken when decisions are being made* (Scottish Government, 2015).

The NMP also contains a series of good environmental status descriptors. Those relevant to biodiversity include:

- **GES 1:** *Biological diversity is maintained and recovered where appropriate. The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions;*

- **GES 2:** *Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems;*
- **GES 4:** *All elements of the marine food webs, to the extent that they are known, occur at normal abundance and diversity and levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity;* and
- **GES 6:** *Sea-floor integrity is at a level that ensures that the structure and functions of the ecosystems are safeguarded and benthic ecosystems, in particular, are not adversely affected* (Scottish Government, 2015).

11.2.2 Habitats Directive

The European Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, also referred to as the 'Habitats Directive' (Official Journal of the European Communities, 1992) has the primary aim of maintaining biodiversity within the European Union (EU) Member States. The Habitats Directive is transposed into Scottish law by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in Scotland). These are commonly known as the 'Habitats Regulations'.

The Habitats Regulations identify several habitats or species whose conservation interest requires the designation of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), which form a set of protected sites within the United Kingdom (UK) National Network (see Section 11.3.1.1).

In addition, the Regulations make it an offence to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4. However, these actions can be made lawful through the granting of licenses by the appropriate authorities.

Species protected by the Regulations are commonly termed European Protected Species (EPS). EPS potentially relevant to the proposed DWS development include bats, otter, cetaceans and basking shark.

11.2.3 Wildlife and Countryside Act 1981 & Nature Conservation (Scotland) Act 2004

The Wildlife and Countryside Act 1981 (WCA) (as amended in Scotland) was originally conceived to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and the European Birds Directive in Great Britain. It has been extensively amended since it first came into force.

The WCA applies to the Scottish terrestrial environment and inshore waters and provides protection to a wide range of species including birds, mammals, fish, invertebrates, and plants. Specific species protected by the WCA are listed in Schedules 1 to 8.

Section 9 (4) of the WCA provides special protection to selected animal species, as listed in Schedule 5, against damage to "*any structure or place which [any wild animal included in the schedule] uses for shelter and protection*", and against causing disturbance whilst in such places.

The WCA also contains measures for preventing the establishment of non-native species which may be detrimental to native wildlife, prohibiting the release of animals and planting of plants

listed in Schedule 9. It also provides a mechanism making the above offences legal through the granting of licenses by the appropriate authorities.

Important amendments to the WCA have been introduced in Scotland including the Nature Conservation (Scotland) Act 2004 (in Scotland) (NCSA). Part 3 and Schedule 6 of this Act make amendments to the WCA, strengthening the legal protection for threatened species. The NCSA is also the instrument under which Sites of Special Scientific Interest (SSSI) are protected in Scotland.

Section 2 of the NCSA also sets out the requirement for Scottish Ministers to designate a Scottish Biodiversity Strategy. As part of this the Scottish Biodiversity List has been produced. This lists a wide range of terrestrial and marine habitats and species which are considered to be of principal importance for biodiversity conservation in Scotland.

The Wildlife and Natural Environment (Scotland) Act 2011 provided a new licensing element to the WCA within Scotland, specifically for certain non-avian protected species '*for any other social, economic or environmental purpose*'. This licensing purpose is qualified by two constraints; '*that undertaking the conduct authorised by the licence will give rise to, or contribute towards the achievement of, a significant social, economic, or environmental benefit;* and *'that there is no other satisfactory solution*'.

11.2.4 Planning Policy and Guidance

National Planning Framework 4 (NPF4) sets out as part of the National Planning Policy for Sustainable Places, Policy 3: Biodiversity. The policy intent is to '*protect biodiversity, reverse biodiversity loss, deliver positive effects from development and strengthen nature networks*' (Scottish Government, 2023). Specifically in relation to EIA developments NPF4 states that demonstration must be made of how the proposal meets the following criteria:

- *'The proposal is based on an understanding of the existing characteristics of the site and its local, regional and national ecological context prior to development, including the presence of any irreplaceable habitats;*
- *Wherever feasible, nature-based solutions have been integrated and made best use of;*
- *An assessment of potential negative effects which should be fully mitigated in line with the mitigation hierarchy prior to identifying enhancements;*
- *Significant biodiversity enhancements are provided, in addition to any proposed mitigation. This should include nature networks, linking to and strengthening habitat connectivity within and beyond the development, secured within a reasonable timescale and with reasonable certainty. Management arrangements for their long-term retention and monitoring should be included, wherever appropriate*; and
- *Local community benefits of the biodiversity and/or nature networks have been considered'* (Scottish Government, 2023).

At a local level the Outer Hebrides Local Development Plan provides relevant policy under NBH2: Natural Heritage. Policy NBH2 sets out the Council's process with regards to designated sites and protected species, including EPS (CnES, 2018).

Planning Advice Note (PAN) 60: Planning for Natural Heritage (Scottish Government, 2008) sets out guidance and case studies in relation to planning and the natural environment,

11.3 Designated Sites

Designated sites represent the very best of Europe's landscapes, plants and animals, rocks, fossils, and landforms. Their protection and management will help to ensure that they remain in good health for all to enjoy, both now and for future generations. They may be designated to meet the needs of international directives and treaties, national legislation and policies, or more local needs and interests.

11.3.1 International

11.3.1.1 European Sites

European Sites include those which make up the UK National Network as part of the Habitats Directive and Birds Directive. Sites included in the UK National Network are Special Protected Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites, although the latter are included as part of SPAs or SACs in Scotland.

SACs are internationally important for threatened habitats and species. They are also selected for a number of habitats and species, both terrestrial and marine, which are listed in the Habitats Directive.

SPAs are internationally important for threatened habitats and species. They are also selected for a number of rare, threatened, or vulnerable bird species listed in Annex I of the Birds Directive, and also for regularly occurring migratory species.

If there is potential for ecological connectivity between any plan or project and any qualifying features of a European Protected Site, a Habitat Regulation Assessment (HRA) must be carried out to determine whether there is a Likely Significant Effect (LSE) on any qualifying feature. Any plan or project, which is likely to have a significant effect on a European Protected Site (either alone or in combination with other plans or projects) and is not directly connected with or necessary to the management of the site, shall be subject to an Appropriate Assessment (AA) of its implications for the European Protected Site in view of the site's conservation objectives. The AA must be completed by the Competent Authority and is included within the HRA. Ramsar Sites

Ramsar sites are wetlands of international importance, designated under the Ramsar Convention (Ramsar, 1971). Wetlands are defined as areas of marsh, fen, peatland, or water, whether natural or artificial, permanent, or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed six metres. There are currently fifty one Ramsar sites designated as internationally important wetlands in Scotland, covering a total area of about 313,000 hectares (Scottish Natural Heritage, 2017). All Ramsar sites in Scotland are also either SPAs or SACs (UK National Network sites), and many are also Sites of Special Scientific Interest (SSSIs), although the boundaries of the different designations are not always exactly the same (Scottish Natural Heritage, 2017). It is not surprising that internationally important wetlands are also of European interest for a wide variety of water birds, bogs, lochs, coastal wetlands and other water-dependent habitats and species. Although there is no specific legal framework that safeguards Scottish Ramsar sites, they benefit from the measures required to protect and enhance the Natura Sites and SSSIs which overlap them. NatureScot also includes Ramsar sites in its site condition monitoring programme.

11.3.1.2 OSPAR

The Convention for the Protection of the Marine Environment of the North-East Atlantic (the OSPAR Convention) is the mechanism by which fifteen governments of Western Europe work together to protect the marine environment of the north-east Atlantic. OSPAR incorporates a wide range of marine issues, from work on pollution and dumping at sea, to the conservation of marine biodiversity.

In 2003, the government committed to establishing a well-managed, ecologically coherent network of Marine Protected Areas (known as the OSPAR MPA commitment). Marine Special Areas of Conservation (mSACs) designated under the Habitats Directive, have been submitted as the UKs initial contribution to the OSPAR network. Whilst OSPAR covers many different issues, the focus of NatureScot's current work is on delivering the OSPAR MPA commitment. A list of marine habitats and species considered to be under threat or in decline within the north-east Atlantic has been produced by OSPAR (known as the OSPAR Threatened and Declining List). The known distribution of these habitats and species in waters around the UK has been mapped on the National Biodiversity Network website. The habitats and species on the OSPAR Threatened and Declining List have been considered through NatureScot's Priority Marine Features (PMFs) work, as discussed in Section 11.2.1. Together with mSACs and marine Special Protection Areas (mSPAs) (also designated under the Habitats Directive) Scotland will achieve the OSPAR commitment of establishing a well-managed, ecologically coherent network of MPAs.

11.3.2 National

National designations cover a range of different types of protected area and are made by a variety of local and national authorities. Some of these designations focus on nature conservation, while others are concerned with special landscapes. The management of multi-functional protected areas (such as our National Parks) seeks to balance the needs of people, landscape, and nature.

11.3.2.1 Sites of Special Scientific Interest

Sites of Special Scientific Interest (SSSI) are those areas of land and water (to the seaward limits of local authority areas), that NatureScot considers to best represent our natural heritage, its diversity of plants, animals and habitats, rocks and landforms, or a combination of such natural features. They are the essential building blocks of Scotland's protected areas for nature conservation. Many are also designated as Natura Sites (SPAs and SACs). The national network of SSSIs in Scotland forms part of the wider Great Britain series. NatureScot designates SSSIs under the Nature Conservation (Scotland) Act 2004. SSSIs are protected by law. It is an offence for any person to intentionally or recklessly damage the protected natural features of an SSSI.

11.3.2.2 Marine Protected Areas

Scotland (along with the rest of the UK) has designated a number of Marine Protected Areas (MPAs) which include SACs and SSSIs. The term "MPA" can be used for several different types of protected areas within the marine environment. The Marine (Scotland) Act 2010 has established a new power for MPAs in the seas around Scotland, to recognise features of national importance and meet international commitments for developing a network of MPAs.

11.3.3 Local

Local natural heritage designations identify areas that are important to people, generally in a Council area. Local nature conservation sites and special landscape areas may be known locally by other names, but all are used to direct local planning policies and highlight local sites of interest. Local nature reserves are areas of at least locally important natural heritage value, which local authorities own or manage, to provide opportunities for people to find out about their environment. Local designations are generally made by local authorities, though many are proposed by special interest and conservation groups, such as local Regionally Important Geological Sites (RIGS) Groups or the Scottish Wildlife Trust.

11.3.4 Designated Sites Relevant to Deep Water South

Where designated sites are situated within reasonable distance of the development site, the potential for qualifying features to be ecological receptors of the proposed development must be considered. A search for designated sites within 20km of the proposed DWS was carried out with these sites listed in Table 11.3.4. These sites comprise of MPA, SAC, SPA, Ramsar and SSSI designations. No locally designated sites are identified within 20km of the proposed DWS site.

Table 11.3.4: Designated Sites Relevant to the Proposed DWS Development

Designated Site	Distance and Direction from DWS	Qualifying Feature(s)	Considered further? Yes/No	Evaluation Rationale
North-East Lewis MPA	850m SE	Risso's dolphin (*Grampus griseus*), sandeels (*Ammodytes marinus/Ammodytes tobianus*)	Yes	Risso's dolphin are a mobile feature with extensive home ranges. Sandeels can also range locally, and the features are therefore **considered further in Section 12: Biodiversity - Marine Mammals and Section 13: Biodiversity – Fish.**
		Marine geomorphology of the Scottish shelf seabed, Quaternary of Scotland	No	The proposed DWS development will not interact with any of the immobile features.
Inner Hebrides and the Minches SAC	1.9km ESE	Harbour porpoise (*Phocoena phocoena*)	Yes	Harbour porpoise are a mobile feature with extensive home ranges and are therefore **considered further in Section 12: Biodiversity - Marine Mammals.**

Designated Site	Distance and Direction from DWS	Qualifying Feature(s)	Considered further? Yes/No	Evaluation Rationale
Tong Saltings SSSI	3.1km NNE	Breeding bird assemblage.	Yes	Ornithological features have extensive home ranges, in particular migratory species. Therefore, breeding birds have been **considered further in Section 15: Biodiversity – Terrestrial Ecology and Ornithology.**
		Mudflats; Saltmarsh; and Sand dune.	No	The proposed DWS development will not interact with any of the immobile features.
Lewis Peatlands SPA	5.6km NNW	Breeding red-throated diver (*Gavia stellata*); breeding black-throated diver (*Gavia arctica*); breeding golden eagle (*Aquila chrysaetos*); breeding merlin (*Falco columbarius*); breeding golden plover (*Pluvialis apricaria*); breeding dunlin (*Calidris alpina schinzii*), breeding greenshank (*Tringa nebularia*)	Yes	Ornithological features have extensive home ranges, in particular migratory species. Therefore, breeding birds have been **considered further in Section 15: Biodiversity – Terrestrial Ecology and Ornithology.**

Designated Site	Distance and Direction from DWS	Qualifying Feature(s)	Considered further? Yes/No	Evaluation Rationale
Lewis Peatlands Ramsar	5.6km NNW	Breeding red-throated diver (*Gavia stellata*); breeding black-throated diver (*Gavia arctica*); breeding golden eagle (*Aquila chrysaetos*); breeding merlin (*Falco columbarius*); breeding golden plover (*Pluvialis apricaria*); breeding dunlin (*Calidris alpina schinzii*), breeding greenshank (*Tringa nebularia*)	Yes	**Considered further as part of Lewis Peatlands SAC** due to same designated features and site boundary.
		Blanket bog; depressions on peat substrates and; subalpine wet heath.	No	The proposed DWS development will not interact with any of the immobile features.
Lewis Peatlands SAC	8.8km WNW	Otter (*Lutra lutra*).	Yes	Otter are a mobile species with extensive home ranges and are therefore **considered further in Section 15: Biodiversity – Terrestrial Ecology and Ornithology.**
		Blanket bog; Depressions on peat substrates; Acid peat-stained lakes and ponds; Wet heathland with cross-leaved heath; and Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels.	No	The proposed DWS development will not interact with any of the immobile features.

Designated Site	Distance and Direction from DWS	Qualifying Feature(s)	Considered further? Yes/No	Evaluation Rationale
Achmore Bog SSSI	10.5km WSW	Blanket bog	No	The proposed DWS development will not interact with this immobile feature.
Gress Saltings SSSI	11.6km NE	Saltmarsh	No	The proposed DWS development will not interact with this immobile feature.
Loch Laxavat Ard and Loch Laxavat Iorach SSSI	18.3km WNW	Breeding bird assemblage.	Yes	Ornithological features have extensive home ranges, in particular migratory species. Therefore, breeding birds have been **considered further in Section 15: Biodiversity – Terrestrial Ecology and Ornithology.**
		Oligotrophic lochs; and Scrub.	No	The proposed DWS development will not interact with any of the immobile features.
Loch Scarrasdale Valley Bog SSSI	19.75km	Blanket bog	No	The proposed DWS development will not interact with this immobile feature.
Loch nan Eilean Valley Bog SSSI	19.8km	Blanket bog; valley fen	No	The proposed DWS development will not interact with any of the immobile features.

12 Biodiversity - Marine Mammals

This section considers the potential impacts on marine mammals from construction and operation of the proposed DWS development.

Construction and operational impacts on marine mammals from the adjacent DWP were previously assessed within the DWP EIAR. With appropriate implementation of mitigation, impacts were deemed to be non-significant (Affric, 2020). The proposed DWS location is very similar to that of DWP, particularly when considering the highly mobile nature of marine mammals. Construction methodologies for the two developments are also expected to be largely indistinguishable. As such, reference to the assessment undertaken for DWP has been utilised in this section.

12.1 Legislation, Policy, and Guidance

The nature conservation legislation and policy relevant to marine mammals is detailed in Section 4: Consenting and Policy Context and Section 11: Biodiversity.

12.2 Baseline

12.2.1 Data Review

A desk study has been undertaken to inform characterisation of the marine mammal baseline. This includes an assessment of the marine mammals which may be utilising the proposed development area and surrounding waters, information on populations sizes, seasonal trends, and foraging characteristics. The following data sources have been consulted:

- NatureScot SiteLink Portal (NatureScot, 2023d);
- The UK PMF list (Tyler-Walters et al., 2016.);
- National Marine Plan Interactive (Marine Scotland, 2023);
- Management Units (MUs) for cetaceans in UK waters (IAMMWG, 2015; 2023);
- Scientific Advice on Matters Related to the Management of Seal Populations: 2017 & 2018 (SCOS, 2017, 2018);
- Atlas of Cetacean Distribution in North-West European Waters (Reid et al., 2003); and
- Various scientific reports and journal articles regarding marine mammal distribution and movements in the northeast Atlantic region.

12.2.2 Designated Sites

There are no designated sites for marine mammals within the proposed development area, however, sites are present within the vicinity, as detailed in Table 11.3.4 and below:

12.2.2.1 North East Lewis MPA

The North-East Lewis MPA lies approximately 0.6km southeast of Stornoway Harbour and is designated for features including Risso's dolphin (*Grampus griseus*).

The North-East Lewis MPA is one of only two places in the UK where high numbers of Risso's dolphin are recorded and thought to be resident. The species normally favours deeper offshore waters where the continental shelf slopes off quickly but around the Isle of Lewis they gather close to shore in water depths ranging from 20-200m. Sightings of Risso's dolphins have been most prominent on the eastern and northern coasts of the Isle of Lewis, with the Eye Peninsula and Butt of Lewis being noted 'hotspots' (Scottish Government, SNH, & Conservation, 2014; Weir et al., 2019). It has been suggested that the area is important for feeding due to the year-round presence of the species and the continued sightings of particular individuals (Weir et al., 2019).

Dedicated research efforts by Whale and Dolphin Conservation between 2010 and 2017 focussing on the North-east Lewis MPA area produced relative abundance values of 0.554 to 6.647 individuals per km^2 (Weir et al., 2019) and the greatest relative abundance was found on the southern coastline of the Eye Peninsula. As of 2017, a total of 113 individual Risso's dolphins have been identified in the North-east Lewis MPA (Weir et al., 2019).

As the North-East Lewis MPA is located less than 1km from the proposed DWS site, and the Stornoway dredge spoil disposal ground is situated within the MPA, there is potential for connectivity between the proposed development and the protected Risso's dolphin feature of the MPA and therefore the designated site is considered further.

12.2.2.2 Inner Hebrides & the Minches SAC

The Inner Hebrides & the Minches SAC is designated for the conservation of harbour porpoise (*Phocoena phocoena*), under the European Habitats Directive. The area is of key importance to the UK as part of the harbour porpoise Management Unit (MU). The Inner Hebrides & the Minches SAC is estimated to support approximately 5,438 individuals for at least part of the year, equating to approximately 32% of the MU (SNH, 2016a). It is suggested that these areas, relative to the rest of the continental shelf, include the best habitat for harbour porpoises, and have been used consistently by the species over the last two decades (SNH, 2016a).

The Inner Hebrides & the Minches SAC is taken forward for further consideration because it is situated within ~ 1.9km of the proposed DWS development, and 850m of the Stornoway dredge spoil ground, hence, there is potential connectivity between the development and qualifying interests of the SAC.

12.2.3 Species Accounts

Eight species of cetacean are regularly recorded in the Minch (Reid et al., 2003), the waterbody which Stornoway Harbour adjoins.. Five of these species are considered to occur commonly or be resident in the area including harbour porpoise, white beaked dolphins, Risso's dolphins, killer whales, and minke whales. The remaining 3 species are regular visitors, but less common and not thought to be resident, these include; bottlenose dolphins, short beaked common dolphins, and Atlantic white sided dolphins (Reid et al., 2003). Humpback whale are also known to be present in Scottish waters, including the Minch. Two species of pinniped are resident in the Minch and the surrounding waters: the common and grey seal. Both species use coastal sites for breeding/pupping and hauling out, and feed in inshore and offshore waters. Each of these marine mammal species are introduced in more detail in the following sections.

12.2.3.1 Regularly Occurring Cetaceans

12.2.3.1.1 Harbour Porpoise (Phocoena phocoena)

The harbour porpoise is distributed throughout temperate and subarctic waters of the North Pacific and North Atlantic oceans and is the most abundant cetacean to occur in north west European shelf waters. They are the UK's smallest, and most abundant cetacean, with the highest densities occurring along the North Sea coast, around the Northern Isles and the Outer Hebrides (Hammond et al., 2003; Reid et al., 2003). The harbour porpoises occurring within the vicinity of the development are included as part of the West Scotland MU, which is estimated to be composed of 21,462 individuals (IAMMWG, 2015). MMO data from watches carried out during DWP construction included one sighting of a harbour porpoise on the 14th February 2023 (OSC, 2023). Harbour porpoise are expected to be one of the most frequently encountered cetaceans in the area of the proposed development and will therefore be considered further.

12.2.3.1.2 White-Beaked Dolphin (Lagenorhynchus albirostris)

The UK is in the southern extent of the range of white-beaked dolphins, and as such the UK distribution is centred in the north. Scottish shelf waters are considered to be the main stronghold of this species in Europe, particularly in the Minch, to the north of the Outer Hebrides, the outer Moray Firth, and off the coast of Aberdeenshire (Northridge et al. 1995; Reid et al., 2003). The species typically inhabits deeper coastal waters with a depth of around 200m (Reid et al., 2003).

White-beaked dolphins from British and Irish waters are considered a single population of 15,895 individuals and as such are included as one MU (IAMMWG, 2015; 2023). The high densities of this species reported in the Minches make it likely that this species will be present within the vicinity of the development. Sightings of white-beaked dolphin in the UK peak between June and October, although they are present year-round (Reid et al., 2003). As such, further consideration will be given to this species with regards to the proposed development.

12.2.3.1.3 Risso's Dolphin (Grampus griseus)

Risso's dolphins have been identified in many parts of the UK including parts of the North Sea, the western shores of Scotland, the Outer Hebrides, the Irish and Celtic seas and around Bardsey Island, Wales. Risso's dolphins however, despite their widespread distribution throughout UK waters, are considered as a single population as a result of the lack of population estimates (IAMMWG, 2015). Although the species is comparatively uncommon when taking into account sightings of other species, there is some evidence of changes in the seasonal distribution of this species. Risso's dolphin sightings occur most frequently in the Minch between May and September and in offshore waters near the continental shelf break during the winter months of October to May (Reid et al. 2003). MMO data from watches carried out during DWP construction included a single sighting of a group of five Risso's dolphins on the 8th June 2023 (OSC, 2023). These were sighted outwith the mitigation zone at approximately 800m. Due to their presence in the area, Risso's dolphins will be considered further.

12.2.3.1.4 Minke Whale (Balaenoptera acutorostrata)

The minke whale is the most common baleen species recorded in British shelf waters, including in the north-eastern Atlantic, where high densities are present off the west coast of Scotland, particularly in the Minch (Hammond et al. 2003; Reid et al., 2003) They feed mainly in deep coastal waters (<200m deep) over the continental shelf, rather than out in the open ocean. They regularly appear around sandbanks or where upwellings bring nutrients and prey near the surface, or in the strong currents around headlands and small islands (Reid et al., 2003). Minke whales are considered to be a coastal species, occurring in areas within approximately 7km of the coast (Macleod et al., 2004; Reid et al., 2003).

Minke whales throughout British and Irish waters designated as a single population of 23,528 individuals, although this is likely an underestimate (IAMMWG, 2015). Densities of minke whale are found to be greatest in Scottish seas during the summer months, between May to September, although there is evidence to suggest that some individuals remain in Scottish waters all year round (Macleod et al., 2004). Minke whales will therefore be given further consideration.

12.2.3.1.5 Killer Whale (Orcinus orca)

Killer whales occur frequently in the deep North Atlantic, and in coastal waters of north-west Europe. In UK waters, the highest densities of killer whales are recorded off the coasts of north-east Scotland and the Shetland, although regular sightings are also recorded off north-west Scotland (Reid et al., 2003). Killer whales are present year-round throughout Scottish waters, although they are primarily recorded in coastal waters during the summer months (Evans et al., 2010).

The majority of killer whale sightings in Scottish waters are transient visitors from pods based in Iceland, the Faroe Islands, and Norway (Evans et al., 2010) however, there is a small resident pod of killer whales based on the west coast of Scotland, known as the 'West Coast Community.' This is the only resident population of killer whales in the UK, and of the eight documented members, only two mature bulls have been sighted since 2016 (Scullion et al., 2021). These two bulls are frequently sighted in the Sea of the Hebrides, to the south of the development area, and are known to forage in the Minch (Hebridean Whale and Dolphin Trust (HWDT), 2018). Though there are few confirmed numbers in this population, consideration will still be given with regards to the proposed development.

12.2.3.2 Other Cetaceans

12.2.3.2.1 Bottlenose Dolphin (Tursiops truncatus)

Bottlenose dolphins are distributed throughout UK shelf waters, primarily close to shore with one of the largest semi-resident populations of bottlenose dolphins found in the Moray Firth, in northeast Scotland. In total, there are six MUs for bottlenose dolphins in UK waters, and as bottlenose dolphins are most commonly recorded within the 20m depth contours, they have a predominantly coastal distribution (IAMMWG, 2015).

Individuals occurring within the vicinity of the development, due to its position on the Isle of Lewis, are most likely to belong to the Coastal West Scotland and Hebrides (CWSH) MU (IAMMWG, 2023). The animals within this MU are less well understood however two disparate communities have been identified within the MU - the 'Inner Hebrides' and 'Sound of Barra' communities. The Inner Hebrides community is made up of approximately 30 individuals which move widely across the west coast (van Geel, 2016). The population ranges throughout the year across the whole of the west coast of Scotland, and as such there is considered to be only a small possibility that they will be present within the Stornoway Harbour area. The Sound of Barra group is made up of less than 15 individuals, and this resident community are mainly found within the Sound of Barra and in immediately adjacent waters (Cheney et al., 2013; van Geel, 2016) approximately 140 km from Stornoway Harbour. It is considered unlikely that these individuals would be found within the vicinity of the proposed development. This species will therefore not be considered further.

12.2.3.2.2 Short-Beaked Common Dolphin (Delphinus delphis)

Short-beaked common dolphins (common dolphins) are one of the most abundant cetacean species and is the most numerous offshore species in the north-east Atlantic (Reid et al., 2003). Common dolphins from British and Irish waters are considered a single population of 56,556 individuals (IAMMWG, 2015) however, the Outer Hebrides is towards the northern extent of the species' range, which, combined with the coastal nature of the Minch means that this

offshore species is not present in the region in high numbers (Reid et al., 2003). The majority of sightings on the west coast of Scotland are to the north or south of the proposed DWS development; at the continental shelf break, or in the Sea of the Hebrides (Marine Scotland, 2018). Sightings do however exist for groups of common dolphin within Stornoway Harbour (HWDT, 2023). MMO data from watches carried out during DWP construction included two sightings of a short beaked common dolphin including a group of five on the 2nd June 2023 and a single individual on the 14th June 2023 (OSC, 2023). Short-beaked common dolphin will therefore be given further consideration.

12.2.3.2.3 Atlantic White-Sided Dolphin (Lagenorhynchus acutus)

Atlantic white-sided dolphins are predominantly an offshore, deep-water species, and are most frequently encountered at the continental shelf break, in areas of steep seabed relief, to the north-west of the Outer Hebrides (Reid et al., 2003). Atlantic white-sided dolphins from British and Irish waters are considered a single population of 46,249 individuals (IAMMWG, 2015). Little is known about the temporal movements of this species, although they are occasionally recorded in shallower continental shelf waters, including the Minch (Reid et al, 2003). No records exist within Stornoway Harbour and as the species are predominantly an offshore species, they will not be considered further with regards to the proposed development.

12.2.3.2.4 Humpback Whales (Megaptera novaeangliae)

Humpback whales are a large baleen whale, inhabiting both shallow and deep waters and capable of diving to depths of over 600m (Derville et al., 2020). They are a migratory species, moving from feeding grounds in the Northeast Atlantic and Barents Sea to breeding grounds in the Caribbean, Cape Verde, and the Azores. From data collected over recent years, the Minch has been noted as a hot spot with a number of sightings concentrated in this area during late autumn and winter, and in early to mid-summer, coinciding with migration. Sightings of humpback whales in Scotland have increased along with population numbers of humpback whales globally (WDC, 2018). It has been estimated that there are at least 35,000 humpback whales in the North Atlantic MU and that humpback whales are likely to be resident year-round in Scottish waters but in extremely low numbers (Marine Scotland Science, 2020). Humpback whales will be given further consideration due to the increase in sightings in the area.

12.2.3.3 Pinnipeds

12.2.3.3.1 Common Seal (Phoca vitulina)

Common seals are widespread around the west coast of Scotland particularly throughout the Hebrides and Northern Isles with haul-outs generally situated in sheltered waters, on tidal sandbanks and rocky skerries.

Common seals in the UK are divided into MUs; the proposed DWS development is situated within the 'Western Isles' MU region, where the population is currently estimated to be at least 3,532 individuals, as of 2019 (SCOS, 2022). Common seals present in the vicinity of the development may also be members of the large 'West Scotland' MU, which has an estimated population of 15,600 (SCOS, 2022).

The species are present in UK waters year-round with pups being born during June and July. During this period, females spend a high proportion of time ashore with their pups (Hammond et al., 2003; SCOS, 2017). Common seals moult in August (SCOS, 2017) and numbers at haul-out sites are highest during this period. There is a single designated common seal haul-out site within 25km (by sea) from the DWS development, known as Broad Bay, on Northeast Lewis.

Common seal habitat utilisation in the north-west of Scotland is concentrated to the south-east of the Outer Hebrides, with the highest usage observed in the Sea of Hebrides. Predicted common seal usage of the western Minch is comparatively low, with densities of 5-10 seals per 5km x 5km cell anticipated in the immediate vicinity of the proposed development (Russel et al., 2017). MMO data from watches carried out during DWP construction included nine sightings of common seals between January 2023 and June 2023. Each record involved one individual at a time (OSC, 2023). This species will therefore be considered further.

12.2.3.3.2 Grey Seal (Halichoerus grypus)

Grey seals occur only in the north Atlantic, Barents and Baltic Seas, with their main concentrations located along the Canadian and US eastern seaboards and in northeast Europe (SCOS, 2017). The UK contains around 38% of the total world breeding population of grey seals, and 88% of those breed in Scotland, with major concentrations in the Outer Hebrides and Orkney (SCOS, 2017). In 2022, the total UK population of grey seals was estimated to be 162,000 individuals (SCOS, 2022), with pup production estimated to be around 54,050 in Scotland (SCOS, 2022). The proposed DWS development is situated within the 'Western Isles' grey seal MU where the population has been estimated to be 21,512 individuals (SCOS, 2022).

Grey seal haul-outs are generally located on remote uninhabited stretches of coast, and often in more exposed areas compared to common seals. Breeding occurs in the autumn, with peak pupping between August and December (SCOS, 2017) although in northern Scotland pupping typically occurs between October and late November (Hammond et al., 2003). Moulting occurs between December and April (Hammond et al., 2003; SCOS, 2017). Designated breeding grey seal haul-out sites are concentrated in the Northern Isles, Orkney, and Shetland, and in the Outer Hebrides. Non-breeding haul-out sites are also concentrated at these locations, in addition to various sites along the west coast of Scotland. No designated grey seal haul-outs are located within 25km by sea of the proposed development.

At-sea grey seal usage maps show that grey seal activity in the north-west of Scotland was concentrated to the west of the Outer Hebrides, particularly around the Monach Islands (Russel et al., 2017). Grey seal densities in the Minch and Sea of the Hebrides were comparatively low in comparison to common seal densities (Russel et al., 2017). The density of grey seals was found to be 0-5 individuals per 5km x 5km cell which would suggest that it is unlikely that grey seals will be present in the immediate vicinity of the proposed development however, sightings data shows records of grey seals in the harbour area. MMO data from watches carried out during DWP construction included 159 sightings of grey seal between October 2022 and June 2023. The most seen at once included ten individuals made up of both adults and juveniles on the 20th February 2023 (OSC, 2023). This species will therefore be given further consideration.

12.3 Potential Construction Impacts

12.3.1 Underwater Noise

As discussed in Section 10, there will be underwater noise generated by construction activities associated with the proposed DWS development. Marine mammals use acoustics for communication, navigation, and foraging, and as such are particularly sensitive to underwater noise. Underwater noise emissions can result in disruption of foraging behaviour, displacement, masking of communications, disturbance, and injury.

Southall et al (2019) groups marine mammals into functional hearing groups and applies filters to the unweighted noise to approximate the hearing response of the receptor. The hearing groups of marine mammals identified within the vicinity of the proposed DWS development are summarised in Table 12.3.1 below.

Table 12.3.1: Functional Hearing Groups, and Relevant Marine Mammals Species (Southall et al, 2019)

Hearing Group	Marine Mammal Species	Generalised Hearing Range
Low Frequency (LF) Cetaceans	Minke Whales, Humpback Whales	7Hz to 35kHz
High Frequency (HF) Cetaceans	Dolphin species as identified in Section 12.2.3, Killer Whales	150Hz to 160kHz
Very High Frequency (VHF) Cetaceans	Harbour Porpoise	275Hz to 160kHz
Phocid Carnivores in Water (PCW) (Underwater)	Grey Seals, Common Seals	50Hz to 86kHz

The Southall publication determines impact from assessment of an area wherein noise will induce either 'Temporary Threshold Shift' (TTS) or 'Permanent Threshold Shift' (PTS) as judged by the weighted Sound Exposure Level over a typical 24-hour period (dBSEL-24). The sound level at which impacts occur is also dependent on the type of noise: impulsive or non-impulsive noise.

For impulsive noises, the guidance presents unweighted frequency maximal zero to peak pressure ($dB_{z\text{-}p}$) and frequency weighted sound exposure level (dB_{SEL}) criteria. For non-impulsive noises, only cumulative, frequency weighted dB_{SEL} are provided. The injury criteria for impulsive noises and non-impulsive noises (Southall et al, 2019) are summarised in Tables 12.3.2 and 12.3.3 respectively.

Table 12.3.2: Acoustic Injury Criteria for Marine Mammals in Relation to Impulsive Noise (Southall et al, 2019)

Impulsive Noise	TTS Criteria		PTS Criteria	
Functional Group	dB_{SEL-24} (weighted) dB re 1 µPa	dB_{z-p} (unweighted) dB re 1 µPa	dB_{SEL-24} (weighted) dB re 1 µPa	dB_{z-p} (unweighted) dB re 1 µPa
LF Cetaceans	168	213	183	219
HF Cetaceans	170	224	185	230
VHF Cetaceans	140	196	155	202
PCW Pinnipeds	170	212	185	218

Table 12.3.3: Acoustic Injury Criteria for Marine Mammals in Relation to Non-Impulsive Noise (Southall et al, 2019)

Non-Impulsive Noise	TTS Criteria	PTS Criteria
Hearing Group	dB_{SEL-24} (weighted) dB re 1 µPa	dB_{SEL-24} (weighted) dB re 1 µPa
LF Cetaceans	179	199
HF Cetaceans	178	198
VHF Cetaceans	153	173
PCW Pinnipeds	181	201

12.3.1.1 Piling

The initial design of the DWS utilises tubular steel piles with an expected diameter in the region of 100cm. As discussed in Section 10.3.2, to allow for potential changes in design it is assumed that 123cm diameter piles like those utilised for DWP could be employed.

As discussed in Section 10.3.2, increased noise levels from piling will only occur within the Stornoway Harbour Area and will not extend to the Minch. Noise levels within Stornoway Harbour associated with impact piling will however be high enough to potentially cause PTS and TTS to marine mammals if present in the area.

The greatest impact ranges of TTS and PTS are predicted for stationary VHF cetaceans as a result of impact piling. Harbour porpoise are the only VHF cetacean species relevant to the development location. The possibility for harbour porpoise being present within Stornoway Harbour is low despite being close to the Inner Hebrides and The Minches SAC. This is due to the unsuitability of the habitat. Glumaig Harbour is generally much shallower (0-15m water depth) than the preferred foraging depths of ~20–50m for harbour porpoise. A review of sightings data shows that densities of harbour porpoise are low in the Stornoway and Glumaig Harbour areas (Marine Scotland NMPi, 2023; HWDT, 2023).

The DWP EIAR identified that underwater noise would have a low, short term and reversible but significant effect on harbour porpoise, however with mitigation measures in place this was reduced to non-significant (Affric, 2020). The effects on harbour porpoise from piling noise emissions at DWS are predicted to be well within the scope of those assessed for DWP. This is due to the location of the works further south within Glumaig Harbour. The potential noise propagation as noise emissions will be interrupted by Arnish Point and the DWP development, limiting the propagation of noise such that it is unlikely to reach the Inner Hebrides and The Minches SAC.

The impacts from piling on LF cetaceans (minke and humpback whales) was also considered within the DWP EIAR. For LF cetaceans, impact piling will have a range of PTS beyond 500m and up to 1.5km for TTS, encompassing the entire harbour area. As the waters within 500m of the works are very confined and less than 15m deep, it is very unlikely that minke or humpback whales would be present in the area and subject to effects of TTS or PTS. It is not anticipated that these species would be adversely affected by piling works for the construction of the proposed DWS development.

Considering HF cetaceans, impact piling is likely to have a PTS range of no more than 500m, with zones of TTS encompassing potentially up to 1.5km. Potentially affected species include Risso's dolphin, short-beaked common dolphin, and killer whale. It is, however, expected that these species would be found in low densities within these distances from the works suggesting that the number of animals possibly subjected to disturbance will be low. As such, it is not anticipated that in EIA terms, as was concluded in the DWP EIAR (Affric, 2020), that a significant effect will occur. It is not expected that noise will travel into the North-east Lewis MPA where Risso's dolphin are a designated feature.

With regards to pinnipeds (PCW), the zone of PTS extended to approximately 500-1000m, with zones of TTS potentially encompassing the majority of the harbour area. Low density distributions of grey seals have been recorded within Stornoway Harbour and as such, are extremely unlikely to be present during piling. With respect to common seals, the nearest known designated common seal haul-out site lies approximately 25km away (by sea) from the development, known as Broad Bay, on North-east Lewis. As such, common seals are much more likely to be present in the TTS zone than grey seals due to having foraging ranges which extend some 50km from the closest haul-out site. Zones of TTS also extend into areas which provide more suitable foraging grounds with water depths of up to 30m. Common seals, however, are extremely unlikely to remain in the PTS zone for long periods of time as it provides unsuitable habitat for foraging due to the shallow depth.

It is recognised that beyond potential hearing impacts, it is possible for underwater noise to create a disturbance effect known as masking. Masking occurs when sound interferes with a marine mammals' ability to perceive and distinguish different sounds. Although it is still relatively unclear on how masking affects each marine mammal species, it is understood that masking could inhibit vocalisations relating to foraging and breeding success (National Research Council (U.S.), 2003). Some researchers have however shown that marine mammals may have the ability to increase the amplitude of their vocalisations as a short-term response to increased noise levels (Clark et al., 2009; Parks et al., 2011) and prevent inhibition from occurring.

12.3.1.2 Dredging

As described in Section 3.3.1, a dredge is required to provide adequate depth at the proposed DWS quayside. Noise generated by dredging was assessed as part of the EIA for the adjacent DWP (Affric, 2020). This modelled the use of cutter-suction dredging, in order to represent and assess a worst-case scenario.

As discussed in Section 10.3.1., noise monitoring for cutter-suction dredging conducted at other projects and applied to DWP indicated that unweighted source levels of noise would be

in the region of 175 dB re 1 µPa. Comparison with the weighted Southall et al guidance for impacts on marine mammals indicated that in the case of the DWP, it was likely that LF cetaceans would be susceptible to the greatest level of noise impacts from dredging activities, with zones of TTS anticipated to extend some 200m from the source. TTS zones were limited to 100m for other species. It should be noted that the probability of a marine mammal being within such close proximity to dredging activities is very low. It is therefore not anticipated that underwater noise from dredging during DWS works will have a significant effect on marine mammals, as was concluded in the DWP EIAR.

12.3.2 Water Quality

As outlined in Section 8: Water Quality and Coastal Processes, construction of DWS could have the following effects on water quality, which in turn are relevant to marine mammals:

- Increased sediment loading in the water column, resulting from dredging, spoil disposal, infilling, and site surface water runoff; and
- Spillage of hazardous materials from machinery, equipment, and processes involved in the construction.

12.3.2.1 Increased Sediment Loading

Increased sediment loading in the water column will result in increased turbidity which could inhibit the foraging success of marine mammals. This is more apparent in largely visual predators such as seals, which do not utilise sonar for detection of prey (Todd et al., 2015). As well as the inhibition of foraging, increased turbidity may also cause seals to avoid affected areas, resulting in the displacement or interruption of transiting individuals. This is most apparent in common seals (*Phoca vitulina*), where visual acuity has been known to deteriorate as turbidity increased (Todd et al., 2015).

Many other marine mammal species, such as toothed cetaceans, inhabit turbid environments and are able to utilise these waters through the use of sophisticated sonar which helps them understand the physical environment around them (Au et al., 2000). For these species, foraging abilities are not inhibited and there is evidence of some level of tolerance to turbidity (Au et al., 2000; Pirotta et al., 2013; Todd et al., 2015).

As such, negative effects may occur for species which do not primarily use acoustics or sonar for biological functions, and which regularly utilise the waters in the vicinity of the development site and spoil ground for foraging, socialising, or migration (Pirotta et al., 2013; Todd et al., 2015).

Section 8: Water Quality and Coastal Processes notes that no significant effects on sediment loading in the water column were identified as part of the DWP EIAR (Affric, 2020) and with appropriate mitigation there are not expected to be impacts upon marine mammals in the area.

Dredged spoil disposal, if determined appropriate by BPEO assessment, will likely take place at the licensed Stornoway disposal ground, located south of Arnish Point. The spoil ground is approximately 850m from the Inner Hebrides and the Minches SAC and within the North-east Lewis MPA, hence spoil disposals have the potential to negatively impact the harbour porpoise

and Risso's dolphin features of these sites. In addition, common seals are known to regularly frequent the waters around north-east Lewis. This notwithstanding, marine mammal densities in the vicinity of the spoil ground are not expected to be high. This is the because the spoil ground is located within 200m off the coast in water less than 20m deep; such areas are not considered to be valuable habitat for cetaceans, and there are no designated seal haul-outs within 25km by sea of the spoil ground. As discussed in Section 8 however, with the implementation of mitigation successfully used during construction of the DWP, it is not expected that there will any significant effects due to increases in sediment loading in the water column on the designated sites and their protected features.

12.3.2.2 Release of Hazardous Substances

A release of oils or other pollutants has the potential to result in both short and long-term impacts on marine mammals. Short term effects include reduction in the thermal properties of seals' fur, resulting in hypothermia and potentially death, as well as poisoning of both seals and cetaceans through inhalation or ingestion of the contaminant resulting in sickness or death. Both seals and cetaceans may also avoid a contaminated area, which could impact foraging behaviour. In the longer term, both seals and cetaceans may accumulate toxic pollutants through the ingestion of contaminated food, or through a prolonged exposure to low levels of pollution. Such toxic build-up may lead to reductions in reproductive success, illness, and increased mortality rates (Gubbay & Earll, 2000).

For all marine mammal receptors, the magnitude of potential impacts arising from a release of contaminants would depend on the nature and quantity of material released into the environment. There is the potential for a spill of hazardous material to have long term major impacts, through changes to the health and behaviour of the receptors on a regional scale however, the adoption of the mitigation measures and standard industry best practice techniques for pollution prevention identified in Section 8 significantly reduces or removes the risk of such an event occurring during DWS construction works. As such, it is considered extremely unlikely that a release of hazardous material of a scale with the potential to negatively impact marine mammals or their designated sites will occur, as was similarly concluded within the DWP EIAR.

12.3.3 Physical Injury

During dredged spoil disposal operations, there is the potential for a marine mammal to be directly under the disposal vessel when the spoil is released. In this event, the animal could be injured or killed by falling debris. Spoil disposal from the proposed DWS dredge may take place at the licensed Stornoway disposal ground (HE035). The spoil ground is approximately 850m from the Inner Hebrides and the Minches SAC and within the North-East Lewis MPA, and hence spoil disposals have the potential to negatively impact the harbour porpoise and Risso's dolphin features of these sites. In addition, Risso's dolphins and common seals are known to regularly frequent the waters around North-East Lewis. It should however, be noted that marine mammal densities in the vicinity of the spoil ground are not expected to be high. The probability of a marine mammal therefore being in the spoil ground and directly under the spoil vessel at the time of release is extremely low, and it is unlikely that an animal would be injured in this way. It is therefore not anticipated that dredge disposal will have a significant effect on marine mammals, as was concluded within the DWP EIAR.

12.4 Potential Operational Impacts

12.4.1 Underwater Noise

The creation of an additional berth at DWS will facilitate additional vessel use of Stornoway Harbour which will in theory add to the overall soundscape however, as discussed in Section 10.3 and demonstrated in Figure 10.3.1, noise arising within Glumaig Harbour is screened by Arnish Point and does not impact upon the wider Minch which offers more suitable habitat for marine mammals.

As discussed in Section 10.4.1, the proposed DWS development will support further growth in the offshore renewables sector. This has the potential to increase vessel movements giving rise to underwater noise emissions within the Stornoway Harbour area, the Minch and potentially out into the Atlantic Ocean. However, it should be noted that the developments within Stornoway Harbour will prevent the need to provide support to offshore wind projects in the area from further afield. Therefore, underwater noise from ship movements effect on underwater noisescapes will ultimately be less, and potential impacts on marine mammals will be less than if DWS wasn't developed.

12.4.2 Water Quality

During operation there could be effects on water quality relevant to marine mammal species due to spillage of hazardous materials from machinery, equipment and vessels operating at the new DWS facility.

The potential impacts of a release of hazardous substances are discussed in Section 8: Water Quality and Coastal Processes and the impacts of such an event occurring during the operational phase are considered to be low. Operation of the facility under direction of SPA with strict management protocols in place will prevent changes from baseline conditions occurring in terms of the risk of pollution events.

12.4.3 Physical Injury

Increased vessel movements within Stornoway Harbour may present the risk of physical injury to marine mammals. Ship strikes are a significant threat to marine mammals globally and can result in injury and death (WDC, 2023; NOAA, 2023). As previously discussed, however, densities of marine mammals within Stornoway Harbour are expected to be low. Strikes most often occur in critical whale habitat where there is high density and where shipping activities overlap. Though records exist for larger whale species, this area has not been identified as significant habitat and is generally low value with low densities of cetaceans. It is also not anticipated that ships travelling in the area of the harbour would be doing so at considerable speeds due to strict rules within harbour waters for safe navigation.

12.5 Mitigation Measures

Mitigation measures will follow those detailed in the DWP EIAR in order to ensure significant effects on marine mammals do not arise during construction of the proposed DWS development. These relate to piling and dredge disposal operations, as detailed in 12.5.1 and 12.5.2.

Additionally, to avoid marine mammal harassment or potential for strikes from vessels working on the DWS development, all vessels will be required to follow the guidance set out in the 'Scottish Marine Wildlife Watching Code' (SNH, 2016b). This document provides best practice guidance on how to navigate vessels in the vicinity of marine mammals.

With no increased risk of injury to marine mammals from vessel strike or increased underwater noise impacts identified, no specific mitigation is identified in relation to operations at the proposed DWS facility. Mitigation in relation to potential impacts from reduced water quality is addressed in Section 8: Water Quality and Coastal Processes.

12.5.1 Piling Marine Mammal Protocol

Modelling of underwater noise from impact piling for the DWP development indicates that there is the potential for piling operations carried out as part of the DWS proposed development to cause disturbance and auditory injury to marine mammal species in the vicinity of the development site. In line with best practice, the mitigation identified will apply to all marine mammal species and will be implemented for both vibro and impact piling operations. This is in accordance with mitigation measures applied at DWP.

The mitigation measures will be aligned to the Joint Nature Conservation Committee's (JNCC) protocol for minimising the risk of injury to marine mammals from piling noise (JNCC, 2010). It is noted that the protocol states that a developer may propose an amended protocol if it is deemed that the standard protocol is unduly restrictive and unproportional. This will be assessed during Marine Mammal Risk Assessment which will be submitted as part of the application for a European Protected Species licence from the Marine Directorate.

12.5.2 Spoil Disposal Marine Mammal Protocol

Should at-sea dredge disposal at the licenced Stornoway spoil ground (HE035) be utilised, appropriate mitigation will be implemented with regards to potential injury of marine mammals and behavioural impacts from increased sediment loading. As with piling, a Marine Mammal Risk Assessment will be completed which will inform the development of the Spoil Disposal Marine Mammal Protocol. If taking account of mitigation there is still a potential for dredging to cause an offence under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) then the EPS licence application will include dredge activities.

12.6 Proposed Impact Assessment

It is proposed that Biodiversity – Marine Mammals is **scoped out** of the DWS EIA, on the basis that the mitigation identified in Section 12.5 and Appendix 1 is implemented. No impacts additional to those assessed for DWP have been identified throughout this scoping process. Significant effects identified within the DWP EIAR without mitigation, will be prevented by the implementation of robust mitigation. EPS licences will be applied for where appropriate for the construction of the DWS development.

13 Biodiversity – Fish Ecology

This section considers the potential impacts on fish ecology from construction and operation of the proposed DWS development. As the DWS location and construction methodology are similar to that of the adjacent DWP, reference to the assessment undertaken for DWP has been utilised in this section.

13.1 Legislation, Policy, and Guidance

The nature conservation legislation and policy relevant to fish ecology is detailed in Sections 4: Consenting and Policy Context and 11: Biodiversity.

13.2 Baseline

13.2.1 Data Review

A desk study has been undertaken to inform characterisation of the fish ecology baseline. This includes an assessment of the fish species which may be utilising the proposed DWS development area and surrounding waters and information on seasonal trends and behavioural characteristics. The following data sources have been consulted:

- NatureScot SiteLink Portal (NatureScot, 2023d);
- The UK PMF list (Tyler-Walters et al., 2016);
- National Marine Plan Interactive (Marine Scotland, 2023);
- OSPAR Intermediate Assessment 2017 (OSPAR Commission, 2017a);
- The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) List of Threatened and/or Declining Species and Habitats (OSPAR Commission, 2017b);
- Scotland's Marine Atlas: Information for the National Marine Plan (Baxter et al., 2011); and
- Various scientific reports and journal articles regarding marine fish distribution and movements in the northeast Atlantic region.

13.2.2 Designated Sites

There are no designated sites for fish within the proposed development area however, sites are present within the wider area, as detailed in Table 11.3.4.

The North-East Lewis MPA lies approximately 0.6km southeast of Stornoway Harbour and is designated for Raitt's sandeel (*Ammodytes marinus*). The MPA encompasses a former Raitt's sandeel fishing ground that supports an important component of a larger, patchy sandeel population on the west coast. The aim of the MPA is to aid recovery of an otherwise declining population of Raitt's sandeel due to overfishing. Sandeels are highly nutritious and are the preferred prey for many species of fish, seabirds, and marine mammals. There is potential connectivity between the proposed DWS development and the MPA due to proximity and mobile nature of the protected Raitt's sandeel feature, and due to the Stornoway dredge disposal site being situated within the MPA. The North-East Lewis MPA is therefore considered further.

13.2.3 Habitat

The proposed DWS development is situated on the western coastline of Glumaig Harbour to the south of the Stornoway DWP, as described in Section 3.1. Glumaig Harbour itself is a small shallow bay, located within Stornoway Harbour, just west of the Eye Peninsula, which meets The Minch on the eastern coast of the Isle of Lewis. The waters of Glumaig Harbour are relatively shallow and rarely reach depths exceeding 15m. Most notably, two watercourses flow into Stornoway Harbour, from the north and from the west.

The River Creed (Abhainn Ghrloda) flows into Stornoway Harbour from the west, and is situated just north of the proposed DWS development and Glumaig Harbour. This watercourse water classification is high overall, with high overall ecology, fish and fish barrier classifications (SEPA, 2020). A high overall fish barrier classification means that <1% of the system is inaccessible due to manmade structures, supporting the migration of fish. The River Creed has been highlighted as a good spawning site, with gravel habitat suitable for use by both salmon and sea trout (Envirocentre, 2018).

In the inner harbour to the north, a small river known as the Glen River or Bayhead River runs through the outskirts of Stornoway and into Glumaig Harbour. Upstream, the watercourse flows from the eastern end of Loch Airigh na Lic. The catchment, despite being small, holds good areas of spawning gravels, potentially suitable for use by both salmon and sea trout, each of which are known to be present throughout the catchment (Envirocentre, 2018). The watercourse does however, contain various obstacles including natural debris, water gates and an accumulation of urban waste which may inhibit migration and subsequent spawning. This is most prevalent in the lower reaches, and which migratory fish would have to pass before reaching the spawning sites available further upstream.

13.2.4 Species Accounts

A data review provided little specific data on fish species inhabiting the waters surrounding the DWS construction area. However, it was identified that the relevant protected receptors that should be considered by this assessment include:

- Diadromous Fish, including Atlantic salmon, sea trout, and European eel;
- Basking sharks; and
- Raitt's Sandeel.

13.2.4.1 Diadromous Fish Species

There are two categories of diadromous fish, anadromous and catadromous: anadromous fish reproduce in freshwater rivers but spend the rest of their adult lives in salt water, while catadromous fish reproduce in saltwater, and spend the rest of their lifecycle in freshwater.

The Western Isles are known to be inhabited by three diadromous species, Atlantic salmon (*Salmo salar*), sea trout (*Salmo trutta* morpha *trutta*) and European eel (*Anguilla anguilla*).

13.2.4.1.1 Atlantic Salmon

Atlantic salmon are widely distributed in Scotland's river systems but are also found across temperate and Arctic regions of the northern hemisphere. Salmon are anadromous, living in freshwater as juveniles then migrating to sea as post-smolts, where they mature. Once sexual

maturity is reached, they return to their native rivers to spawn (Godfrey et al., 2014). Migratory routes of Atlantic salmon to spawning sites are poorly understood since returns to the Scottish coast occur from a range of directions however, the greatest returns are expected from northerly and westerly marine waters, given the distribution of marine feeding areas (Malcolm et al., 2010). Juvenile salmon populations within the Western Isles River systems are generally lower compared to rivers supporting salmon elsewhere in Scotland (Godfrey, 2005).

Atlantic salmon are known to return to the River Creed annually. From eleven sites which were surveyed to best represent the entirety of the river system, eight locations were identified as having high or very high densities of salmon fry and/or parr (juvenile salmon). Salmon fry and/or parr were not identified in the Glen River (Envirocentre, 2018).

Due to the presence of salmon fry and/or parr in the River Creed, the western shores of Glumaig Harbour may provide a migratory route for salmon to return to spawning sites situated in the watercourse. This species will therefore be considered further with regards to the proposed development.

13.2.4.1.2 Sea Trout

Like Atlantic salmon, sea trout may spend several years in freshwater habitats prior to migrating. Sea trout post-smolts may stay within estuaries for extended periods of time, prior to moving into the wider sea (Malcolm et al., 2010). Research from the west coast of Scotland suggested that sea trout post-smolts move from rivers to sea lochs/estuaries between April and early June, prior to moving to the open sea in late June to July, and eventually returning to the river system in August to September (Pemberton, 1976).

Similar to salmon, trout densities are higher in smaller streams and tributaries than larger river networks in the Outer Hebrides (OHFT, 2012). Despite this, both the River Creed and the Glen River were identified as holding areas of high or very high densities of juvenile sea trout (Envirocentre, 2018). Further consideration will therefore be given to sea trout in the area of the proposed development.

13.2.4.1.3 European Eel

The European eel is a critically endangered catadromous fish which is widely distributed across European freshwater and estuarine habitats (Daverat et al., 2006; SNH, 2017b). Since the 1970s, the population of European eel has declined by up to 99% in some parts of its distribution range (Correia et al., 2018). The lifecycle consists of 4 stages: glass eel, elver (juveniles), yellow eel and silver eel (adults). It is suggested that adults may pass through Scottish coastal waters during migration (Malcolm et al., 2010).

Silver eels inhabit over 80% of catchments in the Western Isles (OHFT, 2012). However, distribution and population dynamics of European eels in the Western Isles are poorly understood. Populations of silver eels potentially inhabiting riverine habitats near the DWS development site are likely to enter Glumaig Harbour from the nearby River Creed. Baseline data identified seven sites throughout the River Creed which held significant numbers of adult European eel, with the highest densities closest to the coastline (Envirocentre, 2018) and as a result, the species will be considered further.

13.2.4.2 Basking Shark

The basking shark (*Cetorhinus maximus*) is the largest coastal-pelagic shark found within Scottish waters, growing to lengths of over 11 meters and weighing around 4 tonnes (Sims, 2008a). Basking sharks are filter feeders and feed in areas of high plankton concentrations. Feeding generally occurs from surface waters to depths of 320m (Skomal et al., 2004). Monitoring of feeding behaviour shows that basking sharks aggregate in coastal waters off continental shelfs dominated by transitional waters, where steep bathymetry combined with strong ocean currents result in areas of high productivity with high phytoplankton and zooplankton density (Drewery, 2012).

In Scottish waters, basking sharks are particularly prevalent on the west coast during the summer months, with highest densities observed in the Sea of the Hebrides (Paxton et al., 2014). There is some evidence to suggest that relatively high summer densities of this species are also found in the waters to the west of the Outer Hebrides, although data is limited (Paxton et al., 2014).

Basking sharks are not expected to be present in high densities within the Minch, to the east of the Outer Hebrides, although some sightings have been recorded (Marine Scotland, 2020). The shallow waters of Glumaig Harbour are not anticipated to provide valuable habitat for basking sharks, and no sightings have been reported (Marine Scotland, 2020). Although the wider Stornoway Harbour provides deeper waters in comparison with Glumaig Harbour, only one sighting of basking shark has been recorded (HWDT, 2023). The sighting shows a basking shark at the entrance to Stornoway Harbour, east of Arnish Point in 2019. It is considered unlikely that basking shark will be present in the immediate vicinity of the DWS development. A review of the Marine Scotland NMPi, NBN Atlas and HWDT sightings map did not show any sightings of basking shark within or within close proximity to the Stornoway spoil ground suggesting it is unlikely they will occur in this area. The species will therefore not be considered further.

13.2.4.3 Raitt's Sandeel

Five species of sandeel can be found in Scottish seas with Raitt's sandeel (*Ammodytes marinus*), and the lesser sandeel (*Ammodytes tobianus*) being the most common. The Raitt's sandeel is typically found in waters from 10 to 150m deep, where the sediment at the seabed is made up of sandy substrates (HELCOM, 2019). The distribution of sandeels within Scotland's seas is patchy and is generally concentrated on or nearby banks and areas of suitable sediment. Sandeels are a PMF in Scotland's seas and as noted in Section 13.2.2, a protected feature within the North-East Lewis MPA.

The Raitt's sandeel reaches maturity within 1 to 2 years. Generally, the lifecycle of a Raitt's sandeel is 10 years, but they have been known to live for less time depending on the level of change to their habitat (Froese, 2012). Spawning from November to February, eggs are deposited on sand or fine gravel substrate. Sandeels are largely stationary after settlement. Data show sandeels to be present between Tolsta Head and the Butt of Lewis. Abundance within the North-East Lewis MPA was found to be greatest towards the Butt of Lewis, as well as directly east and northeast of the Eye Peninsula, at water depths between 50 and 150m. Raitt's sandeels were absent around the entrance to Stornoway Harbour and within and

around the Stornoway spoil disposal ground (Scottish Government, SNH, & Conservation, 2014) and will therefore not be considered further with regards to the proposed development.

13.3 Potential Construction Impacts

Construction activities may result in a variety of direct and indirect impacts on the marine environment which may in turn affect fish ecology. This section assesses the impact of water quality and underwater noise specifically on fish ecology and is supported by Sections 8: Water Quality and Section 10: Underwater Noise and Vibration.

13.3.1 Increased Sediment Loading

Increased sediment loading can result in increased turbidity which may induce behavioural changes in fish. It can also reduce foraging efficiency, provoking avoidance of areas in which foraging is inhibited due to large sediment plumes. Likewise, increased sediment loading of the water column can create barrier effects for migrating species by preventing fish from passing through affected areas (Robertson et al., 2007; Stuart-Smith et al., 2004; Wenger et al., 2017).

Multiple studies have highlighted that impacts on fish from increased sediment loading are dependent on the concentration of the sediment in the water column and exposure time, with avoidance responses unlikely unless concentrations are relatively high (Wenger et al., 2017). Studies in the Dutch Wadden Sea identified shifts in local abundance of salmonids associated with increased sediment loading, although these occurred when turbidity levels remained high for several years (Jonge et al., 1993; Wenger et al., 2017). It has been shown that outward migrating smolt are particularly sensitive to increased sediment loading (Wenger et al., 2017). Studies of increased sediment loading on sharks (elasmobranchs) identified similar avoidance of areas with high water column sediment loading (Higham et al., 2015).

Rock placement, infilling works, and dredging will all be conducted within the boundary of the DWS development. Section 8: Water Quality and Coastal Processes did not identify any significant impacts with regards to increased sediment loading from these activities. Any sediment mobilised into the water column is expected to be localised and short-lived, with sediments likely to settle quickly due to the low silt fraction. It is also noted that there are no strong tidal currents in the area which would transport suspended sediments further from the site (RPS, 2020).

Atlantic salmon are known to be present in the River Creed, north of the proposed DWS development. With published scientific data illustrating that smolt and adult salmon migration routes tend to follow shallow coastline, there is the potential for overlap between the marine construction works for DWS and possible migratory pathways. European eel are also found in the River Creed, and are anticipated to follow similar migration routes to Atlantic salmon. Research has also highlighted that short-term increases in suspended sediments decrease the foraging ability of juvenile salmon (Roberston et al. 2007). However, as increased sediment loading as a result of construction of the DWS development is expected to be localised and settle quickly, along with a limited scale of dredging activity, there is not anticipated to be any lasting or significant effect on Atlantic salmon or European eel ecology.

Sea trout are anticipated to follow different migratory routes and therefore the effects of increased sediment loading within the water column are not considered to be the same as for other fish species. Local sea trout densities were found to be highest in the Glen River, north of the proposed DWS development. Sea trout at-sea migrations generally occur approximately 3m below the surface of the water, with no preference as to whether they follow the coastline or not. As such, it is possible that without specific migratory pathways, sea trout may more readily avoid sediment plumes. In addition, increased sediment loading from works at DWS will be localised and is not anticipated to travel to and affect the mouth of the Glen River. It is therefore not anticipated that increased sediment loading in the water column will have a lasting or significant effect on sea trout.

Basking sharks are extremely unlikely to be present in the immediate vicinity of the proposed DWS works due to the shallow (<15m) confined waters, which offer no valuable habitat to the species. It is therefore unlikely increased sediment loading from works at the DWS site will have any effect on the species.

As discussed in Section 13.2.4.3 Glumaig Harbour and Stornoway Harbour do not provide valuable habitat for Raitt's sandeel and therefore the species are unlikely to be present. As any increases in sediment loading due to construction activities will be localised within the Glumaig Harbour area, it is not anticipated that increased sediment loading in the water column will have a lasting or significant effect on Raitt's sandeel or the North-East Lewis MPA.

Dredged material not reused in construction is likely to be disposed of at the designated Stornoway disposal ground, located to the southeast of Arnish Point. The spoil ground is within the North-East Lewis MPA, of which Raitt's sandeel are a protected feature, and approximately 105km from the Sea of the Hebrides MPA designated for basking sharks. The Stornoway dredge spoil disposal area does not provide suitable substrate for Raitt's sandeel and the species were identified to be absent around the entrance to Stornoway Harbour and the Stornoway spoil disposal ground (Scottish Government, SNH, & Conservation, 2014). As dredge material is expected to drop rapidly towards the seafloor, increases in sediment loading in the water column will be localised and short-lived, therefore it is highly unlikely that Raitt's Sandeel will be impacted by dredge disposal activities.

As noted in Section 13.2.4, basking sharks are a migratory species travelling great distances so it is possible that they could be present in the disposal area. It is also possible that basking sharks in the area have connectivity to the MPA. Few basking shark sightings have however been reported within 5km of the spoil disposal ground (National Marine Plan Interactive, 2023; NBN Atlas, 2023; HWDT, 2023). It is therefore considered highly unlikely that basking shark will be present within the spoil disposal ground or within the immediate vicinity. It is therefore anticipated that there is a low likelihood that there will be any lasting or significant effects on basking sharks or the Sea of Hebrides MPA from spoil disposal.

While the volume of dredge spoil from the proposed DWS works is to be determined by final design and BPEO, it is expected that the DWS dredge spoil volume will be in the region of one-fifth the volume of DWP. It should be noted that the DWP EIAR assessed the impact on fish receptors of dredge disposal as non-significant as increases in sediment loading in the water column at the disposal site were anticipated to be localised and very short lived. The probability of fish receptors being in the spoil ground, and directly under the spoil vessel at

the time of release is extremely low and as such, it is unlikely that physical injury would occur in this way. Due to the low value habitat and the low probability of fish presence in the spoil ground, potential impacts on all fish species are unlikely to have a lasting or significant effect, as was also concluded in the DWP EIAR (Affric, 2020).

13.3.2 Release of Hazardous Substances

The release of a hazardous substance can have a detrimental impact on water quality and marine species including fish. High concentrations of pollutants or substances toxic to aquatic environments can result in increased mortality rates over short periods of time (Hutchinson et al., 2013; Wenger et al., 2017). The release of hazardous substances also has the potential to cause chronic impacts, where pollutants affect species over extended periods by accumulating in organic tissue, allowing contamination to pass through the wider ecosystem (Hamilton et al., 2017; Oleksiak, 2008). Effects including physiological harm, behavioural disturbance, reduced fertility and, mortality in fish have been reported after both short and long-term exposure to contaminants following a pollution event. The studies also identified that juvenile fish are more vulnerable to pollution events than adults, with lower doses having an effect (Costa et al., 2011; Limburg & Waldman, 2009; Wenger et al., 2017).

The magnitude of potential impacts arising from a release of contaminants would depend on the nature and quantity of material released into the environment. However, the adoption of the mitigation measures and standard industry best practice techniques for pollution prevention identified in Section 8: Water Quality and Coastal Processes significantly reduces or removes the risk of such an event occurring. As such it is considered extremely unlikely that the release of hazardous material of a scale with the potential to negatively impact on fish receptor species, the North-East Lewis MPA or the Sea of Hebrides MPA, will occur. It is therefore considered unlikely that there will a lasting or significant effect, as was concluded within the DWP EIAR.

13.3.3 Underwater Noise

Underwater noise emissions will result from the construction activities associated with the proposed DWS development, which have the potential to result in disturbance, displacement, and injury to fish. This section considers the potential impacts upon fish and is supplemented by information in Section 10: Underwater Noise.

Potential noise effects on fish include:

- Disturbance which causes a species to act differently from normal but does not cause any direct physical harm;
- Temporary Threshold Shift (TTS) – where hearing is temporarily affected but will recover once the animal is no longer exposed to the sound; and
- Permanent Threshold Shift (PTS) – where hearing is permanently damaged.

An underwater noise assessment was carried out for the adjacent DWP development, as detailed in Section 10. This found that the greatest potential impact would arise from impact piling with all other noise sources being significantly less powerful. This section will consider

the potential DWS impacts of underwater noise on fish, based upon modelling results from the DWP assessment.

In order to estimate the ranges from the piling works at which different magnitudes of acoustic impact may occur, outputs of the piling noise model detailed in Section 10 have been compared against the latest fish auditory injury impact criteria provided by Popper et al. (2014). The criteria groups the types of fish into functional hearing groups as shown in Table 13.3.3.

Table 13.3.3: Functional Hearing Groups, and Relevant Fish Receptors (after Popper et al., 2014)

Hearing Group	Relevant Fish Receptors	Sensitivity to Underwater Noise
Fish: No Swim Bladder (P-)	Basking Shark (Sea of the Hebrides MPA)	Least Sensitive
Fish: Swim Bladder Not Involved in Hearing (P-)	Atlantic Salmon Sea Trout European Eel Raitt's Sandeel	↓
Fish: Swim Bladder Involved in Hearing (P+)	None	Most Sensitive

As highlighted in Section 10, the worst-case scenario with regard to piling noise is associated with 1230mm diameter king piles. The impacts assessed were performed on the basis of impact-piling of a 1230mm pile, working continuously with at least 1000 strikes occurring. As such, the impact of piling on fish receptors has been informed on this basis.

The DWP assessment concluded that an element of masking will be likely to occur within tens of metres during piling activities. Severe behavioural responses can therefore be expected within close range to the noise source. These could include startle responses and strong avoidance resulting in exclusion. Behavioural responses are likely to drop to moderate as distance increases between the noise source and the receptor. Moderate behavioural responses include changes in swimming speeds and a reduction of time spent in the area and are likely to occur within hundreds of metres of the noise source. As distance increases further from the noise source, exceeding 1000m, behavioural responses to noise reduce to low.

It was noted that TTS may occur within 150m of the source for species within the P- hearing groups. This includes basking shark, Atlantic salmon, sea trout, European eel, and Raitt's sandeel as shown in Table 13.3.3. It is predicted that any behavioural effects that may occur are to decrease to low within 1,000m of the works. As a single major river discharges into Glumaig Harbour, noise emissions have the potential to disrupt migrations of fish to or from their riverine habitats. However, due to the localised and temporary nature of the predicted acoustic impacts on diadromous fish, together with the low expected densities of these receptors within the affected area, the piling noise impacts are not anticipated to have significant effect in EIA terms, as was concluded within the DWP EIAR (Affric, 2020).

Basking sharks do not have swim bladders, making them less sensitive to underwater noise than the other species noted. In order to suffer injury, a basking shark would need to remain within 1m of the works during 24hr of continuous piling. As this is unrealistic, no risk to the species is identified. The maximum TTS range for basking sharks is predicted to extend to

150m from the piling works with potential for behavioural disturbance within 1000m. However, the waters within 1000m of the works are <15m deep, and extremely confined, making them unsuitable for such a large fish. It is therefore not anticipated, in EIA terms, that there will be a significant effect on basking shark (including the Sea of the Hebrides MPA), as was also concluded within the DWP EIAR (Affric, 2020).

As Raitt's sandeel are likely absent from the development area and where they have been identified to occur is outwith the limits for TTS and PTS, it can be assumed there will be no impact on the species.

13.4 Potential Operational Impacts

Any impacts on fish during operations would be associated with changes in water quality. As discussed in Section 8: Water Quality and Coastal Processes, appropriate arrangements for fuel and chemical storage will greatly reduce the risk of pollution incidents occurring. This will be coupled with procedures for dealing with losses of containment should they occur, in alignment with the SPA's environmental management system. The biosecurity requirements for visiting vessels will also protect water quality. As no significant effects are predicted on water quality with appropriate mitigation measures in place no operational impacts on fish are predicted.

13.5 Mitigation Measures

Potential impacts on fish ecology associated with deterioration in water quality are prevented by the mitigation identified within the Section 8: Water Quality and Coastal Processes.

While the impacts on basking sharks resulting from piling noise and harm during spoil disposal operations were considered not to be of significance, as a matter of best practice, the marine mammal protocols discussed in Section 12.5 will also be applied to basking sharks.

13.6 Proposed Impact Assessment

It is proposed that fish ecology is **scoped out** of the DWS EIA as with mitigation to protect water quality in place, no significant impacts are anticipated.

14 Biodiversity - Benthic Ecology

This section considers the potential impacts of the proposed DWS development on seabed habitats and species, collectively termed benthic ecology. The DWS location is similar to that of DWP, and indeed overlaps with the areas assessed for benthic ecology within the DWP EIA. The proposed construction methodologies of DWS are also anticipated to be largely indistinguishable from those of DWP. As such, reference to previous assessment undertaken for DWP is utilised within this section.

14.1 Legislation, Policy, and Guidance

Benthic habitats and species are considered in the context of nature conservation legislation and relevant policy as detailed in Sections 4: Consenting and Policy Context and 11: Biodiversity.

14.1.1 Data Review

A desk-based assessment was carried out by APEM Ltd in November 2019 as part of the EIA for the adjacent DWP in order to investigate the benthic habitat within the area (Affric, 2020). This involved reviewing a range of data sources to obtain ecological and sediment composition data for the proposed dredge and surrounding area. The APEM Ltd study area covers the site now proposed for the DWS development. Data sources consulted included:

- NatureScot SiteLink Portal (SNH, 2019);
- Results of project-specific geotechnical ground surveys (Causeway Geotech, 2018a, 2018b);
- Broadscale habitat maps from the HHOME (Highland, Hebridean and Orkney Marine Environment) GIS Project provided by Scottish Natural Heritage;
- Broadscale habitat map from EMODnet (EMODnet, 2014);
- Broadscale habitat map from 'Maps NMPI' Marine Scotland portal (Marine Scotland, 2016);
- SEPA Infaunal Quality Index data for Loch Erisort (used as a proxy for Water Framework Directive status assessment for Stornoway Harbour area), (SEPA, 2015);
- Underwater imagery of wrecks in vicinity of the dredge area;
- National Biodiversity Network (NBN) Atlas.

Biotopes identified were classed in accordance with the Joint Nature Conservation Committee (JNCC) Marine Habitat Classification system and the European Nature Information System (EUNIS). Where quoted together, JNCC Classification has been stated first, followed by the EUNIS Code.

HHOME indicated the potential presence of PMF '*Laminaria saccharina* and red seaweeds on infralittoral sediments' (JNCC Classification: SS.SMP.KSwSS.LsacR and EUNIS Code: A5.521) habitat within the DWP dredge area. To the north east of the DWP dredge area there was an area indicated to be potentially representative of a combination of the '*Laminaria saccharina* and red seaweeds on infralittoral sediments' biotope, the '*Echinocardium cordatum* and *Ensis spp*. in lower shore and shallow sublittoral slightly muddy fine sand' (SS.SSA.IMuSa.EcorEns; A5.241) biotope and '*Zostera marina/angustifolia* beds on lower shore or infralittoral clean or muddy sand' (SS.SMP.SSgr.Zmar; A5.5331) biotope. *Zostera marina* beds (seagrass beds) are a PMF. The HHOME mapping also indicated that maerl beds could potentially be present approximately 500m to the east of the DWP dredge area (SS.SMp.Mrl; A5.51) which are another PMF habitat.

A review of the bathymetry of the proposed DWS development site shows an area of disturbance immediately adjoining to the southeast of the proposed quayside and dredge area. Communication with SPA indicates that the area was dredged in the 1970's to facilitate mooring of oil rigs in Glumaig Harbour (SPA, 2023a). The area which was historically dredged can be seen on Drawing WS2139-XX-XX-DR-C-9011 (P15).

14.1.2 Designated Sites

As noted in Table 11.3.4.1 there are no designated sites within the DWS development area, including those selected specifically for benthic features. The North-east Lewis Marine

Protected Area lies approximately 0.6km southeast of Stornoway Harbour and is designated for Risso's dolphin (*Grampus griseus)*, Raitt's sandeel (*Ammodytes marinus)* and geodiversity features associated with the Quaternary of Scotland and Marine Geomorphology of the Scottish Shelf Seabed. Of the designated features only Raitt's sandeel directly utilise the seabed. The area covered by the North-east Lewis MPA is extensive and incorporates the full of extent of a coastal sandeel ground and predicted sandeel habitat. As noted, the proposed DWS development area does not lie within the MPA, and with a sediment type dominated by gravels (see Section 8.2.1) does not provide suitable substrate for Raitt's sandeel. The Northeast Lewis MPA is therefore not considered further.

14.1.3 Benthic Survey

The desk-based assessment undertaken for the adjacent DWP as detailed in Section 14.1.1 identified there to be the potential for PMFs to be present within the development area. This informed the specification of benthic survey works, utilising video transects and still image capture as agreed with NatureScot. The vessel-based survey was completed by Ocean Ecology Limited in March 2020, in line with JNCC epibiota remote monitoring operational guidelines (Hitchin *et al*, 2015). Five transects were initially completed and footage assessed in-situ which informed a further four transect lines to obtain a clear indication of the habitats present. These transects are illustrated in Drawing 113_DRG_03_1 Benthic Transects & EUNIS Habitats, with an indicative layout of the proposed DWS development shown in addition to the consented DWP facility. It should be noted that access for surveying to the west of Glumaig Harbour was restricted by shallow water depths.

Data collected from transects TRV1, TRV4 and TRH2 can be used to identify habitats within the area of the proposed DWS development as TRV1 passes directly through the area, and TRH2 and TRV4 show what is present in the wider area.

Data from the transects was analysed to identify the habitats present according to EUNIS biotopes. Within the area identified for development of the proposed DWS facility (TRV1, TRV4, TRH2), habitats were identified as A5.24 Infralittoral muddy sand, possibly A5.33 Infralittoral sandy mud within areas to the south, and A5.43 Infralittoral mixed sediments. Fauna was noted as relatively sparse with few species identified. These included brittlestars (*Ophiura* sp.), burrowing anemones (likely *Cerianthus lloydii*) and occasional sea pens (*Pennatulacea* sp.). Other species observed included heart urchin (*Brissopsis lyifera*), sand goby (*Pomatoschistus minutus*) and plumose anemones (*Metridium* sp.).

EUNIS biotope identifications from the transects was synthesised into a habitat map for the area, as shown in Drawing 113_DRG_03_1. This identified the majority of the area of the proposed DWS development to be infralittoral muddy sand and/or infralittoral sandy mud with very small patches of infralittoral mixed sediments.

An area of kelp and seaweed communities on sublittoral sediment located to the west of Seid Rocks, east north-east of the proposed DWS development, was identified as a PMF habitat. No other PMFs were identified during the survey.

14.2 Potential Construction Impacts

Construction activities may result in a variety of direct and indirect impacts on the benthic environment and the habitats identified within the proposed development area.

14.2.1 Land Reclamation

Construction of the land reclamation area will result in certain loss of benthic habitat. Habitat biotopes within the area have been identified as Infralittoral muddy sand/Infralittoral sandy mud (SS.SMu.ISaMu; A5.33/A5.24) with small patches of Infralittoral mixed sediments (SS.SMx.IMx; A5.43). The direct loss of these biotopes will result in the loss of individuals, habitats and potential spawning and foraging sites for benthic species utilising the area and associated communities. However, the reclamation area makes up a small proportion of this habitat within the wider area, and although there will be direct loss of individuals and habitat, there will be significant habitat remaining for spawning and foraging. As such, it is not anticipated that habitat loss due to land reclamation will have a population-level effect on the wider area.

The habitats identified within the area were considered to be of moderate value within the DWP EIA and impacts were assessed as minor and non-significant (Affric, 2020). It is not anticipated that the additional reclamation area proposed for DWS and subsequent loss of a small proportion of moderate-value habitat will be significant in EIA terms.

14.2.2 Dredge and Dredge Disposal

Dredging will have an impact on benthic habitats through a combination of direct habitat loss, disturbance, injury, and mortality of benthic organisms. This will occur within the dredge area itself, and if dredged material is to be disposed of at sea, there will also be benthic impacts at the site where material is deposited. These are each considered in turn below.

Habitat within the proposed DWS dredge area has been identified as Infralittoral muddy sand/Infralittoral sandy mud (SS.SMu.ISaMu; A5.33/A5.24) with small patches of Infralittoral mixed sediments (SS.SMx.IMx; A5.43). Within the DWP EIA these habitats were considered to be of moderate value and impacts from dredging were assessed as minor and non-significant (Affric, 2020). While a disturbance additional to current DWP works, the proposed DWS dredge area of approximately 4000m^2 makes up a small proportion of infralittoral muddy sand/Infralittoral sandy mud and infralittoral mixed sediment biotopes within the wider area. Studies have shown that these habitats can undergo recovery following dredging activity (Goldberg *et al*., 2014) and with no maintenance dredging envisaged following construction it is anticipated that benthic species are likely to recolonise and recover over time. It is therefore not anticipated that the dredge proposed for the DWS development will have a significant effect in EIA terms.

A BPEO process will be undertaken with regards to the dredge spoil material as part of the Marine License process. Should material be disposed of it will most likely be deposited at the licensed Stornoway disposal ground (HE035) nearby. The site has previously been used to dispose of dredge material and it is likely that previous spoil deposits at the site have reduced the quality of the benthic communities in the area through repeated burial and smothering of

the habitat. As such benthic impacts within the disposal area as a result of the proposed DWS dredge works are not considered further,

14.2.3 Remobilisation of Sediments

Dredging, disposal of dredged material and land-reclamation works have the potential to release fines and increase sedimentation in the marine environment. Sedimentation can produce smothering effects to benthic organisms and habitat depending on their resilience (Miller *et al*., 2002). The attenuation of light as a result of sedimentation can prevent photosynthetic benthic flora from obtaining energy (Pineda *et al.,* 2016). The effect of this on benthic habitats identified within the dredge and reclamation areas are not considered as they will be lost and/or disturbed, however habitat in the surrounding area may be impacted.

As noted in Section 14.1.3., a PMF habitat was identified to the west of Seid Rocks, east north-east of the proposed DWS development, containing photosynthetic organisms that may be affected by reduced light levels and smothering. Relative to operations already underway in Glumaig Harbour, the proposed dredge area of DWS is significantly smaller than that of DWP, is situated further from Seid Rocks and will be carried out over a shorter period of time. As outlined in Section 8: Water Quality and Coastal Processes, the material to be dredged is anticipated to comprise largely of gravels and sands with low silt content. As such, sedimentation is likely to be localised and settle in a short period of time. In addition to this, mitigation identified within Section 8 will minimise the effects on benthic ecology. It is therefore not anticipated that the remobilisation of sediments from the proposed DWS construction works will have a significant effect in EIA terms on the surrounding benthic habitats or the PMF.

14.3 Potential Operational Impacts

No specific operational activities have been identified which would have an impact on benthic ecology. It is not anticipated that routine maintenance dredges will be required.

14.4 Mitigation Measures

No significant impacts on benthic ecology are anticipated as a result of the construction of the proposed DWS development. As such, no specific mitigation measures are identified. The absence of significant impacts is in part due to the inherent mitigation provided by the design which minimises the extent of the proposed dredge by the location of the development adjacent to an existing area of suitable water depth. Mitigation detailed in Section 8: Water Quality and Coastal Processes will also provide mitigation to minimise effects on benthic ecology.

14.5 Proposed Impact Assessment

It is proposed that benthic ecology is **scoped out** of the DWS EIA as no significant impacts are anticipated, and no impacts additional to those assessed as part of the DWP EIAR have been identified throughout this scoping process.