Scottish Hydro Electric Power Distribution plc

Mossbank - Yell Emergency Cable Replacement

Marine Environmental Appraisal

ASSIGNMENT A200758-S00
DOCUMENT A-200758-S00-A-REPT-002

XODUS

Aberdeen

5th Floor Capitol Building
429-431 Union Street . Aberdeen
AB11 6DA . UK

T +44 (0)1224 628300
E [Redacted]

www.xodusgroup.com

REVISIONS & APPROVALS

This document has been prepared by Xodus Group exclusively for the benefit and use of Scottish Hydro Electric Power Distribution plc. Xodus Group expressly disclaims any and all liability to third parties (parties or persons other than Scottish Hydro Electric Power Distribution plc) which may be based on this document.

The information contained in this document is strictly confidential and intended only for the use of Scottish Hydro Electric Power Distribution plc. This document shall not be reproduced, distributed, quoted or made available – in whole or in part – to any third party other than for the purpose for which it was originally produced without the prior written consent of Xodus Group.

The authenticity, completeness and accuracy of any information provided to Xodus Group in relation to this document has not been independently verified. No representation or warranty express or implied, is or will be made in relation to, and no responsibility or liability will be accepted by Xodus Group as to or in relation to, the accuracy or completeness of this document. Xodus Group expressly disclaims any and all liability which may be based on such information, errors therein or omissions therefrom.

[Redacted]

REV	DATE	DESCRIPTION	ISSUED	CHECKED	APPROVED	CLIENT
A01	27/01/2025	Issued for Use	AF	JA	JA	
R02	16/01/2025	Re-issued for Review	GK	AF	JA	
R01	06/12/2024	Issued for Review	GK/CG	AF	JA	

CONTENTS

ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
AA	Appropriate Assessment
AC	Alternating Current
AEOSI	Adverse Effects on Site Integrity
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
BGS	British Geological Survey
BSL	Benthic Solutions Ltd
BWM	Ballast Water Management Convention
CBA	Cost Benefit Analysis
CEMP	Construction Environmental Management Plan
CLV	Cable Lay Vessel
COLREGS	Convention on the International Regulations for Preventing Collisions at Sea
dB	Decibel
DC	Direct Current
DDM	Degrees and Decimal Minutes
DMS	Degrees, Minutes and Seconds
DSV	Dive Support Vessel
EC	European Community
ECoW	Ecological Clerk of Works
EDR	Effective Deterrent Range
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EPS	European Protected Species
EU	European Union
EUNIS	European Nature Information System
FCS	Favourable Conservation Status
FIR	Fishing Industry Representative
FLMAP	Shetland Regional Fisheries Liaison Mitigation Action Plan
FLO	Fisheries Liaison Officer
FO	Fibre Optic
FSA	Formal Safety Assessment

ACRONYM	DEFINITION
GPS	Global Positioning System
HDD	Horizontal Directional Drill
HES	Historic Environment Scotland
HF	High-frequency
HLNRA	High Level Navigational Risk Assessment
HMPA	Historic Marine Protected Area
HRA	Habitats Regulations Appraisal
HVAC	High Voltage Alternating Current
IAMMWG	Inter-Agency Marine Mammal Working Group
IMO	International Maritime Organization
INNS	Invasive Non-Native Species
IRPCS	International Regulations for the Prevention of Collision at Sea
JNCC	Joint Nature Conservation Committee
KIS-ORCA	Kingfisher Information Service – Offshore Renewable and Cable Awareness
kHz	Kilohertz
km	Kilometre
kV	Kilovolt
LAT	Lowest Astronomical Tide
LF	Low-frequency
LSE	Likely Significant Effect
MarLIN	Marine Life Information Network
MARPOL	International Convention for the Prevention of Pollution from Ships
MBES	Multi-Beam Echosounder
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate – Licensing Operations Team
MEA	Marine Environmental Appraisal
MEPC	Marine Environmental Protection Committee
MHWS	Mean High Water Springs
MLA	Marine Licence Application
MLWS	Mean Low Water Springs
µPa	Micro Pascal
MPA	Marine Protected Area
MTS	Marine Traffic Study

ACRONYM	DEFINITION
MU	Management Unit
NCMPA	Nature Conservation Marine Protected Area
NM	Nautical Mile
NMPi	National Marine Plan Interactive
NMFS	National Marine Fisheries Service
NSA	National Scenic Area
NtMs	Notice to Mariners
OCT	Open Cut Trenching
OHL	Existing Overhead Line
OIMD	Operation, Inspection, Maintenance and Decommissioning Strategy
OoS	Out of Service
OREI	Offshore Renewable Energy Installations
PAC	Pre-Application Consultation
PAD	Protocol for Archaeological Discoveries
PLGR	Pre-Lay Grapnel Run
PMF	Priority Marine Features
PW	Phocid Carnivores in Water
RCZ	Recommended Clearance Zone
ROV	Remotely Operated Vehicle
RSPB	Royal Society for the Protection of Birds
SAC	Special Areas of Conservation
SBP	Sub-Bottom Profiler
SCANS	Small Cetaceans in European Atlantic waters and the North Sea
SCOS	Special Committee on Seals
SEL	Sound Exposure Level
SEPA	Scottish Environmental Protection Agency
SFA	Shetland Fishermen's Association
SFF	Scottish Fishermen's Federation
SHEPD	Scottish Hydro Electric Power Distribution plc
SIC	Shetland Islands Council
SIRMP	Shetland Islands Regional Marine Plan
SMWWC	Scottish Marine Wildlife Watching Code
SOLAS	International Regulations for the Safety of Life at Sea

ACRONYM	DEFINITION
SOPEP	Shipboard Oil Pollution Emergency Plans
SPA	Special Protection Areas
SPL	Sound Pressure Level
SSEN	Scottish and Southern Electricity Networks
SSMO	Shetland Shellfish Management Organisation
SSS	Side Scan Sonar
SSSI	Site of Special Scientific Interest
SWFPA	Scottish White Fish Producers Association
TJP	Transition Joint Pits
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UN	United Nations
UNCLOS	UN Convention on the Law of the Sea
USBL	Ultra-Short Baseline
UXO	Unexploded Ordnance
VHF	Very High Frequency
WCA	Wildlife and Countryside Act
WEWS	Water Environment and Water Services
WFD	Water Frameworks Directive
ZCC	Zetland County Council

1 INTRODUCTION

Scottish Hydro Electric Power Distribution plc (SHEPD) holds a licence under the Electricity Act 1989 for the distribution of electricity in the north of Scotland including the Islands. It has a statutory duty to provide an economic and efficient system for the distribution of electricity and to ensure that its assets are maintained to provide a safe, secure and reliable supply to customers.

In May 2024, SHEPD identified that one of the subsea cables connecting Mainland Shetland (Mossbank) to Yell had faulted. The cable was installed in 2009 (Mossbank – Yell North 1), as shown in Figure 1-1. In this location there is also a currently active subsea cable that was replaced in 2019 (Mossbank – Yell South 2). A subsequent options evaluation process recommended complete replacement of the 2009 faulted cable.

The proposed cable replacement ('the Project') will involve the installation of a new 33 kilovolt (kV) subsea cable and associated cable stabilisation and protection, together with the removal of the intertidal sections of the existing faulted and Out of Service (OoS) cables, where required. Installation of this cable is required to replace the existing faulted cable and restore connection to the power distribution network providing supply to the communities on Yell, Unst and Fetlar. The cable installation is currently planned to be undertaken during summer 2025, i.e., ahead of winter and anticipated deterioration in weather conditions.

The proposed replacement cable will have an approximate length of 4 kilometres (km) and it will be constructed between the landfalls at Mossbank (Mainland Shetland) and Hoga (Yell) to tie into existing distribution network (Figure 1-2). The final cable route has not yet been determined. As such, to provide flexibility for final route engineering, this Marine Environmental Appraisal (MEA) considers a 1.7 km^2 proposed cable corridor, within which the Mossbank to Yell replacement cable will be installed. The indicative cable centreline as shown in Figure 1-2 does not depict the proposed cable route and is presented only for the purpose of spatial referencing within the proposed cable corridor. The final route selection will be based on further detailed route engineering and design parameters, while taking environmental and other constraints into account.

The installation activities, including the installation of the subsea cable and associated cable protection, and removal of intertidal sections of the faulted cable from the seabed, are licensable marine activities under Part 4, Section 21 of the Marine (Scotland) Act 2010, and as such a marine licence will be required for the Project. Furthermore, as the cable is located within the Shetland Islands Marine Region, (i.e. all territorial waters around Shetland seaward of the Mean High-Water Springs (MHWS) out to 12 Nautical Miles (NM)), the replacement cables will require a works licence under the Zetland Country Council Act 1974 (Zetland County Council (ZCC) Act 1974).

Marine Directorate – Licensing Operations Team (MD-LOT) has confirmed that statutory Pre-Application Consultation (PAC) under the Marine Licensing (Pre-Application Consultation) (Scotland) Regulations 2013 is not required for the Project. Despite this, SHEPD has held two non-statutory public engagement events to inform members of the public of the installation activities including:

- 22nd October 2024 – in Brae, Shetland; and
- 23rd October 2024 – in Lerwick, Shetland.

Figure 1-1 Existing subsea cable locations and fault and damage locations

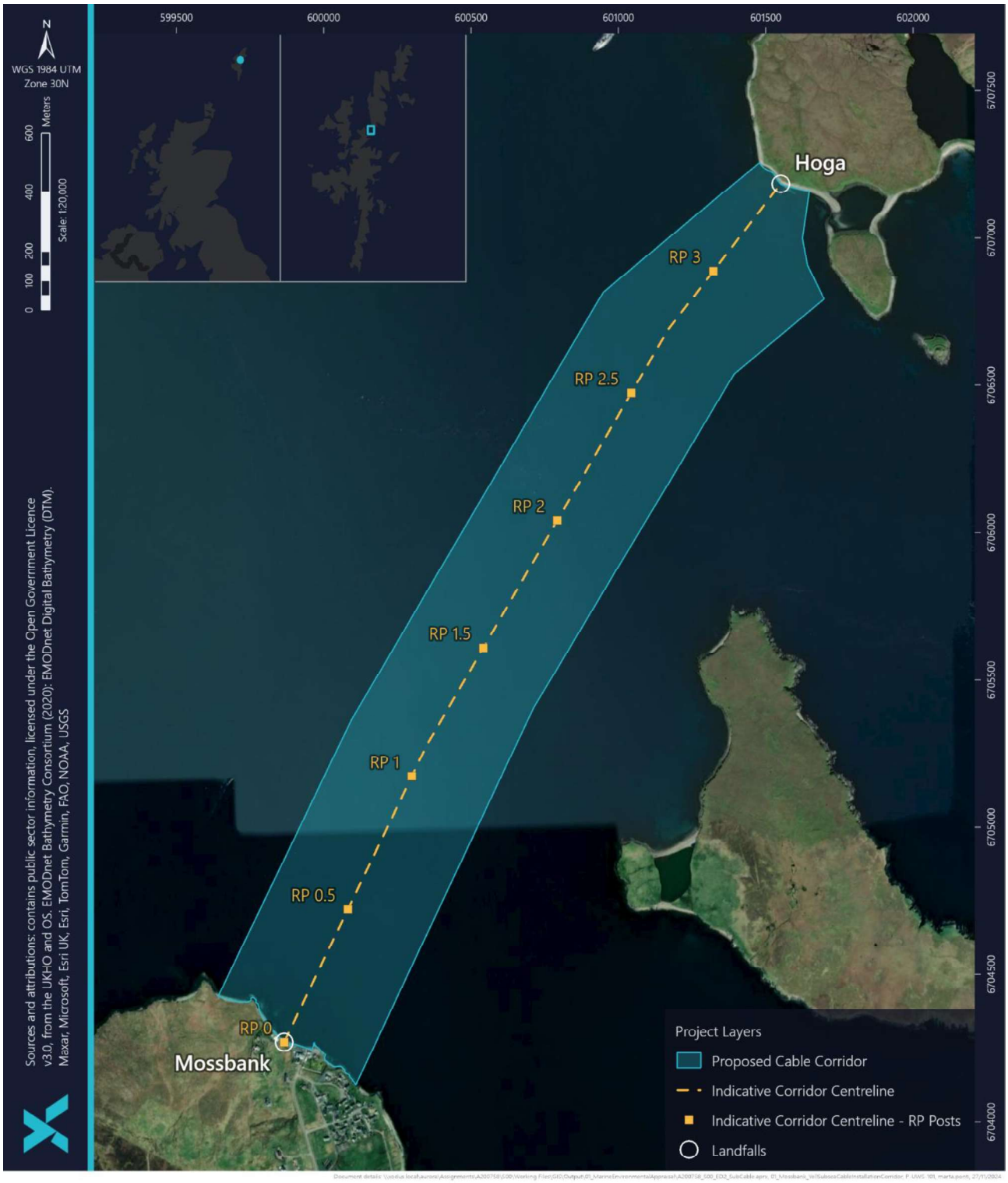

Figure 1-2 The Mainland Shetland (Mossbank) – Yell (Hoga) Proposed Cable Corridor (Note: indicative corridor centreline does not depict proposed cable route but is provided for spatial referencing within the proposed cable corridor, in combination with the Reference Points (RPs)).

This MEA provides an assessment of the potential environmental impacts which may result from the Project and will be used to inform the licence applications. The mitigation requirements identified by this MEA will be included in the accompanying Construction Environmental Management Plan (CEMP) (Document Number: A-200758-S00-A-REPT-004) in order to ensure they are effectively disseminated to and implemented by SHEPD and the cable installation contractor, during the installation activities.

This MEA should be read in conjunction with the following documents:

- Mossbank – Yell Emergency Cable Replacement Project Description;
- Marine Licence Application (MLA) Form;
- European Protected Species (EPS) Licence Application Form;
- Works Licence Application Form under Zetland County Council Act 1974;
- Marine Construction Environmental Management Plan (CEMP);
- High Level Navigational Risk Assessment (HLNRA);
- Shetland Regional Fisheries Liaison Mitigation Action Plan (FLMAP);
- How SHEPD Co-Exists with Other Marine Users;
- Operation, Inspection, Maintenance and Decommissioning Strategy (OIMD); and
- Mossbank-Yell Cost Benefit Analysis (CBA) Summary Report.

1.1 Project need

The existing Mossbank – Yell North 1 subsea cable between Mossbank and Yell faulted in May 2024. The network has been reconfigured to supply Yell and Unst, and Fetlar via one remaining subsea cable link (Mossbank – Yell North 2), and mobile back-up generation has been deployed to these islands. SHEPD therefore proposes to install a replacement subsea cable that will connect Mainland Shetland at Mossbank to Yell at Hoga, via the existing network tie-in points at each landfall to re-establish the network capacity provided by the two cables prior to the fault.

1.2 Consideration of alternatives

Following the subsea cable fault, the following options were considered in order to restore grid connection to Yell:

Option 1: Do Nothing (Customers continue to be supplied via alternative subsea cable). This was discounted as a viable option due to customers on three of the Northern Shetland Isles will be reduced to single cable supply. Should this single cable fail there will be no supply to the Islands of Yell, Unst and Fetlar, until a suitable number and size of generators can be located on the islands. This option would not support SHEPD's island decarbonisation ambitions and would produce a significant increase in carbon output whilst also reducing the network security for these customers.

Option 2: Piece In Repair. This option has been discounted due to historic survey information which highlights the poor condition of the faulted cable, including outer coating damage and armour corrosion throughout much of the length of the cable. In addition, lifting the cable in its current condition to facilitate the repair may cause further damage which could lead to further faulting. Multiple points of damage were noted on the cable in the routine 2022 inspection, with 40% of the cable unseen which could have further damage. Covered sections would likely require intervention and de-burial resulting in additional detrimental impact to the marine environment.

Option 3: Lay New Shore End (Traditional). This option has been discounted for similar reasons as Option 2. The cable would have to be cut and lifted on to a vessel for jointing which heavily relies on the cable being of good condition to joint and manoeuvre, with the fault located mid channel circa 2.6km from Mossbank. Given existing cable damage locations, it is likely to require circa 40 – 50% of the cable length to be replaced to remove damaged and faulted section and increase repair success rate. The cable is likely to remain at an unacceptable Health Index 5 following repair. Multiple points of damage noted on cable in 2022 inspection, with 40% of the cable unseen which could have further damage. Covered sections would likely to require de-burial resulting in additional detrimental impact to the marine environment.

Option 4: End-to-End Replacement. This is the preferred option to be carried forward. This option involves carrying out a full end-to-end cable replacement / installation. Stock 33 kV cable will be installed from a suitable Cable Lay Vessel (CLV) and connected into Transition Joint Pits (TJPs) at both shore ends. The cable will then tie into the existing overhead line (OHL) networks at each landfall via short sections of underground cable.

Option 4 has been determined to be the most cost-effective solution in this situation, despite the expectation that it will be more expensive than a cable repair. This is due to the current condition of the existing cable and the likelihood of success of a repair being low. There is a high probability that even if a repair is successful, a failure may occur within the next three to five years. This will incur further repair or replacement costs, meaning the overall cost of rectifying the issue for the long term is higher. It has been determined that it will be more beneficial to invest in a full cable replacement that is likely to operate for a minimum 25 years. There is also the added advantage of being a more robust solution as no new subsea joints are introduced into the system. This option will improve the security of supply to the customers on Yell, Unst and Fetlar.

Option 5: Replacement by Horizontal Directional Drill (HDD). A duct is drilled under the seabed between shore ends. The cable is pulled through the duct and connected into TJPs at each shore end. This option has been discounted due to operational feasibility. Maximum installation length of power cable estimated to be limited to ~1.4 km. As the cable route is greater than 3 km, this option is unfeasible. There is also significant potential risk with this option, including unknown ground conditions and stability of sediment once drilling commences.

Decommissioning of the OoS cables. Decommissioning and removal of the faulted cable was considered, however, due to the poor physical condition of the cable within the subtidal area it will remain *in situ*. A section of the faulted cable at the Yell landfall may be required to be removed to facilitate installation of the replacement cable within the intertidal area. Where a cable is in poor condition, cable recovery operations are very difficult due to a lack of mechanical strength and coiling ability. To manage any potential navigation hazard from the old cable, periodic inspections are required to ensure the cable does not pose a risk to environmental receptors or other legitimate users of the sea. Further detail on decommissioning requirements and measures can be found in the OIMD Strategy provided alongside this MEA.

2 LEGISLATIVE CONTEXT

This Section presents the key United Kingdom (UK) and Scottish legislation and policies which are applicable to the proposed installation activities and explains how and where these have been considered in the production of this MEA. This includes adherence to statutory legislation as well as to the policies presented in Scotland's National marine Plan (Scottish Government, 2015) and the Amended Draft Shetland Islands Regional Marine Plan (SIRMP) (Shetland Islands Council (SIC), 2021). Where necessary, additional mitigation measures have been presented in topic specific Sections to ensure that the Project adheres to relevant legislation and policies and comply with the conditions required when granting applicable licences. The information is provided in table form for ease of reference, as shown in Table 2-1.

Table 2-1 Key UK and Scottish Legislation and Policies Pertinent to the Project

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Legislation		
Marine (Scotland) Act 2010	The Marine (Scotland) Act 2010 applies to Scottish territorial waters and makes provisions in relation to functions and activities in the Scottish marine area. The following regulations are pertinent to the proposed installation activities: • Under Section 21 of the Act a marine licence is required for any activity which involves: – Deposit of any substance or object in the sea or on or under the seabed; – Construction, alteration or improvement of works in or over the sea or on or under the seabed; and/or – Removal of substances or objects from the seabed. • Under Section 82 of the Marine (Scotland) Act 2010, MD-LOT, acting on behalf of the Scottish Ministers, is required to consider whether a licensable activity is capable of affecting (other than insignificantly) a protected feature of a Nature Conservation Marine Protected Area (NCMPA) or a marine historic asset in a Historic Marine Protected Area (HMPA); and • The seal haul-out sites, designated under The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014 (as amended), are protected under Section 117 of the Act.	SHEPD will submit an MLA form alongside this MEA for the proposed installation activities. Section 5: Designated Sites assesses the potential impacts on NCMPAs in the vicinity of the proposed cable corridor. This assessment concluded that there are no NCMPAs within the vicinity of the proposed cable corridor and therefore no significant effects on NCMPAs are to be expected. Section 7: Marine Megafauna assesses the potential for the installation activities to injure or disturb seals at designated seal haul-outs. This assessment concluded that there are no designated seal haul outs which overlap the proposed cable corridor, with the closest seal haul-out site being the Sligga Skerry & North End of Bigga, which is located 2.09 km away from the cable corridor. As such, there should be no injury of seals or disturbance to seals at designated seal haul-outs. Section 10: Marine Archaeology assess the potential impacts on marine archaeological protected features (including HMPAs). This assessment concluded that there are no HMPAs in the vicinity of the proposed cable corridor and no significant effects on marine archaeology are to be expected.
Zetland County Council Act 1974	Under the ZCC Act 1974, any work in the sea, seabed or foreshore below MHWS and out to 12 NM requires a Works Licence issued by SIC.	SHEPD will submit a works licence application form alongside this MEA for the proposed installation activities.
Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) (also known as 'the Habitats Regulations') and the revision to The Conservation (Natural Habitats) (EU Exit) (Scotland) (Amendment) Regulations 2019	The Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) transpose the European Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) into Scottish Law. In addition, the Conservation (Natural Habitats) (European Union (EU) Exit) (Scotland) (Amendment) Regulations 2019 make provision for the selection, designation, registration and notification of sites to be protected under the European Community (EC) Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The Habitats Regulations Appraisal (HRA) process forms part of these regulations. The first stage of the HRA process requires an assessment of Likely Significant Effect (LSE) to occur on a European Site or its designated features from any proposal. Should the potential for LSE be determined, the second stage of the HRA process is to ascertain whether the proposal could result in Adverse Effects on Site Integrity (AEOSI) on the conservation objectives of the European Site, through an Appropriate Assessment (AA) carried out by the Competent Authority. The Conservation (Natural Habitats, & c) Regulations 1994 as amended make it an offence to deliberately or recklessly capture, kill, injure, harass or disturb an EPS. When EPS are present, licences to permit activities that will affect them can only be granted when: • There is a licensable purpose; • There are no satisfactory alternatives; and • The action authorised will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status (FCS) in their natural range. The 2019 Regulations make amendments to the existing instruments that transpose the habitats and wild birds' directives so that they are operable.	Section 5: Designated Sites assesses the potential impacts on protected features (habitats and species) of Special Areas of Conservation (SAC) and Special Protection Areas (SPA). This assessment concluded that no AEOSI of these designated sites are to be expected from the Project. Section 7: Marine Megafauna assesses the potential impacts on EPS which have potential connectivity with the installation activities (i.e. cetaceans and otters). This assessment concluded that there will be no injurious impacts to these receptors, however, as disturbance could not be ruled out, an EPS licence application will be submitted to MD-LOT.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Wildlife and Countryside Act 1981 (WCA 1981) (as amended) and the Nature Conservation (Scotland) Act 2004	The primary legislation for the protection of birds in the UK is the WCA 1981 (as amended) in combination with the Nature Conservation (Scotland) Act 2004. Under these acts, it is an offence to harm wild bird species, their eggs and nests. Additional protection is provided for certain bird species listed on Schedule 1 of the WCA 1981, and it is an offence to disturb those species at their nest while it is in use. Licensing for wild birds does not cover development purposes, so any activity that could result in disturbance of a nesting Schedule 1 species should not proceed unless out-with the breeding season. In addition, the Conservation (Natural Habitats) (European Union (EU) Exit) (Scotland) (Amendment) Regulations 2019 also instrument an amendment to Section 27 of the WCA 1981 to ensure that existing protections continue.	Section 9: Ornithology assesses the potential impacts on ornithological receptors. This assessment concluded that no significant effects on wild birds, their eggs, and nests are to be expected.
Policy		
Scotland's National Marine Plan (2015): **General Policies –** • **GEN 2 Economic benefit;** • **GEN 3 Social benefit;** • **GEN 5 Climate change;** • **GEN 6 Historic environment;** • **GEN 7 Landscape/seascape;** • **GEN 8 Coastal processes and flooding;** • **GEN 9 Natural heritage;** • **GEN 10 Invasive non-native species;** • **GEN 12 Water quality and resource;** • **GEN 13 Noise; and** • **GEN 18: Engagement.**	**GEN 2 Economic benefit:** Sustainable development and use which provides economic benefit to Scottish communities is encouraged when consistent with the objectives and policies of this Plan.	Section 1: Introduction outlines the importance of replacing the faulted cable to ensure power supply to the communities in Yell, Unst, and Fetlar which will have social and economic benefits, as well as highlighting the sustainable shift away from temporary diesel generation, currently being used as a contingency alongside the one remaining active subsea cable (Mossbank – Yell North 2).
	GEN 3 Social benefit: Sustainable development and use which provides social benefits is encouraged when consistent with the objectives and policies of this Plan.	
	GEN 5 Climate change: Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.	Climate change has been considered within the biological sections of the MEA including: Section 6: Seabed and Water Quality; Section 7: Marine Megafauna; Section 8: Benthic and Intertidal Ecology; and Section 9: Ornithology. Additionally, as described in Section 1.2: Consideration of Alternatives, climate change has been factored into the justification for the cable replacement given the current carbon emissions associated with the temporary diesel generation.
	GEN 6 Historic environment: Development and use of the marine environment should protect and, where appropriate, enhance heritage assets in a manner proportionate to their significance.	Section 10: Marine Archaeology assesses the potential interaction between the installation activities and marine archaeological receptors including heritage assets. This assessment concluded that no significant effects on heritage assets are to be expected.
	GEN 7 Landscape/seascape: Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.	The Project will have no significant long-term landscape/seascape effects.
	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.	Section 6: Seabed and Water Quality assesses the potential impact on coastal processes and flooding. This assessment concluded that the installation activities will not result in changes to coastal processes and will not contribute to coastal flooding.
	GEN 9 Natural heritage: Development and use of the marine environment must (a) Comply with legal requirements for protected areas and protected species; (b) Not result in significant impact on the national status of Priority Marine Features; (c) Protect, and, where appropriate, enhance the health of the marine area.	The potential for the installation activities to impact protected areas and protected species (including Priority Marine Features (PMFs)) is assessed within Section 5 : Designated Sites as well as the biological sections of the MEA including: Section 6: Seabed and Water Quality; Section 7: Marine Megafauna; Section 8: Benthic and Intertidal Ecology; and Section 9: Ornithology. These assessments concluded that no significant effects on protected areas and/or species are to be expected.
	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.	Section 8: Benthic and Intertidal Ecology assesses the potential for the introduction of Invasive Non-Native Species (INNS) as a result of installation activities. This assessment concluded that the likelihood of INNS being introduced is low.
	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.	Section 6: Seabed and Water Quality assesses the potential impacts on the water quality of designated waters. This assessment concluded that no significant effects on the water quality of designated waters are to be expected.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
	GEN 13 Noise: Development and use in the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.	The potential for noise and vibration associated with the installation activities to affect sensitive species has been considered within Section 7: Marine Megafauna. The noise impact assessment concluded that there will be no injurious impacts on sensitive species however, as disturbance could not be ruled out, an EPS licence application will be submitted to MD-LOT. The EPS licence Application form submitted alongside this MEA contains full consideration of alternatives to noise emitting activities, including the "do nothing" option.
	GEN 18 Engagement: Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.	SHEPD has made key stakeholders aware of the cable fault and the Project and sought advice to inform the MEA: • SIC Marine Planning; • SIC Marine and Air Operations; • SIC Head of Ferry Operations; • SIC Community Planning and Development; • Maritime and Coastguard Agency (MCA); • Scottish Fishermen's Federation (SFF), Scottish White Fish Producers Association (SWFPA), • Shetland Fishermen's Association (SFA), and Shetland Shellfish Management Organisation (SSMO); • Sea Farms Shetland Regional Office Gremista; • Cooke Aquaculture Scotland; • Shetland Seafood Centre; • Royal Society for the Protection of Birds (RSPB); • NatureScot; • National Trust Scotland; • Marine Directorate; • Northern Lighthouse Board; • Historic Environment Scotland (HES); and • SSQC Port Arthur Scalloway. The advice has been incorporated throughout this MEA.
Scotland's National Marine Plan (2015): **Sea Fisheries Policies –** • **Fisheries 1;** • **Fisheries 2; and** • **Fisheries 3.**	**FISHERIES 1**: Taking account of the EU's Common Fisheries Policy, Habitats Directive, Birds Directive and Marine Strategy Framework Directive, marine planners and decision makers should aim to ensure: • Existing fishing opportunities and activities are safeguarded wherever possible; • An ecosystem-based approach to the management of fishing which ensures sustainable and resilient fish stocks and avoids damage to fragile habitats; • Protection for vulnerable stocks (in particular for juvenile and spawning stocks through continuation of sea area closures where appropriate); • Improved protection of the seabed and historical and archaeological remains requiring protection through effective identification of high-risk areas and management measures to mitigate the impacts of fishing, where appropriate; • That other sectors take into account the need to protect fish stocks and sustain healthy fisheries for both economic and conservation reasons; • Delivery of Scotland's international commitments in fisheries, including the ban on discards; and • Mechanisms for managing conflicts between fishermen and/or between the fishing sector and other users of the marine environment.	Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts on commercial fisheries. This assessment concluded that due to the highly localised nature of the seabed disturbance footprint, the fact that the Project is replacing an existing cable within the licenced cable corridor for the 2019 installed cable (Mossbank – Yell South 2), and the short duration, no significant effects on fish stocks, or the associated habitats on which these species depend, are anticipated. Please refer to the Shetland Regional FLMAP for further detail on the proposed installation activities interaction with commercial fisheries.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
	FISHERIES 2: The following key factors should be taken into account when deciding on uses of the marine environment and the potential impact on fishing: • The cultural and economic importance of fishing, in particular to vulnerable coastal communities; • The potential impact (positive and negative) of marine developments on the sustainability of fish and shellfish stocks and resultant fishing opportunities in any given area; • The environmental impact on fishing grounds (such as nursery, spawning areas), commercially fished species, habitats and species more generally; and • The potential effect of displacement on: fish stocks; the wider environment; use of fuel; socio-economic costs to fishers and their communities and other marine users.	
	FISHERIES 3: Where existing fishing opportunities or activity cannot be safeguarded, a Fisheries Management and Mitigation Strategy should be prepared by the proposer of development or use, involving full engagement with local fishing interests (and other interests as appropriate) in the development of the Strategy. All efforts should be made to agree the Strategy with those interests. Those interests should also undertake to engage with the proposer and provide transparent and accurate information and data to help complete the Strategy. The Strategy should be drawn up as part of the discharge of conditions of permissions granted.	
Scotland's National Marine Plan (2015): Recreation and Tourism Policy – • Recreation and Tourism 2.	**REC & TOURISM 2**: The following key factors should be taken into account when deciding on uses of the marine environment and the potential impact on recreation and tourism: • The extent to which the proposal is likely to adversely affect the qualities important to recreational users, including the extent to which proposals may interfere with the physical infrastructure that underpins a recreational activity; • The extent to which any proposal interferes with access to and along the shore, to the water, use of the resource for recreation or tourism purposes and existing navigational routes or navigational safety; • Where significant impacts are likely, whether reasonable alternatives can be identified for the proposed activity or development; and • Where significant impacts are likely and there are no reasonable alternatives, whether mitigation, through recognised and effective measures, can be achieved at no significant cost to the marine recreation or tourism sector interests.	Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts on recreation and tourism. This assessment concluded that no significant effects on recreational users and/or tourism are to be expected.
Scotland's National Marine Plan (2015): Shipping, Ports, Harbours and Ferries Policies – • Transport 1; and • Transport 6.	**TRANSPORT 1**: Navigational safety in relevant areas used by shipping now and in the future will be protected, adhering to the rights of innocent passage and freedom of navigation contained in UN Convention on the Law of the Sea (UNCLOS). The following factors will be taken into account when reaching decisions regarding development and use: • The extent to which the locational decision interferes with existing or planned routes used by shipping, access to ports and harbours and navigational safety. This includes commercial anchorages and defined approaches to ports; • Where interference is likely, whether reasonable alternatives can be identified; and • Where there are no reasonable alternatives, whether mitigation through measures adopted in accordance with the principles and procedures established by the International Maritime Organization can be achieved at no significant cost to the shipping or ports sector.	Section 12 Shipping and Navigation assesses the potential navigational safety impacts to key navigational receptors (including in the vicinity of the cable corridor during the proposed installation activities. This assessment is supported by a HLNRA which further details the potential impacts on navigational receptors and has been informed through stakeholder consultation. The HLNRA (Document Number: A-200758-S00-A-REPT-003) is provided alongside this MEA. The findings of the Formal Safety Assessment (FSA) demonstrate that effects to navigational receptors are tolerable with the implementation of the proposed mitigations.
	TRANSPORT 6: Marine planners and decision makers and developers should ensure displacement of shipping is avoided where possible to mitigate against potential increased journey lengths (and associated fuel costs, emissions and impact on journey frequency) and potential impacts on other users and ecologically sensitive areas.	

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Scotland's National Marine Plan (2015): Submarine Cables Policies – • Cables 1; • Cables 2; and • Cables 3.	CABLES 1: Cable and network owners should engage with decision makers at the early planning stage to notify of any intention to lay, repair or replace cables before routes are selected and agreed. When making proposals, cable and network owners and marine users should evidence that they have taken a joined-up approach to development and activity to minimise impacts, where possible, on the marine historic and natural environment, the assets, infrastructures and other users. Appropriate and proportionate environmental considerations and risk assessments should be provided which may include cable protection measures and mitigation plans. Any deposit, removal or dredging carried out for the purpose of executing emergency inspection or repair works to any cable is exempt from the marine licensing regime with approval by Scottish Ministers. However, cable replacement requires a marine licence. Marine Licensing Guidance should be followed when considering any cable development and activity.	This MEA provides a description of how potential impacts on the marine environment associated with the installation of the new cable and removal of the existing faulted cable sections have been minimised. An MLA is being submitted alongside this application. A full description of the proposed installation activities, including cable protection methods, is provided in the Mossbank – Yell Emergency Cable Replacement Project Description (Document No. A-200758-S00-A-REPT-001). Given the poor burial potential along the proposed cable corridor, cable burial is not possible. Please refer to the Mossbank - Yell CBA Summary Report submitted alongside this MEA.
	CABLES 2: The following factors will be taken into account on a case-by-case basis when reaching decisions regarding submarine cable development and activities: • Cables should be suitably routed to provide sufficient requirements for installation and cable protection; • New cables should implement methods to minimise impacts on the environment, seabed and other users, where operationally possible and in accordance with relevant industry practice; • Cables should be buried to maximise protection where there are safety or seabed stability risks and to reduce conflict with other marine users and to protect the assets and infrastructure; • Where burial is demonstrated not to be feasible, cables may be suitably protected through recognised and approved measures (such as rock or mattress placement or cable armouring) where practicable and cost-effective and as risk assessments direct; and • Consideration of the need to reinstate the seabed, undertake post-lay surveys and monitoring and carry out remedial action where required.	
	CABLES 3: A risk-based approach should be applied by network owners and decision makers to the removal of redundant submarine cables, with consideration given to cables being left in situ where this would minimise impacts on the marine historic and natural environment and other users.	A justification for the chosen method of cable replacement (including removal of sections of the faulted cable) is summarised in Section 1.2: Consideration of Alternatives and provided in the Mossbank – Yell Emergency Cable Replacement Project Description (Document No. A200758-S00-A-REPT-001).
Shetland Islands Regional Marine Plan Policy MP WAT 1: Water Ecology and WAT 2: Improving Water Quality and Ecology	WAT 1: Development shall not cause any water body to deteriorate in ecological status nor prevent the achievement of established objectives set out in the Scotland River Basin Management Plan. Development adjacent to a water body must be accompanied by sufficient information to enable a full assessment of the likely effects including cumulative effects.	Section 6: Seabed and Water Quality assesses the potential impacts on the water quality of designated waters, as outlined in Scotland's River Basin Management Plan 3. This assessment concluded that no significant effects on the water quality of designated waters (including coastal waterbodies) are to be expected.
	WAT 2: Development and use of the marine environment will be required to contribute towards objectives to improve the ecological status of coastal water bodies and the environmental status of marine waters where there is a significant risk that an environmental objective will not be achieved.	
Shetland Islands Regional Marine Plan Policy MP INNS1: Reducing the Spread of Invasive Non-Native Species (INNS)	Applications for marine development and use should demonstrate that the potential risks of introducing or spreading INNS have been adequately considered. Necessary measures should be proposed if risks are identified in their proposal, particularly when moving equipment, boats or livestock (e.g. fish and shellfish), introducing structures suitable for settlement of aquatic INNS or which facilitate the movement of terrestrial INNS, including to islands. Development proposals in areas where INNS are known to exist must include necessary measures or a biosecurity plan approved by the consenting authority or regulator that seeks to minimise the risk of spreading the INNS or identifies ways to eradicate the organisms and set up a scheme to prevent reintroduction.	Section 8: Benthic and Intertidal Ecology assesses the potential for the introduction of INNS as a result of installation activities. This assessment concluded that the likelihood of an INNS being introduced is low given the embedded mitigation (e.g. compliance with the Ballast Water Management (BWM) Convention) (see Section 4.3: Mitigation Requirements).

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Shetland Islands Regional Marine Plan Policy MP WST1: Waste Minimisation	All applications for marine-related development and use shall include a waste minimisation and management plan to ensure the safe disposal of waste material and debris associated with the construction, operation and decommissioning stages of the development, unless directed by the consenting authority or regulator that this is not required. The production of waste should be minimised as far as possible through consideration of the waste hierarchy (reduce, re-use or recycle) and disposal of any waste must only be through the use of appropriate licensed facilities. In accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL), the discharge of all garbage/litter into the sea is strictly prohibited.	Section 4.3: Mitigation Requirements outlines the Waste Management Strategy Plan, compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL), and measures undertaken to ensure the minimisation of waste and proper waste disposal.
Shetland Islands Regional Marine Plan Policy MP NOISE1: Minimising Levels of Surface and Underwater Noise and Vibration	Applications for marine-related development and use should, where directed by the consenting authority or regulator: a) Submit a surface and underwater noise and vibration impact assessment or supporting information to describe the duration, type and level of noise and vibration expected to be generated at all stages of the development (construction, operation, decommissioning); and b) Include mitigation measures to minimise the adverse impacts associated with the duration and level of noise and vibration activity. Development must also take into consideration the potential cumulative effects of surface and underwater noise and vibration within the marine area. Developers should consider whether the level of surface or underwater noise and vibration has the potential to affect a marine species and where this includes a European Protected Species (EPS) note that an EPS Licence may be required. Consideration of impacts on Priority Marine Features (PMFs) may also be required.	The potential for noise and vibration associated with the installation activities to affect sensitive species has been considered within Section 7: Marine Megafauna. The noise impact assessment concluded that there will be no injurious effects on sensitive species; however, as disturbance could not be ruled out, an EPS licence application will be submitted to MD-LOT. The EPS licence Application form submitted alongside this MEA contains full consideration of alternatives to noise emitting activities, including the "do nothing" option.
Shetland Islands Regional Marine Plan Policy MP SHIP1: Safeguarding Navigation Channels and Port Areas	Development proposals that would have an adverse impact on the efficient and safe movement or navigation of shipping to and from ports, harbours, marinas and anchorages or the long-term operational capacity of a ferry operation will be refused. Where shipping may be displaced, developers may be required to quantify and consider the impacts of increased fuel use. Developments which have the potential to restrict identified future expansion of important ports and harbours (e.g. proposals included in a local development plan or masterplan) may be refused.	Section 12: Shipping and Navigation assesses the potential navigational safety impacts to key navigational receptors in the vicinity of the cable corridor during the proposed installation activities. This assessment is supported by a HLNRA which further details the potential impacts on navigational receptors and has been informed through stakeholder consultation. The HLNRA (Document Number: A-200758-S00-A-REPT-003) is provided alongside this MEA. The findings of the FSA demonstrate that effects to navigational receptors are tolerable with the implementation of the proposed mitigations.
Shetland Islands Regional Marine Plan Policy MP ACBP1: Avoidance of Cables and Pipelines	Activities that could damage any cable or pipeline (e.g. dredging or mooring attachments to the seabed) must not be carried out in the following situations: a) Within the 500m exclusion zone(s) established under the Petroleum Act 1987 around oil and gas platforms, well heads and associated pipelines; and b) Within a 250m exclusion zone either side of utility (telecommunications, electricity or water supply) cables or pipelines, unless there is a proximity agreement in place with the asset owner.	Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts to third party assets including other subsea cables (telecommunications and power) and oil and gas pipelines. The assessment concluded that no significant to third-party assets within the cable corridor (i.e., the active BT100 telecommunications cable and the open Ulsta waste disposal site) are to be expected. A high-level assessment has been provided in Section 11.
Shetland Islands Regional Marine Plan Policy MP CLIM1: Climate Change Mitigation and CLIM2: Climate Change Adaptation	CLIM1: Applications for marine-related developments should demonstrate, in a format approved by the consenting authority or regulator, that: a) Resource use; b) Energy use; and c) Emissions have been assessed and minimised as part of the overall development proposal. The above requirements apply to both the construction and operational phase of the development.	All materials to be used for the replacement of the faulted cable are outlined in the Mossbank – Yell Emergency Cable Replacement Project Description (Document No. A200758-S00-A-REPT-001). As described in Section 1.2: Consideration of Alternatives, the end-to-end cable replacement is considered to be beneficial in reducing the reliance on diesel generation that is currently providing temporary standby power supply to Yell, Unst, and Fetlar and therefore reducing carbon emissions.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
	Developments which have the potential to impact habitats which act as a carbon sink or protect against coastal erosion may be refused. CLIM2: Applications for marine-related developments should demonstrate that the impacts of climate change over the lifetime of the development have been considered and minimised as part of the overall development proposal.	The potential impact on the marine environment associated with the installation activities has been assessed in Sections 5 – 12 of this MEA. Given the small spatial footprint of the Project, no significant effects on habitats which act as a carbon sink and/or are protected against coastal are anticipated.
Shetland Islands Regional Marine Plan Policy MP MPA1: Plans or projects that may affect SACs, SPAs (collectively known as European sites) and Ramsar Sites and MPA2: Nature Conservation Marine Protected Areas (NCMPAs)	MPA1: Developments or uses that might affect a European (including proposed sites) must comply with legal requirements for these protected areas and must be subject to a Habitats Regulations Appraisal (HRA) undertaken by a competent authority (normally the licensing or consenting authority/body). Proposals which may adversely affect the site's integrity (i.e. compromise any of the conservation objectives for the site), either alone or in-combination, as determined by appropriate assessment (AA), will not normally be permitted. Where a competent authority may wish to consent a proposal despite the potential for an adverse effect on the site's integrity, the competent authority must first show that there are no alternative solutions, and that it is imperative, and of over-riding public interest to grant consent. MPA2: Development capable of affecting any Nature Conservation MPA will only be permitted where it has been adequately demonstrated, to the satisfaction of the consenting authority and Marine Scotland (acting on behalf of Scottish Ministers) and with advice from NatureScot, that the proposal has had due regard to the conservation objectives of the designated site and either: a) There will be no significant risk of hindering the conservation objectives of the Nature Conservation MPA, or b) There is an urgent need for the development to be approved, or c) The benefit to the public outweighs the risk of damage to the environment and there are no alternative solutions. In the last case the applicant must undertake measures of equivalent environmental benefit to offset the damage that will or may be caused by the development.	Section 5: Designated Sites assesses the potential impacts on protected habitats and species, including European sites and NCMPAs, within the vicinity of the cable corridor. This assessment concluded that no AEOSI on a European Site or its designated features are to be expected, as well as no significant effects on NCMPAs.
Shetland Islands Regional Marine Plan Policy MP COAST1: Developments in or near Site of Special Scientific Interest SSSIs	Development likely to have an effect on a Site of Special Scientific Interest (SSSIs) will only be permitted: a) If there is no adverse impact on the special interest of the site or it can be subject to conditions that will prevent damaging impacts on those interests; and b) Where there is no reasonable alternative or less ecologically damaging location and the reasons for the development clearly outweigh the value of the site by virtue of social or economic benefits of national importance.	Section 5: Designated Sites assesses the potential impacts on protected habitats and species, (SSSIs), within the vicinity of the cable corridor. This assessment concluded that no significant effects on SSSIs are to be expected.
Shetland Islands Regional Marine Plan Policy MP SPCON1: Development and European Protected Species and Schedule 5 Species; SPCON2: Protection of Wild Birds and Their Habitats Outside Designated Sites; SPCON3: Development and Designated Seal Haul-Outs; and SPCON4: Priority Marine Features	SPCON1: Development or uses that could affect a European Protected Species (EPS) or Schedule 5 species will be permitted only if: a) It can be shown that the development is not likely to result in an offence being committed under Regulation 39 of The Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) or Section 9 of the Wildlife and Countryside act 1981 (as amended); or b) If an offence might result, it is determined that a licence would be, or has been, issued by the appropriate authority (either NatureScot or Marine Scotland). An EPS licence can only be issued if it passes three strict legal tests:	Section 7: Marine Megafauna assessed the potential impacts on EPS which have a potential connectivity with the proposed installation activities (i.e. cetaceans and otters). This assessment concluded that there will be no injurious impacts to these receptors, however, as disturbance could not be ruled out, an EPS licence application will be submitted to MD-LOT. Section 7: Marine Megafauna assesses the potential for the installation activities to injure seals or disturb seals at designated seal haul-outs and designated sites. This assessment concluded that with the implementation of embedded mitigation measures (see Section 4.3) there will be no significant impacts to seals at designated seal haul-outs or designated sites from the proposed installation works.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
	1. The licence must relate to one of seven purposes listed in Regulation 44 of the Habitats Regulations. 2. There must be no satisfactory alternative, which means that all reasonable alternatives must have been recognised and judged to be unsatisfactory; 3. The action authorised must not be detrimental to the maintenance of the population at a favourable conservation status in their natural range. Under the Wildlife and Countryside Act 1981, a licence from either NatureScot or Marine Scotland will be required to disturb a Schedule 5 species. Where development is permitted under such a licence, a Species Protection Plan containing appropriate mitigation will nevertheless be required to minimise the impact on the species. Developers may be required to submit site survey information which complies with current best practice guidelines and embedded mitigation plans to avoid potential impacts on EPS and Schedule 5 species. Mitigation plans should use the hierarchy of avoidance, mitigation and compensation, and use the precautionary principle within this decision making process. SPCON2: Where there is good reason to suggest that a wild bird protected under the Wildlife and Countryside Act 1981 (as amended), the Nature Conservation (Scotland) Act 2004 or listed in Annex 1 of the EC Birds Directive is present on site, or may be affected by a proposed development, the consenting authorities will require any such presence to be established. If such a species is present, a plan should be provided to avoid or mitigate any adverse effects on the species, prior to determination of the relevant planning, works licence or marine licence application. Development that directly threatens wild birds, the destruction of their nests or eggs or is likely to disturb a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) whilst it is at or near its nest, or with dependent young will only be permitted where it can be demonstrated that: a) The development is required for preserving public health or public safety; a. There is no other satisfactory solution and b) A licence has been granted, or is likely to be granted, by NatureScot. Developers should also take into consideration any sensitive times of year for breeding within the area of the proposed development when planning construction, operation and decommissioning stages. Proposals should include avoidance measures or mitigation of disturbance during these sensitive times and within these sensitive locations. SPCON3: Developments or uses which would result in an activity that harasses, pesters, torments, troubles or attacks a seal on a designated haul-out site, or causes a significant proportion of seals on a haul-out site to leave that site either more than once or repeatedly, will not be permitted. SPCON4: Developments or uses must demonstrate they will have no significant adverse direct or indirect effect on a Priority Marine Feature (PMF) unless: a) There is no reasonable alternative at a less ecologically damaging location and; b) Mitigation is included to minimise impact and; c) The reasons for the development clearly outweigh the value of the feature by virtue of social or economic benefits of regional importance.	Section 9: Ornithology assesses the potential impacts on ornithological receptors. This assessment concluded that no significant effects on wild birds, their eggs, and nests are to be expected. The potential for the Project to impact protected areas and protected species (including PMFs) is assessed within Section 5: Designated Sites as well as the biological sections of the MEA including: Section 6: Seabed and Water Quality; Section 7: Marine Megafauna; Section 8: Benthic and Intertidal Ecology; and Section 9: Ornithology. These assessments concluded that no significant effects on protected areas and/or species are to be expected.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Shetland Islands Regional Marine Plan Policy MP BIOD1: Furthering the Conservation of Biodiversity	Development and use of the marine environment will be considered against public bodies' obligation to further the conservation of biodiversity and the ecosystem services it delivers. Development and use of the marine environment must protect, and where appropriate enhance the health of the Shetland marine area. The extent of these measures should be relevant and proportionate to the scale of the development. Proposals for development that would have a significant adverse effect on habitats or species identified in the Shetland Local Biodiversity Action Plan, Scottish Biodiversity List, Annexes I and II of the Habitats Directive, Annex I of the Birds Directive (if not included in Schedule 1 of the Wildlife and Countryside Act) or on the ecosystem services of biodiversity, including any cumulative impact, will only be permitted where it has been demonstrated by the developer that: a) The development will have benefits of overriding public interest including those of a social or economic nature that outweigh the local, national or international contribution of the affected area in terms of habitat or populations of species; and b) Any harm or disturbance to the ecosystem services, continuity and integrity of the habitats or species is avoided, or reduced to acceptable levels by mitigation. Developers should consider impacts on areas which are important to all aspects of a species life cycle including locations used for breeding, nesting, resting, foraging and seasonal use, including overwintering.	The Project will have benefits of overriding public interest including social, economic and environmental benefits at a local level to the residents of Yell, Unst, and Fetlar by restoring grid connection and at a national / international level by reducing the requirement for the temporary diesel generation. The potential for impacts on habitats or species identified in the Shetland Local Biodiversity Action Plan, Scottish Biodiversity List, Annexes I and II of the Habitats Directive, Annex I of the Birds Directive (if not included in Schedule 1 of the WCA 1981) or on the ecosystem services of biodiversity, including any cumulative impact, have been considered throughout the MEA in Section 5: Designated Sites as well as the biological sections of the MEA including: Section 6: Seabed and Water Quality; Section 7: Marine Megafauna; Section 8: Benthic and Intertidal Ecology and Section 9: Ornithology. All mitigation measures committed to by the Project, including those to reduce harm or disturbance to habitats and species, are provided in the Outline CEMP (Document Reference: A-200758-S00-A-REPT-004).
Shetland Islands Regional Marine Plan Policy MP GEOD1: Safeguarding Marine Geodiversity	Development will only be permitted where appropriate measures are taken to protect or enhance important marine and coastal geological and geomorphological resources and sites, including protected features of SSSIs and MPAs, Geological Conservation Review sites, and Geosites identified by Geopark Shetland for their educational or research value. Proposals that would have an unavoidable effect on marine geodiversity will be permitted only where it has been demonstrated that: a) The development will have benefits of over-riding public interest, including those of a social or economic nature, that outweigh the local, national or international contribution of the affected area in terms of its geodiversity; and b) Any loss of marine geodiversity is reduced to acceptable levels by mitigation, and a record is made prior to any loss.	Section 6: Seabed and Water Quality assesses the potential impacts to marine and coastal geological and geomorphological resources and sites, and Section 5: Designated Sites assesses potential impacts to MPAs and SSSIs. Combined, these assessments conclude that no significant effects on marine geodiversity, including protected features of SSSIs and MPAs, are to be expected.
Shetland Islands Regional Marine Plan Policy MP HIS2: Safeguarding Nationally Important Heritage Assets and HIS3: Safeguarding Locally Important Heritage Assets	HIS2: Development which results in substantial loss or harm to a scheduled monument or the integrity of its setting should not be permitted unless there are exceptional circumstances. Where the loss of the whole or a material part of a heritage asset's significance is deemed justifiable, suitable mitigating actions will be required to be undertaken by the developer in agreement with the relevant regulator and advisors (e.g. the Regional Archaeology Service) to record and advance understanding of the significance of the heritage asset before it is lost. If archaeological discoveries are made during any development, a professional archaeologist should be given access to inspect and record them. All requirements should be based on advice from the relevant regulator and advisors.	Section 10: Marine Archaeology assesses the potential interaction between the installation activities and marine archaeological receptors including heritage assets. This assessment concluded that no significant effects on heritage assets are to be expected. Nevertheless, a Protocol for Archaeological Discoveries (PAD) may be implemented, if deemed required through licensing conditions, during installation activities.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
	HIS3: All other archaeological resources should be preserved in situ wherever feasible. Where preservation in situ is not possible the consenting authority will ensure that developers undertake appropriate archaeological excavation, recording, analysis, publication and archiving in advance of and/or during development. Developments within the vicinity of heritage assets must respect the original structure in terms of design, scale and, where appropriate, setting.	
Shetland Islands Regional Marine Plan Policy MP COM1: Community Considerations	Applications for marine-related developments must demonstrate that there will be no adverse social impact on the local community. They will be required to provide evidence that: a) There is no alternative location for this type of development; b) All necessary mitigation measures have been included in the development proposal; c) Local stakeholders, community councils, groups and other marine and coastal users have been consulted and engaged in the development process; and d) An assessment of social impacts of major developments has been carried out to the satisfaction of the consenting authority.	SHEPD have consulted with key stakeholders and considered their views within the MEA. Section 1.2: Consideration of Alternatives explains the justification of the location of the development. All necessary mitigation measures are detailed in Section 4.3: Mitigation Requirements. Overall, as described for general policies GEN 2 Economic benefit and GEN 3 Social benefit of Scotland's National Marine Plan, the replacement of the faulted cable will have positive social and economic benefits for the communities in Yell, Unst, and Fetlar.
Shetland Islands Regional Marine Plan Policy MP REC1: Safeguarding Marine Recreation	Developments that are likely to result in the reduction or loss of a marine recreational amenity must demonstrate that the proposal is necessary in order to deliver social, economic or environmental benefits that outweigh the reduction or loss. Developments should ensure that continued access rights to the marine and coastal resource for recreational use is maintained, with any necessary changes to be determined through the land-use planning process. Opportunities for co-existence should be maximised wherever possible.	Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts on recreation and tourism. This assessment concluded that no significant effects on recreational users and/or tourism are to be expected.
Shetland Islands Regional Marine Plan Policy MP DEV1: Marine Developments	Proposals for marine-related developments must comply with all policies included in Policy Framework Section (a) and (b), Policies MP DEV1-DEV3 and Policy MP FISH1. The developer should ensure that they have: a) Engaged in pre-application discussions with the relevant consenting authorities and regulators, any adjacent marine user and the local community council; b) Taken into consideration the compatibility of the proposed development with existing marine users, including existing and consented development, and have taken into consideration measures to minimise conflict and any potential adverse impacts; c) Taken into consideration co-existence options with other users in the design and location of the proposed development to maximise the efficient use of the marine space; and d) Taken into consideration the potential individual, in-combination and cumulative effects of the proposed development, and the development will be managed sustainably in terms of spatial and temporal overlaps.	SHEPD have engaged with key stakeholders and considered their views within this MEA. Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts on other users. This assessment concluded that no significant effects on existing marine users are to be expected.
Shetland Islands Regional Marine Plan Policy MP DEV2: Decommissioning of Assets	Applications for marine-related developments should, where directed by the consenting authority or regulator, be supported by a decommissioning plan to ensure the removal of redundant infrastructure. The plan should address the following: a) A description of the development; b) All proposed decommissioning requirements and measures; c) The methods by which work will be carried out; d) Timescales for the carrying out and completion of the work. The re-use of decommissioned assets will be supported where practicable.	For the installation of the new cable, all decommissioning options will be assessed at the end-of-life following best practice at that time. With regard to the existing faulted cable, Section 1.2: Consideration of Alternatives provides the justification for the end-to-end cable replacement, with further details on the removal of intertidal sections of OoS cables provided in the Mossbank – Yell Subsea Cable Installation Project Description (Document No. A200758-S00-A-REPT-001). Further detail on decommissioning requirements and measures can be found in the OIMD Strategy provided alongside this MEA.

LEGISLATION OR POLICY	KEY REQUIREMENTS	RELEVANT SECTION (WHERE APPLICABLE)
Shetland Islands Regional Marine Plan Policy MP FISH1: Safeguarding Fishing Opportunities	Developments will only be permitted where it can be demonstrated that: a) There will be no significant negative impact or permanent significant obstruction to an important fishing area; a) There will be no significant environmental impact to a known/designated spawning, nursery area or habitats or species which are important for commercially important species of fish; b) It will not cause a navigational hazard for commercial fishermen; c) There will be no significant negative effect to the cultural importance of fishing, particularly for vulnerable coastal communities; and d) There is no reasonable alternative and any such adverse effects are clearly outweighed by social, environmental or economic benefits of national importance.	Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts on commercial fisheries. This assessment concluded that due to the highly localised nature of the seabed disturbance footprint, the fact that the Project is replacing an existing cable (within the previously consented 2019 cable corridor), and the short duration, no significant effects on fish stocks, or the associated habitats on which these species depend, are anticipated. Please refer to the Shetland Regional FLMAP for further detail on the interaction between the Project and commercial fisheries.
Shetland Islands Regional Marine Plan Policy MP CBP1: Placement of Utility Cables and Pipelines	The laying or replacement of utility cables and pipelines must: a) Comply with all policies included in Policy Framework Section (a) and (b) and Policy MP DEV1; b) Demonstrate there will be no adverse effects on the integrity of a European site or a proposed site; c) Be within a 250m exclusion zone either side of utility (telecommunications, electricity or water supply) cables or pipelines, unless there is a proximity agreement in place with the asset owner; and d) Demonstrate that they have taken account of the implications for landing points including any seasonal sensitivities and impacts to existing land use. Where possible, cables and pipelines should use existing routes and landing points.	Section 5: Designated Sites assesses the potential impacts on protected habitats and species. This assessment concluded that no AEOSI are to be expected from the proposed installation works with the implementation of the embedded mitigation measures (as detailed in Section 4.3). Section 11: Commercial Fisheries and Other Sea Users assesses the potential impacts to third party assets including other subsea cables (telecommunications and power) and oil and gas pipelines. There are two third-party assets within the proposed cable corridor i.e., the BT100 telecommunications cable and the Ulsta waste disposal site. Nonetheless, the assessment concluded that no significant effects on these assets are to be expected. It is noted that the Project will utilise existing landfalls and the cable corridor previously consented for the 2019 (Mossbank – Yell South 2) cable, as detailed in Section 1.

3 PROJECT DESCRIPTION

3.1 Summary

A summary of the activities considered within this MEA is provided below. This document provides details of the following activities and scopes of work:

- Pre-installation surveys to identify debris / obstructions, where required;
- Pre-Lay Grapnel Run (PLGR) and boulder clearance, where required;
- Removal of OoS cable(s) in the intertidal area to facilitate installation of the replacement cable, where required;
- Landfall establishment;
- Cable installation;
  - The subsea cable will be surface laid below Mean Low Water Springs (MLWS),
  - In the intertidal zone, cable installation will be via open cut trench between MLWS and Mean High Water Springs (MHWS) at each landfall location;
- Cable protection and stabilisation installation;
  - Cable protection measures may include split pipe, rock bags and concrete mattresses,
  - Sea earths and associated protection will also be required;
- Landfall re-instatement; and
- Post-installation surveys.

3.2 Cable Installation and Replacement

This Section provides an overview of the proposed installation activities. The installation activities for the Mossbank Yell cable replacement are currently planned to be undertaken in summer 2025, i.e., ahead of winter and anticipated deterioration in weather conditions. The licence duration being sought by SHEPD is 18 months for contingency in case the installation programme is delayed and cannot be completed before winter. A detailed project description is provided in the Mossbank - Yell Emergency Cable Replacement Project Description (Document No. A200758-S00-A-REPT-001), which should be read in conjunction with this MEA.

The installation activities are expected to take 48 days. This anticipated duration includes all nearshore and offshore works as well as cable pull-in.

Prior to cable installation, a pre-installation survey may be conducted using a Remotely Operated Vehicle (ROV) deployed from a survey vessel to assess seabed conditions and the presence of debris / obstructions / environmental and other sensitives within the cable corridor. During installation a similar survey spread may be utilised to monitor the installation process. Alternatively, an ROV or cable fish may be deployed from the CLV or other support vessel to operate touchdown monitoring and ROV surveys from this platform. During all ROV/cable fish operations, Ultra Short Baseline (USBL) positioning systems will be used to monitor the underwater position of the subsea equipment. Additional survey equipment may include a Multi-Beam Echosounder (MBES) and Hi-Resolution Cameras.

Based on the options appraisal, an end-to-end replacement of the faulted cable is required. The proposed scope is to install an approximately 4 km long 33 kV subsea cable which will tie-into the existing networks on Mainland Shetland at Mossbank and on Yell at Hoga. The intention is to surface lay the cable within the cable corridor, with any obstructions and/or debris avoided where possible or removed by conducting PLGR if required. The intertidal cable sections at the landfall locations at Mossbank and Hoga will be buried via Open Cut Trenching (OCT) using land-based excavators. There will be one trench required at each landfall.

OoS cables may be removed in the intertidal area at the Yell landfall to allow the new cable to be installed in the best approach angle. The worst-case removal of the faulted cable would be 100 m of cable at Yell. No removal of OoS cables is required at the Mossbank landfall as the faulted cable lies outside of the proposed cable corridor.

The selection of the proposed cable corridor was based on the avoidance of environmental constraints, whilst ensuring it will be technically feasible to install a cable within it, considering cable on-bottom stability. An assessment of cable on-bottom stability in the cable corridor is currently underway to inform detailed route engineering. Detailed benthic survey data analyses have been based on existing survey data obtained in 2018 within the cable corridor. This approach has been discussed and agreed with NatureScot. Where there is presence of sensitive benthic receptors in the cable corridor, micro siting will be used to avoid the features where practicable. Use of cable stabilisation materials will be minimised to reduce the seafloor footprint while maintaining adequate protection and stabilisation of the cable.

In order to allow sufficient flexibility for detailed route engineering, SHEPD are seeking consent for the 1.7 km^2 proposed cable corridor that is considered within this MEA. This cable corridor is the same as assessed for the 2019 (Mossbank – Yell South 2) licenced cable corridor. The location of the cable corridor is provided in Figure 1-2, with coordinates of the bounding points provided in Table 3-1.

Table 3-1 Cable Corridor Coordinates (WGS84) in Degrees, Minutes and Seconds (DMS), Degrees and Decimal Minutes (DDM) and Decimal Degrees (DD)

LATITUDE DMS	LONGITUDE DMS	LATITUDE DDM	LONGITUDE DDM	LATITUDE DD	LONGITUDE DD
60° 29' 19" N	1° 9' 11" W	60° 29.319' N	1° 9.191' W	60.488643	-1.15319
60° 29' 18" N	1° 9' 8" W	60° 29.298' N	1° 9.140' W	60.488296	-1.152325
60° 29' 16" N	1° 9' 6" W	60° 29.275' N	1° 9.094' W	60.487913	-1.151569
60° 29' 16" N	1° 9' 1" W	60° 29.263' N	1° 9.010' W	60.487721	-1.150165
60° 29' 11" N	1° 9' 2" W	60° 29.178' N	1° 9.040' W	60.486299	-1.150671
60° 29' 8" N	1° 9' 1" W	60° 29.129' N	1° 9.024' W	60.485481	-1.150406
60° 29' 4" N	1° 8' 58" W	60° 29.066' N	1° 8.966' W	60.484437	-1.149431
60° 28' 56" N	1° 9' 18" W	60° 28.934' N	1° 9.307' W	60.48223	-1.155113
60° 28' 20" N	1° 10' 5" W	60° 28.334' N	1° 10.084' W	60.472236	-1.168061
60° 27' 39" N	1° 10' 47" W	60° 27.654' N	1° 10.781' W	60.460893	-1.179681

LATITUDE DMS	LONGITUDE DMS	LATITUDE DDM	LONGITUDE DDM	LATITUDE DD	LONGITUDE DD
60° 27' 43" N	1° 10' 56" W	60° 27.715' N	1° 10.927' W	60.461912	-1.182117
60° 27' 43" N	1° 11' 2" W	60° 27.723' N	1° 11.021' W	60.462055	-1.183688
60° 27' 45" N	1° 11' 6" W	60° 27.755' N	1° 11.098' W	60.46259	-1.184972
60° 27' 49" N	1° 11' 9" W	60° 27.810' N	1° 11.142' W	60.463493	-1.185702
60° 27' 48" N	1° 11' 11" W	60° 27.803' N	1° 11.175' W	60.463382	-1.186253
60° 27' 49" N	1° 11' 17" W	60° 27.823' N	1° 11.281' W	60.463714	-1.188009
60° 28' 19" N	1° 10' 47" W	60° 28.321' N	1° 10.759' W	60.472018	-1.179324
60° 29' 5" N	1° 9' 47" W	60° 29.090' N	1° 9.783' W	60.484835	-1.163052
60° 29' 19" N	1° 9' 11" W	60° 29.319' N	1° 9.191' W	60.488643	-1.15319

For the avoidance of doubt, the landward boundaries of the cable corridor covered by this MEA are the MHWS. The landfall boundaries defined by the coordinates within this document should be considered approximations, due to the requirement to limit the number of vertices.

3.3 Cable Protection and Stabilisation

The proposed cable protection and stabilisation may include split pipe, rock bags, and concrete mattresses. The cable protection will be placed where required along the cable route. No burial is planned for any subtidal section of the cable due to the cable corridor having a low burial potential along the majority of its length.

Articulated pipe (also referred to as split pipe) is commonly used on cable shore ends and beach landings, as well as subtidal sections of cables. A worst-case of up to 500 m of split pipe protection may be required for the cable (including a 25% contingency). Split pipe can be applied during the shore end installation, being fitted on the CLV whilst the cable is being paid out or retrofitted at low tide. Split pipe can also be installed by divers in the subtidal area using a Dive Support Vessel (DSV). Additional protection afforded by articulated split pipe has been incorporated into the route engineering with respect to both shore end landfalls and out to include the nearshore subtidal rocky outcrops and boulder fields. On either shore, in the intertidal areas above the MLWS limit, where sufficient cable burial cannot be achieved, split pipe will be fitted around the cable for additional protection in the event of exposure.

Sea Earths will also be installed to provide protection from surges and lightning strikes to the electrical circuit. It is expected that two earthing cables will be required at each shore end using copper wires with a cross-sectional diameter of 70 mm^2. One cable will earth the armour of the High Voltage Alternating Current (HVAC) cable system, while the other provides an earth for the FO armour (integral to the HVAC cable system). The earthing wires will be installed in the OCT alongside the new cable above MHWS, and at MLWS the two earth wires will separate and continue on the surface of the seabed for up to 50 m.

The cable installation strategy includes the installation of rock bags and/or concrete mattresses onto the cable to provide stability. If rock bags are used, they will mostly be installed below 8 m Lowest Astronomical Tide (LAT) and within 3 m either side of the installed cable. The 8 m LAT threshold is derived by ensuring that the navigable water depth will not be reduced by >5%. While not anticipated for this project, placement of any stabilisation measures which may result in depth reductions of >5% would only take place after full consultation with MCA and the Harbour

Authority. The potential numbers of rock bags required (including contingency) is up to 90 no. 2 t rock bags (180 t collectively), and up to 40 no. 4 t rock bags (160 t collectively). Where depths allow, some 2 t rock bags may be replaced with 4 t bags, however this will not exceed the overall seabed footprint affected. The formation of rock bag installation would typically be in pairs, one either side of the cable at required intervals to maintain on-bottom stability.

If concrete mattresses were to be used, they would most likely be installed below 6 m LAT and within 3.5 m either side of the installed cable. The 6 m LAT threshold is derived by ensuring that the navigable water depth will not be reduced by >5%. The maximum potential numbers required for mattresses in the event of contingency is up to 20 concrete mattresses which equates to 175 t collectively.

Installation of rocks bags and/or mattresses will either be from the CLV deck, a separate installation vessel with ROV, or multi-cat vessel. Trips to a port to reload with rock bags and/or concrete mattresses may be required where they are deemed necessary.

Up to 10 concrete clump weights (at a maximum of 60 kg each) at each landing (20 in total) may be used to anchor the sea earths at intervals / at their termination subsea. If used intertidally, they would be completely buried along with the sea earth. In the subsea section (max 50 m beyond LAT), the earth would be on the seabed surface and may be protected by clump weights.

Additionally, up to 20 rock anchors (2 kg each) for the subsea earth may be used, in lieu of clump weights, where it is understood to be a harder seabed with less sediment cover. In instances where rock anchors are required, a diver would drill a hole in the rock (max 20 mm diameter, 200 mm depth) and insert a small volume of marine grade resin and a stainless-steel anchor.

For full table of seabed deposits please see Mossbank – Yell Emergency Cable Replacement Project Description (Document number: A-200758-S00-A-REPT-001)

4 ASSESSMENT METHODOLOGY

This MEA supports SHEPD's applications for authorisation to complete the required installation activities by providing an assessment of potential impacts on sensitive environmental receptors. Where potentially significant adverse effects are identified, appropriate mitigation will be prescribed in order to reduce the magnitude of effect to an acceptable level.

An assessment of environmental impacts has been undertaken to support the submission of the MLA and works licence and European Protected Species (EPS) licence applications. The scope of this assessment is exclusively focused on impacts to receptors pertaining to the proposed installation activities below MHWS.

Data sources used to input into the subsequent assessment have been derived from:

- Relevant information and reports supplied by SHEPD; and
- Publicly available literature and data.

Potential impacts have been evaluated to determine how the installation activities could affect the environment and the corresponding significance of those impacts. Where potential impacts are likely to be significant, specific mitigation measures have been identified for implementation.

4.1 Marine Surveys

SHEPD appointed Bibby HydroMap in 2018 to conduct geophysical and benthic surveys of the cable corridor for the Mossbank – Yell South 2 cable, installed in 2019, as shown in Figure 1-1 . The main objectives of the marine surveys were to provide data (both technical and environmental) to form the basis for preliminary route engineering for the 2019 cable installation and assess potential risks to the cable from local seabed influences including boulders, crossings, debris, freespans, trawl scars, etc. SHEPD consulted with NatureScot in order to agree that the existing survey data could be used to inform this MEA.

Before cable installation commences, a pre-installation survey may be conducted using a ROV to assess seabed conditions and the presence of debris. If required, survey operations will likely be conducted from a survey vessel, utilising USBL, SSS, MBES and a Hi-Resolution Camera. Available survey information as well as publicly available data has been used in the impact assessment within the MEA.

4.2 Assessment Criteria

This MEA provides an assessment of potential impacts on environmental receptors, resulting from the effects of the proposed cable, and associated installation activities. The terms effect and impact are different, as one drives the other. Effects are measurable physical changes in the environment (e.g. volume, time and area) arising from installation activities, while impacts consider the response of a receptor to an effect. Impacts can be defined as direct or indirect, beneficial or adverse.

In order to implement a systematic assessment of impacts between the different receptors, an overall approach to the assessment of impact significance has been implemented. The process considers:

- Sensitivity and value of a receptor;
- Magnitude of effect; and
- Determination and qualification of the significance of the impact.

4.2.1 Sensitivity and Value

The sensitivity of a receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is impacted. Sensitivity of a receptor is based on the following factors:

- Tolerance to change;
- Recoverability;
- Adaptability; and
- Value.

The scale of sensitivity is as follows: negligible, low, medium, high, very high.

4.2.2 Magnitude of Effect

The magnitude of an effect can be characterised by considering the following factors:

- Duration of the impact;
- Size and scale;
- Timing / seasonality; and
- Frequency.

Categorisation of the magnitude of effect will vary for specific topics. The magnitude categories are negligible, minor, moderate and major.

4.2.3 Significance of Impact

The significance of potential impact has been determined by a combination of the sensitivity and value of a receptor and the magnitude of an effect. The general framework for assessing the significance of potential effects is outlined below (Table 4-1).

Table 4-1 Significance of Impact

MAGNITUDE	SENSITIVITY / VALUE				
	NEGLIGIBLE	LOW	MEDIUM	HIGH	VERY HIGH
NEGLIGIBLE	Negligible	Negligible	Negligible	Minor	Minor
MINOR	Negligible	Negligible	Minor	Minor	Moderate
MODERATE	Negligible	Minor	Moderate	Moderate	Major
MAJOR	Minor	Minor	Moderate	Major	Major

In general, moderate or major impacts are classified as significant and will require additional mitigation in order to reduce the magnitude of effect to an acceptable level. Where a range of potential effects are identified, expert judgement will be used to determine the final significance.

4.3 Mitigation Requirements

Certain measures are incorporated into the Project design as adherence to standard industry best practices or embedded mitigation which is fundamental to how the Project will be executed. During the assessment of impacts in the receptor specific assessment sections, all embedded mitigation is considered when assessing the significance of an impact. Details of the embedded mitigation which SHEPD is committed to implementing, and hence, the measures considered within the impact assessments presented in this MEA, are included in Table 4-2. All embedded mitigation is included within the outline CEMP (Document Number: A-200758-S00-A-REPT-004).

Table 4-2 Embedded mitigation and best practice relevant to the Project

MEASURE	DETAILS
Production of a CEMP	Includes measures that will be adopted to ensure environmental impacts are minimised, and to reduce the potential for release of pollutants from installation. This will be informed by the results of this MEA.
Mitigation measures for otters	For nearshore and intertidal works, the following otter mitigations will be implemented. Pre-installation otter surveys will be conducted at the cable landfall areas and within a 200 m mitigation zone to ascertain the presence of otters. During the landfall works, an Ecological Clerk of Works (ECoW) will be present to monitor otter activity and ensure a buffer of at least 40m is maintained between the proposed works and any otter holts, layups and couches which may be present. Additionally, to mitigate the risk of otters becoming trapped within excavated trenches at the landfalls, ramps will be incorporated into trench designs to ensure otters are able to escape should they enter a trench. Should pre-construction otter surveys identify otter features, SHEPD will consult with NatureScot ahead of works commencing to determine whether a disturbance licence for otter is required. All works with the potential to impact otter will be carried out in accordance with requirements of the terrestrial consent conditions including SHEPD's Otter Protection Policy.
All project personnel will be trained and informed of their responsibility to implement the environmental and ecological mitigation outlined in the CEMP	Toolbox talks, inductions, and awareness notices will be used to disseminate this information among all relevant personnel.

MEASURE	DETAILS
Pre-installation surveys will be conducted to inform detailed route engineering	Detailed geophysical and benthic surveys were conducted in 2018 for the proposed cable corridor to inform detailed route engineering for the installed 2019 cable and to identify locations of sensitive seabed features and species. The 2018 survey data will be used to identify the presence of sensitive receptors in the cable corridor, to allow for micro siting of the cable to avoid the features where practicable. Use of the 2018 survey data has been discussed and agreed with NatureScot in October 2024. Use of cable stabilisation materials will be minimised to reduce the seafloor footprint while maintaining adequate protection and stabilisation of the cable. A pre-installation survey may be conducted using a Remotely Operated Vehicle (ROV) to assess seabed conditions and the presence of debris / obstructions / environmental and other sensitives within the cable corridor. Any anthropogenic obstructions or debris will be removed, if possible. A work class ROV or PLGR may be used to remove debris. In the nearshore area, a diver may be required to remove debris. If large boulders are relocated within the cable corridor appropriate notifications will be provided, as described further below in this table. Furthermore, any Unexploded Ordnance (UXO) encountered would be avoided. As part of the route engineering process, a detailed UXO risk assessment within the cable corridor will be carried out and mitigations captured as part of the installation campaign. Any requirement for UXO clearance will be subject to a separate marine licence.
Electromagnetic fields (EMF)	The proposed cable will be an HVAC. EMF effects from AC cables are regarded as being negligible.
Marine archaeological features	All wrecks or features of potential archaeological significance shall be avoided by a buffer of at least 50 m during detailed route design. The locations of wrecks and features of potential archaeological significance will be clearly identified on electronic charts on board the installation vessel and utilised to guide installation activities. The location of any wrecks or features of potential archaeological significance will be provided to HES, and the United Kingdom Hydrographic Office (UKHO). Finally, a Protocol for Archaeological Discoveries (PAD) will be implemented during installation activities if conditioned by the Marine Licence. Any features with archaeological potential encountered will be avoided.

MEASURE	DETAILS
Scottish Marine Wildlife Watching Code (SMWWC)	All vessels will adhere to the provisions of the SMWWC during installation activities. NatureScot developed the Code as part of its duties under the Nature Conservation (Scotland) Act 2004. The SMWWC was first published in 2006 and was revised in 2017. The code aims to minimise disturbance to marine wildlife.
Lighting on board installation vessels will be kept to a minimum	Lighting on-board all installation vessels will be appropriately directed and kept to the minimum level required to ensure safe operations. This will minimise disturbance to seabird species.
Aids to Navigation: cable marker beacons	In consultation with the NLB and subject to their Statutory Sanction, it will be determined whether any additional marker beacons (4 m poles with 2.5 m tall yellow flash mark diamonds) are required for established landfalls. These markers will be inspected and maintained for the life of the cable.
Deployment of anchor chains on the seabed will be kept to a minimum	Reduces the potential for disturbance to benthic habitats and species including those which utilise the seabed.
Vessels will be travelling at a slow speed during installation works	Installation vessels will be slow-moving, travelling in well-defined routes and collision risk is generally considered to be low for marine mammals, otters and seabirds.
Production of an Emergency Spill Response Plan	An Emergency Spill Response Plan will help to ensure that the potential for release of pollutants from the Project is minimised.
Control measures and Shipboard Oil Pollution Emergency Plans (SOPEP) will be in place and adhered to under MARPOL Annex I requirements for all vessels.	As per the MARPOL 73/78 requirement under Annex I, all ships with 400 gross tonnage and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization (IMO) under Marine Environmental Protection Committee (MEPC) Act. Production of this plan will help to ensure that the potential for release of pollutants from installation, operation and decommissioning is minimised. In the event of an accidental fuel release occurring appropriate standard practice management procedures will be implemented accordingly.
Vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) IMO MARPOL Annex IV Prevention of Pollution from Ships standards	A Waste Management Plan will be developed and implemented to ensure the waste hierarchy is followed and all waste is sent onward to recycling or disposal via a licenced waste route. Additionally, all recovered debris will be taken ashore and sent for appropriate recycling or disposal at a licenced waste handling facility.

MEASURE	DETAILS
Ballast water discharges from vessels will be managed under International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention)	The BWM Convention, adopted in 2004, aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Measures will be adopted to ensure that the risk of Invasive Non-Native Species (INNS) introduction during installation activities is minimised. Larger vessels will utilise anti-fouling measures in order to reduce INNS impacts. Anti-fouling measures also help reduce the fuel consumption of the vessels being used which will in-turn reduce the volume of emissions.
Use of clean materials	The rock contained within the rock bags will be terrestrially sourced, clean and free from organic material. Concrete mattresses and clump weights will be new, and free from organic material. These measures will reduce the risk of INNS.
A Fisheries Liaison Officer (FLO) will be employed to manage interactions between cable installation vessels, personnel, equipment and fishing activity. This will be managed through the Shetland Regional FLMAP	Employment of a FLO will ensure all commercial fisheries operators in the vicinity of the Project will be proactively and appropriately communicated with in terms of the proposed Project operations.
Consultation with commercial fishing stakeholders to identify acceptable and feasible mitigation options with the aim of minimising potential effects on commercial fishing.	There are various options available to mitigate the risks, including: • Continuing effective positive liaison with commercial fishing stakeholders through the pre-installation, installation and operational phases of any cable replacement; • Continued employment of FLO services (as noted above) until the completion of the replacement works; • Ensuring contractors comply with the contractor's obligations outlined above so as to minimise any interference to commercial fishing activities; • Managing the cable replacement works so as to minimise any potential effects on the marine environment, habitats and commercial fishing; • Raising awareness of the danger of fishing in the vicinity of submarine cables; • Adopting a hierarchical approach to submarine cable protection, taking account of sea users concerns; • Organising an installation phasing workshop to inform commercial fishermen of planned activities; • Organising installation schedules as far as is practicably possible in order to reduce the combined loss of fishing area associated with safety zones; • Distributing weekly notice of operations; • Providing information in plotter format to enable fishermen to easily interpret the information; and/or • Scouting surveys to identify potting areas and any other relevant static gear areas.

MEASURE	DETAILS
Avoidance of trawling and anchoring	In line with guidance provided by the UKHO, the IMO and the MCA within the Mariner's Handbook (NP100), and MGN 661, SHEPD recommend that vessels should avoid demersal fishing and anchoring in proximity to subsea cables.
Guard Vessels and Recommended Clearance Zone (RCZ)	A guard vessel or small support vessel, marshalling a 500 m RCZ may be used during the installation campaign where a potential risk to the asset or danger to navigation has been identified. The requirement for a guard vessel will be considered through consultation with the Sullom Voe Harbour Authority and Installation Contractor. The RCZ may be reduced to 250 m (or other agreed distance) for the Yell Ferries and vessels carrying Sullom Voe Harbour Authority pilots. This will be implemented through ongoing communications and agreements between the Sullom Voe Harbour Master, the Yell ferry operator, SHEPD and the cable installation contractor.
Notice to Mariners (NtMs), local notifications to marine users, Kingfisher bulletins, Radio Navigational Warnings, and/or broadcast warnings will be promulgated in advance of any proposed works. The notices will include the time and location of any work being carried out, and emergency event procedures	Ensure navigational safety and minimise the risk of equipment snagging. The NtMs will be distributed via the Sullom Voe Harbour Authority. Notices will also be issued if any large boulders are relocated within the licenced installation corridor.
Engagement with navigational consultees	Ongoing consultations with SIC ports and harbour authority ensure continued awareness and communication of installation and harbour specific details relevant to minimising disruption. Ongoing consultation with SSMO and SFA to discuss the potential impacts as a result of the installation activities. Engagement with ferry operators and regular runners ensures awareness of the installation details which minimises disruption. Installation maintenance and decommissioning schedules arranged to minimise impact on ferry schedules. This may extend to working in night-time hours where practicable.
Compliance with International Regulations for the Prevention of Collision at Sea (IRPCS) (IMO, 1972) and the International Regulations for the Safety of Life at Sea (SOLAS)	IRPCS are the international standards designed to ensure safe navigation of vessels at sea. All installation vessels will adhere to these rules, including displaying appropriate lights and shapes. SOLAS is an international maritime treaty which sets minimum safety standards in the installation, equipment and operation of merchant ships. The convention requires signatory flag states to ensure that ships flagged by them comply with at least these standards. In relation to the Project its compliance will ensure navigational safety.

MEASURE	DETAILS
As built survey data will be provided to the UKHO and Kingfisher for inclusion on Admiralty Charts and the Kingfisher Information Service – Offshore Renewable and Cable Awareness (KIS-ORCA) charts	Ensure navigational safety and minimise the risk of equipment snagging.

4.4 Cumulative Impact Assessment

The current 'Marine Projects' list on Marine Directorate's website and the works licence applications list on Shetland Islands Council website (Marine Directorate, 2024a; SIC, 2024) were reviewed to identify other projects with the potential to result in cumulative effects. A number of projects in the vicinity of Yell Sound were considered during this review, however, these have subsequently been screened out for assessment, as detailed in Table 4-3. As such, considering the extremely localised nature of the effects likely to be associated with the Project, no potential cumulative effects are identified, and no further assessment is required.

Table 4-3 Screening of projects for cumulative impact assessment

PROJECT NAME	PROJECT DESCRIPTION	LOCATION	LICENCE DURATION	SCREENED IN (Y/N)	JUSTIFICATION
SGS Sullom Voe – Sediment Sampling	Biennial monitoring survey sampling sediment from the seabed for macrobenthic and pollutant analysis.	Sullom Voe (No overlap with cable corridor)	2024 - 2030	N	Although this project may be undertaken at the same time as the installation of the cable, the works do not overlap the cable corridor. Additionally, sediment sampling is to be undertaken from a single vessel. Therefore, will be a negligible change to the baseline shipping and no cumulative impacts will occur. As such this project is screened out for cumulative assessment.
Rocket Launch - Saxa Vord Spaceport	Launch of an unguided sub-orbital rocket. The splash zone estimated to be in the range 18 NM - 55 NM north of Unst.	Lamb Ness, Unst (No overlap with cable corridor)	01 August 2024 to 30 November 2024	N	The rocket launch could see additional vessel traffic required to recover deposited substances from the launch. However, these works do not overlap with the Project's proposed installation schedule and therefore there is no potential for cumulative impacts. As such this project is screened out for cumulative assessment.

PROJECT NAME	PROJECT DESCRIPTION	LOCATION	LICENCE DURATION	SCREENED IN (Y/N)	JUSTIFICATION
Sullom Voe Terminal Construction Jetty	Construction works to extend the lifetime of the Construction Jetty at Sullom Voe	Sullom Voe Terminal (No overlap with cable corridor)	N/A – Screening Opinion (April 2024)	N	The Screening Opinion states that an Environmental Impact Assessment (EIA) is not required for this project. Currently there is no further applications for this project in the public domain. As the project does not overlap the cable corridor and due to the lack of available information for this project, it is screened out for cumulative assessment.
Fish Holm Fish Farm	Proposed redevelopment and expansion of an existing consented salmon farm	Linga, Yell Sound (No overlap with cable corridor)	N/A – Scoping Opinion (July 2024)	N	The Scoping Opinion details that an EIA is required for this project. Nonetheless, there is no further applications and no information available regarding the construction activity timelines. Given the limited information currently available and noting that the project does not overlap with the cable corridor, this project is screened out for cumulative assessment.

5 DESIGNATED SITES ASSESSMENT

5.1 Introduction

This Section will provide the information required to support the HRA and MPA assessment processes. As such, the installation activities will be assessed as to whether they are likely to constitute a Likely Significant Effect (LSE) on a European Site, in line with the HRA process, or if they are capable of affecting (other than insignificantly), on an NCMPA. Therefore, magnitude and significance of impact will not be discussed within this Section, and these will be determined in the topic-specific sections.

LSE on European sites which include Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites will be determined. In addition to this, the potential impact on NCMPAs and designated seal haul-outs will also be assessed as per sections 82 and 117 of the Marine (Scotland) 2010 Act.

The following criteria has been used to screen designated sites for the assessment of LSE or assessment of whether the Project is capable of affecting (other than insignificantly) on a NCMPA:

- SACs and NCMPAs (including proposed and candidate sites) with cetaceans as qualifying features within 50 km of the cable corridor;

- SACs (including proposed and candidate sites) with harbour seal (*Phoca vitulina*) interests within 50 km of the cable corridor and breeding grey seal within 20 km of the cable corridor;
- Designated seal haul-outs or grey seal breeding sites that overlap with or are located within 500 m of the cable corridor;
- SACs and NCMPAs (including proposed and candidate sites) with otter interests that overlap with or are located within 500 m of the cable corridor;
- SPAs (including proposed sites) and NCMPAs (including proposed sites) with birds as qualifying features that overlap with or are located within 2 km of the cable corridor;
- SACs and NCMPAs (including proposed and candidate sites) with seabed / benthic protected features that overlap with the cable corridor; or
- Other sites of importance, including Site of Special Scientific Interest (SSSIs), National Scenic Area (NSAs) and World Heritage Sites which transect the cable corridor.

The distances between SPAs, other sites of importance (including SSSIs, National Scenic Area (NSAs) and World Heritage Sites) and the cable corridor, were calculated on a straight-line basis. For the rest of the sites (e.g. SACs and NCMPAs for cetaceans) 'at sea' distances were calculated. Where no LSE is predicted on a European site or the Project is not predicted to be capable of affecting (other than insignificantly) on a NCMPA or designated seal haul-out, the site has been screened out for further assessment in this report. Where an LSE cannot be ruled out, a more detailed assessment has been carried out. Details of mitigation measures have then been presented where necessary. Further details on impacts to qualifying features will also be assessed in the topic-specific impact assessments.

5.2 Data Sources

The designated sites within the vicinity of the proposed cable corridor have been identified through publicly available geospatial data (e.g. National Marine Plan Interactive (NMPi) (Marine Directorate, 2024b) and the Joint Nature Conservation Committee (JNCC) Marine Protected Area (MPA) Mapper (JNCC, 2024a). Additionally, this Section draws on the information presented in the Shetland Island's Marine Region State of the Environment Assessment (Shucksmith, 2017) which has been used to develop the Shetland Island's Regional Marine Plan.

5.3 Baseline and Receptor Identification

The designated sites located in the vicinity of the proposed cable corridor which have the potential to be impacted by the installation activities subject to the selection criteria above are illustrated in Figure 5-1 and described in the following sections.

5.4 Consultation

SHEPD consulted with NatureScot on the scope of the Project activities and potential impacts on designated sites and qualifying features. The advice received has been considered as part of the designated site and ecology assessments presented throughout this MEA.

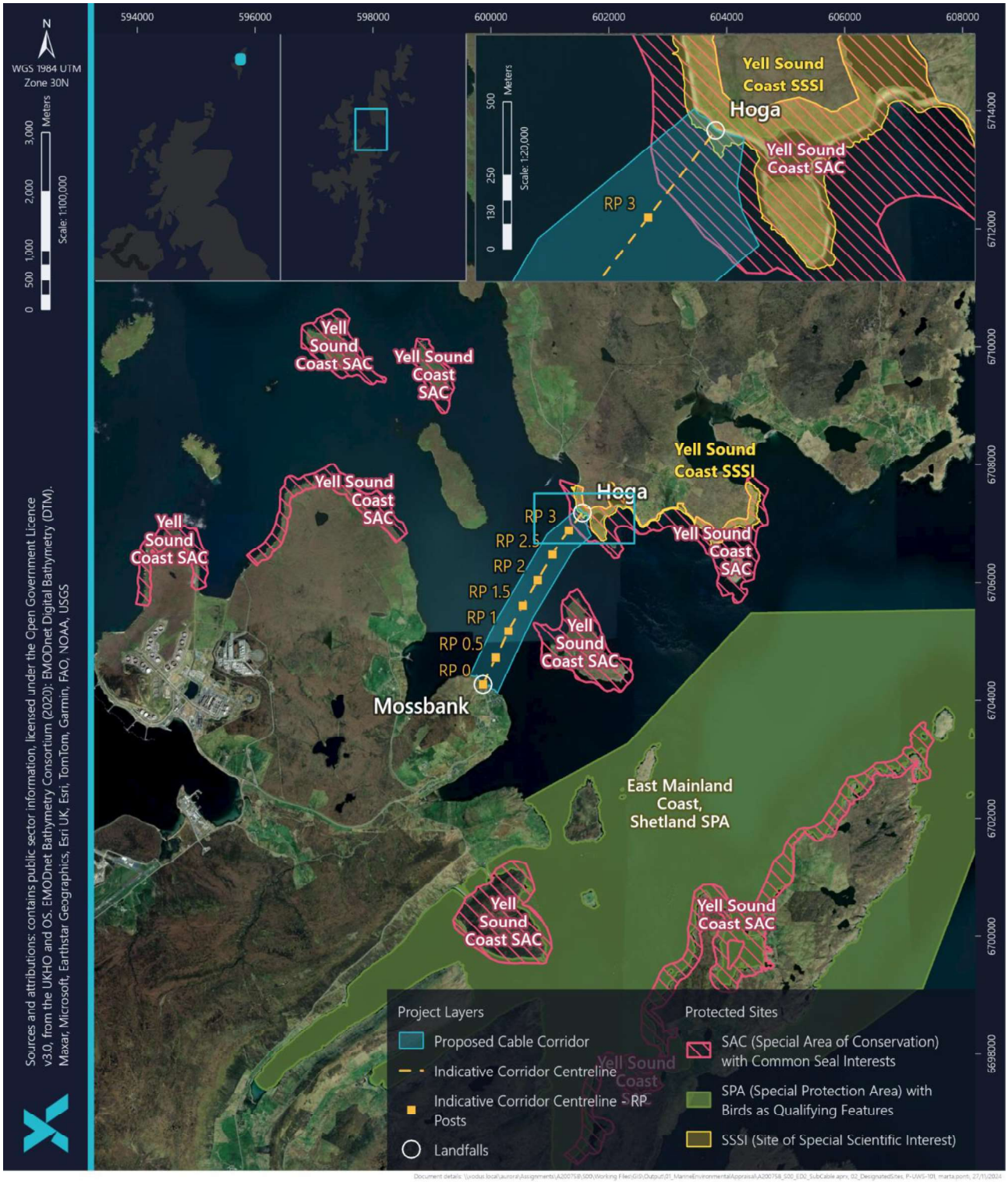

Figure 5-1 Designated Sites within the Vicinity of the Proposed Cable Corridor

5.4.1 SACs and NCMPAs with Cetaceans as Qualifying Features

All species of cetacean (whale, dolphin and porpoise) occurring in UK waters are listed in Annex IV of the Habitats Directive. Harbour porpoise (*Phocoena phocoena*) and bottlenose dolphin (*Tursiops truncatus*) are listed under Annex II of the Habitats Directive and are given additional protection through the designation of SACs for those species.

There are no designated SACs and NCMPAs (including proposed and candidate sites) with cetaceans as qualifying features within 50 km of the cable corridor and thus they are not considered further.

5.4.2 SACs with Harbour or Grey Seal as a Qualifying Feature

There are no SACs (including proposed and candidate sites) with grey seal as a qualifying feature within 20 km of the cable corridor and thus these SACs are not considered further.

There is one SAC with harbour seal as a qualifying feature within 50 km of the cable corridor i.e. the Yell Sound Coast SAC. A part of the SAC overlaps with the cable corridor (Figure 5-1). Harbour seals are most sensitive to disturbance during the pupping and moulting seasons which occur between mid-June to September in Shetland. The proposed installation activities will be undertaken in summer 2025, potentially overlapping with the pupping and moulting season for harbour seal. Therefore, SACs with harbour seal as a qualifying feature are screened in for further assessment.

5.4.3 Designated Seal Haul-Outs or Grey Seal Breeding Sites

There are no designated seal haul-outs or grey seal breeding sites that overlap with or are located within 500 m of the cable corridor. Thus, any impacts on haul-outs and breeding sites are not considered further.

The closest seal haul-out site is the Sligga Skerry & North End of Bigga, which is located 2.09 km away from the cable corridor.

5.4.4 SACs and NCMPAs with Otter Interests

The otter (*Lutra lutra*) is listed in Annex IV of the Habitats Directive as an EPS. They are small, semi-aquatic mammals which inhabit riverine, brackish and coastal environments throughout the UK. Although land mammals, otters depend on both freshwater and marine environments for food. Their marine habitat comprises low, peat-covered coastlines with shallow, seaweed rich waters and a consistent freshwater supply (NatureScot, 2024b).

The Yell Sound Coast SAC (designated for the protection of otter) overlaps with the cable corridor (Figure 5-1). Otters could potentially be present in the Project area and may be temporarily disturbed by vessel presence and noise. As such, this SAC is screened in for further assessment.

5.4.5 SPAs and NCMPAs with Birds as Qualifying Features

There is one SPAs with birds as qualifying features that is located within 2 km of the cable corridor; this is the East Mainland Coast, Shetland SPA which is located 1.84 km from the cable corridor (Figure 5-1). The designated features of this SPA are Great northern diver (*Gavia immer*) (non-breeding), red-throated diver (*Gavia stellata*) (breeding) and Slavonian grebe (*Podiceps auritus*) (non-breeding) (NatureScot, 2022). Breeding and wintering birds could be present in the area of the landfall works and be disturbed by landfall excavation works when foraging within the cable corridor. As such, this SPA is screened in for further assessment.

5.4.6 SACs and NCMPAs with Seabed / Benthic Protected Features

There are no SACs or NCMPAs with seabed / benthic protected features that overlap with the cable corridor. The closest site designated for seabed / benthic protected features is the Sullom Voe SAC which is located 3.67 km from the cable corridor. The Sullom Voe SAC is designated for the protection of reefs, large shallow inlets and bays, and coastal lagoons (NatureScot, 2024a). As such, SACs and NCMPAs designated with seabed / benthic protected features are not considered further.

5.4.7 Other Sites of Importance

The Yell Sound Coast SSSI overlaps with the cable corridor (Figure 5-1). This SSSI is designated for the protection of otter. Yell Sound Coast SSSI overlaps with the Yell Sound Coast SAC, which is also designated for otter. The SSSI consists of low rocky coastlines backed by areas of peaty moorland with numerous sources of fresh water. This habitat provides suitable conditions for otters and sustains a nationally and internationally important breeding population (NatureScot, 2011). Otters could potentially be present in the Project area and may be temporarily disturbed by vessel presence and noise.

Nonetheless, given the overlap with the Yell Sound Coast SAC, which is also designated for otters, the assessment of potential effects is assessed under the Yell Sound Coast SAC LSE assessment (as detailed in 5.6.2). As such, this SSSI is not specifically considered for further assessment.

5.5 Potential Connectivity with Designated Sites

Although there are designated sites within relatively close proximity to the proposed cable corridor, for a LSE to arise, there has to be potential ecological connectivity between the installation activities and the qualifying features of a designated site. An initial consideration has been provided in Table 5-1 identifying whether particular designated sites or particular impacts require a more detailed investigation of whether there is a potential LSE. Those sites or impacts for which no LSE is expected are not considered for further assessment.

Table 5-1 Designated Sites Within the Vicinity of the Cable Corridor as per the Selection Criteria and Potential Connectivity (JNCC, 2024a)

DESIGNATED SITE (NAME AND DESIGNATION)	REASON FOR SELECTION	DISTANCE TO CABLE CORRIDOR (km)	RELEVANT QUALIFYING FEATURES	POTENTIAL IMPACT PATHWAY	REQUIREMENT FOR FURTHER ASSESSMENT
Yell Sound Coast SAC	Overlaps with the cable corridor.	0	Harbour seal, otter	Vessel presence offshore and vehicle presence at shore and pre-installation surveys (including noise emissions)	Y – Overlaps with proposed cable corridor and therefore further assessment is required.
Yell Sound Coast SSSI*	Overlaps with the cable corridor.	0	Otter	Vessel presence and vehicle presence at shore and pre-installation surveys (including noise emissions)	Y – Overlaps with proposed cable corridor and therefore further assessment is required.
East Mainland Coast, Shetland SPA	This site is within 2 km of the cable corridor	1.84	Great northern diver, red-throated diver and Slavonian grebe	Vessel presence and noise (offshore) and presence of heavy machinery and vehicles at landfall.	Y – It is found within 2 km from the cable corridor and therefore further assessment is required.

Note assessment of impacts to otter features of the Yell Sound Coast SSSI are not considered separately and instead are considered as part of the Yell Sound Coast SAC otter LSE assessment, due to the overlap of the two sites.

5.6 Assessment of Likely Significant Effects

The following sections will assess the potential for LSE on the designated sites which require further assessment. For each designated site that has the potential to be affected by the installation activities, mitigation measures have been considered based upon site-specific protected features.

5.6.1 SACs with Harbour or Grey Seal as a Qualifying Feature

As per the criteria outlined in Section 5.1, there is one SAC with harbour seal as a qualifying feature within the connectivity range of 50 km of the proposed cable corridor. The Yell Sound Coast SAC is designated for harbour seal and otter and the proposed cable corridor overlaps with this SAC. Further details on the assessment of potential impacts on pinnipeds is detailed within Section 7: Marine Megafauna.

5.6.1.1 Underwater Noise

Underwater noise emissions have the potential to cause physical injury or disturbance to seals, particularly if they fall within their generalised hearing range (Southall *et al.*, 2019; NMFS, 2018). As detailed in Section 7: Marine Megafauna and Appendix A: Noise Impact Assessment, no injury risk is associated with the Project, and the disturbance range is limited to approximately 207 m. The proposed installation activities are due to take place in summer 2025 and therefore will likely coincide with the pupping and moulting season for harbour seal. However, as the installation activities will be transient, temporary, and localised, any disturbance to seals resulting from underwater noise emissions will be limited. As such, no LSE on the Yell Sound Coast SAC is expected from underwater noise emissions.

5.6.1.2 Vessel, Vehicle and Human Presence

With the increase in vessel traffic associated with the cable installation, harbour seal could potentially be at an increased risk of collision and disturbance. However, as the installation vessels will be slow-moving, and thus collision risk is generally considered to be low. Additionally, all vessels will adhere to the SMWWC. Moreover, the presence of vessels associated with the proposed cable corridor is not considered to be substantive change from baseline vessel activity, e.g., due to the regularly operated ferry service between Toft (Mainland, Shetland) and Ulsta (Yell) (see Section 11 for further details). However, given the overlap between the cable corridor and the Yell Sound Coast SAC, there could be impacts on seals from vehicles, equipment, and people needed for work in the intertidal and landfall areas at Yell, especially if the work coincides with the pupping season. Should works overlap with the pupping season this could potentially give rise to significant disturbance and / or mortality impact to seals within the SAC without mitigation due to the potential for separation of mothers and pups. As such, there is the potential for LSE on the Yell Sound Coast SAC.

However, consultation with NatureScot (on 09/01/2025) has shown that harbour seals tend to use Orfasay, east side of Samphrey, and the isle of Bigga for haul outs near Yell. NatureScot acknowledge that if the proposed operations are localised, short-term and do not result in the permanent removal of haul-out habitat, and appropriate mitigation is applied (e.g., slow moving vessels), significant disturbance to seals is unlikely. Given that the operations will be highly localised, transient, temporary and follow appropriate mitigation (e.g., adherence to the SMWWC and given that vessels will be slow moving, it is considered that there will be no AEOSI or adverse effects the conservation objectives of the Yell Sound Coast SAC regarding harbour seal features.

5.6.2 SACs with Otter Interests

As per the criteria outlined in Section 5.1, there is one SAC with otter as a qualifying feature within the connectivity range of 500 m of the proposed cable corridor. The Yell Sound Coast SAC is designated for otter and the proposed cable corridor overlaps with this SAC. Further details on the assessment of potential impacts on otters is detailed within Section 7: Marine Megafauna.

5.6.2.1 Vessel and Vehicle Presence and Excavation Hazards

Otters are likely to be present in the area of the landfall works and could be disturbed during excavation works at the intertidal areas, or when swimming within the vicinity of the vessels deployed for cable installation works. These activities could result in potential avoidance behaviours in areas at the landfall and intertidal areas where vessels, vehicles and site workers are present. Additionally, disturbance may be caused by temporary habitat change associated with landfall installation activities and equipment placement. Furthermore, as OCT will be utilised at landfalls, this also presents a risk to otter should they enter a trench and become trapped.

During terrestrial ecology surveys undertaken in August 2024 in Mossbank and Yell, one otter couch was found within the Mossbank survey area (Purple Plover Consulting, 2024a) while an otter was observed actively fishing off the beach near the northern landfall site in Yell; no holts were found during the survey in Yell (Purple Plover Consulting, 2024b). Although otters apparently have no specific breeding season, Kruuk *et al.* (1987) found that in Shetland a birth peak occurs in June.

As the installation activities will be transient, temporary, and localised, any disturbance to otters at these sites from vessels, or vehicles will be limited. However, due to the overlap with the Yell Sound Coast SAC (and Yell Sound Coast SSSI), the potential for disturbance to otter from the nearshore works at Yell cannot be ruled out and therefore there is potential for LSE without mitigation.

Consultation with NatureScot (on 09/01/2025) has shown that pre-construction surveys will be needed to ascertain if there are any otter holts in the Yell area; from there it may be that certain areas have to be avoided or marked off to minimise disturbance; consideration should also be given if there is likely to be overland access to the coast.

Given this, SHEPD have committed to several embedded mitigations in respect to otter as detailed in Section 4.3. These mitigations include pre-installation otter surveys to ascertain the presence of otters. In addition, during the works an Ecological Clerk of Works (ECoW) will be present for landfall works to implement a buffer distance of at least 40 m between otter holts, layouts or couches and the proposed works, and to monitor otter activity. Furthermore, to mitigate the risk of otters becoming trapped within excavated trenches at the landfall, ramps will be incorporated in trench designs, to ensure otters are able to escape should they enter a trench. All mitigations will be compliant with terrestrial planning conditions including SHEPD's Otter Protection Policy. With the implementation of these embedded mitigations, potential disturbance from nearshore works will be further reduced. As such, it is considered that there will be no AEOSI or the conservation objectives of the Yell Sound Coast SAC with respect to otter features. These conclusions for otter are also applicable to the Yell Sound Coast SSSI.

Should pre-construction otter surveys identify otter features, SHEPD will consult with NatureScot ahead of works commencing to determine whether a disturbance licence for otter is required.

5.6.3 SPAs with Birds as Qualifying Features

As per the assessment criteria outlined in Section 5.3, there is one designated site with birds as qualifying features within 2 km of the cable corridor. The East Mainland Coast, Shetland SPA is designated for Great northern diver (non-breeding), red-throated diver (breeding) and Slavonian grebe (non-breeding) (NatureScot, 2022). The East Mainland Coast, Shetland SPA is located 1.84 km from the cable corridor. Further details on the assessment of potential impacts on birds are presented in Section 9: Ornithology.

5.6.3.1 Vessel Presence

There will be a number of vessels present on site during installation activities which have the potential to result in visual disturbance to breeding and / or foraging seabirds; however, it is noted that the vessel activity will not be a substantive change from baseline vessel activity within the area including the regularly operated ferry service between Toft (Mainland, Shetland) and Ulsta (Yell) (see Section 11 for further details).

The presence of vessel lighting also has the potential to disorientate birds, leading to increased collision rates with vessels at night, which may be fatal (Rodriguez *et al.*, 2015). A single disturbance event is unlikely to have any immediate effect on the survival or breeding productivity of an individual bird, and this would only be expected with repeated disturbance over an extended period of time. There is limited potential for disturbance associated with the noise of vessel presence and given the distance this is unlikely to be an issue.

The installation activities are planned to occur in summer 2025 and therefore will there is potential for installation to coincide with the sensitive peak breeding season for red-throated divers features of the East Mainland Coast SPA, if works are undertaken between May and mid- September (NatureScot, 2020). Additionally, should there be delays to the Project programme, this may coincide with non-breeding seasons for great northern diver and Slavonian grebe features of the SPA when they may be present to roost or feed in close proximity to the survey corridor or the landfall.

Nonetheless, the installation activities will be short-lived (48 days) and transient, therefore, there is very low potential for direct disturbance of breeding birds within coastal nesting sites or loafing birds on the sea surface. Furthermore, any disturbance from the installation activities will be restricted to the immediate vicinity of the Project vessels, minimising any disturbance at important breeding sites at the East Mainland Coast, Shetland SPA. The waters in the vicinity of the cable corridor are subject to relatively high levels of vessel activity, predominantly associated with ferry and commercial vessel traffic (see Section 11). As such, the presence of the installation vessels required to facilitate the cable installation will not constitute a substantive change from baseline vessel activity. As part of the embedded mitigation detailed in Section 4.3 lighting on board will be appropriately directed and kept to a minimum to reduce potential light disturbance and vessels will be travelling at slow speeds to reduce the potential collision risk. In addition, all vessels will adhere to the provisions of the SMWWC during installation activities (Table 4-2). As such, potential effects on the qualifying avian features of the SPA will be temporary and of localised nature and will further be reduced by the other embedded mitigation measures such as those implemented to reduce a pollution incident, as outlined in Section 4.3. Therefore, no LSE on the qualifying avian features of this site is expected and hence, no adverse impact will result on conservation status of the East Mainland Coast, Shetland SPA.

5.7 Impact Assessment

Due to the temporary and localised nature of the proposed installation activities, no LSE is predicted on the conservation objectives of the East Mainland Coast, Shetland SPA from vessel presence and as such it is not expected that an AA will be required for this site.

With regards to the Yell Sound Coast SAC, which is designated for harbour seals and otters, impacts from underwater noise will not result in the potential for LSE on harbour seals due to the localised disturbance ranges from the installation activities coupled with the transient, temporary, and localised nature of the installation works. As such it is not expected that an AA will be required for this impact on the Yell Sound Coast SAC.

However, given the overlap at the Yell landfall with the Yell Sound Coast SAC, the potential for LSE could not be ruled out with respect to nearshore works in the intertidal and landfall areas because of vessels, vehicles, equipment, and human activity in this area. Due to this, there is the potential for significant impacts on harbour seal from during the pupping season. Similarly, LSE could not be ruled out for otters due to the know presence of these features and the potential for significant disturbance, including to holt sites and from potential entrapment in the nearshore area.

SHEPD have committed to several embedded mitigations in line with advice from NatureScot for seal and otter features of the Yell Sound Coast SAC. For otters, these mitigations include pre-installation otter surveys, employment of an ECoW to ensure works do not occur within 40 m of areas of evidence of otter activity and ensuring ramps are incorporated in trench designs to allow otters to exit trenches should they enter them. Additionally, to mitigate impacts to seals, SHEPD will ensure all vessels adhere to the SMWWC, in line with NatureScot advice.

Given these commitments and the short duration of activities, coupled with the fact that vessels will be slow moving, and the existing baseline shipping in the area e.g. ferry operations, there is not anticipated to be any AEOSI or adverse effects on the conservation objectives of the Yell Sound Coast SAC. Should pre-construction otter surveys identify otter features, SHEPD will consult with NatureScot ahead of works commencing to determine whether a disturbance licence for otter is required.

Overall, the installation of the Mossbank to Yell emergency replacement cable constitutes work of an overriding public interest whilst presenting a minor and temporary disturbance in a limited area.

6 SEABED AND WATER QUALITY

6.1 Introduction

This Section provides an overview of potential impacts on seabed conditions and water quality resulting from the proposed installation activities (including potential deposits of rock bags and /or mattresses) and removal of intertidal sections of OoS cables. Details on baseline seabed conditions presented in this Section provides the relevant information for the purposes of the impact assessment and is not intended for engineering applications.

In the intertidal areas between MHWS and MLWS, the cable will be buried at both landfalls using OCT method. This will be conducted using conventional land-based excavators working within a tidal window, i.e., when the intertidal area is exposed, avoiding works below the waterline. One trench will be required at each landfall down to MLWS with a width of approximately 1 m. It is anticipated that a 20 m wide working corridor will be required for each trench, accounting for the footprint of the excavator and the temporary storage of excavated material. The trench at each landfall will contain the new power cable plus two earth wires. At MLWS the two earth wires will separate and continue on the surface of the seabed for up to 50 m. As OCT is being used for cable burial, coastal and subtidal sediment suspension is assessed for this activity.

The cable will be surface laid along the entire length of the subtidal section of the cable corridor (MLWS to MLWS), achieved using a CLV. The decision to surface lay the cable is due to poor burial potential along the majority of the cable corridor length. The seabed footprint of the Project will be largely confined to the physical footprint of the cable itself and any cable stabilisation, as no seabed modification such as trenching and/or burial will be undertaken beyond the intertidal area. Given that the cable will be surface laid except at the landfall areas, offshore sedimentation related impacts are screened out of the assessment and water quality impacts relate only to those potentially associated from accidental vessel pollution.

Associated impacts on benthic features are discussed in Section 8.

6.2 Data Sources

Seabed sediments and bathymetry has been characterised by the 2018 Bibby HydroMap geophysical and benthic surveys contracted by SHEPD (Bibby HydroMap, 2018) and publicly available geospatial data (e.g., NMPi and EMODNet). Water quality and the presence of designated water bodies have been identified through Scottish Environmental Protection Agency (SEPA) River Basin Management 3 database (SEPA, 2024). Additionally, this Section draws on the information presented in the Shetland Island's Marine Region State of the Environment Assessment (Shucksmith, 2017).

6.3 Baseline and Receptor Identification

6.3.1 Seabed Sediments and Bathymetry

Bibby HydroMap were commissioned by SHEPD in 2018 to undertake a geophysical and benthic surveys along the proposed cable corridor. Results from these surveys indicated that the intertidal areas at Mossbank and Yell are largely comprised of coarse gravel hardgrounds with subcropping and outcropping rock. Further offshore, the seabed largely comprises sub and outcropping rock from RP 0 – RP 1 and RP 2.5 – RP 3.5. Between RP 1 and RP 2.5 the seabed shows a patchy veneer of coarse-grained sediments comprising sands with gravels, shell fragments and boulders, forming rough, irregular, hard substrate (Bibby Hydromap, 2018; as shown in Figure 6-1). The EUNIS broadscale habitats that have been characterised in these areas and are further detailed in Section 8, and are displayed in Figure 8-2.

The survey data available generally aligns with publicly available data. The public data shows that the intertidal areas at both the Mossbank and Yell landfall location exhibits a mix of exposed littoral rocks and shingle beaches. The shallower subtidal areas of the cable corridor to the south near Mossbank comprising a mix of rock, cobbles, gravel and coarse sand, while in the north towards the Yell landfall, highlights a mix of rocks and coarse sand. The deeper seabed sediment type across the cable corridor is generally composed of mixed sediments and coarse substrate classified by the British Geological Survey as muddy, gravelly sand (NMPi, 2024; British Geological Survey (BGS), 2024a).

In terms of seabed features, the 2018 survey data also highlights a broad bathymetric trough feature with mega ripples (of up to approximately 1 m) present between approximately RP 2 and RP 2.5 within the cable corridor (as shown in Figure 6-1). The maximum thickness of the sediments in this small section of the cable corridor is in the region of 5 m (Bibby Hydromap, 2018).

Bathymetry data indicates a maximum water depth of -58 m LAT at ~RP 2.5, coinciding with the broad bathymetric trough noted above. However, generally water depths along the offshore sections of the cable corridor are in the region of -35 m LAT to -45 m LAT (Figure 6-2).

The bedrock is thought to comprise igneous rocks, Precambrian Lewisian Gneiss, Dalradian Schists and other metamorphic rocks. Available sub-bottom data indicates the bedrock to be largely structureless (Bibby Hydromap, 2018).

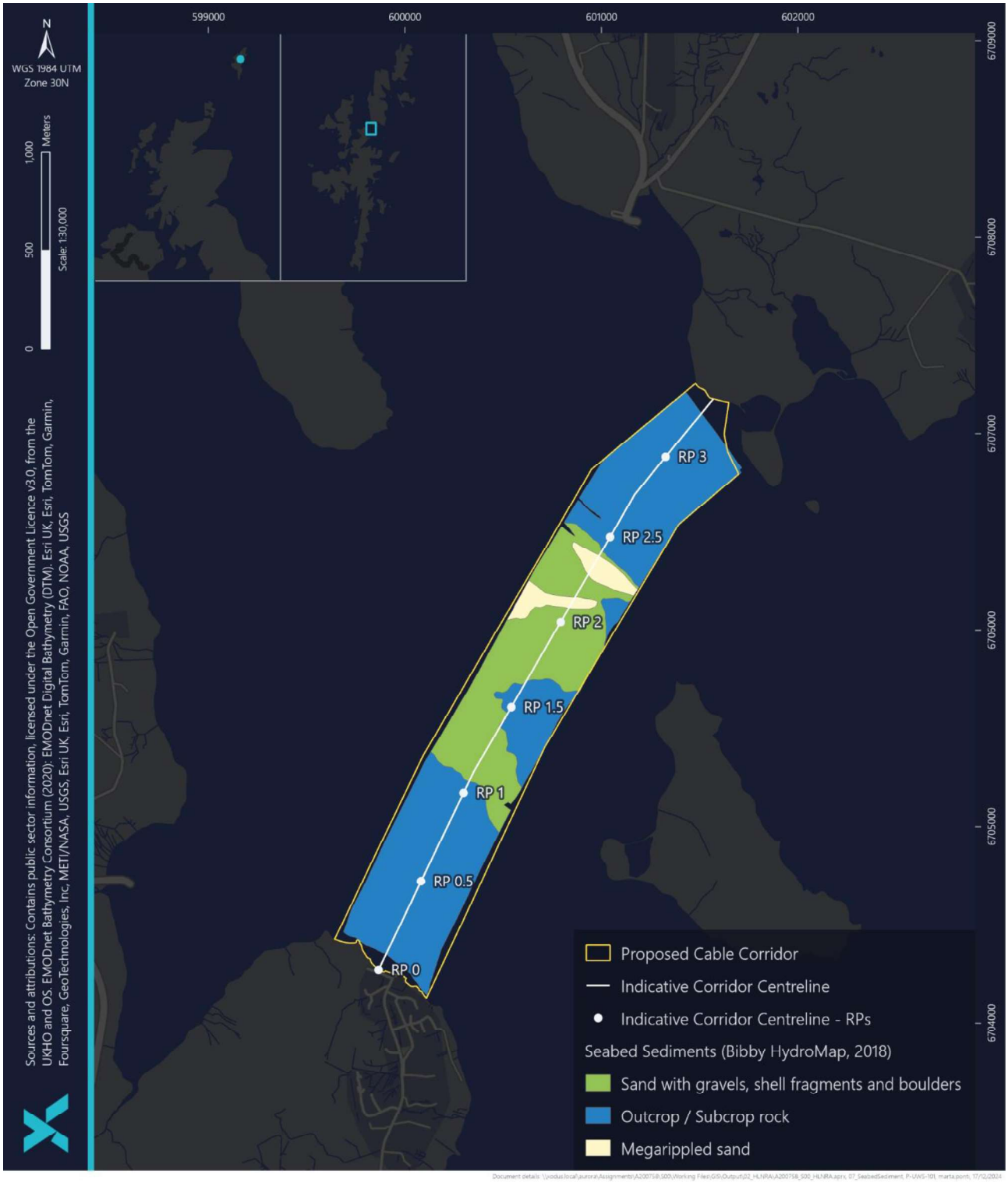

Figure 6-1 1 Seabed Sediment Types within the Proposed Cable Corridor (Bibby Hydromap, 2018)

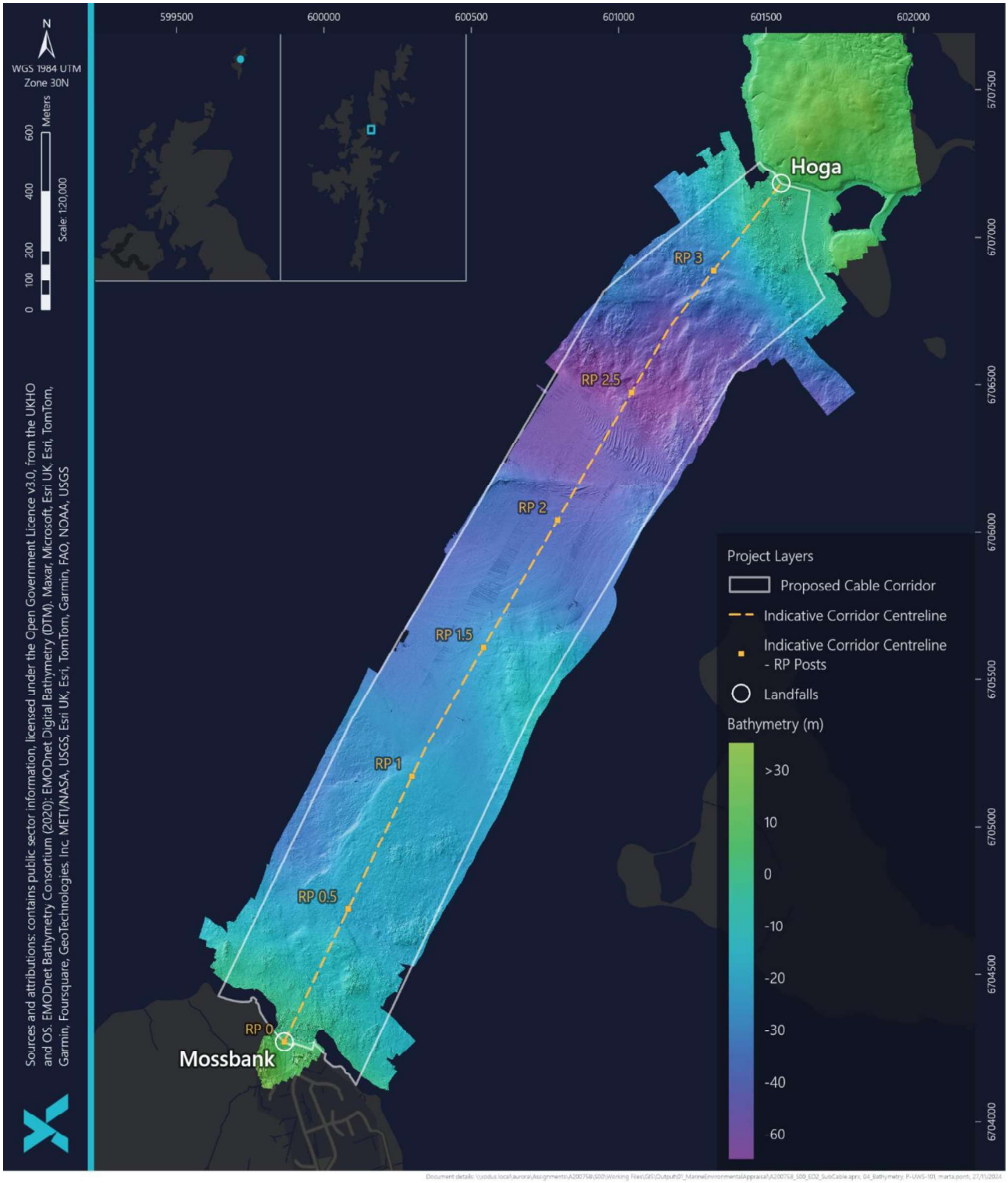

Figure 6-2 Indicative Bathymetry at the Proposed Cable Corridor

6.3.2 Water Quality

The EU Water Framework Directive (2000/60/EC) (WFD) (as implemented into Scottish law through the Water Environment and Water Services (Scotland) (WEWS) Act 2003 and regulated through the Water Environment (Controlled Activities) (Scotland) Regulations 2011. This directive ensures the protection of inland, transitional and coastal surface waters, and groundwaters through regulating individual pollutants, to remove and reduce pollution in water sources and prevent deterioration. Designated waterbodies are required to be kept in 'Good' status, both ecologically and chemically.

The cable corridor overlaps with the Yell Sound designated coastal waterbody (ID: 200503) which is listed in 'Good' overall condition and water quality, and 'High' physical condition based on 2020 data (SEPA, 2024). The overall condition is projected to continue to be 'Good' through 2027 and beyond, with no pressures identified on this waterbody. No significant physical, chemical, biological or morphological changes to the waterbody are expected and as such no impacts on waterbody status are predicted as a result of the Project. There are no shellfish water protected areas or bathing waters within the immediate vicinity of the cable corridor.

6.4 Impact Assessment

6.4.1 Coastal and Subtidal Sediment Suspension

As detailed in Section 6.1, the cable will be buried at both landfalls between MHWS and MLWS using OCT. This will be conducted using conventional land-based excavators working within a tidal window, i.e., when the intertidal area is exposed, avoiding works below the waterline. Temporary resuspension of sediments may be cause by the rising tide and wave action interacting with the trench and any associated spoil berms. The beaches at both landfalls are characterised by shingle and the intertidal and subtidal areas range between mixed and coarse sediments. Due to these sediment types (i.e., mixture of coarser sediments) it is anticipated there will be limited potential for significant suspension of disturbed seabed sediments with any sediment suspension being temporary and highly localised. It is expected that any wave/tide induced sediment suspension would be characteristic of natural processes. Therefore, effect on sediment resuspension and associated deposition is considered to be of minor magnitude.

Up to 100 m of OoS cables may be removed in the intertidal areas at the Yell landfall to allow the new cable to be installed in the best approach angle. The OoS cable will be deburied using land-based excavators, working at low tide, before the section of cable is cut and removed. The temporary trench and spoil berms resulting from this process may interact with the tide and waves as described above, resulting in a minor magnitude effect.

Assessment of Impact Significance

There are no designated bathing waters or shellfish protected waters in the vicinity of the proposed cable corridor. Therefore, the sensitivity is assessed as low. All Project activities at the landfall locations will be tidally dependent, working at low water. Increased suspended sediment in the intertidal region will only occur during the interaction between the incoming tide, the trench walls and spoil heaps. Additionally, there may be some intertidal sediment suspension due to the removal of OoS cables at the Yell landfall. However, similarly, this will result in highly localised and temporary increases in suspended sediment. Therefore, the magnitude of effect is assessed as minor, resulting in a negligible consequence.

Embedded mitigation measures considered as part of the Project design are listed in Section 4.3.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
Low	Minor	Negligible

Impact Significance – NOT SIGNIFICANT

6.4.2 Changes to Sediment and Water Quality Following Accidental Release of Hydrocarbons

There is the potential for an unplanned spill to occur in the event of a collision with another vessel, if one of the Project vessels loses containment of hydrocarbon bunkers, or a hydraulic line leaks or fails (for example associated with cranes and ROVs). The main release risk associated with the proposed cable installation activities is a loss of diesel fuel from the installation and support vessels. Diesel has very high levels of light ends, evaporating quickly on release. The low asphaltene content prevents emulsification, therefore reducing its persistence in the marine environment. Light oil (such as diesel) tends to dissipate completely through evaporation and physical dispersion within 1 – 2 days and does not normally form emulsions. Some small-dispersed globules of semi-solid oil may persist for some time if the oil possesses wax or other persistent components. Any discharge of hydrocarbons will be limited to the inventory of each vessel during the proposed cable installation activities. Due to the low viscosity of diesel, it will spread very rapidly to form a thin sheen at the surface. The sheen will break up rapidly under the influence of spreading and evaporation. Diesel is unlikely to persist within the water column once the spill has occurred.

Based on the volume and components of marine diesel, it is unlikely that diesel will percolate to the seabed and deposit on sediments. Therefore, sediments are unlikely to be affected by a spill. As such, it is not considered to present a major risk to the environment. As outlined in Section 4.3, the Emergency Spill Response Plan, and the SOPEPs in place for each vessel, will provide a clear protocol in the event of a release scenario, resulting in rapid and effective remedial action, limiting the extent of any spill.

Accidental releases of hydraulic fluids from the cranes on the project vessels and used for the ROVs are possible. Hydraulic fluids are used as part of a closed system (i.e. lines) in cranes and other machinery equipment (such as ROVs). The potential impacts of a hydraulic fluid release depend on the properties and components of each hydraulic fluid. Hydraulic fluids can either be oil or water-based. Water-based hydraulic fluids used are unlikely to be toxic to the marine environment and will disperse rapidly as they tend to not bioaccumulate and are biodegradable. Any accidental spills of oil-based hydraulic fluid are unlikely to form a sheen, as the potential volume of hydraulic fluid

spilled is likely to be small and mineral oil content is low. Equipment (cranes, ROVs etc.) used during the Project will be regularly maintained, reducing the likelihood of a release.

A large spill of hydrocarbons or hydraulic fluids is very unlikely during the planned installation activities. The impact of an accidental release (diesel or hydraulic fluid) is not considered to be significant.

Assessment of impact significance

There are no designated bathing waters or shellfish protected waters in the vicinity of the proposed cable corridor. Therefore, the sensitivity is assessed as low. Best practice will be followed, as detailed within the embedded mitigation listed in Section 4.3, and it is therefore unlikely that a spill would occur during the operation activities. Impact significance will vary depending on the size, volume and nature of the spill. Based on the very low likelihood of such an event, the magnitude of effect is assessed as moderate, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
Low	Minor	Minor
Impact Significance – NOT SIGNIFICANT		

6.4.3 Operation

The cable has been designed to be maintenance free, as such no planned ongoing maintenance activities are proposed. SHEPD will conduct routine inspections and surveys of the cable throughout its operational life to ensure it remains in good condition. There is a potential for remedial cable repair works to be required, in the event the cable is damaged or the need for additional stabilisation materials is identified during the routine surveys. Repair and remedial works would be subject to a separate license application.

If required, impacts on seabed and water quality resulting from cable repairs will be analogous to those occurring during construction, although significantly reduced on both spatial and temporal scales. As such, impacts during the operational phase are considered to be not significant.

6.5 Conclusion

As the proposed cable installation activities at the landfall locations will be tidally dependent, they are not anticipated have any significant impact on water quality. As stated in Section 6.4.1, any increase in suspended sediment will only occur naturally during tidal cycles with the trench walls and spoil heaps and as a result of cable removal activities. This will result in highly localised and temporary increases in suspended sediment which will not have a significant impact on coastal water quality or the waterbody status.

Best practice will be followed by all installation vessels, therefore the likelihood of accidental hydrocarbon releases from the installation vessel is extremely remote. The level of impact is therefore considered minor and not significant.

7 MARINE MEGAFAUNA

7.1 Introduction

This Section of the report provides further detail on marine megafauna, including marine mammals (cetaceans and pinnipeds) the vicinity of the proposed cable corridor, and presents results from an assessment of potential impacts on key sensitive species. Management and mitigation measures to ensure impacts are minimised will also be suggested. This Section also provides an EPS Risk assessment, with regard to potential impacts on cetaceans and otters. It should be noted that basking sharks have been excluded from the scope as they are not routinely present in Shetland.

7.2 Data Sources

The presence of marine mammals within the vicinity of the cable corridor have been characterised through publicly available geospatial data (e.g., NMPi) and relevant literature sources, including the findings of the Small Cetaceans in European Atlantic waters and the North Sea (SCANS) SCANS-IV survey (Gilles *et al.*, 2023), Special Committee on Seals (SCOS) 2022 report and 2023 interim advice (SCOS, 2022; 2023) and Carter *et al.*, (2022) seal at sea density mapping. Additionally, this Section draws on the Shetland Island's Marine Region State of the Environment Assessment (Shucksmith, 2017).

7.3 Existing baseline Description

7.3.1 Cetaceans

There have been 15 species of cetaceans observed in Shetland; however only five are year-round residents: killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), white-beaked dolphin (*Lagenorhynchus albirostris*), harbour porpoise and Risso's dolphin (*Grampus griseus*). The remaining species are considered seasonal migratory species, deep-water species, or rare (Shucksmith, 2017).

The SCANS-IV survey indicates that four of the five year-round species were observed within block NS-E which represents Shetland: Risso's dolphin, white-beaked dolphin, minke whale and harbour porpoise (Gilles *et al.*, 2023). It is noted that there were too few killer whales sighted to be able to determine abundance. Additionally, the results indicate that Atlantic white-sided dolphin (*Lagenorhynchus acutus*) were also present within the block NS-E. The following provides a description of these species, including their density (animals / km^2) and abundance:

- Harbour porpoises are resident and abundant year-round in Scottish waters and throughout the UK, often observed alone or in small groups, and occasionally sighted in larger groups (Hague *et al.*, 2020). Harbour porpoises are widely distributed in shelf water around Shetland with numbers peaking during the summer months (Hague *et al.*, 2020). Harbour porpoises are the most abundant cetacean species in block NS-E with an abundance of 33,735 individuals and a density of 0.52 animals / km^2 (Gilles *et al.*, 2023);
- White-beaked dolphins are also resident and abundant year-round in Scottish waters (Hague *et al.*, 2020). White-beaked dolphins are the second-most abundant cetacean species recorded within NS-E with an abundance of 11,611 individuals and a density of 0.18 animals / km^2 (Gilles *et al.*, 2023);

- Risso's dolphins are common in deeper, offshore waters (Hague *et al.*, 2020). Risso's dolphin are typically observed in small groups of five to 25 individuals during the summer months from June to September. The density of Risso's dolphin in block NS-E is approximately 0.07 animals / km^2, with an abundance of 4,589 individuals (Gilles *et al.*, 2023);
- Atlantic white-sided dolphins have been sighted on the south coast of Shetland and are typically found in cool temperature and subarctic waters of the North Atlantic (HWDT, 2018). This species tends to travel in social groups of two up to 30 individuals and are commonly sighted with white-beaked dolphins. The density of Atlantic white-sided dolphin in block NS-E is approximately 0.015 animals / km^2, with an abundance of 958 individuals (*Gilles et al.*, 2023); and
- Minke whales are the smallest, most abundant baleen whale to be sighted in Scottish waters (HWDT, 2018). The density of minke whale in block NS-E is approximately 0.01 animals / km^2, with an abundance of 795 individuals (Gilles *et al.*, 2023).

The distribution, density, and abundance of the six most commonly occurring cetacean species, including those identified in the SCANS-IV survey and killer whale, around the proposed cable corridor are presented in Table 7-1. As noted above, there were too few sightings of killer whale in the SCANS-IV surveys to determine abundance.

As noted in Section 5, there are no SACs or NCMPAs designated for cetacean species within 50 km of the cable corridor.

Table 7-1 Population Parameters of Cetaceans Potentially Present within the Vicinity of the Cable Corridor (Gilles et al., 2023; Inter-Agency Marine Mammal Working Group (IAMMWG), 2022)

SPECIES	ESTIMATED DENSITY[1] (ANIMALS / km^2) (GILLES *et al.*, 2023)	ESTIMATED ABUNDANCE WITHIN THE CABLE CORRIDOR (1.69 km^2)	MANAGEMENT UNIT (MU) / BIOGEOGRAPHICAL POPULATION ESTIMATE (IAMMWG, 2022)	PROPORTION OF THE MU POTENTIALLY AFFECTED BY INSTALLATION ACTIVITIES
Harbour porpoise	0.52	0.88	346,601	0.0003
White-beaked dolphin	0.18	0.30	43,951	0.0007
Risso's dolphin	0.07	0.12	12,262	0.0009
Atlantic white-sided dolphin	0.02	0.03	18,128	0.0002
Minke whale	0.01	0.02	20,118	0.0001
Killer whale	*Insufficient data*	*Insufficient data*	*N/A*	*N/A*

[1] *Based on SCANS-IV block NS-E.*

7.3.2 Seals

Two pinniped (seal) species regularly occur in the Scottish offshore and coastal environment: grey seals and harbour seals. Both grey and harbour seals are listed under Annex II of the Habitats Directive and are PMFs. Approximately 36% of the world's grey seals breed in the UK (of these, 81% breed at colonies in Scotland). Harbour seals are also widespread around Shetland (SCOS, 2022).

Similar to seabirds, seals are central-place foragers, utilising a terrestrial 'base' for important life history events (i.e., breeding, pupping, moulting, etc.) and to rest, and then undertake foraging trips at sea before returning to land (Vance *et al.*, 2021). While both species are associated with shallower shelf waters, grey seals often make longer foraging trips to deeper waters than harbour seals.

Carter *et al.*, (2022) modelled the habitat preference of grey and harbour seals and predicted at sea seal distribution on a 5 km x 5 km grid for both species. These data have been processed according to the method described in SCOS (2022), utilising scalars to generate estimates of number of seals within each grid cell (and 95% confidence limits). This is calculated by scaling the Carter *et al.*, (2022) relative density in a cell to an absolute at sea seal density (mean numbers of seals per cell) using the most recent independent estimate of the grey or harbour seal population and the proportion of the population at sea at a given time.

In line with this, the mean predicted absolute abundance of grey and harbour seals per 25 km^2 is provided below in Figure 7-1 . The population densities overlapping the cable corridor are estimated to be between 5 -10 seals per 25 km^2 for harbour seal and 0 – 3 seals per 25 km^2 for grey seal (Figure 7-1)

As discussed in Section 5.4.2 the Yell Sound Coast SAC which is designated in part for harbour seals overlaps with the cable corridor at the Yell landfall (Figure 5-1). Nonetheless, NatureScot have advised SHEPD through consultation (on the 09/01/2025) that seals tend to use Orfasay (isle at the ness of Copister), east side of Samphrey and the isle of Bigga for haul outs near Yell and so are less likely to utilise the Yell landfall specifically.

Additionally, there are no SACs with grey seal as a qualifying feature within 20 km of the cable corridor. Also, as discussed in Section 5.4.3, there are no designated seal haul-outs or grey seal breeding sites that overlap with or are located within 500 m of the cable corridor. The closest designated seal haul-out site is the Sligga Skerry & North End of Bigga, which is located over 2 km away from the cable corridor.

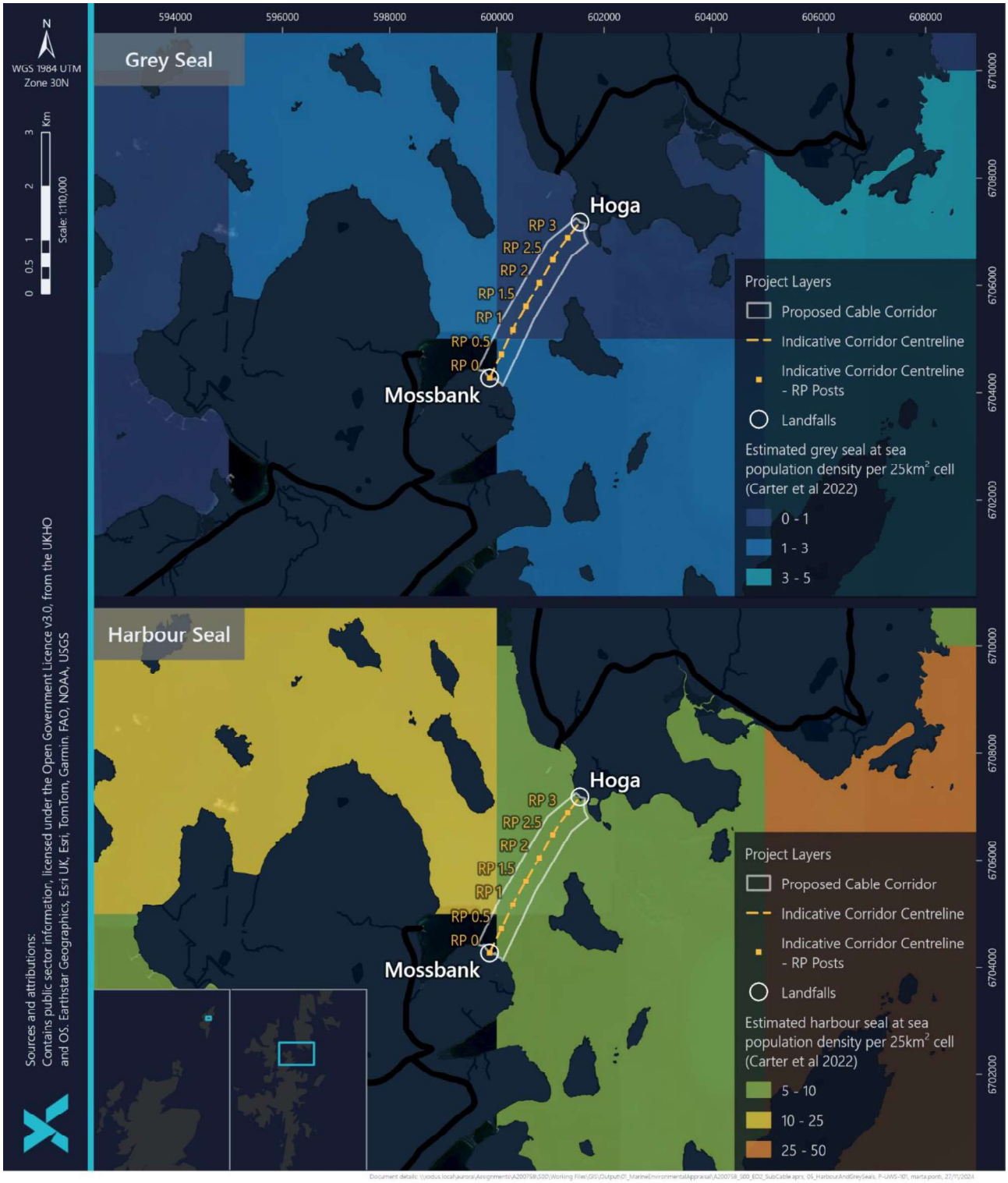

Figure 7-1 Mean Predicted Absolute Density of At Sea Harbour and Grey Seals per 25 km2 (Carter et al., 2022)

7.3.3 Otters

Otters are small, semi-aquatic mammals which inhabit riverine, brackish and coastal environments throughout the UK. Although land mammals, otters depend on both freshwater and marine environments for food. Their marine habitat comprises low, peat-covered coastlines with shallow, seaweed rich waters and a consistent freshwater supply (NatureScot, 2024b).

The coastal areas in the Shetland marine area provide good quality habitat for otters, and the species is prevalent on the islands (JNCC, 2024b). The otter population in Shetland are one of the most intensely studied in Europe and are believed to be genetically distinct.

As described in Section 5.4.4, the cable corridor overlaps with the Yell Sound Coast SAC and the Yell Sound Coast SSSI (Figure 5-1) which have been designated (in part) for the protection of otter. The Yell Sound area has the highest density of otter and is believed to support > 2% of the entire UK otter population. This area is characterised by low-lying peaty coastlines with large numbers of otter holts and easy access to fresh water.

During terrestrial ecology surveys undertaken in August 2024 in Mossbank and Yell, one otter couch was found within the Mossbank survey area (Purple Plover Consulting, 2024a) while an otter was observed actively fishing off the beach near the northern landfall site in Yell; no holts were found during the survey in Yell (Purple Plover Consulting, 2024b).

7.4 Impact Assessment

This Section outlines the proposed installation activities which have the potential to impact upon marine megafauna species, including cetaceans, pinnipeds and others.

7.4.1 Identification of Potential Impacts

This Section reviews potential impacts to marine megafauna receptor species from the proposed installation activities and narrows down which activities require further assessment to identify the likelihood and significance of those impacts. Impacts from accidental releases from pollution for all marine megafauna have not been considered for further assessment, given that the likelihood of this is extremely low.

7.4.1.1 Marine Mammals Impacts

Underwater noise emissions from the installation activities are likely to constitute the greatest potential risk to marine mammals within the vicinity of the cable corridor. Noise has the potential to impact cetaceans and other marine species in two ways:

- Injury – physiological damage to auditory or other internal organs; and
- Disturbance (temporary or continuous) – disruptions to behavioural patterns, including, but not limited to: migration, breathing, nursing, breeding, foraging, socialising and / or sheltering (note: this impact factor does not have the potential to cause injury).

If a noise emission is composed of frequencies which lie outside the estimated auditory bandwidth for a given species, then the potential for auditory impact is considered to be very unlikely (National Marine Fisheries Service (NMFS), 2018). To understand the potential for noise-related impacts, the likely hearing sensitivities of different marine mammal hearing groups has been summarised in below in Table 7-2 (Southall *et al.*, 2019).

Table 7-2 Auditory bandwidth estimated for marine megafauna (Southall et al., 2019; NMFS, 2018)

HEARING GROUP	ESTIMATED AUDITORY BANDWIDTH
Low-frequency (LF) cetaceans (e.g. baleen whales, such as minke whales)	7 Hz to 35 kilohertz (kHz)
High-frequency (HF) (e.g. dolphins)	150 Hz to 160 kHz
Very high-frequency (VHF) cetaceans (e.g. harbour porpoises)	275 Hz to 160 kHz
Phocid carnivores in water (PW) (e.g. grey and harbour seal)	50 Hz to 86 kHz

The potential sources of underwater noise associated with installation activities include:

- Vessel noise from ships;
- Noise associated with cable-laying activities;
- Noise from the USBL positioning device during installation – please refer to the EPS licence application form submitted alongside this MEA.

While vessel noise is broadband and will be audible to marine mammals, the presence of the vessels within the cable corridor will not constitute a substantive change from the type of vessels in the area or baseline vessel numbers, including the regularly operated ferry service between Toft (Mainland, Shetland) and Ulsta (Yell). Additionally, the duration of the cable installation campaign is relatively short-lived. As such the presence of vessels will not result in a significant change to the existing soundscape in the area, hence, this aspect does not have the potential to result in adverse underwater noise impacts on cetaceans and is not considered further.

Underwater noise emissions resulting from the cable laying activities are expected to be minimal. This is because SHEPD intend to surface lay the cable and no subtidal trenching or burial activities are proposed. Moreover, trenching activities in the intertidal area will be conducted at low water when the area is dry, and hence there is no potential for underwater noise emissions to result from this activity. Further details on the cable lay methodologies are described in the Mossbank – Yell Emergency Cable Replacement Project Description (Document No. A-200758-S00-A-REPT-001).

The MBES proposed for the pre-installation surveys will be at frequencies > 200 kilohertz (kHz) and therefore are above the hearing threshold for marine mammals; however, USBL is proposed for the pre-installation surveys. USBL devices commonly operate in a frequency range which makes them audible to cetaceans and pinnipeds, and hence this equipment does have the potential to result in adverse effect on these receptors. The highly mobile nature of cetaceans and pinnipeds combined with the temporary, localised nature of USBL noise emissions associated with the activities, dramatically reduces the likelihood of interactions between the Project and cetacean and pinniped receptors

resulting in significant impacts. However, as the risk of injury or disturbance to a small number of individual cetaceans remains, an EPS licence may be required, and hence impacts from noise emissions associated with USBL have been carried forward for further assessment.

Collision risk is another potential risk to marine mammals in the area and may cause mortality and sublethal injury (Laist *et al.*, 2001). However, marine mammals are highly mobile and as the installation activities are due to take place from slow moving vessels operating in well-defined routes, collision risk is anticipated to be negligible. Any remaining residual risk from vessel movements will be further reduced on the basis of the embedded mitigation measures outlined in Section 4.3, which includes the management of vessel speed and the commitment for vessels to adhere to the SMWWC. For this reason, vessel movements have not been identified as having the potential to cause adverse or significant impacts to the FCS of any marine mammal population and has therefore been screened out from further assessment.

The marine mammal species of interest in the area do not rely extensively on eyesight for hunting and navigation and potential impacts resulting from localised elevation of sediment, considering this and the fact that changes to water quality are expected to be minimal (as detailed in Section 6), water quality impacts are not discussed further.

Seals are particularly susceptible to disturbance during their respective pupping and moulting seasons, when the residency of seals at haul-outs and in surrounding waters elevates the relative density of each species. As mentioned in Section 5.4.3, there are no designated seal haul-outs or grey seal breeding sites that overlap with or are located within 500 m of the cable corridor. The closest designated seal haul-out site is the Sligga Skerry & North End of Bigga, which is located over 2 km away from the cable corridor. The vessel activity associated with the installation activities will not be a substantive change from baseline vessel activity within the area.

However, as described in Section 5, although no seal haul-out sites or grey-seal breeding sites are present within the cable corridor, the Yell landfall does overlap with the Yell Sound Coast SAC, which is designated for harbour seals. As such, should the installation activities overlap with the sensitive pupping season then there is potential for impacts to harbour seal from the intertidal and landfall works at Yell including from vessels, vehicles and human presence at the landfall. As such, impacts to harbour seals from the nearshore activities have been carried forward for further assessment.

7.4.1.2 Otter Impacts

Otters are particularly sensitive to anthropogenic changes to their habitats, as their coastal habitat use is highly dependent on the presence of freshwater features (Loy et al., 2022). As such, the location of their holts is restricted, and anthropogenic changes to their habitat may have dramatic repercussions, including localised extinctions. Given that otters may be present within the vicinity of the Project activities, there is potential for vessel, vehicle and human presence to result in disturbance to otters during the intertidal works, particularly at the Yell landfall where the cable corridor overlaps with the Yell Sound Coast SAC and SSSI (see Figure 5-1), which are both designated for otter. During terrestrial ecology surveys undertaken in August 2024 in Mossbank and Yell, one otter couch was found within the Mossbank survey area (Purple Plover Consulting, 2024a) while an otter was observed actively fishing off the beach near the northern landfall site in Yell; no holts were found during the survey in Yell (Purple Plover Consulting, 2024b). As such, impacts to otter from vessels, vehicles and human presence in the nearshore area have been carried forward for further assessment.

7.4.2 Injury of Disturbance from Noise Emissions

Underwater noise generated by USBL constitutes the only source of sound with the potential to cause injury or significant disturbance to marine mammals. USBL typically operates in the frequency range of 20 – 33.5 kHz, and as such is audible to all marine mammal species likely to be present in the vicinity of the cable corridor. The USBL source level utilised during the installation activities will be limited to 207 decibel (dB) re 1 Micro Pascal (µPa) (peak).

Noise modelling has been undertaken to identify the potential range (i.e. the straight-line distance from the source) in which noise impacts to marine mammals could occur. This assessment was based on the methods and thresholds provided by the current best practice guidance, as presented by NMFS (2018) and Southall *et al.* (2019). The full noise assessment has been presented in Appendix A; a summary of the results is presented below.

Based on a source level of 207 dB re 1µPa (peak), Very High Frequency (VHF) cetaceans represent the hearing group with the greatest potential impact range for the peak Sound Pressure Level (SPL) metric (36 m at 10 m depth). Conversely, High-Frequency (HF) cetaceans represent the hearing group with the lowest potential impact range for the peak SPL metric. Furthermore, a theoretical risk of injury has been identified with regard to the cumulative sound exposure level (SEL) criteria.

Under the worst-case scenario, the largest injury range resulting from USBL was 104 m for VHF cetaceans (harbour porpoises), when considering cumulative SEL for a stationary animal. For other whale, dolphin, and seal receptors (Low-Frequency (LF), VHF and Phocid Carnivores in Water (PW) hearing groups) the potential injury ranges were significantly reduced. While a theoretical injury risk is identified by the underwater noise modelling, this is based on a cumulative exposure over an extended time period. As such, in order for a harbour porpoise to be at risk of injury, an animal would have to remain within 104 m of the USBL device for a period of several hours. The likelihood of this scenario occurring is extremely low when considering that the source is deployed from a moving vessel, and that animals will tend to move away from sources of acoustic disturbance.

As such, the assessment concludes that there is no realistic risk of injury to marine mammals, resulting from the use of USBL with source levels up to 207 dB re 1µPa (peak).

Whilst no injury impacts are expected, noise emissions have the potential to affect the behaviour of marine mammals in the vicinity of the noise source. Significant or strong disturbance may occur when an animal is at risk of a sustained or chronic disruption of behaviour or habitat use resulting in population-level effects. The potential impacts resulting from USBL noise was modelled in the noise assessment in Appendix A.

Under the worst-case scenario, it was predicted that a behavioural change may occur for marine mammals within 207 m of the cable installation vessel. As such, underwater noise emissions from the use of USBL have the potential to elicit a strong behavioural response in marine mammals which could be classed as a disturbance of EPS offence as defined under Regulations 39(1) or 39(2).

However, for the relevant biogeographical population MU for harbour porpoise, white-beaked dolphin, Risso's dolphin, white-sided dolphin and minke whale, which all occur in the area, this will not result in population levels effects or adverse impact the FCS of the species. This is due to the fact that the noise assessment predicts that less than 0.1% of the biogeographic populations of relevant cetacean species will be impacted by noise-related

disturbance as a result of USBL operations. Moreover, the number of animals within the disturbance range at any one time is predicted to be < 0.1. This means that on average, there will be no marine mammals within the disturbance range for 90% of USBL operations, making potential disturbance impacts at the population level arising from this equipment negligible.

As the vessel and / or the subsea equipment (e.g. an ROV) will generally not be stationary during USBL operations, animals within a particular area will not be exposed to extended periods of underwater noise. Rather, individuals would have to follow the moving equipment to be subjected to lasting or prolonged periods of acoustic disturbance. As such, the exposure to disturbance from USBL operations will be extremely limited in duration, and hence does not have the potential to result in adverse effects at a population or species level.

Given the transient, highly localised and short-term nature of the USBL activities, it is highly unlikely that any disturbance offences from use of USBL would negatively impact upon the FCS of any of the cetacean species which may be present in the survey area. This is on the basis that the modelled level of disturbance is unlikely to affect the ability of any individual animal to survive or reproduce and will not have significant population-level impacts to any marine mammal. As such, no mitigation is required to limit the potential impacts on marine mammals resulting from USBL operations.

The above notwithstanding, it is possible that a small number of cetaceans may experience some level of disturbance for the short period that they encounter the proposed installation activities. As such, an EPS licence is expected to be required for the USBL-related activities which will be conducted during the installation of the Mossbank to Yell installation activities (as per Regulation 39(2)) (Scottish Government, 2024).

Assessment of Impact Significance

As cetaceans are EPS, and therefore afforded strict protection under the Habitats Regulations, and also potentially vulnerable to underwater noise impacts, the sensitivity is assessed as high. There will be no injurious impacts to marine mammals as a result of noise-generating installation activities. However, there is potential for disturbance to marine mammals from underwater noise. Activity-related disturbance is expected to be limited to one or a few individuals of a species and will therefore not result in any adverse impact to the FCS of any marina mammal species. Therefore, the magnitude of effect is assessed as minor, resulting in a minor consequence.

As the impact is not significant, no additional mitigation measures are required. Embedded mitigation measures considered as part of the Project design are listed in Section 4.3

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Minor	Minor

Impact Significance – NOT SIGNIFICANT

7.4.3 Potential Disturbance from Nearshore and Intertidal Activities

There will be a number of vessels present on site during Project activities, including vehicles during intertidal works, which have the potential to result in disturbance risk to seals and otters; however, it is noted that the vessel activity will not be a substantive change from baseline vessel activity within the area.

7.4.3.1 Seal Impacts

Given the overlap between the cable corridor and the Yell Sound Coast SAC, which is designated for harbour seal, there could be impacts on seals from vessels vehicles, equipment, and human presence in the intertidal and landfall areas at Yell. This is especially likely if the work coincides with the pupping season, which is between mid-June to July in Shetland (SCOS, 2022). Should works overlap with the pupping season this could potentially give rise to significant disturbance and / or mortality impact to seals present at Yell, due to the potential for separation of mothers and pups. As there are no designated areas for harbour or grey seal at the Mossbank landfall, the impact on seals within this nearshore area are considerably reduced and will not be significant.

NatureScot advised through consultation (on 09/01/2025) that harbour seals tend to use Orfasay (isle at the ness of Copister), east side of Samphrey and the isle of Bigga for haul outs in that area, and so are less likely to be present at the Yell landfall specifically. NatureScot also advised that given the proposed operations will be localised short-term, will not result in permanent seal haul-out habitat loss, and the Project vessels will be slow moving and if appropriate mitigations are followed (e.g., adherence the SMWWC (Table 4-2)) then significant disturbance to seals is unlikely.

As such, considering that proposed operations will be highly localised, transient, temporary in nature and appropriate mitigation will be followed, it is considered that there will be no significant effects on seals.

7.4.3.2 Otter Impacts

Vessel, vehicle and human presence have the potential to disturb otters at the landfall sites. This is due to the potential avoidance of areas at the landfall and intertidal areas where vessels, vehicles and site workers are present. Additionally, disturbance may be caused by temporary habitat change associated with landfall installation activities and equipment placement. Furthermore, as OCT will be utilised at landfalls, this also presents a risk to otter should they enter a trench and become trapped which has the potential to induce additional disturbance.

As detailed in Section 7.3.3, during terrestrial surveys of the landfalls in August 2024, an otter sighting was recorded at close proximity to the Yell landfall and one otter couch was found at the Mossbank landfall. Given this, it is highly likely that otters will be present in the nearshore areas, particularly at the Yell landfall where the cable corridor overlaps with the Yell Sound Coast SAC (and SSSI), both designated for otter.

Although there is the potential for disturbance to otters, this is likely to be greatly reduced, owing to the temporary nature of the nearshore Project activities. As such, no permanent impacts are expected on otter habitats which could induce permanent and irreversible damage.

NatureScot provided advice to SHEPD on otter impact through consultation (on 09/01/2025). NatureScot advised that pre-construction surveys should be undertaken to ascertain if there are any otter holts at the landfall locations

at Yell and Mossbank. Should evidence be found, avoidance of these areas should be adopted to minimise disturbance.

Although no significant impacts to otter populations are anticipated, there is still the potential for disturbance which could constitute an offence under the Habitats Regulations, and as such the following mitigation measures, aligning with the NatureScot advice, will be implemented to minimise any effects:

- Pre-construction otter surveys will be conducted prior to the commencement of the cable replacement operation, and will include the cable landfall areas and a 200 m mitigation zone;
- An appropriately qualified ECoW will be appointed to work with the cable installation personnel and ensure sensitive otter sites are not disturbed;
- Any otter holts, layups and couches will be identified and avoided by a 40 m buffer;
- To mitigate the risk of otters becoming trapped within excavated trenches at the landfalls, ramps will be incorporated into trench designs to ensure otters are able to escape should they enter a trench; and
- All mitigations will be compliant with terrestrial planning conditions including SHEPD's Otter Protection Policy.

These mitigation measures will minimise any disturbance to otters, or the habitats that they depend on. The above notwithstanding, it is possible that a small number of otters may experience some level of disturbance for the short period that they encounter the proposed installation activities. As such, if evidence of otters is found during pre-construction otter surveys, SHEPD will consult with NatureScot to ascertain whether an EPS licence for otter disturbance is required for nearshore activities.

Assessment of Impact Significance

There is potential for disturbance risk to seals and otters from the presence of vessels and vehicles during installation activities as well as from the excavations of trenches. Due to the potential vulnerability of seals to disturbance impacts during breeding and moult periods, combined with the protection afforded to seals under the Marine Scotland (2010) Act, seals are assessed as having a high sensitivity. Similarly, due to the protection afforded to otters as EPS, and the potential vulnerability to changes in their coastal habitat, otters are also assessed as having a high sensitivity.

With the implementation of the proposed embedded mitigations (e.g., adherence to the SMWWC code) no adverse impacts to harbour seals are anticipated. Additionally, as there is no overlap with grey seal breeding sites, there will be no adverse impacts on grey seal.

Similarly, with the implementation of the proposed mitigations for otter (including pre-installation surveys, employment of an ECoW, mitigation distances to holts, layups and couches and incorporation of ramps in trench design to facilitate egress, any disturbance to otters will be minimal, including at Yell where the cable corridor overlaps the Yell Sound Coast SAC and SSSI designated for otter.

Therefore, the magnitude of impact is assessed as minor, resulting in a minor consequence. Embedded mitigation measures considered as part of the Project design are listed in Section 4.3

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Minor	Minor

Impact Significance – NOT SIGNIFICANT

7.4.4 Operation

SHEPD will conduct routine inspections and surveys of the cable throughout its operational life to ensure it remains in good condition (please refer to the OIMD strategy submitted alongside this MEA). There is a potential for remedial cable repair works to be required, in the event the cable is damaged or the need for additional stabilisation materials is identified during the routine surveys' however, this would be subject to a separate licensing process.

If required, impacts on marine megafauna resulting from cable repairs will be analogous to those occurring during installation, although significantly reduced on both spatial and temporal scales. As such, impacts during the operational phase are considered to be not significant.

Underwater noise from routine inspections and surveys of the cable will have the potential to affect marine mammals, however these will be consented separately through the EPS licence regime and are not considered further.

Vessel, vehicle and human presence have the potential to disturb seals and otters in the nearshore areas. Although there is the potential for disturbance to both seals and otter, this is likely to be greatly reduced, owing to the highly temporary nature of the nearshore Project activities during operations. As such, no permanent impacts are expected on otter habitats which could induce permanent and irreversible damage.

7.5 Conclusion

Underwater noise emissions have the potential to affect marine megafauna in the area of activities. Noise modelling used to inform the assessment (see Appendix A: Noise Impact Assessment), demonstrates that whilst there may be some disturbance to marine mammals resulting from USBL operations, this is likely to be limited in space and time and should only affect a few individuals of any species.

There will be no injurious impacts to cetaceans, seals or otters as a result of underwater noise from cable installation activities and no requirement to apply for an EPS licence in that respect; however, there is potential for disturbance to cetaceans from USBL use during pre-installation surveys, and therefore an EPS licence application has been submitted alongside this MEA. The disturbance is expected to be limited to one or a few individuals of the local population and will therefore not result in any adverse impact to the FCS of any marine mammal species.

In addition, harbour seals are likely to be present in the intertidal and landfall area at Yell during the pupping season due to the overlap with the Yell Sound Coast SAC which is designated for harbour seal. Given this, there is the potential for significant impacts caused by vehicles, vessels or human presence. Consultation with NatureScot has shown that, in terms of the landfall activities at Yell, harbour seals tend to use Orfasay (isle at the ness of Copister), east side of Samphrey and the isle of Bigga for haul outs in that area. SHEPD has committed to mitigation measures (Table 4-2) which will ensure that no adverse impacts on harbour seals occur.

Furthermore, the proposed installation activities will not result in the catching or killing of seals, and thus the protection provided to grey and harbour seals by the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) will not be breached.

Finally, otters are also likely to be present within the intertidal and landfall areas, based on terrestrial ecology surveys and the overlap of the cable corridor at the Yell landfall with the Yell Sound Coast SAC and SSSI, both designated for otter. As such, there is potential for significant disturbance from vessels, vehicles, equipment and human presence in the nearshore areas. Due to this, a number of mitigation measures have been committed to (which align with advice received from NatureScot) which will significantly reduce the potential for disturbance as described in Sections 7.4.3. As such, impacts on otters are expected to be limited, and will not impair an otter's ability to survive, breed or reproduce, or rear or otherwise care for its young, and there will be no adverse impact on the FCS of otters in the region. Nonetheless, should evidence of otter be identified during pre-construction surveys, SHEPD will consult with NatureScot to ascertain whether an EPS licence for otter disturbance is required for the nearshore works prior to works commencing.

Considering the temporary, transient and localised nature of the activities there are not anticipated to be any significant impacts to individuals or populations of marine megafauna in the area.

8 BENTHIC AND INTERTIDAL ECOLOGY

8.1 Introduction

This Section provides detail on the benthic and intertidal habitats and species located along, and in the immediate vicinity of, the cable corridor. An assessment of potential impacts on key sensitive habitats and species is presented, along with an outline of secondary mitigation measures that will be undertaken in order to ensure impacts are minimised. The impact assessment focuses on habitats and species that are protected or are qualifying features of designated sites which have the potential to be affected by the proposed cable installation activities.

8.2 Data Sources

8.2.1 Desktop Study

Benthic and intertidal habitats and species have been characterised through publicly available geospatial data (Marine Directorate, 2024, EMODnet, 2023) as well as through descriptions provided in the Marine Life Information Network (MarLIN) database (MarLIN, 2024) and Tyler-Walters *et al.*, (2016) descriptions of Scottish PMFs. Additionally, this Section draws on the information presented in the Shetland Island's Marine Region State of the Environment Assessment (Shucksmith, 2017) and the Biosecurity Plan for the Shetland Island's (Collin *et al.*, 2015).

8.2.2 Marine Surveys

Benthic survey data collected in 2018 for the Mossbank – Yell cable route corridor which are presented in the Environmental Habitat Assessment Report (Bibby HydroMap and Benthic Solutions, 2018, hereafter).

8.2.2.1 Geophysical Surveys

Acoustic data were acquired by Bibby HydroMap in geophysical surveys of the proposed cable route in summer 2018 (Bibby HydroMap and Benthic Solutions, 2018). Survey operations were carried out over a 500m corridor (±250m) between Mossbank and Yell. The proposed landfall locations were surveyed by Benthic Solutions Ltd (BSL) at Mossbank and Yell (Bibby HydroMap and Benthic Solutions, 2018).

8.2.2.2 Intertidal Surveys

The intertidal surveys were conducted at two landfall locations, one located on mainland Shetland and one on the Isle of Yell.

The surveys were carried out during the low tide period of a spring tide to identify the habitats at the extreme low water mark in all areas. A handheld Global Positioning System (GPS) device and a digital camera were used to capture habitat and sediment changes in these areas. The type of environment and landscape were captured as well as the species and approximate species coverage (Bibby HydroMap and Benthic Solutions, 2018).

8.2.2.3 Benthic Analysis and Sampling

Benthic surveys were undertaken by BSL supported by Bibby Hydromap (Bibby HydroMap and Benthic Solutions, 2018). The multibeam echosounder and Side Scan Sonar (SSS) datasets collected in previous geophysical surveys were assessed to provide a predictive benthic habitats map (Bibby HydroMap and Benthic Solutions, 2018). SHEPD consulted NatureScot regarding the use of this survey data for this Project and no concerns were noted, particularly as the previous survey data for the 2019 corridor provides coverage of the current proposed cable corridor.

Following the review of multibeam echo sounder and side scan sonar datasets, the seabed was determined to be variable in nature ranging from low energy coarse sand to bedrock and boulders with potential areas of gravel. Sampling stations were selected along the survey corridor in order to ground-truth all acoustic facies evident on the side scan sonar data and, accordingly characterise the full range of sediment types and benthic habitats (Bibby HydroMap and Benthic Solutions, 2018). Ground-truthing was based on a combination of seabed sampling using a Day or Hamon grab, and seabed photography (stills and video) (Bibby HydroMap and Benthic Solutions, 2018).

A total of 34 stations were chosen for habitat assessment and environmental baseline data collection, providing 479 high-quality still images and 205 minutes of continuous video. At these 34 stations, nine sediment samples were taken and described in detail. No attempts to take samples at the remaining stations were attempted due to the presence of bedrock and boulders at the sample sites (Figure 8-2).

8.3 Baseline and Receptor Identification

8.3.1 Overview

The following sections characterise the seabed habitats and species likely to be present along the cable corridor, including the potential presence of sensitive features (e.g. PMFs) and Annex I habitats.

8.3.2 Intertidal Habitats and Species

For the intertidal survey a habitat classification was carried out using the EUNIS classification (JNCC, 2010), based on five components: the general environment (marine or coastal); the nature of the substrata (rock or sediment); the littoral zonation (upper, mid or lower littoral); exposure to waves (from very exposed to very sheltered) and the different floral or faunal species characteristic of community zonation.

8.3.2.1 Mossbank (Mainland Shetland)

Below there is a brief description of the habitats, fauna and flora encountered in different zones:

Supralittoral: The supralittoral zone to the northwest of the corridor was composed of unvegetated mobile shingle beaches above the drift line (B2.2) directly below the terrestrial Shetland peat bog which runs all the way up to the shore unless interrupted by man-made structures. At the central beach area granite boulders laid as beach defences dominate the supralittoral zone. These have been colonised by yellow and grey lichens (B3.111) as is typical of rocks found above the spring high tide line. Directly below this area the littoral fringe boulders have started to become dominated by *Verrucaria maura* (tar lichen) (B3.1132) (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

Littoral sediments: The foreshore, at the centre of the corridor, lead directly from granite boulders with yellow and grey lichens (B3.111) to *V. maura* on littoral fringe rock (B3.1132) to barren littoral shingle (A2.111). Moving further down the beach this started to be colonised by some green algae. In two small patches to the north and to the south areas of oligochaetes in littoral mobile sand were found (A2.222) where the rock formations allowed small, sheltered areas to retain some sand deposition. Above these areas the low energy mixed substrata biotope *Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata (A1.3142) was found. This supports the theory that these small patches are due to localised areas of low energy environment. Areas without the deposited granite boulders showed a distinct shingle beach driftline (B2.1) within the unvegetated mobile shingle beaches that exist directly beneath the peat bog (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

High to moderate energy littoral rocks: The most exposed areas are outcrop of rock to the north and the southern limit of the corridor. They are natural formations that display fucoid zonation. The upper end of the littoral zone is *Pelvetia canaliculata* (channelled wrack) and barnacles on moderately exposed littoral fringe rocks (A1.211). Beneath this zone the dominant algae species becomes *Fucus spiralis* (spiral wrack) on full salinity exposed to moderately exposed upper eulittoral rocks (A1.212). Beneath this the bladder wrack *Fucus vesiculosus* (A1.213) becomes the more successful species. At the northern exposed outcrop, MLWS is occupied by the habitat (A1.123) *Himanthalia elongata* and red seaweeds on exposed lower eulittoral rock. This is one of two areas that have been classified as (A1.1) High energy littoral rock at the southern area was less protruding and dominated by *Fucus serratus* (toothed wrack) and red seaweeds (A1.2141). The other area found to be a high energy environment was at the northern end of the central beach, where a patch of *Semibalanus balanoides* (common rock barnacle) was found with red seaweeds on high energy eulittoral rocks (A1.1132) (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

Moderate to low energy littoral rocks: Most of the shoreline has been classed as a mix of moderate and low energy environments dominated by the usual fucoid species. The central beach and the beach to the west either side of the outcrop are moderately exposed mid eulittoral mixed substrata with *F. vesiculosus* (A1.3132). A small patch of *F. vesiculosus* is found on the granite boulders to the south of the man-made jetty (A1.3131) where the boulders have been placed over the natural mixed substrata. Beneath these layers, toothed wrack and occasional kelp dominate the

flora. The beach areas at the centre and north of the site are formed over mixed substrata (A1.3152), and at the higher energy areas bedrock and boulders dominate (A1.2141) (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

8.3.2.2 Hoga (Yell)

Below there is a brief description of the habitats, fauna and flora encountered in different zones:

Supralittoral zone: The supralittoral zone was composed of peat bog grazing land leading to unvegetated mobile shingle beaches (B2.2). These contained a shingle beach driftline along all their length. The only exception to this was at the moderately exposed area to the south of the site where yellow and grey lichens were found attached to supralittoral rocks (B3.111). In the area directly below the lichen habitat the dominant species was tar lichen creating the zone B3.1132 (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

Littoral sediments: Within the areas topped with unvegetated mobile shingle (B2.2) the littoral shingle continued to be the dominant sediment type throughout the littoral zone. Large parts of the beach were barren littoral shingle (A2.111). A few patches of the habitat oligochaetes in littoral mobile sand (A2.222) were found mixed in with the *F. vesiculosus* on mid eulittoral mixed substrata band (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

Medium to low energy littoral rocks: On the island to the south of the survey area the slightly more exposed coastline comprises mostly of boulders and bedrock and has a thin band of *P. canaliculata* and barnacles on moderately exposed littoral fringe rock (A1.211) at the top of the littoral zone. Below this is a band of *F. spiralis* on full salinity exposed to moderately exposed upper eulittoral rock (A1.212). In the mid eulittoral rocks the fucoid *F. vesiculosus* dominates, followed by *F. serratus* in the lower eulittoral zone (A1.2141). The entrance to the tidal lagoon is exposed at low tide revealing *Ascophyllum nodosum* on full salinity mid eulittoral mixed substrata (A1.3142) across the causeway, the same habitat appears on a patch of raised cobbles in the north part of the survey area. The sheltered beach inside the lagoon contained *F. spiralis* on upper eulittoral mixed substrata (A1.3122). In this area, nesting terns and a nesting duck were observed at the shingle beach. North of the causeway, the beach continued in a similar pattern with *F. vesiculosus* on mid eulittoral mixed substrata (A1.3132) dominating the mid eulittoral zone, and *F. serratus* (A1.3152) dominating MLWS, before the sublittoral kelp-based communities start to encroach. Normally dominant in the upper eulittoral zone, *F. spiralis* (A1.3122) only occurred in patches and not across the whole length of the beach (Figure 8-1) (Bibby HydroMap and Benthic Solutions, 2018).

8.3.2.3 Notable Habitats and Species (Sensitive or Invasive)

Bibby HydroMap and Benthic Solutions (2018) mentions the presence of five potentially sensitive habitats at Mossbank landfall and four potentially sensitive habitats in Yell landfall. These five habitats are listed in the Bern Convention:

- *Semibalanus balanoides*, *Patella vulgata* and *Littorina* spp. on exposed to moderately exposed or vertical sheltered eulittoral rock (EUNIS A1.1131). Found in Mossbank;
- Oligochaetes in littoral mobile sand (EUNIS A2.222). Found in Mossbank and Yell;
- Shingle beach driftlines (EUNIS code: B2.1). Found in Mossbank and Yell;
- Yellow and grey lichens on supralittoral rock (EUNIS B3.111). Found in Mossbank and Yell; and
- *V. maura* on very exposed to very sheltered upper littoral fringe rock (EUNIS B3.1132). Found in Mossbank and Yell.

No invasive species were identified.

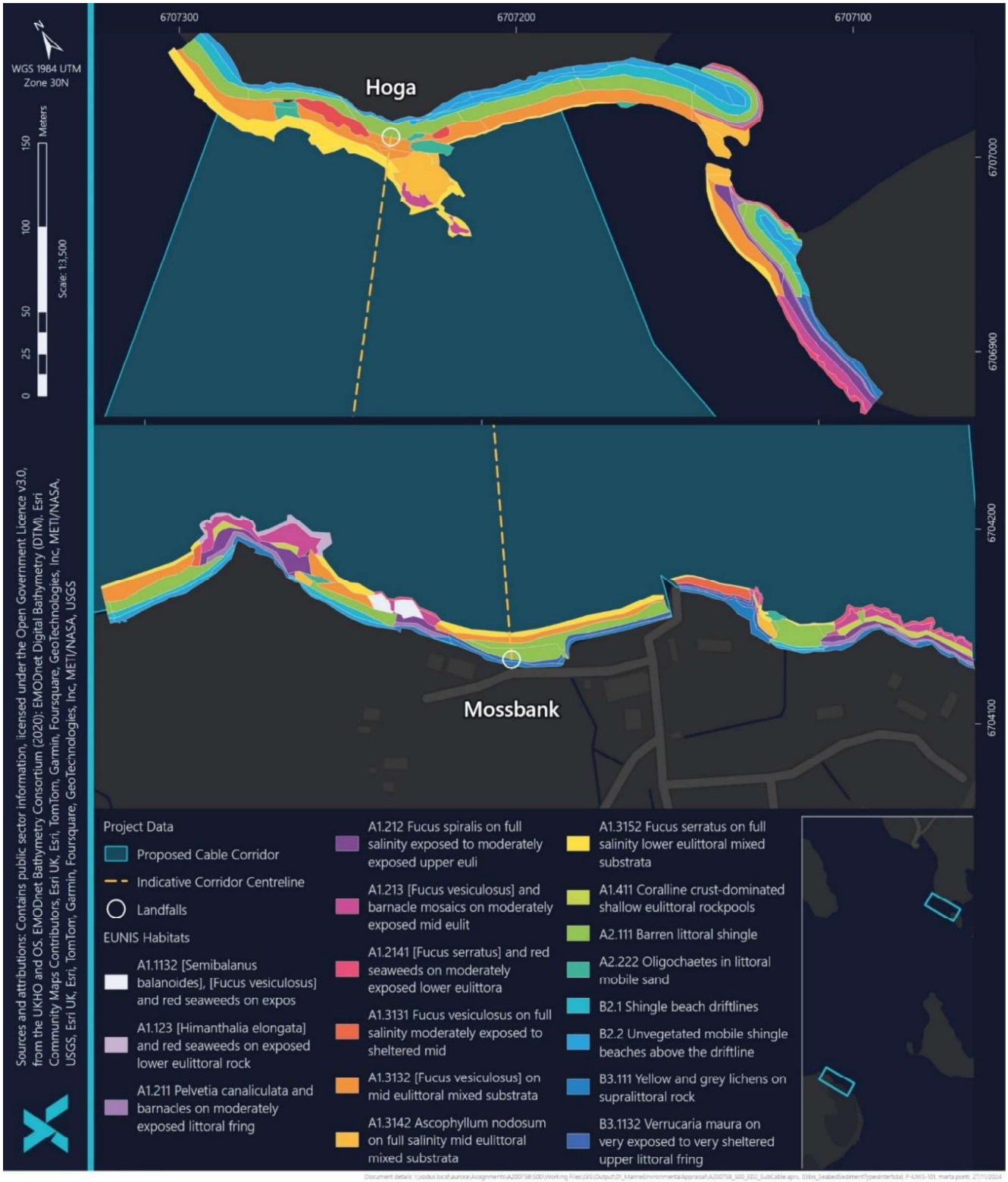

Figure 8-1 Habitat types at the Mossbank and Hoga (Yell) intertidal zones

8.3.3 Subtidal Habitats and Species

Overall, the survey data indicated that the seabed was heterogeneous in nature along the cable route, varying from coarse sediment to areas of cobbles and occasional boulders. Conspicuous fauna was relatively homogeneous across the survey area. Where the substratum formed cobbles and rocks, the macrofaunal community was enhanced by epifaunal species such as kelps, hydroids, and cnidarians. Free-swimming megafauna was limited (Bibby HydroMap and Benthic Solutions, 2018). Below there is a summary of habitats recorded along the Mossbank – Yell survey area.

Cobble field colonised by dense Rhodophyta (A3.116 – Foliose red seaweeds on exposed lower infralittoral rock): The four stations where this habitat was recorded (ENV_03, ENV_04, ENV_25 and ENV_30) were located close to the Mainland Shetland coast where conditions were more sheltered. The habitat type 'A3.116 – Foliose red seaweeds on exposed lower infralittoral rock' typically forms on moderately exposed lower infralittoral rock below the limit of the kelp (Figure 8-2) (Bibby HydroMap and Benthic Solutions, 2018). As well as varied red seaweeds the habitat also contained occasional kelp plants and patches of brown foliose seaweed *Dictyota dichotoma*. The fauna generally comprised low-encrusting forms such as polychaetes (*Pomatoceros* spp.,), anthozoans (*Alcyonium digitatum*, *Urticina felina*) and occasional sponge crusts (e.g., *Cliona celata*). Mobile fauna included gastropods (*Calliostoma*), echinoderms (*Echinus*), starfish (*Asterias*) and crabs (*Cancer*) (Bibby HydroMap and Benthic Solutions, 2018).

Laminaria beds over mixed sediment (A3.2131 – *Laminaria hyperborea* forest and foliose red seaweeds on tide-swept upper infralittoral mixed substrata): This habitat was found in stations ENV_01, ENV_02, ENV_13, ENV_14 and ENV_35. The proximity to the coastline of this biotope provided greater protection to the kelp beds from the strong tidal currents which prevail across large sections of the survey area. The rock surface was colonised by a rich fauna comprising Anthozoa (*Urticina*), calcareous tubeworm (*Pomatoceros*) and gastropods (*Calliostoma*). Echinoderms (*Echinus*, *Asterias*, *Ophiothrix*) and crabs (*Cancer*, *Pagurus*, *Necora*). The elasmobranch species, *Mustelus*, was also observed among the kelp fronds at station ENV_21 (Figure 8-2) (Bibby HydroMap and Benthic Solutions, 2018).

Cobble field and sporadic boulders densely colonised by epifauna (A4.21 – Echinoderms and crustose communities): A hard substratum in the form of cobbles and sporadic boulders densely colonised by epifauna was represented in relatively large patches across the survey area. Examples of this sediment were evident in stations ENV_11, ENV_12, ENV_26, ENV_29, ENV_30, ENV_32. In the current survey area, associated fauna within these areas included: common sunstars (*Crossaster*), cnidarians (*Alcyonium*, *Urticina*), and sponges (*Myxilla*) (Figure 8-2) (Bibby HydroMap and Benthic Solutions, 2018).

Cobble field with patchy gravel and little epifauna (A5.1 – Sublittoral coarse sediment (unstable cobbles, pebbles, gravels and coarse sands): The habitat was found at stations located within the tide-swept channel of the survey area. The habitat notably has a low silt content and a lack of significant seaweed components. The scour action present within the tide-swept channel of the survey area prevents colonisation by delicate species and instead the habitat is restricted to the colonisation by two robust species, the polychaete *Pomatoceros triqueter* and the bryozoan *Flustra foliacea* (Figure 8-2) (Bibby HydroMap and Benthic Solutions, 2018).

Coarse sand with high shell debris (A5.44 – Circalittoral mixed sediment): Examples of this sediment was evident in stations ENV_05 to ENV_09, ENV_23 and ENV_33 in the Mossbank – Yell survey area. The epifauna observed in this habitat type was rather impoverished. Instead, the habitat was found to be dominated by a few species including coralline algae, hydroids, and the bryozoan *F. foliacea* (Figure 8-2) (Bibby HydroMap and Benthic Solutions, 2018).

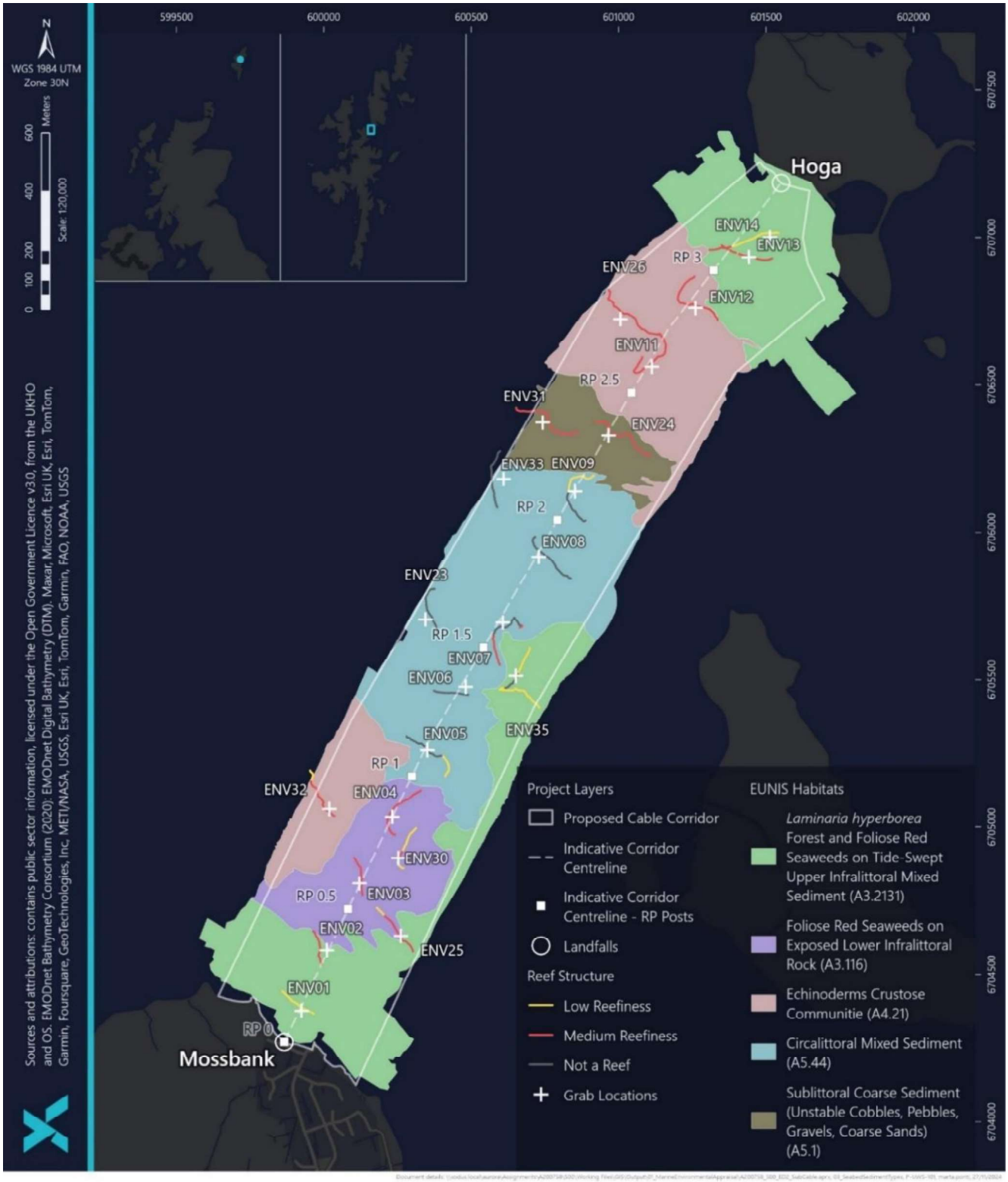

Figure 8-2 EUNIS habitats, grab locations and camera transects showing outputs for Annex I reef assessment (not a reef, medium / low reefiness)

8.3.4 Annex I Habitats

A review of the ground-truthed data throughout the Mossbank to Yell cable route corridor indicated the presence of a potentially sensitive habitat, stony reef. The presence of cobbles and boulders necessitated further investigation to assess whether any areas have the potential to be classified as Annex I stony reef. The underwater imagery was assessed for potential stony reefs using the criteria proposed by Irving (2009). This breaks down the assessment criteria measures of 'quality' or 'reefiness' (Table 8-1).

Table 8-1 Stony reef assessment criteria

Measure of 'reefiness'	Not a reef	Low	Medium	High
Composition	<10%	10-40%	40-95%	>95%
Elevation	Flat seabed	<64 mm	64 mm-5 m	>5 m
Extent	<25 m^2	>25 m^2	>25 m^2	>25 m^2
Biota	Dominated by infauna			>80% of species are epifauna

The review of the ground-truthed data indicated the presence of potentially sensitive habitat 'stony reef' in 14 stations along the Mossbank – Yell cable route corridor (Figure 8-2; Table 8-2):

- ENV_02 (RP 0.5);
- ENV_03 (RP 0.5);
- ENV_04 (RP 1);
- ENV_07 (RP 1.5);
- ENV_11 (RP 2.5);
- ENV_12 (RP 3);
- ENV_13 (RP 3);
- ENV_14 (RP 3);
- ENV_24 (RP 2.5),
- ENV_25 (RP 0.5);
- ENV_26 (RP 3);
- ENV_30 (RP 0.5, RP 1);
- ENV_31 (RP 2, RP 2.5); and
- ENV_32 (RP 0.5, RP1).

The Annex I stony reef assessment found that the sublittoral zone at Mossbank showed 'Low' reefiness close to the shore but increasing to 'Medium' reefiness as the mixed sediment becomes coarser and eventually bedrock and boulders take over the substrata. The centre of the Mossbank – Yell channel was assessed as 'Not a Reef' or of 'Low' reefiness. The deepest part of the survey corridor towards the north of the channel became mixed coarser sediment resulting in a classification of 'Medium' reefiness. This reduced to 'Low' reefiness as the coarser echinoderm and encrusting habitat became dominated by kelp forest closer to the shore.

Table 8-2 Summary of stony reef assessment (after Irving, 2009)

Station	Easting (m)	Northing (m)	Sediment type	Reefiness
ENV_02	599995	6704532	Dense *Laminaria* kelp bed coverage over cobbles and sporadic boulders	Medium
	599987	6704581		
	599987	6704581	*Laminaria* kelp bed coverage over mixed sediment, cobbles and small boulders	Medium
	599964	6704648		
ENV_03	600131	6704769	Cobble field with mixed sediment	Medium
	600131	6704854		
	600131	6704854	Cobble field with mixed sediment and large boulders	Medium
	600103	6704896		
ENV_04	600242	6704975	Cobble field with mixed sediment	Medium
	600237	6705013		
	600237	6705013	Cobble field with mixed sediment and large boulders	Medium
	600330	6705124		
ENV_07	600672	6705684	Cobble field with mixed sediment shell debris consisting of empty *Modiolus modiolus* shells	Medium
	600694	6705686		
	600694	6705686	Coarse sand and mixed sediment shell debris consisting of empty *M. modiolus* shells	Not a reef
	600609	6705662		
	600609	6705662	Cobble field with mixed sediment shell debris consisting of empty *M. modiolus* shells	Medium
	600598	6705549		
ENV_11	601101	6706637	Cobble and boulder field heavily colonised by epifauna	Medium
	601137	6706674		
ENV_12	601258	6706867	Cobble and boulder field heavily colonised by epifauna	Medium
	601336	6706720		
ENV_13	601521	6706928	Dense laminaria kelp bed coverage over mixed sediment	Medium
	601456	67069931		
	601456	67069931	*Laminaria* kelp bed coverage over mixed sediment and cobbles	Low
	601407	6706944		
	601407	6706944	*Laminaria* kelp bed coverage over mixed sediment and cobbles	Medium
	601349	6706973		
ENV_14	601543	6707015	*Laminaria* kelp bed coverage over mixed sediment and cobbles	Low
	601384	6706969		

Station	Easting (m)	Northing (m)	Sediment type	Reefiness
	601384	6706969	Cobble field	Medium
	601307	6706957		
ENV_24	600921	6706383	Cobble field	Medium
	600976	6706351		
	600976	6706351	Cobble field with mixed sediment	Medium
	601072	6706281		
ENV_25	600301	6704583	Dense *Laminaria* kelp bed coverage over cobble field	Medium
	600223	6704678		
	600223	6704678	Cobble field with mixed sediment	Low
	600192	6704705		
ENV_26	600933	6706841	Cobble and boulder field	Medium
	601084	6706705		
ENV_30	600269	6704848	Cobble field and mixed sediment	Low
	600261	6704865		
	600261	6704865	Cobble and boulder field	Medium
	600270	6704894		
	600270	6704894	Cobble field and mixed sediment	Low
	600336	6704966		
ENV_31	600666	6706419	Cobble field and mixed sediment	Medium
	600700	6706418		
	600700	6706418	Cobble field	Medium
	600741	6706392		
	600741	6706392	Cobble field and mixed sediment	Medium
	600812	6706350		
ENV_32	600030	6705013	Boulder field	Medium
	599978	6705091		
	599978	6705091	Cobble field and mixed sediment	Low
	599965	6705134		

Bibby HydroMap and Benthic Solutions (2018) mentions the presence of the habitat '*L. hyperborea* forest and foliose red seaweeds on tide-swept upper infralittoral mixed sediment', a habitat that is recorded in the Scottish List of Priority Marine Features (Tyler-Walters *et al.*, 2016).

The Mossbank – Yell cable corridor does not overlap with any designated site for the protection of benthic habitats / species; in addition, no invasive non-native species were recorded in the surveyed subtidal areas (Bibby HydroMap and Benthic Solutions (2018).

8.4 Impact Assessment

8.4.1 Area of Impact

Potential impacts associated with pre-installation and installation activities of the proposed cable, and removal of the OoS cable within the intertidal area of the Yell landfall, include habitat loss and disturbance, introduction of INNS, sedimentation and pollution. The proposed cable, cable stabilisation deposits and spud can / anchor deployments will be in direct contact with the seabed and have the potential for direct impacts on the benthic species and habitats within the Project footprint. The cable corridor will cross a variety of benthic habitats and biotopes as described in Section 8.3. Detailed benthic survey data analysis has taken place to inform route engineering and to identify locations of sensitive seabed features and species. Where the surveys confirm the presence of sensitive benthic receptors in the cable corridor, micro siting will be used to avoid the features where practicable. Use of cable stabilisation materials will be minimised to reduce the seafloor footprint while maintaining adequate protection and stabilisation of the cable. The exact cable location cannot currently be determined and therefore the impact footprint on specific habitat types encountered along the cable corridor cannot be estimated.

As discussed in Section 3, it is expected that the cable will be surface laid along the entire length of the subtidal section of the cable corridor (MLWS to MLWS). In the intertidal areas between MHWS and MLWS, the cable will be buried at both landfalls via OCT. As a worst case, up to 100 m of OoS cables may be removed in the intertidal area at Yell to allow the new cable to be installed in the best approach angle. No subtidal sections of OoS cable are planned to be removed.

The length of cable proposed to be surface laid and buried is summarised in Table 8-3. The lengths and associated impacts of the cable and associated deposits have been included in Table 8-4.

Table 8-3 Burial for the Proposed Cable

INSTALLATION TYPE	LOCATION	EXTENT	LENGTH (M)
Surface laid	Cable Route	Maximum length of surface laid cable (MLWS to MLWS)	3,900
Burial	Yell Landfall	Maximum burial in the intertidal areas between MHWS and MLWS	50
	Mossbank Landfall		50
	TOTAL		100
Total Length	Surface Laid + Burial		4,000

The following worst-case assumptions have been made for the area of seabed impacted:

- Temporary footprint
  - The impact corridor for OCT (~ 1 m) where excavation and the FO and Sea Earths are required in the intertidal area has been assessed based on the length of the cable expected to be buried (+ 10% contingency) with an assumed 20 m wide working corridor;
  - The removal of the OoS cable (100 m) at the Yell landfall assuming a width of disturbance corridor of 30 m;
  - Assume a corridor of up to 3 m wide may be disturbed during PLGR operations, of a length of approximately 3.9 km in the subtidal area; and
  - Spud leg deployment / anchoring areas:
    - DSV will either be deployed with spud legs or mooring lines / anchors;
    - Spud cans: a maximum spud can diameter of 0.914 m has been assumed for a seabed footprint of 0.66 m^2 per spud can (total seabed footprint per placement, assuming 4 spud legs per vessel, is 2.62 m^2). It is considered as a worst case that one spud leg vessel movement (4 spud legs) is required per day (i.e. 2.62 m^2 for one spud leg vessel movement) at each landfall during split pipe installation and cable pull in operations (12 days) (see Mossbank - Yell Emergency Cable Replacement Project Description (A-200758-S00-A-REPT-001). This results in a total area of 31.48 m^2 per landfall (62.96 m^2 in total); and
    - Delta Flipper Anchors: Each Delta Flipper anchor impacts an area of 6.2 m^2 (based on 2.4 m x 2.6 m dimensions), at a quantity of 4 for total area of 24.96 m^2 per landfall or a total area of 49.92 m^2.
- Permanent footprint
  - The surface laid cable has a cross-sectional diameter of 141.6 mm, with a total length of approximately 3,900 m.
  - Cast iron split pipe protection has been assessed based on the total length required for the cable (+ 25% contingency) at 500 m, with a cross-section diameter of 0.260 m;
  - Each 2 t rock bag is assumed to impact an area of 3.8 m^2 (2.2 m diameter);
  - Each 4 t rock bag is assumed to impact an area of 6.2 m^2 (2.8 m diameter);
  - Each concrete mattress measures 6 m x 3 m, therefore impacting an area of 18 m^2 each;
  - Cable protection and stabilisation utilised is likely to be a combination of split pipe, rock bags and concrete mattresses. The cable stabilisation materials are alternatives, and it is not expected that 100% of all the rock bags and mattresses will be used.
  - Clump weights for the Sea Earthing cables are 1 m diameter with a footprint of 0.79 m^2. Rock anchors may be used in lieu of clump weights; however, the footprint of the rock anchors would be less than that of the clump weights and therefore the footprint of the clump weights is assumed as a worst-case scenario.

Table 8-4 Footprint of Cable Installation Methods and Permanent Materials Along the Cable Corridor

INSTALLATION METHOD	DESCRIPTION	AREA OF SEABED IMPACT (m^2)	AREA OF SEABED IMPACT (km^2)
Temporary Footprint			
Removal of OoS cables at Yell intertidal zone	As a worst case, up to 100 m of OoS cables may be removed in the intertidal area at Yell nearshore at both ends to allow the new cable to be installed in the best approach angle. A 30 m wide working corridor has been assumed.	3,000	0.003
OCT Trench Requirements	Total burial (+10% contingency) of 100 m, with a 20 m wide working corridor (noting the trench itself will be 1 m; however, this may be increased depending on the stability of the soils).	2,000	0.002
PLGR (MLWS to MLWS)	The total length of the surface laid cable excluding burial length, assuming a 3 m wide corridor. It should be noted that where cable protection is used, the protection footprint will encompass the PLGR footprint and not add to it.	11,700	0.0117
Spud Leg Deployment / Anchoring Work Areas	Seabed footprint associated with spud leg vessel movements (up to 1 movement per landfall per day during split pipe installation and cable pull in activities (12 days)) and anchoring for the DSV vessel in the nearshore. Assumes 0.914 m diameter spud legs and anchor footprint of 2.4 m x 2.6 m.	112.88	0.000113
	Maximum Temporary Footprint		*0.0168*

INSTALLATION METHOD	DESCRIPTION	AREA OF SEABED IMPACT (m^2)	AREA OF SEABED IMPACT (km^2)
Permanent Footprint			
Surface Laid Cable (MLWS to MLWS)	Total length of 3,900 m with a 0.1416 m (diameter) seabed footprint.	552.24	0.00055224
Split Pipe Requirements	Total length (+25% contingency) of 500 m with a 0.260 m (diameter) seabed footprint.	130	0.00013
Rock bags (2 t)	Each 2 t rock bag impacts an area of 3.8 m^2. The quantity required will be up to 90.	342	0.000342
Rock bags (4 t)	Each 4 t rock bag impacts an area of 6.16 m^2. The quantity required will be up to 40.	246.4	0.0002464
Concrete mattresses	Each 8.75 t mattress impacts an area of 18 m^2. The quantity required will be up to 20.	360	0.00036
Clump weights	Each 60 kg clump weight has a seabed footprint of 0.79 m^2. The quantity required will be up to 20.	15.8	0.0000158
Maximum Permanent Footprint			*0.00165*

8.4.2 Direct Loss of / Disturbance to Benthic Habitats and Communities

Installation activities have the potential to result in direct loss and / or disturbance of benthic habitats and communities, including the sensitive seabed features and habitats as described in Section 8.3.

Temporary habitat loss / disturbance will be associated with installation activities including intertidal trenching and pre-lay debris removal (e.g., PLGRs) and permanent loss / disturbance may result from the surface laying of the cable and potential placement of cable protection and stabilisation deposits on the seabed (i.e., rock bags and concrete mattresses). This may lead to direct habitat loss within the footprint of the cable; however, the hard structures placed during the installation activities represent a substrate to which benthic organisms typically living on hard substrates can colonise. Therefore, there is potential for re-colonisation of the surface laid cable and associated material by epifauna, and habitat loss in this habitat type will only be temporary. As illustrated in Figure 8-2, Annex I reef habitat is likely to be present throughout the cable corridor, as well as the potential presence of other sensitive features (e.g., PMFs); however, the footprint of the installation activities will be highly localised (i.e., up to 0.0168 km^2 temporary and 0.00165 km^2 permanent).

As described above, micro siting will be used to avoid the sensitive features where practicable; however, given the extent of the reef habitat present additional measures are considered, such as minimising cable stabilisation materials to reduce the seabed footprint while maintaining adequate protection and stabilisation of the cable.

Overall given the small footprint of the installation activities, the direct habitat loss / disturbance will result in imperceptible change to the wider available habitat and will not change the ecology of the area, therefore the effect is considered to be minor.

The Bibby HydroMap and Benthic Solutions (2018) mentions the presence of potentially sensitive subtidal habitats along the Mossbank – Yell cable corridor with five of the subtidal habitats having the potential to be classified as Annex I habitats (Section 8.3; Figure 8-2; Table 8-2).

Table 8-5 summarises the sensitivity of these features to 'Abrasion / disturbance of the surface of the substratum or seabed' and 'Physical change to another seabed type', i.e. impacts that are closely related to disturbance and habitat loss of benthic habitats (MarLIN, 2024). In terms of 'Abrasion / disturbance of the surface of the substratum or seabed' sensitivity is low/medium while in terms of 'Physical change to another seabed type' the sensitivity is high.

Table 8-5 MarESA sensitivity assessment for potentially sensitive subtidal habitats in the cable corridor

POTENTIALLY SENSITIVE SUBTIDAL HABITATS	SENSITIVITY TO 'ABRASION / DISTURBANCE OF THE SURFACE OF THE SUBSTRATUM OR SEABED'	SENSITIVITY TO 'PHYSICAL CHANGE TO ANOTHER SEABED TYPE'	REFERENCE
***L. hyperborea* forest and foliose red seaweeds on tide-swept upper infralittoral mixed substrata**	Medium	High	Stamp *et al.* (2023a)
Foliose red seaweeds on exposed lower infralittoral rock	Low	High	Tillin *et al.* (2023)
Echinoderms and crustose communities[2]	Low	High	Stamp *et al.* (2023b)
Circalittoral mixed sediments[3]	Medium	High	Readman and Watson (2024)
Sublittoral coarse sediment (unstable cobbles, pebbles, gravels, coarse sands)[4]	Low	High	Tillin and Watson (2023)

Assessment of Impact Significance

There is potential for Annex I habitats (e.g., stony reefs) as well as sensitive features (e.g., species and habitats listed as Scottish PMFs) to be present within the cable corridor. Given the importance of these features, the overall sensitivity is high.

Sublittoral coarse sediments are widespread in Scottish waters (Tyler-Walters et al., 2016). Tidal swept communities are widespread throughout Shetland and are noted as currently being unaffected by human activity (Shucksmith, 2017).

Overall, a minor shift from baseline conditions is anticipated; however, the impact will be localised resulting in a minor change to a small proportion of the receptor population. Given the extremely localised footprint and the wider availability of these seabed habitats and species, the magnitude of effect is considered minor, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Minor	Minor

Impact Significance – NOT SIGNIFICANT

[2] *Since the habitat 'Echinoderms and crustose communities' itself is not included in MarESA sensitivity assessments (MarLIN, 2024), the biotope 'Caryophyllia (Caryophyllia) smithii, sponges and crustose communities on wave-exposed circalittoral rock' has been used as a proxy.*
[3] *Since the habitat 'Circalittoral mixed sediments' itself is not included in the MArESA sensitivity assessments (MarLIN, 2024), the biotope 'Flustra foliacea and Hydrallmania falcata on tide-swept circalittoral mixed sediment' has been used as a proxy.*
[4] *Since the habitat 'Sublittoral coarse sediment' itself is not included in the MarESA sensitivity assessments (MarLIN, 2024), the biotope 'Glycera lapidum, Thyasira spp. and Amythasides macroglossus in offshore gravelly sand' has been used as a proxy.*

8.4.3 Temporary Increase in Suspended Sediments and Associated Sediment Deposition

The section of the cable in the intertidal areas at Mossbank and Yell will be installed via OCT by land-based excavation. The timing of the works will be tide dependent (working at low water when the intertidal area is exposed). Therefore, there will be no disturbance of submerged sediments. There may be temporary and highly localised increase in suspended sediment caused by the incoming tide and wave action interacting with the trench walls and associated spoil berms. As a worst case, up to 100 m of OoS cables may be removed in the intertidal area at Yell to allow the new cable to be installed in the best approach angle. No other sections of OoS cable are planned to be removed. It is not expected that these activities will result in sediment resuspension and associated deposition effects beyond that which is already found in the area due to the dynamic seabed currents and tidal regime and the activities being very localised.

The habitat complexity of the intertidal zone supports a wide range of species that will demonstrate different sensitivities to increased turbidity and sediment deposition. The resettlement of sediments is expected to occur within the 100 m of the excavation activities in the intertidal zone, and the impacts will be most applicable to sessile and less mobile fauna. Suspension and deposition of fine particles may have an effect on low mobility filter feeders; however, the benthic communities in muddy and sandy sediments will be generally adapted to high sediment loading and have a high tolerance to smothering.

Assessment of Impact Significance

The sensitivity of the varied intertidal community to increased suspended sediment and associated deposition possible during tide and wave action is considered high on a precautionary basis; however, if the impact occurs it will be highly localised and temporary in nature. Therefore, the magnitude of effect is negligible, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Negligible	Minor

Impact Significance – NOT SIGNIFICANT

8.4.4 Impact from Invasive Non-Native Species (INNS)

According to the Biosecurity Plan for the Shetland Islands, there are currently eleven marine INNS identified within the Shetland Islands (Collin *et al.*, 2015). However, the benthic survey data collected in 2018 for the Mossbank – Yell cable route corridor presented in the Environmental Habitat Assessment Report, mention that INNS were not recorded in the surveyed areas (Bibby HydroMap and Benthic Solutions, 2018).

Ballast water discharges from vessels will be managed under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention). Implementation of the BWM Convention will not mitigate the risk of an INNS being introduced via biofouling on a vessel. However, this vector is considered to carry a lower risk of INNS introduction than ballast water and the installation vessel movements are

unlikely to constitute a change from baseline conditions with respect to the potential for introducing INNS. The rock contained within the rock bags will be terrestrially sourced, clean and free from organic material. Concrete mattresses and clump weights will be new, and free from organic material. The protective deposits do not therefore present a risk of transport and introduction of INNS.

Whether a rocky reef feature will be adversely impacted by INNS depends on the severity of threat, likelihood of introduction and likelihood of establishment (Macleod *et al.*, 2016). The likelihood of introduction is based on the potential for installation activities to result in a suitable vector capable of carrying and introducing an INNS. Once introduced, the likelihood of establishment is dependent on the ecological preferences and dispersal potential of INNS within the receiving environment.

Although the severity of the threat is high due to the high sensitivity of the feature, the embedded biosecurity measures, including management of ballast water in adherence with the BWM Convention, will ensure that there are no pathways for INNS to be introduced by the installation activities and subsequently spread. Therefore, the likelihood of introduction of INNS and the likelihood of spread and establishment are reduced to low, and the residual magnitude of effect is negligible.

In addition to the above, larger vessels will utilise anti-fouling measures in order to reduce INNS impacts. Anti-fouling measures also help reduce the fuel consumption of the vessels being used which will in-turn reduce the volume of emissions.

Assessment of Impact Significance

Due to the potential presence of Annex I habitats and Scottish PMFs, the sensitivity is assessed as high. Given that the embedded mitigation measures will ensure that no INNS are introduced and spread as a result of the Project, no residuals impact on benthic habitats and communities are anticipated. Therefore, the magnitude of effect is negligible, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Negligible	Minor

Impact Significance – NOT SIGNIFICANT

8.4.5 Accidental Release of Hazardous Substances

The use of vessels could lead to a fuel release, or of cleaning fluids, oils and hydraulic fluids used on board vessels and during ROV operations, which could be released overboard or accidentally discharged. These discharges can be potentially harmful and can lead to localised organic enrichment and a change in the balance of the food chain. However, as the vessels will be < 12 NM from shore, there will be no discharge of grey water, sewage, food waste or drain water.

All vessels will be compliant with IMO and MARPOL requirements and as such, the risk of oils and other contaminants entering the marine environment is very low. Neither organic enrichment nor oxygen depletion is considered likely, due to the relatively small cumulative volume of any discharges. Any reduced water quality will be short-term and localised in nature along the cable corridor, occurring sequentially with the location of the installation activity, and

near the seabed. A temporary and localised reduction low in water quality is unlikely to cause a detectable change to the benthic species and habitats along the cable corridor.

Assessment of Impact Significance

Due to the potential presence of Annex I habitats and Scottish PMFs, the sensitivity is assessed as high. Given that the embedded mitigation measures will ensure the risk of releases of hazardous substances being released into the marine environment are minimised, impacts on benthic receptors are expected to be minimal. Therefore, the magnitude of effect is negligible, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Minor	Minor

Impact Significance – NOT SIGNIFICANT

8.4.6 Operation

8.4.6.1 Maintenance activities

SHEPD will conduct routine inspections and surveys of the cable throughout its operational life to ensure it remains in good condition (please refer to the OIMD strategy submitted alongside this MEA). There is a potential for remedial cable repair works to be required, in the event the cable is damaged or the need for additional stabilisation materials is identified during the routine surveys; however, this would be subject to a separate licensing process.

If required, impacts on benthic ecology resulting from cable repairs will be analogous to those occurring during installation, although significantly reduced on both spatial and temporal scales. As such, impacts during the operational phase are considered to be not significant.

8.4.6.2 Heating and Electromagnetic Fields

While operational subsea power cables generate heat since they are not made from perfect conductors, and as such in theory could result in increased temperatures in their surrounding environs. However, due to the very high heat capacity of sea water, this effect will be highly localised and limited to the immediate vicinity (the surface) of the cable. As such, the impact resulting from heat emitted by the cable will be wholly within the footprint of the cable, and has therefore been assessed as habitat loss, so is not considered further.

Recent studies have identified potential impact on benthic organisms including crustaceans, which may result from EMFs generated by subsea power cables (Scott *et al.*, 2021; Harsanyi *et al.*, 2022). However, these papers were focussed on cables associated with marine renewables, transmission links and interconnectors which operate at much higher voltages and currents than the proposed cable. The studies found detectable changes in physiology or behaviour, when organisms were exposed to field strength ranging between 500 – 2,800 µT (Scott *et al.*, 2021; Harsanyi *et al.*, 2022). The strength of EMFs from 33 kV subsea cables, similar to that proposed for this project are in the range of 0.5 to 30 µT (Olsson *et al.*, 2010). As such the strengths of EMF resulting from the operation for this project are several orders of magnitude lower than those which have been shown to potentially result in adverse effects on benthic receptors. Furthermore, this should be considered in the context of the natural geomagnetic field

in the area, which is approximately 50 µT (BGS, 2024b). It should be noted that the studies listed above are in relation to Direct Current (DC) cables. EMF effects from Alternating Current (AC) cables, such as those proposed by the Project, are also regarded as being negligible.

As such, EMFs resulting from the cable operation are not anticipated to be of a magnitude which may result in adverse effects on benthic organisms according to the current literature and fall within the natural range of the earth geomagnetic field in the vicinity of the Project. Therefore, no significant effects are anticipated.

8.5 Conclusion

Physical disturbance through seabed preparation, excavation and cable laying activities and smothering of benthic habitat and species via sediment re-suspension and settlement are likely to occur within the footprint of the proposed installation activities. The effects of the proposed installation activities are expected to be highly localised and temporary. Consequently, there will be no significant impact on the benthic and intertidal ecology resulting from the cable installation.

The effects from the proposed operations during the operation and maintenance phase are also expected to be highly localised and temporary. Consequently, there will be no significant impact on the benthic and intertidal ecology resulting from cable operation and maintenance.

9 ORNITHOLOGY

9.1 Introduction

This Section of the report provides further detail on the bird receptors in the vicinity of the proposed cable corridor and presents results from an assessment of potential impacts which may result from the proposed installation activities. Management and mitigation measures to ensure the identified impacts are minimised will also be suggested where necessary.

9.2 Data Sources

This Section draws on a number of data sources including published papers and publicly available geospatial data (Marine Directorate, 2024). Additionally, this Section draws on the Shetland Island's Marine Region State of the Environment Assessment (Shucksmith, 2017).

9.3 Baseline and Receptor Identification

The Scottish coastal and marine environment forms vital habitat to a variety of seabird species (Scottish Government, 2020). While the marine environment forms important habitat to seabirds year-round, birds are most vulnerable to human disturbance at sea during the moulting period when many species become flightless and spend greater time on the sea surface (Scottish Government, 2020). After the breeding season ends, moulting birds disperse from their

coastal colonies to head to offshore waters. This at sea period increases the likelihood of interactions with survey vessels and potential collision risk.

As discussed in Section 5.4.5, there is one designated site with ornithological features within the vicinity of the cable corridor, the East mainland Coast, Shetland SPA (Figure 5-1). The East mainland Coast, Shetland SPA met the criteria as it is located within 2 km of the cable corridor (located approximately 1.8 km). The East mainland Coast, Shetland SPA is designated for the protection of Great northern diver (non-breeding), red-throated diver (breeding) and Slavonian grebe (non-breeding) (NatureScot, 2022). Additionally, through Project engagement with RSPB, it has been advised that the cable corridor landfall at Yell is in the vicinity of an Arctic tern colony.

9.4 Impact Assessment

9.4.1 Installation

The installation activities are planned to occur in summer 2025 and therefore there is potential for installation to coincide with the sensitive peak breeding season for red-throated divers features of the East Mainland Coast, Shetland SPA, if works are undertaken between May and mid- September (NatureScot, 2020). Additionally, as advised by RSPB, the Arctic tern colony near the Yell landfall could be impacted should works occur during the breeding season between May and August. Furthermore, should there be delays to the Project programme, this may coincide with the non-breeding seasons for great northern diver and Slavonian grebe features of the East Mainland Coast, Shetland SPA, when they may be present to roost or feed in close proximity to the cable corridor or the landfalls.

The installation activities are short-lived (48 days) and transient, and there is very low potential for direct disturbance of breeding birds within coastal nesting sites or loafing birds on the sea surface. However, the installation activities do have the potential to affect seabirds at sea, outwith any SPA boundary, due to the mobile nature of the species. However, the proposed installation activities are considered extremely unlikely to result in any adverse effects on the FCS of sensitive ornithological receptors as well as to the Arctic tern colony. This is concluded for the following reasons:

- No adverse effects on water quality (and associated changes to prey availability) are anticipated as detailed in Section 6;
- Cable installation vessels will be slow moving, as detailed in Section 4.3, reducing the potential for disturbance;
- All vessels will adhere to the provisions of the SMWWC during installation activities;
- During night-time operations and intertidal operations, vessel lighting will be minimised in so far as possible whilst allowing for safety, as detailed in Section 4.3. This will reduce the potential for bird strikes or disturbance of seabirds; and
- The waters in the vicinity of the cable corridor are subject to relatively high levels of vessel activity, predominantly associated with ferry and commercial vessel traffic (see Section 11). As such, the presence of the installation vessels required to facilitate the cable installation will not constitute substantive change from baseline vessel activity.

Assessment of Impact Significance

Due to the low likelihood for the presence of breeding birds designated within the proposed cable corridor, and the potential vulnerability of these birds to disturbance during the moulting season, the sensitivity is assessed as high. The East Mainland Coast, Shetland SPA is located 1.84 km from the cable corridor with great northern diver (non-breeding), red-throated diver (breeding) and Slavonian grebe (non-breeding) as designated features. Additionally, RSPB have advised that a colony of Arctic ternmay be present near the Yell Landfall. Given that the presence of the installation vessels and onshore vehicles during intertidal works will not constitute a change from baseline conditions, together with the transient, localised and temporary nature of potential impacts whilst considering the embedded mitigation measures, effects on ornithological receptors are expected to be minor, and no adverse effects on the FCS of any species are anticipated. Therefore, the magnitude of effect is assessed as minor, resulting in a minor consequence.

SENSITIVITY	MAGNITUDE OF EFFECT	CONSEQUENCE
High	Minor	Minor

Impact Significance – NOT SIGNIFICANT

9.4.2 Operation

The cable has been designed to be maintenance free, as such no planned ongoing maintenance activities are proposed. SHEPD will conduct routine inspections and surveys of the cable throughout its operational life to ensure it remains in good condition (please refer to the OIMD strategy submitted alongside this MEA). There is a potential for remedial cable repair works to be required, in the event the cable is damaged or the need for additional stabilisation materials is identified during the routine surveys; however, this would be subject to a separate licensing process.

If required, impacts on ornithological receptors resulting from cable repairs will be analogous to those occurring during installation, although significantly reduced on both spatial and temporal scales. As such, impacts during the operational phase are considered to be not significant.

9.5 Conclusion

Seabird species have the potential to be disturbed by the physical presence of vessels during the installation activities in the intertidal and nearshore areas. The East Mainland Coast, Shetland SPA is located 1.84 km from the cable corridor with great northern diver (non-breeding), red-throated diver (breeding) and Slavonian grebe (non-breeding) as designated features. In addition, the Arctic tern colony near the Yell landfall could be impacted should works occur during the breeding season between May and August. However, given the increase in vessel activity is not considered to be a change from baseline conditions, the temporary, localised and relatively short-term nature of proposed installation activities, the potential impacts on protected seabirds and Arctic tern colony will not result in killing of individuals or disturbance of eggs and nests. Particularly with the implementation of the mitigation measures outlined in Section 4.3, activities are unlikely to significantly impact populations of seabirds.

10 MARINE ARCHAEOLOGY

10.1 Introduction

This Section provides detail on marine archaeological features in the vicinity of the cable corridor. An assessment of potential impacts on these features is then presented, along with recommendations for additional secondary mitigation measures that may be required to ensure losses of or impacts to the archaeological record are minimised.

10.2 Data sources

A review of publicly available information pertaining to marine archaeological sites in the vicinity of the cable corridor has been conducted in order to inform this assessment. The key sources utilised were:

- UKHO wrecks database (UKHO, 2024);
- HES – Canmore and PastMap Databases (HES, 2024a,b)
- Shetland Island's State of the Environment Report (Shucksmith, 2017); and
- Shetland Heritage – Yell brochure (Shetland Amenity Trust, 2024).

Additionally, a review of the 2018 Bibby HydroMap geophysical surveys (Bibby HydroMap, 2018) has also been undertaken to include any relevant archaeological findings.

10.3 Baseline and Receptor Identification

The following archaeological sites have been identified in the vicinity of the proposed cable corridor as detailed in Table 10-1, and shown on Figure 10-1.

Table 10-1 Potential wreck sites at proximity to the cable corridor

NAME / TYPE	UKHO	CANMORE	SHIP TYPE	CIRCUMSTANCE OF LOSS	PROXIMITY TO CABLE CORRIDOR
Unknown Wreck	N/A	290461	19th Century small craft	Small boat upset between Mossbank and Samphray. 4 lost.	0.9 km southeast of cable corridor
Unknown Wreck	1860	327125	19th Century small craft	Small boat upset between Mossbank and Yell. 5 people drowned.	Within cable corridor between RP 0 – RP 0.5.
Unknown Wreck	94	N/A	Unknown	Unknown wreck within Bay of Ulsta, Yell Sound	0.76 km northwest of cable corridor
Unknown Wreck	61409	N/A	Unknown	Unknown wreck, Yell Sound	1.36 km northwest of cable corridor
Unknown Wreck	100577	N/A	Unknown	Unknown wreck within Bay of Ulsta, Yell Sound	0.6 km northwest of cable corridor

All of these wreck locations are listed as tentative, with the precise location of their sinking unknown. However, no evidence of these wreck sites was recorded during the 2018 geophysical surveys within the cable corridor. The SSS data identified 68 contacts recorded as rocks or boulders with no anthropogenic materials noted except the existing cables. The magnetometer survey found 301 anomalies attributed to igneous and metamorphic geological bedrock or existing known cables. Overall, 30 linear features were identified, based on the MBES, SSS and magnetometer surveys, mostly interpreted as cable segments, with some potentially being geological in nature. The sub-bottom profile survey also showed no anthropogenic items (Bibby HydroMap, 2018).

Given the available data and seabed surveys of the cable corridor carried out to date, it considered unlikely that sites of marine archaeological significance are located within the cable corridor, although their presence (such as drifted debris) cannot be ruled out.

There are also no HMPAs within the vicinity of the proposed cable corridor (HES, 2024c).

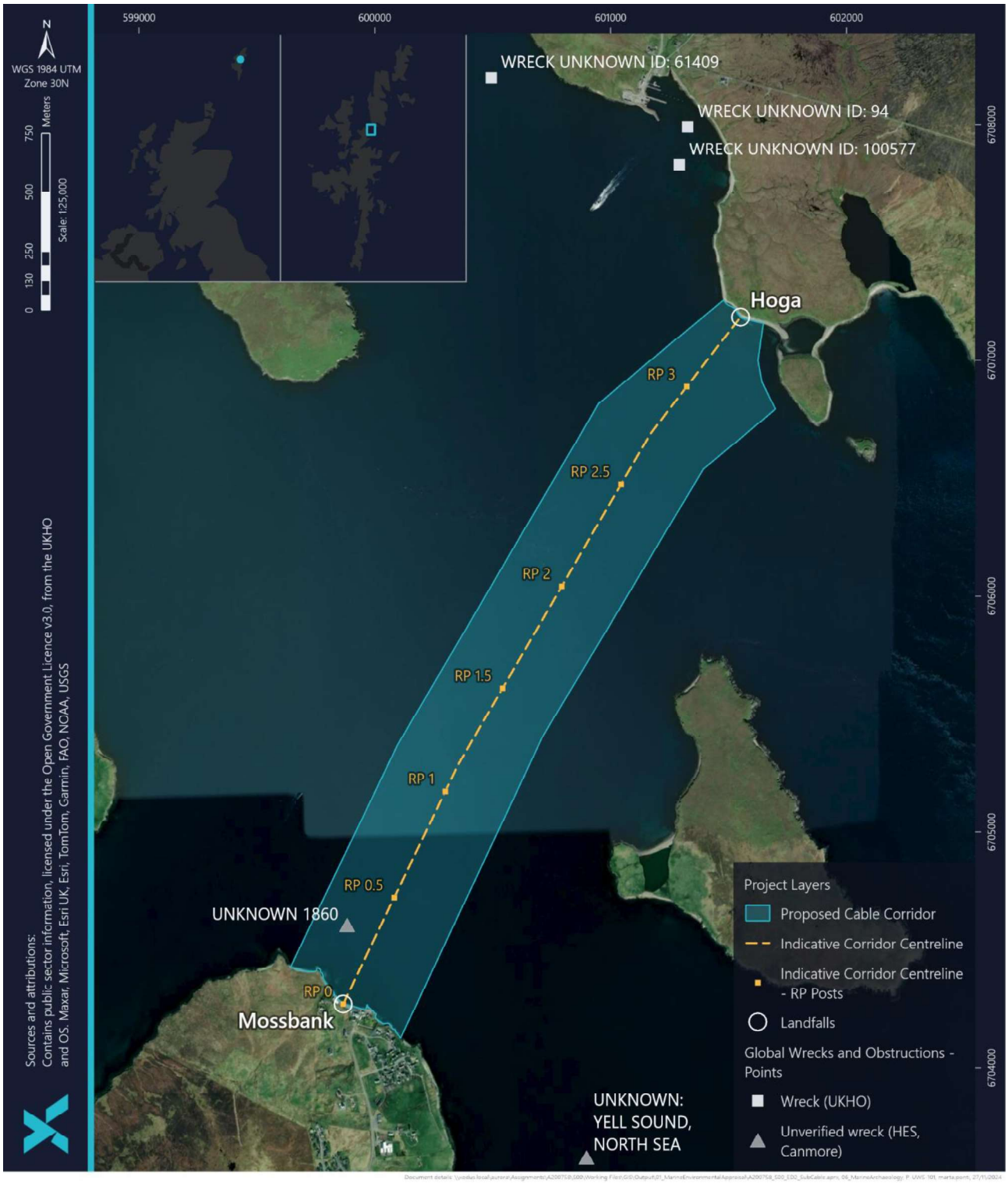

Figure 10-1 Marine Archaeology Wreck Sites within the Vicinity of the Cable Corridor (UKHO, 2024; Canmore, 2024)

10.4 Impact Assessment

10.4.1 Installation

There is one suspected wreck within the cable corridor identified as Unknown 1860 (Canmore 327125), the wreck details note that the wreck is a 19th century craft and that 5 people drowned during the loss of the craft. The location of this wreck is tentative; however, no identification of this wreck was noted during the 2018 geophysical surveys. Given the potential for the cable corridor to overlap with this archaeological feature, the installation activities have the potential to result in damage to or loss of the historic record. This would be limited to interactions with wrecks or artefacts during cable laying operations, and the placement of stabilisation measures. Should such interactions occur, the damage or loss of archaeological features would be a permanent effect on a potentially sensitive receptor, which has no ability to recover, and as such could constitute a significant impact on historic records.

Additionally, there are other unknown wrecks recorded in the vicinity, but out with the cable corridor. There is one wreck site is 0.9 km to the southeast of the cable corridor from the Mossbank landfall. Additionally, there are three more wreck sites to the northeast of the cable corridor, two in the Bay of Ulsta, 0.6 km and 0.76 km, respectively and one farther northeast (1.3 km) from the cable corridor at the Yell landfall end. As these sites are out with the cable corridor, there is no potential for interaction and subsequent effects.

As discussed in Section 3, pre-installation surveys may be undertaken to inform the final routing of the cable identifying any sites of potential archaeological significance prior to the installation. During detailed route design, the following provisions shall be implemented regarding wrecks or other features of potential archaeological value identified in the survey data:

- All confirmed (through geophysical survey) wrecks or features of potential archaeological significance shall be avoided by a buffer of at least 50 m during detailed route design;
- The locations of confirmed wrecks and features of potential archaeological significance will be clearly identified on electronic charts on board the installation vessel and utilised to guide installation activities; and
- The location of any wrecks or features of potential archaeological significance will be provided to HES, and the UKHO.

It is acknowledged that there is the potential that archaeological features could be present within the cable corridor, which are not identified by pre-installation surveys. In order to account for this, if conditioned by licence, a PAD will be implemented during the cable installation activities.

Given the analysis of pre-installation survey data, the avoidance of features of archaeological significance and, if required, the implementation of a PAD during installation activities, it is considered that the installation activities will not result in significant adverse effects on marine archaeological receptors.

Assessment of impact significance

The presence of historic sites (e.g. Wrecks, scheduled monuments) within the vicinity of the cable corridor presents the potential for disturbance / damage to marine archaeological receptors as a result of installation activities. However, given the embedded mitigation as described in Section 4.3, including avoidance of archaeological features through detailed route engineering and implementation of a PAD, if required, no adverse impacts on marine archaeology are anticipated.

SENSITIVITY	MAGNITUDE OF IMPACT	CONSEQUENCE
High	Negligible	Minor

Impact Significance – NOT SIGNIFICANT

10.4.2 Operation

The cable has been designed to be maintenance free, as such no planned ongoing maintenance activities are proposed. SHEPD will conduct routine inspections and surveys of the cable throughout its operational life to ensure it remains in good condition. There is a potential for remedial cable repair works to be required, in the event the cable is damaged or the need for additional stabilisation materials is identified during the routine surveys.

If required, impacts on archaeological receptors resulting from cable repairs will be analogous to those occurring during construction, although significantly reduced on both spatial and temporal scales. As such, impacts during the operational phase are considered to be not significant.

10.5 Conclusion

A review of publicly available data revealed the presence of an albeit unknown, potential wreck site within the cable corridor, as well as a number of sites within 5 km of the cable corridor. As such, it was determined that the proposed installation activities have the potential to result in adverse effects on the historic record. However, given that no evidence of wrecks or archaeological features were identified by the geophysical surveys, and the implementation of the embedded mitigation measures as described in Section 10.4, it is considered to be extremely unlikely that the installation activities would result in the loss or damage of archaeological features. As such this assessment concludes that the Project will not result in any adverse significant impacts on the historic record.

11 COMMERCIAL FISHERIES AND OTHER SEA USERS

11.1 Introduction

Through good communication and understanding of viewpoints, SHEPD aim to minimise any potential impacts by agreeing mitigation strategies before the installation activities begin. This approach continues through all phases of the Project, thus enabling co-existence with other marine users as SHEPD and their Contractors carry out the installation activities. It should be noted that risks to navigational safety are covered in Section 12.

Works are planned to keep unnecessary interference with other legitimate sea users to a minimum. SHEPD achieve this by actively engaging with legitimate sea users and those with consented development rights close to the operations.

SHEPD's consultations and agreements are tracked through the Shetland Regional FLMAP. This is a key document which shows the associated risks to the commercial fishing industry and other legitimate sea users, addresses the potential effects and identifies how to minimise and mitigate potential impacts. SHEPD will give as much notice as is practicably possible for the activities and provides updates when things change.

In terms of third party assets, there is a very slight overlap in the eastern Mossbank intertidal area of the cable corridor with the active BT100 telecommunications cable. Additionally, the open Ulsta dredge spoil disposal site overlaps the western edge of the cable corridor between RP 3 and RP 3.5. These other assets will be considered as part of the detailed routing design for the cable, and asset owners / users will be consulted to facilitate proximity / access agreements where necessary.

11.2 Supporting Documents

11.2.1 Shetland Regional FLMAP

The purpose of the Shetland Regional FLMAP is to:

- Illustrate the associated risks to the commercial fisheries industry (and other legitimate sea users), address the potential effects (highlighted in the marine licenced evidence); and
- Identify how to minimise and mitigate potential impacts on local communities.

A summary assessment of all the potential marine interactions and activities which could influence or affect the proposed installation activities is given in Sections 6 and 7 of the Shetland Regional FLMAP.

11.2.2 FLMAP Delivery Programme

The FLMAP Delivery Programme sets out how the FLO and Fishing Industry Representative (FIR) will communicate during the installation activities and how the deliverables, set out in the FLMAP will be measured and fulfilled. This document will also highlight any regional specific communication and consultation that is required, which may extend

the notice period required to issue NtMs and communicate upcoming works. It will also highlight any ongoing issues which may arise throughout the works.

It is concluded that due to the highly localised nature of the seabed disturbance footprint, the fact that the Project is replacing an existing cable within the licenced cable corridor for the 2019 installed cable (Mossbank – Yell South 2), and the short duration in combination with the embedded mitigation measures, that no significant effects on fisheries, fish stocks, or the associated habitats on which these species depend, are anticipated. The Shetland Fishermen's Association have been consulted with regards the Project, and it is noted that there were no comments raised through this consultation in relation to the proposal.

11.2.3 Co-Existence between SHEPD and Other Marine Users

SHEPD have produced a co-existence strategy, 'How Scottish Hydro Electric Power Distribution co-exists with other marine users'[5]. This document outlines SHEPD's approach to minimising interactions with other marine users as far as is practicable to maximise the potential for coexistence. The key principles of SHEPD's approach to co-existence include:

- Stage 1 - Identifying other marine users, and all relevant stakeholders potentially affected by the Project;
- Stage 2 - Identifying efficient communication channels for the promulgation of information to other marine users; and
- Stage 3 - Engaging and addressing the concerns of other marine users to agree co-existence plans and mitigation activities.

Further details on the specific mitigations to minimise impacts on other marine users (including recreational users and non-fishing vessel traffic) are detailed within the Shetland Regional FLMAP. It is noted that the cable corridor is located adjacent to the mainland Shetland to Yell ferry route, which is a lifeline ferry service. However, given the short duration of installation activities (i.e. 48 days) there will be no long-term impacts to recreational users (and no adverse impact to navigational safety), see Section 12 for further details. Furthermore, the Project partially overlaps with the active BT100 telecommunications cable at the Mossbank intertidal area and partially overlaps the open Ulsta dredge spoil disposal site (between RP 3 and RP 3.5). Any potential impacts to these third party assets will be mitigated though the necessary agreements with the site operators, i.e., NtMs, and proximity agreements, if required. Additionally, due to the short and localised nature of cable installation, it is not anticipated this will lead to any impacts on these sites and is therefore not anticipated to result in significant adverse impacts.

11.3 Approach to Mitigation

A summary of SHEPD's approach to mitigating interactions with commercial fisheries and other sea users during the installation and operation of the proposed cable replacement is presented in Table 11-1 below.

[5] https://www.ssen.co.uk/globalassets/about-us/projects-and-live-works/subsea-cables/how-shepd-co-exists-with-other-marine-users.pdf.

Table 11-1 Summary of Mitigation for Commercial Fisheries and Other Sea Users

MEASURE	DETAILS
NtMs (including local), Kingfisher bulletins, Radio Navigational Warnings, and/ or broadcast warnings will be promulgated in advance of any proposed works the notices will include the time and location of any work being carried out, and emergency event procedures.	Ensure navigational safety and minimise the risk of equipment snagging. The NtMs will be distributed via the Sullom Voe Harbour Authority. Notices will also be issued if any large boulders are relocated within the licenced installation corridor.
Consultation with commercial fishing stakeholders to identify acceptable and feasible mitigation options with the aim of minimising potential effects on commercial fishing.	There are various options available to mitigate the risks, including: • Continuing effective positive liaison with commercial fishing stakeholders through the pre-installation, installation and operational phases of any cable replacement; • Continued employment of FLO services until the completion of the replacement works; • Ensuring contractors comply with the contractor's obligations outlined above so as to minimise any interference to commercial fishing activities; • Managing the cable replacement works so as to minimise any potential effects on the marine environment, habitats and commercial fishing; • Raising awareness of the danger of fishing in the vicinity of submarine cables; • Adopting a hierarchical approach to submarine cable protection, taking account of sea users concerns; • Organising an installation phasing workshop to inform commercial fishermen of planned activities; • Organising installation schedules as far as is possible to reduce the combined loss of fishing area associated with safety zones; • Distributing weekly notice of operations; • Providing information in plotter format to enable fishermen to easily interpret the information; and/or • Scouting surveys to identify potting areas and any other relevant static gear areas.
Avoidance of trawling and anchoring	In line with guidance provided by the UKHO, the IMO and the MCA within the Mariner's Handbook (NP100), and MGN 661, SHEPD recommend that vessels should avoid demersal fishing and anchoring in proximity to subsea cables.
A FLO will be employed to manage interactions between cable installation vessels, personnel, equipment, and fishing activity.	Employment of a FLO will ensure all commercial fisheries operators in the vicinity of the Project will be proactively and appropriately communicated with in terms of the proposed Project operations. This will be managed through the Shetland Regional Fisheries Liaison Management Plan.

MEASURE	DETAILS
Compliance with IRPCS (IMO, 1972) and SOLAS.	IRPCS are the international standards designed to ensure safe navigation of vessels at sea. All installation vessels will adhere to these rules, including displaying appropriate lights and shapes. SOLAS is an international maritime treaty which sets minimum safety standards in the construction, equipment and operation of merchant ships. The convention requires signatory flag states to ensure that ships flagged by them comply with at least these standards. In relation to the cable installation its compliance will ensure navigational safety.
Aids to Navigation	In consultation with the NLB and subject to their Statutory Sanction, it will be determined whether any additional marker beacons (4 m poles with 2.5 m tall yellow flash mark diamonds) are required for established landfalls. These markers will be inspected and maintained for the life of the cable.
Guard Vessels and Recommended Clearance Zone (RCZ)	A guard vessel or small support vessel, marshalling a 500 m RCZ may be used during the installation campaign where a potential risk to the asset or danger to navigation has been identified. The requirement for a guard vessel will be considered through consultation with the Sullom Voe Harbour Authority and Installation Contractor. The RCZ may be reduced to 250 m (or other agreed distance) for the Yell Ferries and vessels carrying Sullom Voe Harbour Authority pilots. This will be implemented through ongoing communications and agreements between the Sullom Voe Harbour Master, the Yell ferry operator, SHEPD and the cable installation contractor
As built survey data will be provided to the UKHO and Kingfisher for inclusion on Admiralty Charts and the KIS-ORCA Charts	Ensure navigational safety and minimise the risk of equipment snagging.
Proactive engagement with SIC Ports and Harbours	Ongoing consultations with SIC ports and harbour authority ensure continued awareness and communication of installation and harbour specific details relevant to minimising disruption.
Proactive engagement with SSMO and SFA	Ongoing consultation with SSMO and SFA to discuss the potential impacts as a result of the installation activities.
Proactive engagement with regular runners including ferry operators	Engagement with ferry operators and regular runners ensures awareness of the installation details which minimises disruption
Deconfliction of activity schedules with ferry schedules	Installation maintenance and decommissioning schedules arranged to minimise impact on ferry schedules. This may extend to working in night-time hours where practicable.

12 SHIPPING AND NAVIGATION

12.1 Introduction

The proposed cable corridor is located in the Yell Sound and as such there are a number of navigational considerations required to facilitate the installation and operations of the cable. Through good communication and understanding of stakeholder requirements, SHEPD aim to minimise any potential impacts shipping and navigation by agreeing mitigation strategies before the installation activities begin. This approach continues through all phases of the Project, thus ensuring that all impacts to navigation are not significant.

A consultation meeting was held with SIC (harbour master and ferry operators) to understand key concerns to navigation from the Project, which has supported the assessment of impacts. The following impacts have been considered for the Project:

- Vessel collision (Third party vessel with project vessel) during installation, maintenance and decommissioning;
- Disruption to established vessel routes and areas during installation, maintenance and decommissioning;
- Interactions with vessel anchors during installation, maintenance and decommissioning
- Interactions with vessel anchors during normal operations;
- Interactions with fishing gear during installation, maintenance and decommissioning
- Interactions with fishing gear during normal operations;
- Reduction in under keel clearance during; and
- EMF effects and compass deviation.

Full details of the navigational assessment are provided in the HLNRA (document reference A-200758-S00-A-REPT-003), which has been submitted alongside this MEA. A summary of the HLNRA is provided in the subsequent sections.

12.2 Supporting Documents

A HLNRA has been undertaken for the Project to ascertain the risks to shipping and navigation for all phases of the Project, including installation, operations, maintenance and decommissioning.

The HLNRA was undertaken based on a Marine Traffic Study (MTS) established by undertaking a review of historic Automatic Identification System (AIS) data for a 5 NM corridor around the proposed cable corridor (the study area).

Following the MTS, a high level FSA was conducted in line with IMO 2018 guidance (IMO, 2018) and the MCA Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations (OREI) (MCA, 2021). The FSA identified hazards for the Project and provide an assessment of associated risks of these hazards and provide recommendations for further mitigations where required to ensure risks were As Low as Reasonably Practicable (ALARP).

Full details of the HLNRA, including methodology and outcomes of the FSA are provided in the HLNRA (document reference A-200758-S00-A-REPT-003), which has been submitted alongside this MEA.

12.3 Navigational Features and Baseline Shipping

A summary of the key navigational receptors and shipping baseline are provided below, with full details available in the HLNRA.

12.3.1 Navigational Features

The cable corridor for the Project is fully contained within the Sullom Voe Harbour Authority jurisdiction. A number of navigational features have been identified at proximity to the cable corridor, as per the HLNRA, including:

- The Yell ferry route (between Toft and Ulsta), is situated approximately 280 m west of the proposed cable corridor at the closest point. The ferry route runs broadly parallel to the cable corridor;
- The cable corridor intersects with several existing cables and pipelines, including the faulted SHEPD 2009 cable, the active SHEPD 2019 cable, and the BT 100 telecommunications cable. Cable marker beacons mark the start and endpoints of these cables at the landfalls. A number of pipelines are located outwith the cable corridor, the closest being the TAQA Cormorant A to Sullom Voe active pipeline, located 1.2 km southeast of the cable corridor;
- As noted in Section 10, there is one suspected wreck within the cable corridor (230 m north from the Mossbank landfall) identified as Unknown 1860 (Canmore 327125). However, no evidence of this wreck site was found during the 2018 geophysical surveys (Bibby HydroMap, 2018). No other wrecks are present within the cable corridor although a few unknown wreck sites are noted outwith the cable corridor; and
- A single obstruction (an underwater rock of unknown depth) is noted from public data at the Yell landfall.

All navigational features within proximity to the cable corridor are shown in Figure 12-1.

12.3.2 Baseline Shipping

The MTS highlighted from the AIS data that between 01 September 2023 and 31 August 2024, 14,180 vessel tracks were recorded in the 5 NM study area and 2,626 in the cable corridor, involving 309 unique vessels and 350 routes. The busiest routes were the Ulsta (Yell)–Toft and Toft–Ulsta (Yell) ferry services. Vessel activity peaked in autumn and winter, with passenger vessels being the most frequent. February was the busiest month, while May and June were the quietest. Significantly fewer vessels were identified at night, with a 50% reduction in the study area and 61% in the cable corridor.

The AIS data highlighted that vessel tracks observed within the 5 NM study area and the cable corridor were from cargo and tankers vessels, fishing vessels, offshore industry vessels, recreational vessels, passenger vessels and other vessels. A summary of the vessel track data across the study area is provided below:

- Passenger vessels are the most frequently observed vessels within both the 5 NM study area and the cable corridor, accounting for 58.3% and 71% of total tracks across each area respectively. The ferries were the most frequently occurring vessel type within the passenger vessel category;
- Cargo vessels and tankers (accounting for 15.7% of the tracks in the study area) were mainly observed during the day, with cargo vessels being the predominant sub-category;

- Other vessels (including dredging vessels, military vessels pilot vessels, tugs etc) accounted for 16.5% of tracks in the 5 NM study area and mostly these tracks comprised of tug vessels;
- Fishing vessels (accounting for 8.1% of the tracks in the study area) were also primarily observed during the day, with a significant proportion being fish carriers, which do not engage in fishing activity. Additionally, tracks within the cable corridor are straight in nature, suggesting that the vessel are in transit, and not actively engaged in fishing in the corridor. However, it's is noted that due to their size, smaller inshore and creel fishing vessels are less likely to have AIS equipment installed, and therefore may be under-represented in the data;
- Recreational vessels accounted for 1.3% of the tracks in the study area, with sailing vessels being the most common sub-category; and
- The least common vessels were offshore industry vessels, accounting for just 0.2% of tracks within the study area.

The vessel track type and density data within the study area is presented in Figure 12-2.

Figure 12-1 Navigational Features in the vicinity of the proposed cable corridor

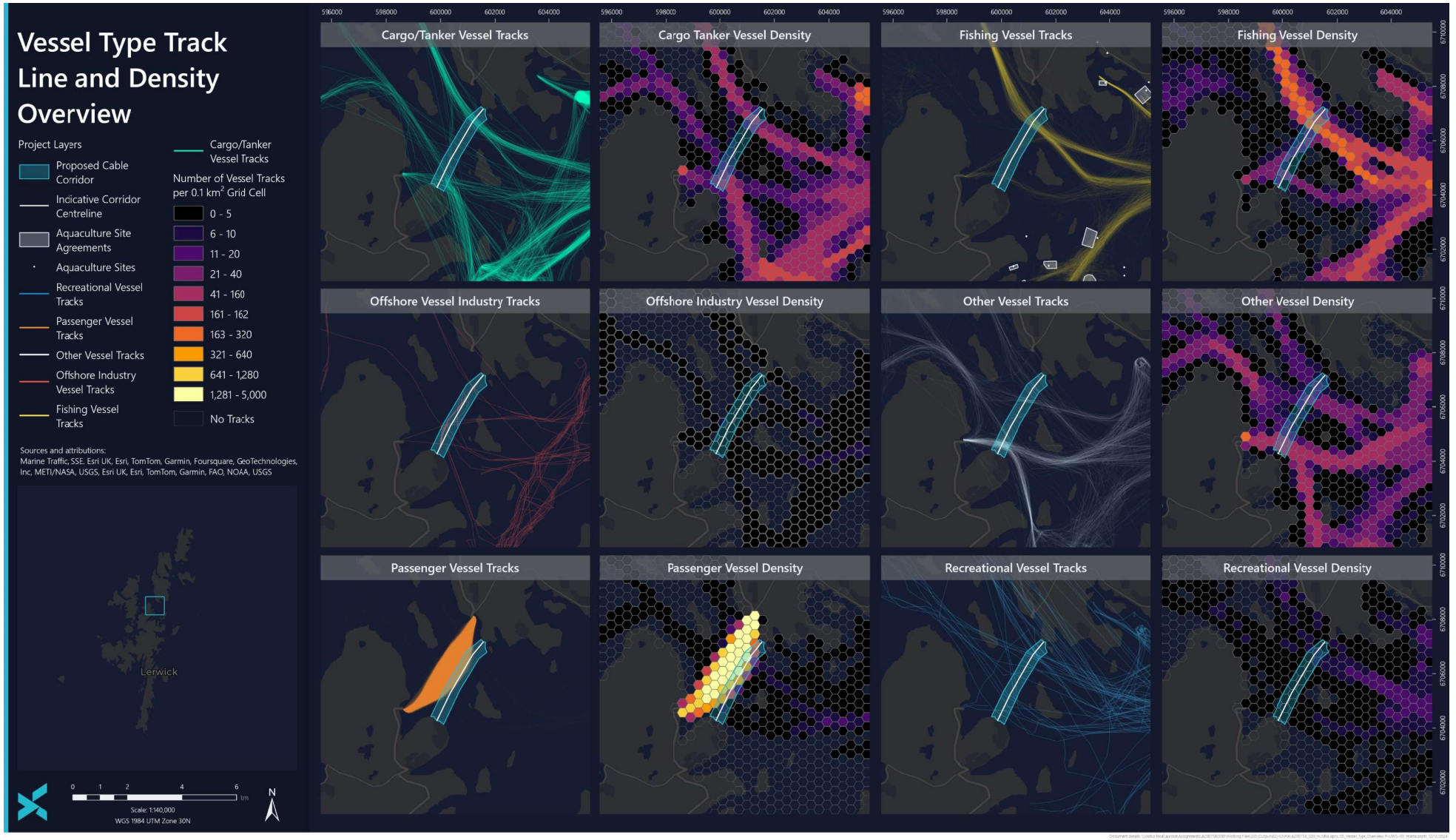

Figure 12-2 Vessel type track line and density overview

12.4 Approach to Mitigation

The FSA within the HLNRA undertook an assessment of identified impacts/ hazards (as detailed in Section 12.1). The assessment took the Project navigation safety specific embedded mitigations into account, as laid out in Table 4-2 and Table 11-1.

12.5 Assessment Outcomes

From the assessments undertaken in the HLNRA, a summary of the FSA outcomes is provided in Table 12-1: Full details of the FSA is provided in the HLNRA (document reference A-200758-S00-A-REPT-003).

Table 12-1 Navigational Risk Assessment Results

HAZARD / IMPACT	LIKLIHOOD	CONSEQUENCE	INITIAL RISK	RESIDUAL RISK
Vessel Collision – Installation, Maintenance and Decommissioning	Remote	High	Tolerable	ALARP
Disruption to Established Vessel Routes and Areas – Installation, Maintenance and Decommissioning	Remote	Medium	Broadly Acceptable	ALARP
Interaction with Vessel Anchors – Installation, Maintenance and Decommissioning	Remote	Medium	Broadly Acceptable	ALARP
Interaction with Vessel Anchors – Normal Operations	Remote	Medium	Broadly Acceptable	ALARP
Interactions with Fishing Gear – Installation, Maintenance and Decommissioning	Remote	High	Tolerable	ALARP
Interactions with Fishing Gear – Normal Operations	Remote	High	Tolerable	ALARP
Reduction in Under Keel Clearance – Normal Operations	Remote	Low	Broadly Acceptable	ALARP
EMF and Compass Deviation Effects – Normal Operations	N/A	N/A	No Risk	No Risk

12.6 Conclusions

The Mossbank to Yell Cable Replacement project involves installing cables through a busy navigation channel, posing potential hazards due to the limited manoeuvrability of installation vessels.

From the assessments undertaken, one hazard identified 'no risk', whilst four were assessed as being 'Broadly Acceptable' therefore, no further consideration of risk reduction measures is necessary for these hazards. The remaining three were assessed as 'Tolerable if ALARP' and therefore required further consideration. However, no additional risk reduction measures above the embedded mitigations as laid out in Table 11-1 were considered appropriate, and no recommendations have been made following the assessment.

Overall, given the short duration of the operation, and because the cable will be laid within an area with existing subsea cables, which avoids designated anchoring zones, no significant impacts are anticipated. This is particularly evident given the adherence of the Project to international regulations which ensure safety along with other embedded mitigations listed in Table 11-1, including ongoing engagement between SHEPD, SIC and ferry operators to agree protocols such as RCZs. The assessment therefore determined that all risks to navigation associated with the Project are considered ALARP.

13 CONCLUSIONS

The MEA supports SHEPD's application for a marine licence and works licence to complete the required installation activities proposed to take place in summer 2025. It provides a robust assessment of potential impacts of the installation activities on groups of sensitive environmental receptors (Sections 5 to 12). Where relevant, these impact assessments have considered interactions with protected sites, and indirect impacts on other receptors. Specifically, environmental assessments of potential impact from the proposed installation activities have been carried out for the following receptors:

- Designated sites;
- Seabed and Water Quality;
- Marine Megafauna;
- Benthic and Intertidal Ecology;
- Ornithology;
- Marine Archaeology;
- Commercial Fisheries and Other Sea Users; and
- Shipping and Navigation.

Table 13-1 provides an overview of the findings from the environmental assessments undertaken within this MEA. Based on the findings and recommendations of the impact assessments presented in Sections 5 to 12, and the embedded mitigation requirements discussed in Section 4.3: Mitigation Requirements, it is anticipated that the installation activities, will be conducted without significant impact on any relevant environmental receptor.

Table 13-1 Outcomes of Environmental Assessments of Receptors

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Designated Sites (Section 5)	SACs with Harbour or Grey Seal as a Qualifying Feature *(Yell Sound Coast SAC)*- ***Underwater Noise***	No LSE	Due to the temporary and localised nature of the proposed installation activities as well as the results of the underwater noise modelling which highlights a limited disturbance range (see Appendix A), there is no potential for LSE from underwater noise impacts on harbour seal within the Yell Sound Coast SAC. As such, it is not expected an AA will be required for this impact.	No LSE	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	No LSE
	SACs with Harbour or Grey Seal as a Qualifying Feature *(Yell Sound Coast SAC)*- ***Nearshore Activities***	Potential LSE	There is the potential for LSE on harbour seal features of the Yell Sound Coast SAC due to the overlap of the cable corridor at the yell landfall and proximity to nearshore activities should they occur in the sensitive pupping season. However, due to the implementation of mitigation measures (e.g. use of the SMWWC) there will be no AEOSI or adverse effects on the conservation objectives of the SAC.	No AEOSI		No AEOSI

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Designated Sites (Section 5)	SACs with otter as a Qualifying Feature *(Yell Sound Coast SAC / SSSI)- **Nearshore Activities***	Potential LSE	There is the potential for LSE on otter features of the Yell Sound Coast SAC due to the overlap of the cable corridor at the yell landfall, the known presence of this feature and the proximity to nearshore activities. However, due to the implementation of specific mitigation for otters, as detailed in Section 4.3, no AEOSI or adverse effects to the conservation objectives of Yell Sound Coast SAC is predicted with respect to otter features.	No AEOSI		No AEOSI
	SPAs and NCMPAs with Birds as Qualifying Features *(East Mainland Coast, Shetland SPA) – **Vessel Presence***	No LSE	Vessels within the cable corridor have the potential to cause visual disturbance to seabird features of the East Mainland Coast, Shetland SPA. However, vessels will be travelling at slow speeds and vessel activity will not be a substantive change from baseline vessel activity within the area. Installation activities will be short-lived and localised, and disturbance will be limited to the immediate area around the project vessels, reducing impact on the SPA. Mitigation measures include directed and minimal lighting to reduce light disturbance and compliance with SMWWC provisions. As such, there is no potential for LSE, and it is considered an AA is not required.	No LSE		No LSE

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Seabed and Water Quality (Section 6)	Coastal and Subtidal Sediment Suspension and changes to water and sediment quality	Minor	Due to the temporary nature of the installation activities no adverse effects are anticipated with regard to sediment suspension and water quality. Intertidal works will be conducted during low tide. Any sediment suspension from subtidal works will be temporary and, as Yell sound is a high energy environment, sediments will quickly be dispersed and resettled.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant
Marine Megafauna (Section 7)	Injury or Disturbance from Noise Emissions	Minor	Underwater noise is considered the impact mechanism most likely to affect marine megafauna in the proposed area of activities. Noise modelling used to inform the assessment, presented in Appendix A, demonstrates no realistic risk of injury to any species exists resulting from USBL operations. While there may be some disturbance, this is likely to be limited in space and time and should only affect a few individuals of any species. SHEPD has applied for an EPS licence alongside this MEA for disturbance to cetaceans. Given the transient, localised and temporary nature of the activities with the mobile nature of marine mammals, there are not anticipated to be any significant impacts to individuals or populations of marine megafauna in the area.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Marine Megafauna (Section 7)	Potential Disturbance from Nearshore and Intertidal Activities	Minor	The presence of vessels during installation activities, including vessels, vehicles, equipment and human presence during intertidal and landfall works, have the potential to result in impacts to seals and otters. Given the overlap at the Yell landfall with the Yell Sound Coast SAC, should works overlap with the pupping season of harbour seal this could potentially give rise to significant disturbance and / or mortality impacts. With the implementation of mitigation measures (Table 4-2, Section 7.4), the magnitude of impact will be minor, and no adverse significant impacts will occur. Additionally, vessel, vehicle and human presence have the potential to disturb otters at in the nearshore areas given their known presence and considering the overlap at Yell landfall with the Yell Sound Coast SAC/ SSSI which is designated for otter.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Marine Megafauna (Section 7)	Potential Disturbance from Nearshore Activities (Continued)	Minor	To reduce potential disturbance from nearshore activities, mitigation measures for otters will be implemented, including pre-construction otter surveys, and employment of an ECoW to ensure otter holts, layups and couches will be avoided by 40 m. Additionally, to mitigate the risk of otters becoming trapped within excavated trenches at the landfall, ramps will be incorporated in the trench design to allow egress. Whilst no injury to otters is anticipated, disturbance cannot be ruled out and as such should evidence of otter be noted during pre-construction surveys, SHEPD will discuss the potential requirements for EPS licence for otter disturbance with NatureScot ahead of works commencing. Overall, as the installation activities will be transient, temporary and localised and due to the implementation of the proposed mitigation measures any disturbance from vessels, vehicles or human presence will be limited. Therefore, it is not likely for significant impacts on seals or otters to occur.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Benthic and Intertidal Ecology (Section 8)	Direct Loss of/ Disturbance to Benthic Habitats and Communities	Minor	Physical disturbance through seabed preparation, landfall excavation activities, cable laying and removal activities, smothering of benthic habitat and species via sediment re-suspension and settlement are likely to occur within the footprint of the proposed installation activities. As discussed in Section 8.3.4, the cable corridor overlaps areas which may host Annex I 'Reefs'. Such features may lie within the subtidal area. The effects on these habitats and associated fauna are expected to be highly localised and temporary. Additionally, the expected disturbance to the associated species is likely to be impacted on an individual's basis and not likely to impact communities at a population level. The potential impact associated with introduction and/or spread of INNS and accidental releases are wholly managed through the embedded mitigation in Section 4.3: Mitigation Requirements. Therefore, no significant impacts are anticipated.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant
	Temporary Increase in Suspended Sediments and Associated Sediment Deposition	Negligible				
	Impact from Invasive Non-Native Species (INNS	Negligible				
	Accidental Release of Hazardous Substances	Minor				

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Ornithology (Section 9)	Wild birds, their eggs and nests	Minor	There is the potential that the installation activities could occur in the sensitive breeding season and cause disturbance to ornithology receptors in the vicinity of the cable corridor as activities are expected to occur in summer 2025. The cable corridor is located within 2 km of the East Mainland Coast, Shetland SPA, designated for Great northern diver (non-breeding), red-throated diver (breeding) and Slavonian grebe (non-breeding). RSPB has mentioned the presence of an Arctic tern colony in the vicinity of the Yell landfall. However, given the temporary, transient and localised nature of the activities, the fact that installation vessels will not constitute a substantive change from baseline shipping activity and the mitigation measures described in Section 4.3, installation activities are unlikely to result in a significant impact to seabird populations.	Not significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not significant

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
Marine Archaeology (Section 10)	Marine Archaeology assets and features	Negligible	Due to the temporary nature of the installation activities, it is not anticipated that there will be any impacts on marine archaeological features. Any features identified will be avoided with 50 m buffers and notified to HES and the UKHO. Additionally, a PAD may be implemented if conditioned by the licence during installation.	Not Significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not Significant
Commercial Fisheries and Other Sea Users (Section 11)	Commercial fisheries and other sea users (including third party assets).	Minor	Due to the temporary nature of the installation works and the relevant mitigation measures to be adhered to as detailed in Table 11-1 (and Section 4.3), including engagement with relevant operators, it is not anticipated that there will be significant impacts to commercial fisheries or other sea users.	Not Significant	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not Significant
Shipping and Navigation (Section 12)	Vessel Collision – Installation, Maintenance and Decommissioning	Broadly Acceptable	A HLNRA has been undertaken for the Project and submitted alongside this MEA. The HLNRA concludes that given the short duration of the operations and because the cable will be laid within an area with existing subsea cables, which avoids designated anchoring zones, no significant impacts are anticipated.	Not Significant /ALARP	No additional mitigation measures identified beyond the embedded mitigation measures outlined in Section 4.3:	Not Significant /ALARP
	Disruption to Established Vessel Routes and Areas – Installation, Maintenance and Decommissioning	Broadly Acceptable		Not Significant /ALARP		Not Significant /ALARP

RECEPTOR	ASSESSMENT UNDERTAKEN	LEVEL OF IMPACT	ASSESSMENT OUTCOME	OVERALL LSE / SIGNIFICANCE	SECONDARY MITIGATION	POST MITIGATION IMPACT
	Interaction with Vessel Anchors – Installation, Maintenance and Decommissioning	Broadly Acceptable	This is particularly evident given the adherence of the Project to international regulations which ensure safety along with other embedded mitigations listed in Table 11-1 (and Section 4.3), including ongoing engagement between SHEPD, SIC and ferry operators to agree protocols such as RCZs. The assessment therefore determined that all risks to navigation associated with the Project are considered ALARP. No additional risk reduction measures above the embedded mitigations were considered appropriate, and no further recommendations have been made following the assessment.	Not Significant /ALARP		Not Significant /ALARP
	Interaction with Vessel Anchors – Normal Operations	Tolerable		Not Significant /ALARP		Not Significant /ALARP
	Interactions with Fishing Gear – Installation, Maintenance and Decommissioning	Tolerable		Not Significant /ALARP		Not Significant /ALARP
	Interactions with Fishing Gear – Normal Operations	Broadly Acceptable		Not Significant /ALARP		Not Significant /ALARP
	Reduction in Under Keel Clearance – Normal Operations	No Risk		Not Significant /ALARP		Not Significant /ALARP
	EMF and Compass Deviation Effects – Normal Operations	Broadly Acceptable		Not Significant /No Risk		Not Significant /No Risk

14 REFERENCES

Bibby Hydromap (2018). Shetland Survey Works. Volume 3: Mossbank to Yell Results Report Project No. 2018-018.

Bibby Hydromap and Benthic Solutions (2018). Shetland Survey Works. Volume 5: Environmental Habitat Assessment Report.

BGS (2024a). BGS Geology Viewer. Available online at: https://geologyviewer.bgs.ac.uk/?_ga=2.217184917.2095132215.1732560458-573656278.1732560457 [Accessed on 25/11/2024].

BGS (2024b). The Earth's magnetic field: an overview. Available online at: http://www.geomag.bgs.ac.uk/education/earthmag.html [Accessed on 25/11/2024].

Carter, M.I.D., Boehme, L., Cronin, M.A., Duck, C.D., Grecian, W.J., Hastie, G.D., Jessopp, M., Matthiopoulos, J., McConnell, B.J., Miller, D.L., Morris, C.D., Moss, S.E.W., Thompson, D., Thompson, P.M. and Russell, D.J.F. (2022). Sympatric Seals, Satellite Tracking and Protected Areas: Habitat-Based Distribution Estimates for Conservation and Management. Frontiers in Marine Science 9:875869.

Collin, S.B., MacIver, K., Shucksmith, R. (2015). A Biosecurity Plan for the Shetland Islands. Report prepared as part of the Shetland Island's Marine Spatial Plan. NAFC Marine Centre 2015. Available online at: https://www.shetland.uhi.ac.uk/t4-media/one-web/uhi-shetland-images-and-documents/research/document/marine-spatial-planning/biosecurity/biosecurity-plan.pdf [Accessed on 25/11/2024].

EMODnet (2023). EUSeaMap 2023 Broad-Scale Predictive Habitat Map for Europe. Available online at: https://emodnet.ec.europa.eu/geonetwork/emodnet/api/records/0a1cb988-22de-48b2-8cda-d90947ef77d1 [Accessed on 25/11/2024].

Gilles, A, Authier, M, Ramirez-Martinez, NC, Araújo, H, Blanchard, A, Carlström, J, Eira, C, Dorémus, G, Fernández Maldonado, C, Geelhoed, SCV, Kyhn, L, Laran, S, Nachtsheim, D, Panigada, S, Pigeault, R, Sequeira, M, Sveegaard, S, Taylor, NL, Owen, K, Saavedra, C, Vázquez-Bonales, JA, Unger, B, Hammond, PS (2023). Estimates of cetacean abundance in European Atlantic waters in summer 2022 from the SCANS-IV aerial and shipboard surveys. Final report published 29 September 2023. 64 pp.

Hague, E.L., Sinclair, R.R. and Sparling, C.E. (2020). Regional baselines for marine mammal knowledge across the North Sea and Atlantic areas of Scottish waters.

HES (2024a). Canmore: National record of the historic environment. Available online e at: https://canmore.org.uk/site/search/result?SIMPLE_KEYWORD=mossbank%20&SITEDISCIPLINE=3&SITECOUNTRY=1 [Accessed 21/10/2024].

HES (2024b). Pastmap: Exploring Scotland's historic environment. Available online at: https://pastmap.org.uk/ [Accessed 21/11/2024].

HES (2024c). HES Designated Site Search Map. Available online at: https://hesportal.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d [Accessed 03/12/2024].

Harsanyi, P., Scott, K., Easton, B.A.A., de la Cruz Ortiz, G., Chapman, E.C.N., Piper, A.J.R., Rochas, C.M.V., Lyndon, A.R. (2022). The effects of anthropogenic electromagnetic fields (EMF) on the early development of two commercially important crustaceans, European lobster, *Homarus gammarus* (L.) and edible crab, *Cancer pagurus* (L.). Journal of Marine Science and Engineering 10: 564. Available online at: https://tethys.pnnl.gov/sites/default/files/publications/Harsanyi-et-al-2022-EMF.pdf [Accessed on 25/11/2024].

Inter-Agency Marine Mammal Working Group (IAMMWG) (2022). Updated abundance estimates for cetacean Management Units in UK waters (Revised 2022). JNCC Report No. 680, JNCC Peterborough, ISSN 0963-8091.

IMO (2018). Maritime Safety Committee-Marine Environment Protection Committee Circulars - MSC-MEPC.2 Circulars - MSC-MEPC.2/Circular.12/Rev.2 – Revised Guidelines for Formal Safety Assessment (FSA) for Use in the IMO Rule-Making Process – (9 April 2018) - Annex – Revised Guidelines for Formal Safety Assessment (FSA) For Use in the IMO Rule-Making Process. Available online at: https://www.imorules.com/GUID-60EB5CBD-71B2-4D5F-B9E6-EDF663512E2D.html#google_vignette [Accessed 24/12/24].

Irving, R. (2009). The identification of the main characteristics of stony reef habitats under the Habitats Directive. Summary report of an inter-agency workshop 26-27 March 2008. JNCC Report No. 432. Available online at: https://data.jncc.gov.uk/data/21693da5-7f59-47ec-b0c1-a3a5ce5e3139/JNCC-Report-432-FINAL-WEB.pdf [Accessed on 25/11/2024].

Joint Nature Conservation Committee (2010). Correlation Table showing Relationships between Marine Habitat Classifications (2004 and 2007 versions) and Habitats Listed for Protection.

Joint Nature Conservation Committee (JNCC) (2024a). MPA Mapper. Available online at: https://jncc.gov.uk/mpamapper/ [Accessed on 25/11/2024].

Joint Nature Conservation Committee (JNCC) (2024b). Otter *Lutra lutra*. Available online at: https://sac.jncc.gov.uk/species/S1355/ [Accessed on 25/11/2024].

Kruuk, H., Conroy, J.W.H. and Moorhouse, A. (1987). Seasonal reproduction, mortality and food of otters (*Lutra lutra* L.) in Shetland. Symposium of the Zoological Society of London 58: 263-278.

Laist, D.W. Knowlton, A.R., Mead, J.G., Collet, A.S., and Podesta, M. (2001). Collisions between ships and whales. Marine Mammal Science, 17: 35-75. Available online at: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1748-7692.2001.tb00980.x?msockid=2661e81a9f21664b2fc6fd2d9ebe67dc [Accessed on 25/11/2024].

Loy, A., Kranz, A., Oleynikov, A., Roos, A., Savage, M and Duplaix, N. (2022). Lutra lutra (amended version of 2021 assessment). The IUCN Red List of Threatened Species 2022: e.T12419A218069689.

Macleod, A., Cottier-Cook, E., Hughes, D., and Allen, C. (2016). Investigating the Impacts of Marine Invasive NonNative Species. Natural England. Available online at: https://pureadmin.uhi.ac.uk/ws/portalfiles/portal/3729569/NECR223_edition_1.pdf [Accessed on 25/11/2024].

Marine Directorate (2024a). Marine Projects. Available online at: https://marine.gov.scot/marine-projects [Accessed 28/11/2024]

Marine Directorate (2024b). National Marine Plan Interactive (NMPi). Available online at: https://marinescotland.atkinsgeospatial.com/nmpi/ [Accessed on 25/11/2024].

MarLIN (2024). The Marine Life Information Network. Available online at: https://www.marlin.ac.uk/ [Accessed on 25/11/2024].

MCA (2021). MGN 654 (M+F) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response. Available online at: https://assets.publishing.service.gov.uk/media/64637cd60b72d3000c34454c/MGN_654.pdf [Accessed 24/12/2024].

NatureScot (2011). Yell Sound Coast. Site of Special Scientific Interest. Site Management Statement. Available online at: https://sitelink.nature.scot/site/1686 [Accessed on 25/11/2024].

NatureScot (2020). Seasonal Periods for Birds in the Scottish Marine Environment. Short Guidance Note Version 2. October 2020. Available online at: https://www.nature.scot/sites/default/files/2020-10/Guidance%20note%20-%20Seasonal%20definitions%20for%20birds%20in%20the%20Scottish%20Marine%20Environment.pdf [Accessed on 25/11/2024].

NatureScot (2022). East Mainland Coast, Shetland SPA. Conservation and Management Advice. Available online at: https://sitelink.nature.scot/site/10482 [Accessed on 25/11/2024].

NatureScot (2023). Peatland restoration and breeding birds. Available online at: https://www.nature.scot/doc/peatland-restoration-and-breeding-birds [Accessed on 25/11/2024].

NatureScot (2024a). Sullom Voe SAC. Conservation and Management Advice. Available online at: https://sitelink.nature.scot/site/8388 [Accessed on 25/11/2024].

NatureScot (2024b). Land mammals- Otter. Available online at: https://www.nature.scot/plants-animals-and-fungi/mammals/land-mammals/otter [Accessed on 25/11/2024].

NMFS (2018). Marine Mammal Acoustic Technical Guidance and Other Acoustic Tools. Available online at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance-other-acoustic-tools [Accessed on 25/11/2024].

Olsson, T, Larsson, A., Bergsten, P., Nissen, J. (2010). Impact from electric and magnetic fields from submarine cables on marine organisms. The current state of knowledge. Available online at: https://www.seai.ie/sites/default/files/renewable-energy/ocean-energy/foreshore-lease/Appendix-4-Impact-of-electric-and-magnetic-fields.pdf [Accessed on 25/11/2024].

Purple Plover Consulting Ltd (2024a). PPC023 Mossbank Phase 1 Report.

Purple Plover Consulting Ltd (2024b). PPC023 Yell Phase 1 Report.

Readman, J.A.J., Watson, A. (2024). Flustra foliacea and Hydrallmania falcata on tide-swept circalittoral mixed sediment. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available online at: https://www.marlin.ac.uk/habitat/detail/74 [Accessed on 25/11/2024].

Rodríguez, A., García, D., Rodríguez, B., Cordona, E., Parpal, L., Pons, P. (2015). Artificial lights and seabirds: is light pollution a threat for the threatened Balearic petrels? SpringerLink, Journal of Ornithology, Volume 156, ISSUE 4.

Scott, K., Harsanyi, P., Easton, B.AA., Piper, A.J.R., Rochas, C.M.V., Lyndon, A.R. (2021). Exposure to electromagnetic fields (EMF) from submarine power cables can trigger strength-dependent behavioural and physiological responses in edible crab, *Cancer pagurus* (L.). Journal of Marine Science and Engineering 9: 776. Available online at: https://tethys.pnnl.gov/sites/default/files/publications/Scott-et-al-2021-EMF.pdf [Accessed on 25/11/2024].

Scottish Environment Protection Agency (SEPA) (2024). River Basin Management 3 (RBMP3). Available online at: https://informatics.sepa.org.uk/RBMP3/ [Accessed on 20/11/2024].

Scottish Government (2015). Scottish Government (2015). Scotland's National Marine Plan. Available online at: https://www.gov.scot/publications/scotlands-national-marine-plan/ [Accessed on 25/11/2024].

Scottish Government (2020). Scotland's Marine Assessment 2020 – Seabirds. Available online at: https://marine.gov.scot/sma/assessment/seabirds-0#:~:text=Globally%20seabirds%20are%20considered%20the%20most%20vulnerable%20group,of%20the%20populations%20of%20most%20of%20these%20species. [Accessed 25/11/2024].

Scottish Government (2024). Marine environment: licensing and consenting requirements. Available online at: https://www.gov.scot/collections/marine-licensing-and-consent/ [Accessed on 25/11/2024].

Shetland Amenity Trust (2024). Yell Brochure. Available online at: https://www.shetland-heritage.co.uk/downloads/resources/geographicleaflets/Yell.pdf [Accessed 21/11/2024].

Shetland Islands Council (2021). Shetland Islands Regional Marine Region Amended Draft – May 2021. NAFC Marine Centre UHI pp 158. Available online at: https://www.shetland.gov.uk/downloads/file/3629/sirmp-2021-amended-version [Accessed on 25/11/2024].

Shetland Islands Council (2024). Planning – Applications Search. Available online at: https://pa.shetland.gov.uk/online-applications [Accessed 26/11/2024].

Shucksmith, R.J. (2017). Shetland Islands Marine Region State of the Marine Environment Assessment. NAFC Marine Centre UHI. Report for the Shetland Islands Marine Planning Partnership. pp 172

Southall B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J. and others (2007) Marine mammal noise exposure criteria: initial scientific recommendations. Aquatic Mammals, 33: 411–522.

Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P and Tyack, P. L. (2019). Marine mammal noise exposure criteria: updated scientific recommendations for residual hearing effects. Aquatic Mammals. 45(2), 1258-232.

Special Committee on Seals (SCOS) (2022). Scientific Advice on Matters Related to the Management of Seal Populations: 2022. Natural Environment Research Council Special Committee on Seals. Available online at: http://www.smru.st-andrews.ac.uk/files/2023/09/SCOS-2022.pdf [Accessed on 25/11/2024].

Special Committee on Seals (SCOS) (2023). Scientific Advice on Matters Related to the Management of Seal Populations: Interim Advice 2023. Natural Environment Research Council Special Committee on Seals. Available online at: http://www.smru.st-andrews.ac.uk/files/2024/02/scos-2023-interim-advice-final.pdf [Accessed on 25/11//2024].

Stamp, T.E., Burdett, E.G., Lloyd, K.A. and Tyler-Walters, H. (2023a). Laminaria hyperborea forest and foliose red seaweeds on tide-swept upper infralittoral mixed substrata. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available online at: https://www.marlin.ac.uk/habitat/detail/1046 [Accessed on 25/11/2024].

Stamp, T.E., Lloyd, K.A. and Watson, A. (2023b). Caryophyllia (Caryophyllia) smithii, sponges and crustose communities on wave-exposed circalittoral rock. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available online at: https://www.marlin.ac.uk/habitat/detail/6 [Accessed on 25/11/2024].

Tillin, H.M., Watson, A. (2023). Glycera lapidum, Thyasira spp. and Amythasides macroglossus in offshore gravelly sand. In Tyler-Walters H. Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available online at: https://www.marlin.ac.uk/habitat/detail/1136 [Accessed on 25/11/2024].

Tillin, H.M., Budd, G.C., Tyler-Walters, H., & Burdett, E.G. 2023. Foliose red seaweeds on exposed lower infralittoral rock. In Tyler-Walters H. and Hiscock K. (eds) Marine Life Information Network: Biology and Sensitivity Key Information Reviews, [on-line]. Plymouth: Marine Biological Association of the United Kingdom. Available online at: https://www.marlin.ac.uk/habitat/detail/65 [Accessed on 25/11/2024].

Tyler-Walters, H., James, B., Carruthers, M. (eds.), Wilding, C., Durkin, O., Lacey, C., Philpott, E., Adams, L., Chaniotis, P.D., Wilkes, P.T.V., Seeley, R., Neilly, M., Dargie, J. & Crawford-Avis, O.T. (2016). Descriptions of Scottish Priority Marine Features (PMFs). Scottish Natural Heritage Commissioned Report No. 406.

UKHO (2024). Admiralty: Comprehensive marine data available in one place. Available online at: https://www.admiralty.co.uk/access-data/marine-data [Accessed 21/11/2024]

Vance, H.M., Hooker, S.K., Mikkelsen, L., van Neer, A., Teilmann, J., Siebert, U., and Johnson, M. (2021). Drivers and constraints on offshore foraging in harbour seals. Scientific Reports 11: 6514. Available online at: https://www.nature.com/articles/s41598-021-85376-2 [Accessed on 25/11/2024].

APPENDIX A - UNDERWATER NOISE MODELLING

During the cable lay, an ROV or CableFish with USBL will be utilised, deployed from the support vessel or CLV, to monitor the proposed cables at the touch down locations with the seabed. This will capture seabed information at the contact point and helps observe the lay tension that is applied to the proposed cables from the vessel. This will also help to minimise the potential for proposed cable suspensions along the route.

This Section describes the potential impacts and disturbance to marine mammal species in the area as a result of utilising USBL.

A.1 Acoustic Injury or Disturbance Criteria for Marine Mammals

A.1.1 Injury

NMFS (2018) defines two different types of sound that have the potential to result in acoustic injury:

- Impulsive: sounds which are short in duration (i.e. less than 1 second long) and temporary, occupy a broadband bandwidth, and have rapid rise and decay times with a high peak pressure level; and
- Non-impulsive: sounds which may occupy a broadband, narrowband or tonal bandwidth, can be brief, prolonged, continuous or intermittent in nature, and are not characterised by rapid rise and decay times or a high peak pressure level.

A dual-metric approach has been adopted which identifies the range of potential injury to marine mammals from both the peak sound pressure level (SPL_{PEAK}; also called the source level) and cumulative Sound Exposure Level (SEL) for the operation of USBL which is the only equipment identified to require consideration for noise-related injury. The thresholds above which each marine mammal hearing group may experience noise-related injury are presented in Table A-1 below. These thresholds are derived from measurements of marine mammal hearing using weighting functions which account for peak hearing abilities for each hearing group (NMFS, 2018).

Table A-1 Criteria Considered in this Assessment for the Onset of Injury in Marine Mammals from Impulsive Noise (NMFS, 2018; Southall et al., 2019)

MARINE MAMMAL HEARING GROUP	IMPULSIVE NOISE		NON-IMPULSIVE NOISE
	SPL_{PEAK} (dB re 1 µPA)	CUMULATIVE SEL (dB re 1 μPA^2S)	CUMULATIVE SEL (dB re 1 μPA^2S)
Low-frequency (LF) cetaceans	219	183	199
High-frequency (HF) cetaceans	230	185	198
Very high-frequency (VHF) cetaceans	202	155	173
Phocid pinnipeds (underwater)	218	185	201

A.1.2 Disturbance

There are currently no disturbance criteria which have been adopted or recommended by UK regulators or statutory nature conservation bodies. NatureScot have recently advised that the Effective Deterrent Range (EDR) of 5 km should be used as a proxy for disturbance range for Sub-Bottom Profiler (SBP) operations, however this is not considered appropriate for USBL, given that USBL is a significantly less powerful sound source than an SBP. As such auditory thresholds for disturbance, as defined by NMFS (2014), coupled with behavioural response criteria detailed in Southall *et al.*, (2007) have been adopted for the assessment of potential marine mammal disturbance from USBL. These thresholds, which utilise the behavioural response severity scale detailed in Southall *et al.*, (2007) for grading the strength of behavioural responses, are provided in Table A-2.

Table A-2 Disturbance Threshold Criteria for Impulsive Sound (Southall et al., 2007; NMFS, 2014)

BEHAVIOURAL EFFECT	THRESHOLD CRITERIA (SPLRMS)
Potential strong behavioural reaction (6 or more on the severity scale)	160

A.2 Sound Propagation Modelling

A.2.1 Approach

Modelling to identify the potential range (i.e. the straight-line distance from the source) in which sound impacts to marine mammals could occur was undertaken using Xposure, a semi-empirical propagation model developed by Xodus. Modelling was conducted at water depths bookending those expected in the survey area. The dual-metric modelling approach recommended by NMFS (2018) has been used to identify impacts from: (1) the peak Sound Pressure Level (SPL_{PEAK}); and (2) the cumulative SEL. The SEL represents the total energy produced by a sound-generating activity (i.e. USBL) standardised to a one-second interval. This enables comparison of the total energy attributed to different activities with different inter-pulse intervals. As described above, empirically-derived weighting functions (NMFS, 2018; Southall *et al.*, 2019) have been applied to the modelling outputs to account for peak hearing sensitivity for the respective marine mammal hearing groups

The following assumptions have been applied to the models:

- Maximum SPL_{PEAK} has been used for all calculations;
- Maximum pulse length and minimum turn around has been used where provided;
- Where source frequencies occur across a range of frequencies, a flat 1/3 octave spectrum has been used;
- Where data is unavailable, the time between pulses has been calculated as 1.5 times the ping length;
- Mammals swim at seabed depths (this represents the worst-case);
- Vessels are moving at slow speeds; and
- Survey equipment (i.e. USBL) likely to be used in the nearshore shallow water environment (i.e. < 10 m) will likely operate at a very high frequency to provide better resolution and will operate at a lower SPL, and so does not constitute a worst-case scenario.

The directional characteristics of sound are also an important factor affecting the received sound pressure levels from sound-generating activities. Sound source arrays are designed so that the majority of acoustic energy is directed downwards towards the ocean floor for data collection purposes. As such, the amount of energy emitted across the horizontal plane is significantly less (≥ 20 dB) than the amount of energy emitted downwards.

Due to the frequency-dependent nature of sound, the loss of pressure on the horizontal plane is more pronounced at higher frequencies than at lower frequencies. Directional corrections can be applied to the model outputs, which provide broadband normalised amplitudes at varying angles of azimuth[6] and dip angle[7]. Directivity corrections have been applied to the modelling outputs under the assumption that the animal is directly in-line with the vessel (i.e. at the 0° azimuth).

[6] *The azimuth is taken as the angle of circumference around the boat which lies parallel to the surface of the water, progressing around the boat from port to starboard.*
[7] *The dip angle is taken as the angle under the boat, progressing from prow to stern.*

A.2.2 Injury Impacts

For the proposed cable installation activities, the expected frequency range for USBL operations overlap with the hearing range of all cetacean hearing groups. Potential injury to cetaceans (i.e. injury which results from a permanent threshold shift in hearing abilities) is limited to impulsive sound sources which exceed the injury thresholds defined in Table A-1.

Modelling of ranges at which injury impacts are likely to result from deployment of USBL has been undertaken (Table A-3). Impacts from noise sources which are strictly behavioural in nature (i.e. disturbance impacts) are covered in the subsection below.

Table A-3 Noise Modelling Results for Injury Impacts from the Impulsive Noise Source (N/E = no exceedance of thresholds)

ACTIVITY	DEPTH (M)[8]	FREQUENCY (KHZ)	SOURCE LEVEL SPLPEAK (DB RE 1µPA)	INJURY RANGE (M)											
				CUMULATIVE SEL (STATIC MAMMALS)				CUMULATIVE SEL (MOVING MAMMALS)				PEAK SPL			
				VHF	HF	LF	PW	VHF	HF	LF	PW	VHF	HF	LF	PW
USBL	100	24 – 33.5	207	104	98	73	86	104	56	36	44	24	6	11	11
	10	24 – 33.5	207	12	11	11	11	12	11	11	11	36	10	16	17

[8] *Depth refers to below the Project activity, which has been assumed to be hull-mounted or towed at the surface. These depths have been identified as representative of the nearshore and offshore depths in which installation activities are likely to occur across the cable corridor, based on available bathymetry data.*

USBL has the potential to cause injury to EPS and other marine mammals. As such, the operation of USBL associated with the Project may be potentially injurious to EPS species without appropriate mitigations.

Across modelling scenarios and metrics, the injury ranges were generally highest for the VHF hearing group (Table A-3), which is represented by harbour porpoise in UK waters. Conversely, HF cetaceans seemed to constitute the hearing group with the lowest potential impact ranges for the peak SPL metric, while LF cetaceans had the lowest impact ranges for the cumulative SEL metric, when comparing between activity types (Table A-3).

High frequency sounds attenuate more quickly than lower frequency sounds such that an animal would need to be much closer to the sound source for it to cause acoustic injury. The deployment of hull-mounted USBL in 100 m depths elevated the potential range of impact to a maximum of 104 m (cumulative SEL) for VHF cetaceans. However, the likelihood of a cetacean being this close to operational equipment is extremely unlikely when considering that the source is deployed from a moving vessel travelling at more than 2 ms-1 (i.e. 4 knots) and, in some cases, is being towed at depth (e.g. a USBL may be mounted on a towed device within a few metres of the seabed).

The majority of injury ranges were slightly reduced when considering animal movement during the cumulative SEL estimation. Swim speeds of the species most likely to be observed in the area have been shown to be several ms^{-1} (e.g. cruising minke whale swim speed is 3.25 ms^{-1} and harbour porpoise may swim up to 4.3 ms^{-1}) (Blix and Folkow, 1995; Otani *et al.*, 2000). Further, NatureScot (2016) has provided standard values for mean swimming speeds of various marine mammal species likely to occur in the vicinity of the proposed cable corridor, including harbour seal / grey seal (1.8 ms-1; Thompson, 2015); and minke whale (2.1 ms^{-1}; Williams, 2009). To offer a representative model of the predicted noise exposure ranges of marine mammals moving away from the sound source, a conservative mean swim speed of 1.5 ms^{-1} has been used in the calculations. Considering that USBL will be deployed while the vessel is moving, the cumulative SELs are expected to be lower than predicted based on the premise that animals are likely to move away from the mobile sound source, opposite to the direction of vessel travel.

It should also be noted that the modelling scenarios presented as part of this assessment are meant to define the worst-case injury ranges associated with the deployment of USBL. The *in situ* deployment of USBL will most frequently occur in waters of intermediate depths (i.e. between 10 to 100 m). Moreover, the source levels modelled constitute the lowest frequency and highest SPL that are likely to be used, meaning that the actual sound propagation in the marine environment is also likely to be less than those defined by the modelled outputs, thereby this assessment constitutes a conservative estimate.

As such, the assessment concludes that there is no realistic risk of injury to EPS which may result from the use of USBL with SPL_{PEAK} source levels of up to 207 dB re 1µPa.

A.2.3 Disturbance Impacts

In addition to physical injury, sound emissions have the potential to result in behavioural disturbance of cetacean species within the vicinity of the sound source. Significant or strong disturbance (see Table A-2; Southall *et al.*, 2007) may occur when an animal is at risk of a sustained of chronic disruption of behaviour or habitat use, which could result in a population-level effect. An assessment of potential disturbance impacts as a result of USBL operations impulsive and non-impulsive sound is provided in the sections below. The outputs of the noise modelling assessment against cetacean disturbance thresholds are provided in Table A-4.

Table A-4 Noise Modelling Results for Disturbance Impacts from Impulsive Noise Sources

ACTIVITY	DEPTH (M)	FREQUENCY (KHZ)	SPL_{RMS} (DB RE 1 µPA)	RANGE OF BEHAVIOURAL CHANGE (M)
USBL	100	24 – 33.5	200	182
	10	24 – 33.5	200	207

The USBL activities have the potential to generate a strong disturbance event (i.e. a disturbance offence). The sound generated by the USBL has the potential to generate disturbance impacts on the order of a couple hundred metres (Table A-4).

The number of individuals which may experience disturbance from the worst-case scenario for USBL has been calculated in Table A-5 below, based on the population parameters supplied in Table 7-1 (see Section 7.3.1). In these calculations, the impact range serves as a radius with which to calculate the total area of coverage for a potential disturbance event associated with each survey activity.

Table A-5 Number of Individual Cetaceans and Proportion of the MU Which May Experience a Disturbance from the Proposed Cable Installation Activities, Based on Known Population Parameters of the Most Frequently Occurring Species

SPECIES	NUMBER OF INDIVIDUALS WHICH MAY INCUR A STRONG DISTURBANCE USBL (0.13 KM^2 AREA)	MAXIMUM PROPORTION OF THE MU POTENTIALLY AFFECTED BY THE INSTALLATION ACTIVITIES
Harbour porpoise	< 0.1	< 0.1 %
White-beaked dolphin	<0.01	< 0.1 %
Risso's dolphin	< 0.01	< 0.1 %
Atlantic white-sided dolphin	<0.01	< 0.1 %
Minke whale	< 0.01	< 0.1 %

The source levels associated with USBL have the potential to elicit a strong behavioural response in EPS which could be classed as a disturbance offence as defined under Regulations 39(1) or 39(2) of the Habitats Regulations. However, for the relevant biogeographical population MU for harbour porpoise, bottlenose dolphin, Risso's dolphin, common dolphin and minke whale which all regularly occur in the area, this will not incur significant impacts. For these species, less than 0.1% of the biogeographic population will be impacted by noise-related disturbance (Table A-5). Moreover, less than a tenth of any cetacean will be potentially disturbed by USBL deployment at any given time, making potential disturbance impacts from this survey equipment negligible.

Given the transient and short-term nature of the survey and vessel activities, it is highly unlikely that any disturbance offences from the use of USBL would negatively impact upon the FCS of any of the cetacean or seal species which may be present in the survey area. This is on the basis that the modelled level of disturbance is unlikely to affect the ability of any individual animal to survive or reproduce and will not have significant population-level impacts to any EPS. Regardless, it is possible that a small number of animals may experience some level of disturbance for the short period that they encounter the proposed survey activities.