Mainland – Jura Emergency Cable Replacement

Marine Environmental Appraisal

Scottish and Southern Energy plc

Assignment Number: A500124-S00
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Xodus Group
Xodus House, 50 Huntly Street
Aberdeen, UK, AB10 1RS

T +44 (0)1224 628300
E info@xodusgroup.com
www.xodusgroup.com

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ABBRIEVIATIONS

AA	Appropriate Assessment
BP	Best Practice
BWM	Ballast Water Management
CEMP	Construction Environmental Management Plan
CFP	Common Fisheries Policy
CLV	Cable lay vessel
CoCP	Code of Construction Practice
EPS	European Protected Species
FCS	Favourable Conservation Status
FLO	Fisheries Liaison Officer
HF	High Frequency
HRA	Habitats Regulations Appraisal
IMO	International Marine Organisation
HWDT	Hebridean Whale and Dolphin Trust
JNCC	Joint Nature Conservation Committee
kHz	Kilohertz
LF	Low Frequency
LSE	Likely Significant Effects
MPCP	Marine Pollution Contingency Plan
MEA	Marine Environmental Appraisal
MLWS	Mean Low Water Springs
MEPC	Marine Environmental Protection Committee
MHWS	Mean High Water Springs
MLA	Marine Licence Application
MMMP	Marine Mammal Mitigation Protocol
MNNS	Marine Non-Native Species
MOD	Ministry of Defence
MPA	Marine Protected Area
MPCP	Marine Pollution Contingency Plan
MSFD	Marine Strategy Framework Directive
MS-LOT	Marine Scotland Licensing Operations Team
MU	Management Unit
NCMPA	Nature Conservation Marine Protected Area
NMP	National Marine Plan
NMPI	National Marine Plan Interactive

OCT	Open Cut Trench
PEMMP	Project Environmental and Monitoring Plan
PMF	Priority Marine Feature
ROVs	Remotely Operated Vehicles
SAC	Special Areas of Conservation
SEPA	Scottish Environmental Protection Agency
SHEPD	Scottish Hydro Electric Distribution plc
SSSIs	Sites of Special Scientific Interest
SOLAS	Safety of Life at Sea
SOPEP	Shipboard Oil Pollution Emergency Plans
SPA	Special Protection Area
UK BAP	UK Biodiversity Action Plan
UKHO	UK Hydrographic Office
UNCLOS	UN Convention on the Law of the Sea
UXO	Unexploded Ordnance
USBL	Ultra-Short Baseline
VHF	Very High Frequency
WCA	Wildlife and Countryside Act

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 ensure a safe, secure and reliable supply to customers. On the 20th November 2019, a fault was identified on the existing submarine power cable between the Scottish mainland and Jura. SHEPD have identified that this cable needs to be replaced.

SHEPD applied for authorisation to carry out an emergency inspection, survey, repair and possible replacement of this cable under The Marine Licensing (Exempted Activities) (Scottish Inshore Region) Order 2011 – Article 32 Cables and Pipelines. An exemption was granted for the inspection and survey elements of the application. The installation of a replacement cable requires a marine licence under Part 4 of The Marine (Scotland) Act 2010. As SHEPD have previously been granted a marine licence for the construction of a cable greater than 1,853 m in length which crosses the intertidal area at this site, then section 23 of the Marine (Scotland) Act 2010 does not apply and SHEPD have not had to carry out formal Pre-Application Consultation, however SHEPD have consulted stakeholders produced a report summarising how their views have influenced our application.

This Marine Environmental Appraisal (MEA) supports SHEPD's Marine Licence Application, 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. The mitigation requirements identified by this MEA will be included in the accompanying Marine Construction Environmental Management Plan (CEMP) Ref: A-500124-S00-TECH-001, in order to ensure they are effectively disseminated to, and implemented by SHEPD and the cable installation contractor during the proposed works.

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

- Marine Licence Application Form;
- Pre-Application Consultation (PAC) Report (appended by Cost Benefit Analysis Model);
- Mainland – Jura Emergency Repair Project Description;
- Fishing Liaison Mitigation Action Plan (FLMAP) (covering all legitimate sea users);
- Construction Environment Management Plan (CEMP);
- Operation, Inspection, Maintenance and Decommissioning Strategy; and
- EPS Licence Application Form.

1.1 Project Need

The islands of Jura and Islay are normally fed by a 33kV circuit from Lochgilphead. This 33kV circuit is comprised of overhead line, underground cable and submarine cable sections. Further dependant on the 33kV circuit is the island of Colonsay which is supplied by the 11kV network from Islay. In total 3,070 customers are supplied on Jura, Islay and Colonsay. Electricity is now considered to be an essential service for communities. This cable distributes electricity to domestic and business customers; providing a long term economic and social benefit to the communities.

On 20 November 2019 at 07:26, the existing submarine cable between Mainland and Jura faulted in service. During the time of fault, Bowmore Power Station was operational and maintaining supplies to customers on Islay and Colonsay whilst 33kV overhead line refurbishment works were being carried out on Jura. Therefore 199 customer electricity supplies on Jura were impacted by the fault. Bowmore Power Station is now maintaining customer supplies to the islands of Jura, Islay and Colonsay.

Bowmore Power Station is now maintaining customer supplies to the islands of Jura, Islay and Colonsay. Electricity is now considered to be an essential service for communities. This cable distributes electricity to

domestic and business customers; providing a long term economic and social benefit to the communities. This now means that there is an increased reliance upon fossil fuels to maintain electricity supplies to the islands through the use of the embedded power station at Bowmore. This places electricity supplies at significant risk if any further faults occur on the SHEPD electricity network infrastructure.

1.2 Consideration of Alternatives

Considering the socio-economic importance of the Mainland – Jura power cable, together with SHEPD's duty to ensure reliability of supply to its customer, the do-nothing option cannot be considered. Network testing has confirmed that there is a submarine cable fault located 4.7 km from the Mainland end and 3.3 km from the Jura end. Attempting a repair instead of replacement would be possible however there is significant concern with the water depth at this location (approximately 80m). At this cable location, the water depth reaches a maximum of 200m at its deepest point. The following options were considered by SHEPD, with further details provided in the stand alone Project Description:

- **Offshore piece-in repair**: As the cable is approximately 8km long; the and the fault is a significant distance from the shore, an offshore mid-section repair would be required, dependant on cable condition and water depth. The cable would be cut on the seabed either side of the fault location, with a new piece of cable pieced into the gap and jointed at either end on the deck of the repair vessel. The new cable section will be laid on the seabed in a bight orientation. Typically, this repair option would be completed within 20 days subject to appropriate weather windows.

  This option has been discounted because historical submarine cable repairs have been limited to diver operated water depths around a maximum 20m water depth. Cable recovery and jointing results in significant mechanical stresses and fatigue within the cable. These repairs have had limited success predominantly dependent on the condition of the existing cable being repaired. With the water depth at the fault location being approximately 80m, this is outwith the safe working depths of divers and therefore remotely operated vehicles (ROVs) will be required to cut the cable and rig it for recovery to vessel for subsequent testing. This would further increase the risk of damage to the cable, and failure of the repair.

- **End to end cable replacement**: This cable was installed in 2014 and inspected in 2018. The water depth at the point of fault is known to be approximately 80m from the previous route survey completed to inform the installed route. This water depth exceeds the limitations of diver operated works and at this significant water depth the mechanical and tensile stress on the existing cable and marine repair joint is likely to exceed the safe working limits of the cable and joint. Typically, this repair option would be completed within 28 days subject to appropriate weather windows.

  Therefore, considering that the repair option has ruled out due to technical constraints, an end-to-end replacement is assessed to be the only feasible engineering option.

The replacement cable would be on a like-for-like basis, initially surface laid within the installation corridor at an offset from the faulted cable. Micro-routing will be required based on the rocky and steeply graded seabed. With the tidal conditions at this location, a cable on bottom stability analysis will be completed to identify whether cable mobility may be an issue. The installation of rock filter bags may be required to stabilise the cable. At this stage it is expected that the cable will be buried between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS) where possible. If burial at the shore ends is not possible, it is proposed that the cable be protected with split pipe protection fitted directly around the cable.

1.3 Exclusions from the Scope of Assessment

Since the Mainland – Jura Emergency cable replacement works will be a like for like replacement of an existing faulted cable, the operational aspects (such as snagging risk, electromagnetic fields, and sediment heating effects) of this project will not constitute a change from baseline conditions. Therefore, only the installation phase is considered by this MEA. This appraisal only covers the marine cable installation activities, below MHWS.

SHEPD also recognise the need to consider options regarding the future of the existing faulted cable, specifically whether it shall be removed or left in situ. Due to the current emergency situation, it is not

appropriate to consider these options at this time, as efforts need to be focussed on restoring a stable power supply to the islands. However, SHEPD are committed to undertaking a review as to the future options for decommissioning the existing Mainland – Jura cable. This review, and any subsequent works will be subsect to a separate assessment and licence application. As such decommission is also outwith the scope of this MEA, although it is acknowledged that a short section (<50 m) of the existing cable in the intertidal zone may have to be removed to facilitate the installation of the new cable. If necessary, the removed section will be recovered and sent for onward recycling or disposal via an appropriate and licenced waste route.

Geophysical survey operations including, pre during post installation will be conducted as part of the proposed emergency cable replacement works. However, these survey operations are subject to existing consents held by SHEPD, specifically:

- An EPS Licence Reference – MS EPS 29 2019 0; and
- A Basking Shark Derogation Licence Reference – MS BS 07 2019 0.

As such no geophysical survey operations are included within the scope of this MEA.

2 LEGISLATIVE CONTEXT

This section presents the key UK and Scottish policies which are applicable to the proposed cable replacement works, 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 (NMP) (Scottish Government, 2015). Where necessary, additional mitigation measures have been presented in topic specific chapters to ensure that the proposed cable replacement works adhere to relevant legislation and policies and comply with the conditions required when granting applicable licenses. The information is provided in table form for ease of reference, as shown in Table 2-1.

Table 2-1 Key UK and Scottish Policies Pertinent to the Proposed Cable Replacement Works

Legislation or Policy	Key Requirements	Relevant Section (where applicable)
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 Project: > Under Section 37 of the act a marine licence is required for laying any activity which activities which involves: o deposit any substance or object in the sea or on or under the seabed o construct, alter or improve works on or over the sea or on or under the seabed o remove substances or objects from the seabed o carry out dredging o deposit and/or use explosives o incinerate substances or objects > Under section 82 of the Marine (Scotland) Act 2010, Marine Scotland Licensing Operations Team (MS-LOT) is required to consider whether a licensable activity is capable of affecting (other than insignificantly) a protected feature in a Nature Conservation Marine Protected Area (NCMPA) or a historic marine asset in a Historic Marine Protected Area (MPA). > Under Section 107 of the act, it is an offence to kill, injure or take a live seal; 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 a Marine License Application for the cable replacement works. **Section 5 – Designated Sites** assesses the potential impacts on NCMPAs in the vicinity of the cable corridor. This concluded that no effects on NCMPAs were expected. **Section 10 – Marine Archaeology** assesses the impact of the cable installation on Historic Marine Protected Areas. This concluded that no impacts were expected. **Section 7 – Marine Megafauna** assessed the potential for the Project activities to injure seals or disturb seals at designated seal haul-outs. This assessment concluded there should be no injury to seals and no disturbance at designated seal haul-outs.
Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) (also known as 'The Habitats Regulations')	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. The Habitats Regulations Appraisal (HRA) process forms part of these regulations. The HRA process requires that any proposal which has the potential to result in a negative likely significant effect (LSE) to a Natura site or its designated features, to be subject to an HRA by the Competent Authority, and if necessary an Appropriate Assessment (AA). 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 European protected species are present, licences to permit works that will affect them can only be granted when: > there is no satisfactory alternative, and > the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.	**Section 5 – Designated Sites** concluded that no Likely Significant Effect was expected on any designated site in the vicinity of the cable corridor. **Section 7 – Marine Megafauna** assessed the potential impacts on EPS which have a potential connectivity with the Project activities (cetaceans and otters). This concluded that there will be no injurious impacts to these receptors, however, as disturbance could not be ruled out, an EPS licence will be submitted to Marine Scotland.
Wildlife and Countryside Act 1981 (as amended) and the Nature Conservation (Scotland) Act 2004	Basking sharks are protected under Schedule 5 of the Wildlife and Countryside Act (WCA) (1981 as amended) which prohibits the killing, injuring or taking by any method of those wild animals listed on Schedule 5 of the Act. The Nature Conservation (Scotland) Act 2004, Part 3 and Schedule 6 make amendments to the WCA, strengthening the legal protection for threatened species to include 'reckless' acts, and specifically makes it an offence to intentionally or recklessly disturb or harass basking sharks. A derogation licence under the WCA will therefore be required for any activity which may result in disturbance or injury to basking sharks. In addition, the primary legislation for the protection of birds in the UK is the WCA 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, 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 outwith the breeding season.	**Section 7 – Marine Megafauna** concluded that there is not likely to be any impacts on basking sharks. **Section 9 – Ornithology** concluded that no impacts to birds were expected from the Project activities.

Legislation or Policy	Key Requirements	Relevant Section (where applicable)
Scottish National Plan Policy 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 potential benefits of the cable replacement. This will restore a reliable power source to Jura which will inherently provide the potential for economic benefit for the communities on the Island.
Scottish National Plan Policy GEN 5 Climate change	Marine Planners and decision makers much act in the way best calculated to mitigate and adapt to climate change.	**Mainland – Jura Emergency Repair Project Description** outlines how failure to complete the replacement works would result in an increased reliance on fossil fuels.
Scottish National Plan Policy 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** concluded that no impacts are expected on protected marine assets
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 submarine cable will have no long term landscape/seascape effects.
Scottish National Plan Policy 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.	No impacts to coastal change and flooding are expected from the cable replacement works.
Scottish National Plan Policy GEN 9 Natural Heritage	Development and use of the marine environment must: > Comply with legal requirements for protected areas and protected species. > Not result in significant impact on the national status of Priority Marine Features. > Protect and, where appropriate, enhance the health of the marine area.	**Section 5 – Designated Sites** concluded that no impacts on protected areas are expected. **Section 7 – Marine Megafauna** concluded that no adverse impacts on protected marine megafauna were expected. **Section 8 – Benthic and Intertidal Ecology** concluded that no adverse impacts on protected benthic or intertidal features were expected. **Section 9 – Ornithology** concluded that no adverse impacts on birds was expected.
Scottish National Plan Policy 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** concluded that the likelihood of invasive species being introduced as part of the Project activities is low.
Scottish National Plan Policy 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 (MSFD) or other related Directives apply.	**Section 6 – Seabed and Water Quality** concluded that no deterioration in water quality in the vicinity of the cable corridor is expected.
Scottish National Plan Policy 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.	**Section 7 – Marine Megafauna concluded** that no adverse impacts to marine mammals are anticipated from underwater noise generated from the Project activities.
Scottish National Plan Policy GEN 18 Engagement	Early and effective engagement should be undertaken with the general public and all interested stakeholders to facilitate planning and consenting processes.	**See PAC Report and FLMAP** SHEPD have consulted stakeholders and include a PAC report summarising how their views have influenced their application.

Legislation or Policy	Key Requirements	Relevant Section (where applicable)
Scottish National Plan Policy Sea Fisheries – Fisheries 1	Taking account of the EU's Common Fisheries Policy (CFP), Habitats Directive, Birds Directive and MSFD, marine planners and decision makers should aim to ensure: > Existing fishing opportunities and activities are safeguarded wherever possible; > Protection for vulnerable stocks (in particular for juvenile and spawning stocks through continuation of sea area closures where appropriate); > That other sectors take into account the need to protect fish stocks and sustain healthy fisheries for both economic and conservation reasons; and Mechanisms for managing conflicts between fishermen and/or between the fishing sector and other users of the marine environment.	**See:** • FLMAP Argyll Jura-Islay; • FLMAP Delivery Programme Mainland Jura Fault; and • How SHEPD co-exists with Other Marine Users
Scottish National Plan Policy Sea Fisheries – 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.	**See Cost Benefit Analysis Model within the PAC Report.** The impact submarine electricity cables have on fuel poverty (including associated increased health service and social care costs for island communities), commercial fishing and planned renewable electricity generation projects on the islands is considered within socio-economic impact of the Cost Benefit Analysis Model.
Scottish National Plan Policy Sea Fisheries – Fisheries 3	Where existing fishing opportunities or activity cannot be safeguarded, a Fisheries Management and Mitigation Strategy should be prepared by the proposer of the 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 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. > The content of the Strategy should be relevant to the particular circumstances and could include: > An assessment of the potential impact of the development or use on the affected fishery or fisheries, both in socio-economic terms and in terms of environmental sustainability; > A recognition that the disruption to existing fishing opportunities/activity should be minimised as far as possible; > Reasonable measures to mitigate any constraints which the proposed development or use may place on existing or proposed fishing activity; and Reasonable measures to mitigate any potential impacts on sustainability of fish stocks (e.g. impacts on spawning grounds or areas of fish or shellfish abundance) and any socioeconomic impacts.	**See Cost Benefit Analysis Model in PAC Report.** The impact submarine electricity cables have on fuel poverty (including associated increased health service and social care costs for island communities), commercial fishing and planned renewable electricity generation projects on the islands is considered within socio-economic impact of the Cost Benefit Analysis Model. **Section 8 – Benthic and Intertidal Ecology** concluded that no impacts on fish are expected.
Scottish National Plan Policy Recreation and 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. 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.	**See:** • FLMAP Argyll Jura-Islay • FLMAP Delivery Programme Mainland-Jura Fault; and • How SHEPD co-exists with other marine users.

Legislation or Policy	Key Requirements	Relevant Section (where applicable)
Scottish National Plan Policy 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.	**See:** • FLMAP Argyll Jura-Islay; • FLMAP Delivery Programme Mainland-Jura Fault; and • How SHEPD co-exists with other marine users.
Scottish National Plan Policy 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.	**See:** • FLMAP Argyll Jura-Islay; • FLMAP Delivery Programme Mainland-Jura Fault; and • How SHEPD co-exists with other marine users.
Scottish National Plan Policy 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 consideration 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.	SHEPD have consulted with stakeholders prior to the replacement works commencing. This MEA has indicated how impacts on the marine environment have been minimised. A Marine License application will be submitted for the cable replacement.
Scottish National Plan Policy 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.	**The Mainland -Jura Emergency Repair Project Description** has outlined the cable protective measures. This MEA has concluded that no likely significant impacts are expected from the cable replacement works once relevant mitigation measures have been implemented. Cable will not be buried as the area is comprised of large areas of rocky seabed.
Scottish National Plan Policy 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.	Due to the urgent nature of the Project, the removal of the current Mainland – Jura cable has not been considered as of yet. SHEPD will consider this as the Project progresses.

3 PROJECT DESCRIPTION

This section provides and overview of project activities, a detailed project description is provided in the Mainland – Jura Emergency Repair Project Description.

The Mainland – Jura cable is located on the west coast of Scotland, in the Argyll region. The existing cable is approximately 8 km in length, and extends from Carsaig Bay on the Scottish mainland, across the Sound of Jura to Camas nam Meanbh-chuileag on the Isle of Jura. The proposed replacement cable will be installed adjacent to the existing cable, but will be micro routed around possible technical and environmental constraints, informed by pre-construction surveys. In order to allow sufficient flexibility for detailed route engineering, a 1,000 m wide installation corridor, centred on the existing cable location, will be consented and considered by this MEA. The location of the installation corridor is shown in Figure 3-1, with coordinates of the bounding points provided in Table 3-1.

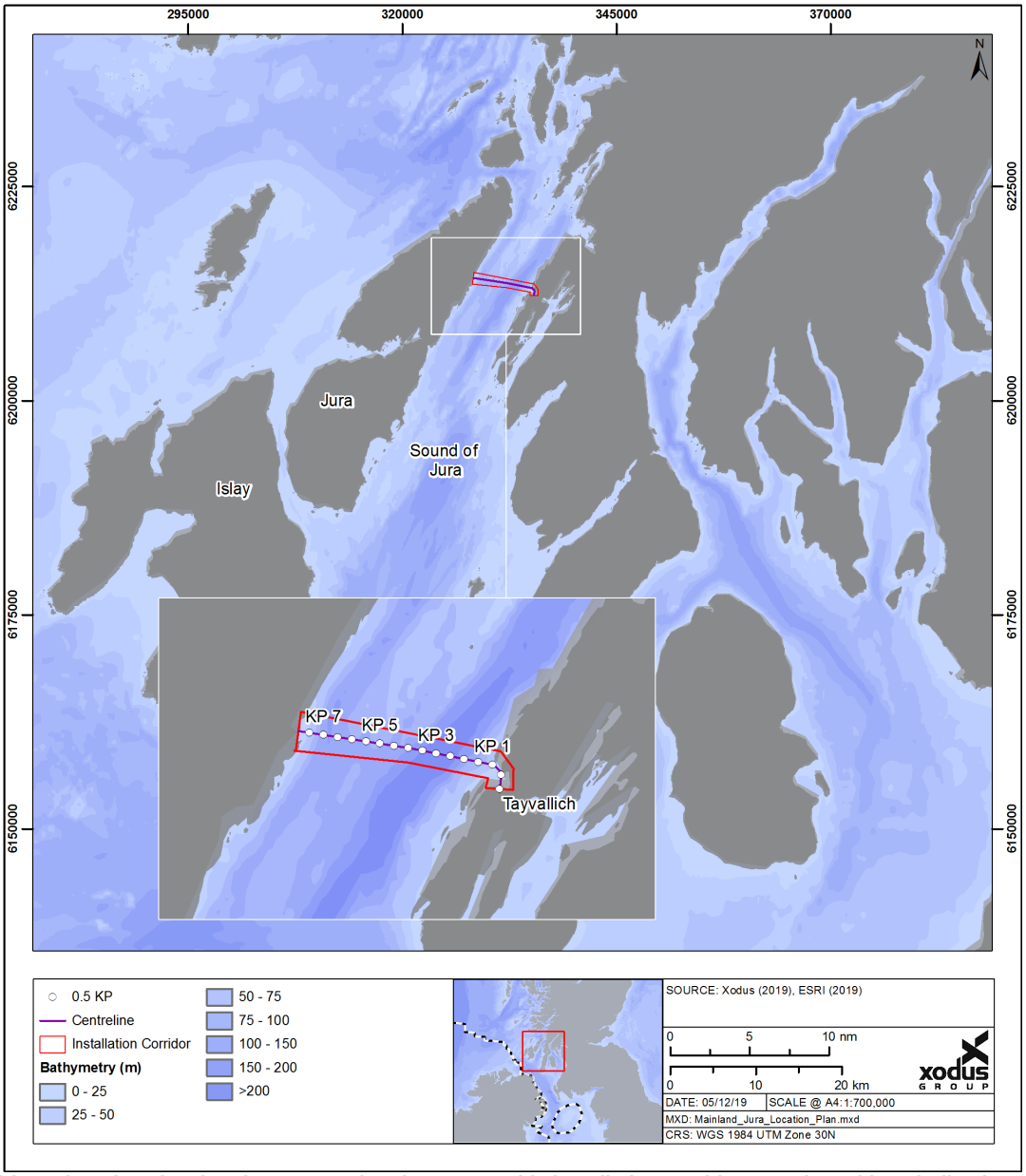

Figure 3-1 Location plan showing the proposed replacement cable installation corridor, together with an indicative centreline, and kilometre post (KP) referencing.

Table 3-1 Cable Installation Corridor Coordinates in Degrees, Minutes & seconds (DMS), Degrees & Decimal Minutes (DDM) and Decimal Degrees (DD).

Cable Installation Corridor Coordinates (WGS84)					
Latitude DMS	**Longitude DMS**	**Latitude DDM**	**Longitude DDM**	**Latitude DD**	**Longitude DD**
56° 2' 17.38" N	5° 38' 39.08" W	56° 2.290' N	5° 38.651' W	56.03816	-5.64419
56° 2' 2.18" N	5° 38' 16.94" W	56° 2.036' N	5° 38.282' W	56.03394	-5.63804
56° 1' 39.47" N	5° 38' 16.55" W	56° 1.658' N	5° 38.276' W	56.02763	-5.63793
56° 1' 38.86" N	5° 39' 3.60" W	56° 1.648' N	5° 39.060' W	56.02746	-5.651
56° 1' 51.67" N	5° 39' 18.72" W	56° 1.861' N	5° 39.312' W	56.03102	-5.6552
56° 2' 13.49" N	5° 44' 26.09" W	56° 2.225' N	5° 44.435' W	56.03708	-5.74058
56° 2' 13.56" N	5° 45' 32.04" W	56° 2.226' N	5° 45.534' W	56.0371	-5.7589
56° 2' 51.65" N	5° 45' 20.05" W	56° 2.861' N	5° 45.334' W	56.04768	-5.75557
56° 2' 53.84" N	5° 44' 52.87" W	56° 2.897' N	5° 44.881' W	56.04829	-5.74802
56° 2' 17.38" N	5° 38' 39.08" W	56° 2.290' N	5° 38.651' W	56.03816	-5.64419
For the avoidance of doubt, the landward boundaries of all survey corridors covered by this MEA shall be 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.					

A summary of activities considered by this assessment is provided below, please refer to Mainland – Jura Emergency Repair Project Description for further detail:

- Surface laying of approximately 8 km of submarine power cable using a cable lay vessel (CLV);
  - Including the use of a remotely operated vehicle to conduct touch down monitoring and associated Ultra-Short Baseline (USBL) positioning systems.
- Placement of rock filter bag, and or concrete mattresses to pin the cable to the seabed;
- Burial of the cable in an Open Cut Trench (OCT) in the intertidal areas between MHWS and MLWS;
- Use of external half pipe cable protection systems in the intertidal zone if burial via OCT is not possible; and
- Associated vessel presence.

4 ASSESSMENT METHODOLOGY

This MEA supports SHEPD's application for authorisation to complete the required works, 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.

Due to stringent time restrictions associated with the current emergency situation of the proposed Jura cable replacement works; a proportionate assessment of environmental impacts has been undertaken to support the Marine Licence and associated EPS Licence applications. The scope of this assessment is exclusively focused on impacts to receptors pertaining to the proposed cable installation activities below the MHWS. Furthermore, the time constraints precluded the undertaking of ecological or environmental field surveys due to inform the baseline assessment. Therefore, the data sources used to input into the subsequent assessment have been derived from:

- Relevant studies and reports available for the Jura cable location as supplied by SHEPD;
- Publicly available literature; and
- Previous reports relating to SHEPD Jura operations.

Potential impacts have been evaluated to determine how the Jura emergency cable replacement 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 Assessment Criteria

This MEA provides an assessment of potential impacts resulting from the effects of the Jura emergency cable replacement activities on environmental receptors. 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 project 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 impacts in order to determine their 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.

4.1.1 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.

4.1.2 Magnitude of Impact

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 impact will vary for specific topics. The magnitude categories used are negligible, minor, moderate and major.

4.1.3 Significance of Impact

The significance of potential effects 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 or moderate	Moderate
Moderate	Negligible	Minor	Moderate	Moderate	Major
Major	Minor	Minor or moderate	Moderate	Major	Major

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

4.2 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. Details of the embedded mitigation which SHEPD are committed to implementing, and hence has be considered by this MEA presented in Table 4-2. All embedded mitigation will be included within the CEMP.

Additional mitigation has been suggested on a receptor specific basis informed by the impact assessments. During the assessment of impacts in the receptor specific assessment chapters, all proposed mitigation is considered when assessing the significance of an impact.

Table 4-2 Embedded mitigation and Best Practice relevant to the Project

Measure	Details
Production of a Construction Environmental Management Plan (CEMP)	Measures will be adopted to ensure environmental impacts are minimised, and to reduce the potential for release of pollutants from installation works. This will be informed by the results of this MEA.
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 project personnel.
Preconstruction surveys will be conducted to inform detailed route engineering.	Appropriate preconstruction geophysical surveys and visual inspection will be conducted to confirm the locations of potentially sensitive features.
Environmental planning.	The final cable route, and positioning of filter bags and concrete mattresses will be optimised to avoid impacts on sensitive environmental features, including Annex 1 habitats and wrecks insofar as possible. The emergency cable replacement will be conducted during winter months, avoiding bird and seal breeding periods.
Scottish Marine Wildlife Watching Code (SMWWC)	All vessels will adhere to the provisions of the SMWWC during installation works. SNH developed the Code as part of its duties under the Nature Conservation (Scotland) Act 2004. The Code 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 the cable installation vessel will be kept to the minimum level required to ensure safe operations. This will minimise disturbance to seabird species.
Deployment of anchor chains on the seabed will be kept to a minimum	Reduces the potential for disturbance to benthic habitats and species including which utilise the seabed.
Vessels will be travelling at a slow speed during installation works.	The slow speed of installation vessels will minimise the risk of disturbance and injury impacts to seabird and marine mammal receptors.
Production of an Emergency Spill Response Plan	An Emergency Spill Response Plan will help to ensure that the potential for release of pollutants from cable installation works 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. In the event of an accidental fuel release occurring appropriate standard practice management procedures will be implemented accordingly.	As per the MARPOL 73/78 requirement under Annex I, all ships with 400 GT and above must carry an oil prevention plan as per the norms and guidelines laid down by International Maritime Organization under MEPC (Marine Environmental Protection Committee) act. Production of this plan will help to ensure that the potential for release of pollutants from construction, operation and decommissioning is minimised.
Vessels will be equipped with waste disposal facilities (sewage treatment or waste storage) to IMO MARPOL Annex IV Prevention of Pollution from Ships standards.	Measures will be adopted to ensure that the potential for release of pollutants from installation vessels is minimised.
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 Marine Non-Native Species (MNNS) introduction during cable installation works is minimised.

Measure	Details
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 Fisheries Liaison Mitigation Action Plan.	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 proposed Project operations including exclusions, dates and durations.
Notice to Mariners (including local), Kingfisher bulletins, Radio Navigational Warnings, NAVTEX, 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 and equipment snagging.
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 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 Project its compliance will ensure navigational safety.
As built survey data will be provided to the UKHO and Kingfisher for inclusion on Admiralty Charts and KIS-ORCA Awareness Charts.	Ensure navigational safety and minimise the risk and equipment snagging.

4.3 Cumulative Impact Assessment

The Current Marine Projects list on Marine Scotland's website (MS, 2019) was reviewed to identify other projects with the potential to result in cumulative effects. However, considering the extremely localised nature of the effects likely to be associated with the proposed emergency cable replacement works, no potential cumulative effects were identified, and no further assessment is required.

5 DESIGNATED SITES

5.1 Introduction

This chapter will provide the information required to support the Habitats Regulations Appraisal process. As such, the Project activities will assessed as to whether they are likely to constitute a 'Likely Significant Effect' (LSE) on a designated site, in line with the HRA process. Therefore, magnitude and significance of impact will not be discussed within this chapter and these will be determined in the topic-specific receptors impact chapters.

The likely significant effect (LSE) on Natura 2000 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 section 82 and 117 of the Marine (Scotland) Act 2010.

No LSE on Sites of Special Scientific Interest (SSSIs) or Ramsar sites are expected, as an overview of those present within the wider area (Sitelink, 2019) revealed that none were designated for features which have any ecological connectivity with the proposed cable replacement works. As such, impacts on SSSIs and Ramsars have not been considered for further assessment.

For each of the cable routes, the following criteria has been used to select those designated sites where potential impacts need to be assessed:

- SACs and NCMPAs (including proposed and candidate sites) with cetaceans or basking sharks as qualifying features within 50 km of the proposed cable replacement works;
- SACs (including proposed and candidate sites) with harbour seal interests within 50 km of the proposed cable installation corridor and breeding grey seal within 20 km of the proposed cable installation corridor;
- Designated seal haul-outs or grey seal breeding sites that overlap with or located within 500 m of the proposed cable installation corridor;
- SACs and NCMPAs (including proposed and candidate sites) with otter interests that overlap with or located within 500 m of the proposed cable installation corridor;
- SPAs and NCMPAs (including proposed and candidate sites) with birds as qualifying features that overlap with or are located within 2 km of the proposed cable installation corridor; or
- SACs and NCMPAs (including proposed and candidate sites) with seabed / benthic protected features that overlap with the proposed cable installation corridor.

Where no LSE is predicted on a Natura 2000 site, NCMPA or Designated Seal Haul-out, the site has been screened out for further assessment in this report. Where a 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 chapters in Section 7 – Marine Megafauna, Section 8 – Benthic and Intertidal Ecology and Section 9 – Ornithology.

5.2 Data Sources

This section draws on a number of data sources including published papers and industry-wide surveys. A key data source available for Scottish waters (within 12 nautical miles and offshore) is the National Marine Plan interactive (NMPi) website (NMPi, 2019) which underpins the Scottish National Marine Plan (NMP) (Scottish Government, 2015). Identification of designated sites within the vicinity of the cable corridor has been obtained using publicly available geospatial data.

5.3 Baseline and Receptor Identification

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

5.3.1 SACs and NCMPAs with cetaceans or basking sharks as qualifying features

The cable corridor overlaps with the Inner Hebrides and the Minches SAC and is located approximately 31.8 km from the Sea of Hebrides pMPA.

The Inner Hebrides and the Minches SAC is designated for supporting harbour porpoise (*Phocoena phocoena*), an Annex II species under the Habitats Directive (SNH, 2019a). The Inner Hebrides and the Minches SAC was designated in 2018 and extends almost across the entire north west coast of Scotland, covering an area of 13,814 km^2 from the Sound of Jura to the north east coast of Skye (SNH, 2019a). Harbour porpoise are present within this area year-round (HWDT, 2018).

The Sea of Hebrides pMPA is proposed to protect basking shark (*Cetorhinus maximus*) and minke whale (*Balaenoptera acutorostrata*). The waters within this area are nutrient-rich and this creates a large feeding ground for these two species (SNH 2019b). Basking sharks are usually present in the Sea of Hebrides pMPA between June and October before they migrate to deeper waters (SNH, 2019b). Similarly, minke whales are present in their highest numbers along the west coast of Scotland between May and October, however, several remain in the area over winter (Weir *et al.*, 2001; HWDT, 2018).

5.3.2 SACs with harbour seal or breeding grey seal interests

There are two sites designated for harbour seal (*Phoca vitulina)* within 50 km of the propose cable replacement works. This includes the South-East Islay Skerries SAC and the Eileanan agus Sgeiran Lios mor SAC which are 42.6 km and 48.8 km from the cable corridor, respectively. There are no sites designated for grey seals within 50 km of the cable corridor.

The South- East Islay Skerries SAC supports 1.5 – 2% of the entire UK harbour seal population (JNCC, 2019a). The Eileanan agus Sgeiran Lios mor SAC is located on Lismore and supports 1% of the UK harbour seal population (JNCC, 2019b).

Harbour seals are central-place foragers, utilising their terrestrial ‘base’ for important life history events (i.e. breeding, pupping, moulting, etc.) to rest, and head 40 – 50 km offshore on foraging trips before returning to land (Pollock, 2000; SCOS, 2018). Harbour seals are most sensitive during the pupping and moulting season which occur in June – July and August, respectively (SCOS, 2018).

5.3.3 Designated seal haul-outs or grey seal breeding sites

There are no designated seal haul outs within 500 m of the proposed cable replacement works. Therefore, no ecological connectivity is expected with these designated sites, and as such they have not been considered for further assessment.

5.3.4 SACs and NCMPAs with otter interests

The Tayvallich Juniper and Coast SAC is located approximately 0.2 km from the cable corridor. One of the qualifying interests of this site is otter (*Lutra lutra*) (JNCC, 2019c).

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 (DECC, 2016).

5.3.5 SPAs and NCMPAs with birds as qualifying features

The Jura, Scarba and the Garvellachs SPA is located approximately 0.7 km from the cable corridor. This site is designated for supporting more than 2% of the GB population of breeding Golden eagle (*Aquila chrysaetos*), an Annex 1 species under the Birds Directive (SNH, 2010).

Golden eagle are primarily a terrestrial species that mostly utilise upland areas and feed on small terrestrial mammals and birds (JNCC, 2019d; SNH, 2019c). Nests are usually located high up on hill tops or along cliffs and breeding usually occurs in March with most young fledging the nest in October (SNH, 2019c; RSPB, 2019).

5.3.6 SACs and NCMPAs with seabed / benthic protected features

The cable corridor overlaps with the Loch Sunart to the Sound of Jura MPA. The Loch Sunart to the Sound of Jura MPA covers a 741 km^2 area and supports a large resident population of common skate and is expected to be a potential breeding ground for the species. The distribution of this species is largely restricted to the west coast of Scotland and Orkney (SNH, 2017).

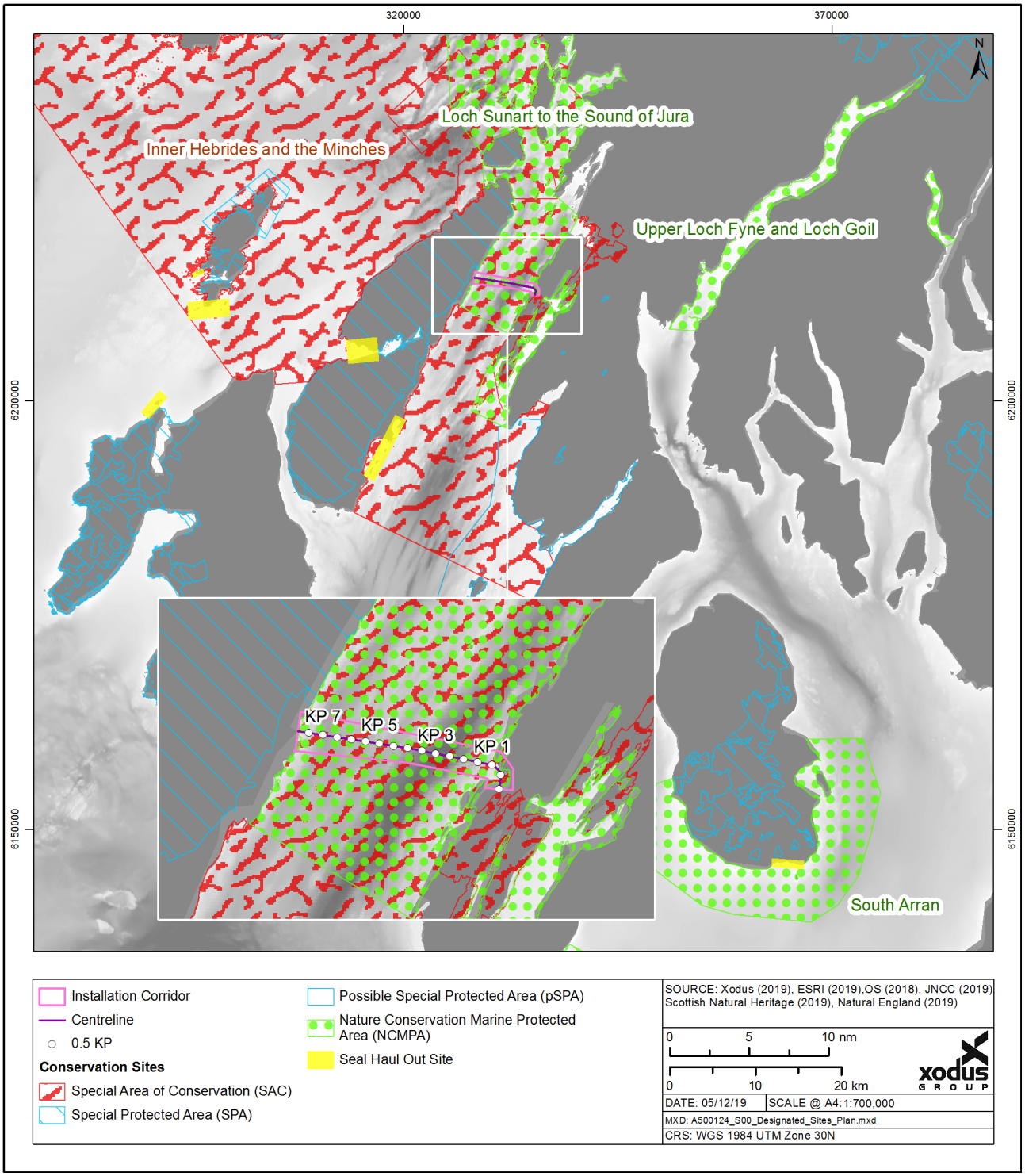

Figure 5-1 Protected Sites in the vicinity of the Mainland - Jura cable Replacement

5.4 Potential Connectivity with Designated Sites

Although there are several designated sites within the vicinity of the cable corridor, for a likely significant effect to arise, there has to be potential ecological connectivity between the cable replacement works and the qualifying features of a designated site. An initial consideration has been provided within Table 5-1 identifying whether particular designated sites or particular impacts require a more detailed investigation of whether there is a potential likely significant effect. Those sites or impacts for which no likely significant effect is expected are not considered for further assessment.

Table 5-1 Protected sites in the vicinity of cable corridor

Designated Site	Reason for Selection	Distance from nearest part of cable corridor to protected site (km)	Qualifying features of designated site	Potential impact from cable replacement works	Requirement for further assessment
Loch Sunart to the Sound of Jura NCMPA	This designated site overlaps with the cable route.	0	Common skate; and Quaternary of Scotland	> Disturbance	Overlap with the Project, therefore **further assessment is required** with regard to effects on common skate. However, no impacts are expected on geological qualifying features and as such impacts on quaternary of Scotland **do not require further assessment.**
Inner Hebrides and the Minches SAC	The designated site overlaps with the cable route.	0	Harbour porpoise	> Underwater noise; and > Vessel presence.	Overlap with Project, therefore **further assessment required.**
Sea of Hebrides pMPA	The designated site is within 50 km of the cable route.	31.8	Basking Shark; and Minke Whale	> Underwater noise; and > Vessel presence.	Due to the highly mobile nature of basking sharks and minke whale connectivity exists, **further assessment is required.**
Jura, Scarba and the Garvellachs SPA	This designated site is within 2 km of the cable route.	0.7	Golden eagle	> Vessel presence	As golden eagles are a terrestrial species, they are not expected to be impacted by the cable replacement works. As such, **no further assessment is required for this site**.
South-East Islay Skerries SAC	The designated site is within 50 km of the cable route.	42.6	Harbour seal	> Underwater noise; and > Vessel presence.	The intervening distance between the cable corridor and this designated site means that disturbance at seal haul outs is not anticipated and as such this impact is **not considered for further assessment.** However, due to the mobile nature of harbour seals **further assessment for this qualifying feature is required** for the potential impacts at-sea.
Tayvallich Juniper and Coast SAC	The designated site is within 500m of the cable route.	0.2	Otter *Juniperus communis* formations on heaths or calcareous grasslands; and Marsh fritillary butterfly (*Euphydras aurinia*)	> Vessel presence; and > Landfall works in the intertidal zone.	Given the small distance between the cable corridor and this SAC **further assessment is required.** However, impacts on *Juniperis communis* formations on heaths or calcareous grasslands and marsh fritillary butterfly are not expected as these features are terrestrial, and as such, **no further assessment is required for these receptors.**
Eileanan agus Sgeiran Lios mor SAC	The designated site is within 50 km of the cable route.	48.8	Harbour seal	> Underwater noise; and > Vessel presence.	The intervening distance between the cable corridor and this designated site mean that disturbance at seal haul outs is not anticipated and as such this impact is **not considered for further assessment.** However, due to the mobile nature of harbour seals **further assessment for this qualifying feature is required** for the potential impacts at-sea.

5.5 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 impacted by the cable replacement works, mitigation measures have been considered based upon site-specific protected features.

5.5.1 Assessment of Likely Significant Effects on SACs with Harbour Seals as a Feature

The cable corridor is located within 50 km of the South-East Islay Skerries SAC and the Eileanan agus Sgeiran Lios mor SAC, both of which are designated for harbour seal (JNCC, 2019a; JNCC, 2019b). Further details on the assessment of potential impacts on seals is provided in Section 7.

5.5.1.1 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 (Southhall *et al*., 2019; NOAA, 2018). As detailed in Section 7 and Appendix A, no injury risk is associated with the proposed installation works, and the disturbance range is limited to approximately 200 m. Considering the intervening distance between from the two SACs and the cable installation corridor at its nearest point (42.6 and 48.8 km), and the availability of comparable marine habitat surrounding the installation works, the potential for adverse effects on harbour seals is considered limited. In addition, the installation vessel will be continually moving, and therefore effects will be transient.

As the installation activities will be transient, temporary and localised, any disturbance to seals at these sites resulting from underwater noise emissions will be temporary and this is not thought to adversely affect the conservation objectives of the two sites. In addition, the Project activities are expected to occur outwith the sensitive breeding and moulting seasons minimising the severity of any disturbance. As such, **no LSE** on the South-East Islay Skerries SAC and the Eileanan agus Sgeiran Lios mor SAC are expected from underwater noise emissions.

5.5.1.2 Vessel presence

With the increase in vessel traffic associated with the cable installation, marine mammals could potentially be at an increased risk of collision and disturbance.

However, as the installation vessels will be slow-moving, collision risk is generally considered to be low. Moreover, the presence of vessel associated with the installation works is not considered to be substantive change from baseline vessel activity in the area and as such, there is **no LSE expected** on these sites.

5.5.2 Assessment of Likely Significant Effects on SACs and MPAs with Cetaceans and Basking Shark as a Feature

The cable corridor is located within 50 km of the Inner Hebrides and the Minches SAC, designated for harbour porpoise and within 50 km of the Sea of Hebrides pMPA, designated for basking shark and minke whale (SNH, 2019a; SNH, 2019b). Further details on the assessment of potential impacts on cetaceans and basking sharks is provided in Section 7.

5.5.2.1 Underwater noise

As detailed in Section 7 and Appendix A, no injury risk is associated with the proposed installation works, and the disturbance range is limited to approximately 200 m. Nevertheless, there is the potential for noise emissions to disturb harbour porpoise and minke whale. The greatest risk likely to arise for harbour porpoise in the Inner Hebrides and the Minches SAC, as the cable installation corridor directly overlaps with this designated site.

However, the short-term and transient nature of the cable installation works means the risks to marine mammals are extremely localised and temporary, therefore animals within a particular area will not be exposed to extended periods of underwater noise. The temporary and transient in nature of the potential disturbance,

in conjunction with the highly mobile and wide-ranging nature of harbour porpoise and minke whales means that the disturbance is unlikely to cause a negative effect at a population level.

Basking sharks are considered unlikely to be present in the vincity of the installation works, since the project will be executed during winter months, when basking sharks do not utilise the waters off the west coast of Scotland, hence no effects on this species are expected.

Therefore, it is not expected that the proposed works will adversely affect the conservation objectives of these two sites and as such **no LSE is expected.**

5.5.2.2 Vessel presence

With the increase in vessel traffic associated with the cable installation, marine mammals and basking shark could potentially be at an increased risk of collision. This likely poses the greatest risk to basking sharks this species have slower swimming speeds than the highly manoeuvrable minke whales and harbour porpoise.

However, basking sharks will not be present in the area during the installation works, and the installation vessels will be slow-moving; hence collision risk with minke whales and harbour porpoise is generally considered to be low. Moreover, the presence of vessel associated with the installation works is not considered to be substantive change from baseline vessel activity in the area and as such, there is **no LSE expected** on these sites.

5.5.3 Assessment of Impacts on Loch Sunart to the Sound of Jura MPA

The cable installation corridor overlaps the Loch Sunart to the Sound of Jura MPA which is designated for its resident common skate population (SNH, 2017). Further details on the assessment of potential impacts on common skate and benthic habitats is provided in Section 8.

5.5.3.1 Disturbance

Cable installation methods in direct contact with the seabed have the potential to impact on the common skate and their habitats directly within the Project footprint. Common skate rely directly on the sediment for laying their egg capsules and any seabed disturbance could therefore have an adverse impact on the breeding of this species (MCS, 2019). However, as the cable will be surface-laid, any sediment disturbance will have an extremely limited footprint (see Section 8). As such, any disturbance to egg capsules already anchored in the sediment will be extremely limited. Moreover, there should be plenty available habitat for egg laying outwith the cable corridor. Common skate are mobile species and hence there is very limited potential for direct physical interactions with cable installation works, that could lead to injury or mortality of this species. As such, **no LSE is expected**.

5.5.4 Assessment of Impacts on Tayvallich Juniper and Coast SAC

The cable corridor is 0.2 km from the Tayvallich Junper and Coast SAC, designated for otters. Further details on the assessment of potential impacts on otters is provided in Section 7.

5.5.4.1 Vessel Presence and Landfall Works in the Intertidal Zone

Otters may be present at the landfalls of the Mainland – Jura cable installation corridor during the cable replacement works. Otters may be disturbed by the presence of vessels but are not particularly sensitive to underwater noise. There is also the potential for landfall works in the intertidal area to result in disturbance of otters at their resting or breeding sites.

Due to the short period of time that installation works will be occurring in the nearshore area adjacent to the landfall, disturbance will be temporary; and therefore, no adverse impacts to otters are expected as a result of the vessel-based operations. In addition to this, otter surveys should be conducted by a qualified ecologist prior to the commencement of the cable installation, or where this is not possible, an ecologist will be present at the site during landfall works. Any otter holts, layups and couches are to be marked and avoided by a 40 m buffer during the intertidal landfall operations. As a result of this mitigation, distance of otters at the landfall works will be minimised, and **no LSE is expected.**

5.6 Conclusion

Due to the temporary and localised nature of the proposed cable replacement works, no LSE is predicted on the conservation objectives of any protected site and as such it is not expected that an Appropriate Assessment (AA) will be required. Overall, the replacement of the Mainland - Jura submarine power cable constitutes work of an overriding public need whilst presenting a trivial 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 cable replacement works. Detail on baseline seabed conditions presented in this section provides the relevant information for the purposes of the Environmental Appraisal and is not intended for engineering applications.

The offshore section of proposed cable will be surface laid, and as such no disturbance to underlying geological features in the area is expected. The benthic footprint of the works will be also be minimal, largely confined to the physical footprint of the cable itself, as no seabed modification such as trenching and burial will be undertaken and lateral movement of the cable will be prevented by the placement of rock filter bags or concrete mattresses directly onto the cable. As such, potential effects on seabed quality have been screened out of this assessment.

Likewise, as the offshore section cable will be surface laid, the installation activities will not result in significant levels of sediment resuspension, as would be expected from burial activities. Therefore, sedimentation related impacts are screened out and the water quality assessment will focus on potential impacts resulting from accidental release of chemical or hydrocarbon from the installation vessels.

6.2 Data Sources

This section draws on a number of data sources including published papers, industry-wide surveys and site-specific investigations. A key data source available for Scottish waters (within 12 nautical miles and offshore) is the National Marine Plan interactive (NMPi) website (NMPi, 2019) which underpins the Scottish NMP (Scottish Government, 2015).

6.3 Baseline and Receptor Identification

Surface sediments in the vicinity of the Project are comprised of sandy gravel and gravelly sand. No sedimentary bedform features of interest such as Annex 1 feature pockmarks or sandbanks are present in the vicinity of the Project.

Coastal water body classification by Scottish Environment Protection Agency (SEPA) over the period 2007 – 2017 (NMPi, 2019) shows that waters in the vicinity of the Project have an overall good to high potential/ status.

6.4 Impact Assessment

6.4.1 Coastal Sediment Suspension

At both landfall locations, the cable will be installed via an OCT inshore from the MLWS in which the cable will be trenched and buried. The timing of trench works will be tide dependent (working at low water when the intertidal zone is exposed), using terrestrial plant. 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 interacting with the trench walls and associated spoil. However, this will not be significantly greater than that expected by wave action causing low-level erosion of the shoreline sediments. As such the impact on sediment loading is considered to be non-significant.

Assessment of impact significance		
All installation activities at the landfall locations will be tidally dependent, working at low water. Increased suspended sediment will only occur during the interaction between the incoming tide, the trench walls and spoil heaps. This will result in highly localised and temporary increases in suspended sediment. Mitigation measures considered as part of the Project design are listed in Section 4 – Assessment Methodology.		
Sensitivity / value	**Magnitude of effect**	**Level of impact**
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 that a collision with another vessel occurs, one of the Project vessels loses its containment, or that a hydraulic line leaks or fails (for example associated with cranes and remotely operated vehicles (ROVs)). The main release risk associated with the cable installation 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 cable installation. 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. Additionally, the project's 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) 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 operations. The impact of an accidental release (diesel or hydraulic fluid) is therefore considered to be minor and not significant.

Assessment of impact significance		
Best Practice will be followed, and it is therefore unlikely that a spill from would occur during the operations. 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 overall level of impact is Minor. Mitigation measures considered as part of the Project design are listed in Section 4 – Assessment Methodology.		
Sensitivity/ value	**Magnitude of effect**	**Level of impact**
Low	Moderate	Minor
Impact significance – NOT SIGNIFICANT		

6.5 Conclusion

All installation activities at the landfall locations will be tidally dependent. Increased suspended sediment will only occur during the interaction between the incoming tide, the trench walls and spoil heaps. This will result in highly localised and temporary increases in suspended sediment which will not have a significant impact on coastal water quality.

Best practice will be followed by all installation vessels, therefore the likelihood of an accidental hydrocarbon release from one of the installation vessels 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 the large marine species, including marine mammals, otters and basking sharks, in the vicinity of the proposed marine cable installation corridor and landfall locations, 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 a European Protected Species Risk assessment, with regard to potential impacts on cetaceans and otters.

7.2 Data Sources

This section draws on a number of data sources including published papers and industry-wide surveys. A key data source available for Scottish waters (within 12 nautical miles and offshore) is the NMPi website (NMPi, 2019) which underpins the Scottish NMP (Scottish Government, 2015).

7.3 Existing Baseline Description

7.3.1 Cetaceans

Around 20 species of cetacean have been recorded off the west coast of Scotland, with eight being commonly observed in the region surrounding the Mainland – Jura cable corridor (HWDT, 2018); harbour porpoise, minke whale (*Balaenoptera acutrostrata*), common dolphin (*Delphinus delphis*), bottlenose dolphin, white-beaked dolphin (*Lagenorhynchus albirostris*), white-sided dolphin *(Lagenorhynchus acutus*), Risso's dolphin (*Grampus griseus*), and killer whale (*Orcinus orca*) (HWDT, 2018). The following summarises those species regularly sighted within the Project area:

- **Harbour porpoise** are the most frequently sighted cetacean along the west coast of Scotland where they are present year-round (Pollock *et al*., 2000; Reid *et al*., 2003; HWDT, 2018). They are most commonly sighted between April and October when densities reach > 0.1 individuals/ km^2 (Pollock *et al*., 2000). The Sound of Jura is noted as an area with a relatively high abundance of harbour porpoise in comparison to the wider region (Booth *et al.,* 2013; HWDT, 2018). As discussed in Section 5, the Inner Hebrides and the Minches SAC, designated for harbour porpoise, overlaps the cable installation corridor.
- **Minke whale** are present on the west coast of Scotland between May and October and are most commonly sighted in the summer months (June – August) (Weir *et al*., 2001). Minke whale sightings are higher in the north west of Scotland, however, sightings are relatively common in the Sound of Jura (HWDT, 2018). As discussed in Section 5, the Sea of Hebrides pMPA is located 31.8 km from the cable installation corridor. Minke whale is a qualifying feature of this site (SNH, 2019b).
- **Bottlenose dolphin** sightings are less common in the southern areas of the west coast of Scotland (HWDT, 2018; Cheney *et al.,* 2013). Two distinct bottlenose dolphin populations reside on the west coast of Scotland, one found mostly around Skye, and one around Barra (Cheney *et al*., 2013). Those bottlenose dolphins which form the Skye population are known to travel south towards the area surrounding Jura (Cheney *et al.,* 2013).
- **Common dolphin** sightings along the west coast of Scotland have increased in the last twenty years (HWDT, 2018). However, in the waters surrounding Jura, densities are fairly low compared to more northern areas of the west coast of Scotland (HWDT, 2018; Reid *et al*., 2003).
- **Risso's dolphin** are present in fairly low densities across the west coast of Scotland (HWDT, 2018; Reid *et al.,* 2003). Although Risso's dolphin are present throughout the entire range of the region, the highest densities occur around the Mull, Coll, and Tiree (HWDT, 2018).

- **Other species,** such as killer whales, white-beaked dolphins, and white-sided dolphins are seen infrequently in the waters surrounding the Mainland – Jura cable corridor (HWDT, 2018; Pollock *et al.*, 2000; Weir *et al.,* 2001).

The distribution, density, and abundance of the eight most commonly occurring cetacean species around the project area off the west coast of Scotland are described in Table 7-1 below.

Table 7-1 Population parameters of cetacean species potentially present in the project area (Hammond *et al.*, 2017)

Species name	Estimated density across the project area (individuals/km^2)	Management Unit (MU) / biogeographical population estimate (IAMMWG, 2015)
Harbour porpoise	0.336	21,462
Minke whale	0.027	23,528
Bottlenose dolphin	0.121	45
Common dolphin	*Insufficient data*	56,556
Risso's dolphin	*Insufficient data*	*Insufficient data*
Killer whale	*Insufficient data*	*Insufficient data*
White-Beaked dolphin	*Insufficient data*	15,895
White-sided dolphin	*Insufficient data*	63,293

7.3.2 Basking Sharks

Basking sharks (*Cetorhinus maximus*) are one of the only three species of shark which filter feed and are the second largest fish in the world (Sims, 2008). This species can be found throughout the offshore waters in the UK continental shelf (Sims, 2008) and are considered frequent visitors to the west coast of Scotland (HWDT, 2018). They typically move very slowly (around 4 miles per hour).

Basking sharks were hunted in Scotland up to 1995. However, they are now protected in the UK waters principally under Schedule 5 of the Wildlife and Countryside Act 1981 and under the Nature Conservation (Scotland) Act 2004 and are classed as Scottish priority Marine Feature (PMF) as well as a species on the OSPAR list.

The West Coast of Scotland has one of the highest sighting densities of basking sharks in the UK (Bloomfield & Solandt, 2006). Basking sharks are migratory and are present along Scottish shores between spring and autumn (Witt *et al.*, 2012). Although sightings within the Sound of Jura are common, they are less frequent than in the more northern areas of west Scotland where several basking shark 'hot spots' are present (e.g. waters surrounding Coll, Mull and Tiree) (Bloomfield & Solandt 2006 and Speedie *et al.*, 2009). Since the Mainland – Jura emergency cable replacement works will be conducted during winter months, when basking sharks will not be present in nearshore waters off the west coast of Scotland, no further assessment of potential impacts to this receptor is provided.

7.3.3 Seals

Two species of seals inhabit UK waters: the grey seal (*Halichoerus grypus)* and the harbour seal (*Phoca vitulina*). The waters around Scotland are important habitat for both species, which utilise the coastlines and nearshore waters year-round for breeding and feeding (Pollock *et al.,* 2000). The at-sea density of grey and harbour seals surrounding the Mainland – Jura cable installation corridor is shown in Figure 7-1 and Figure 7-2.

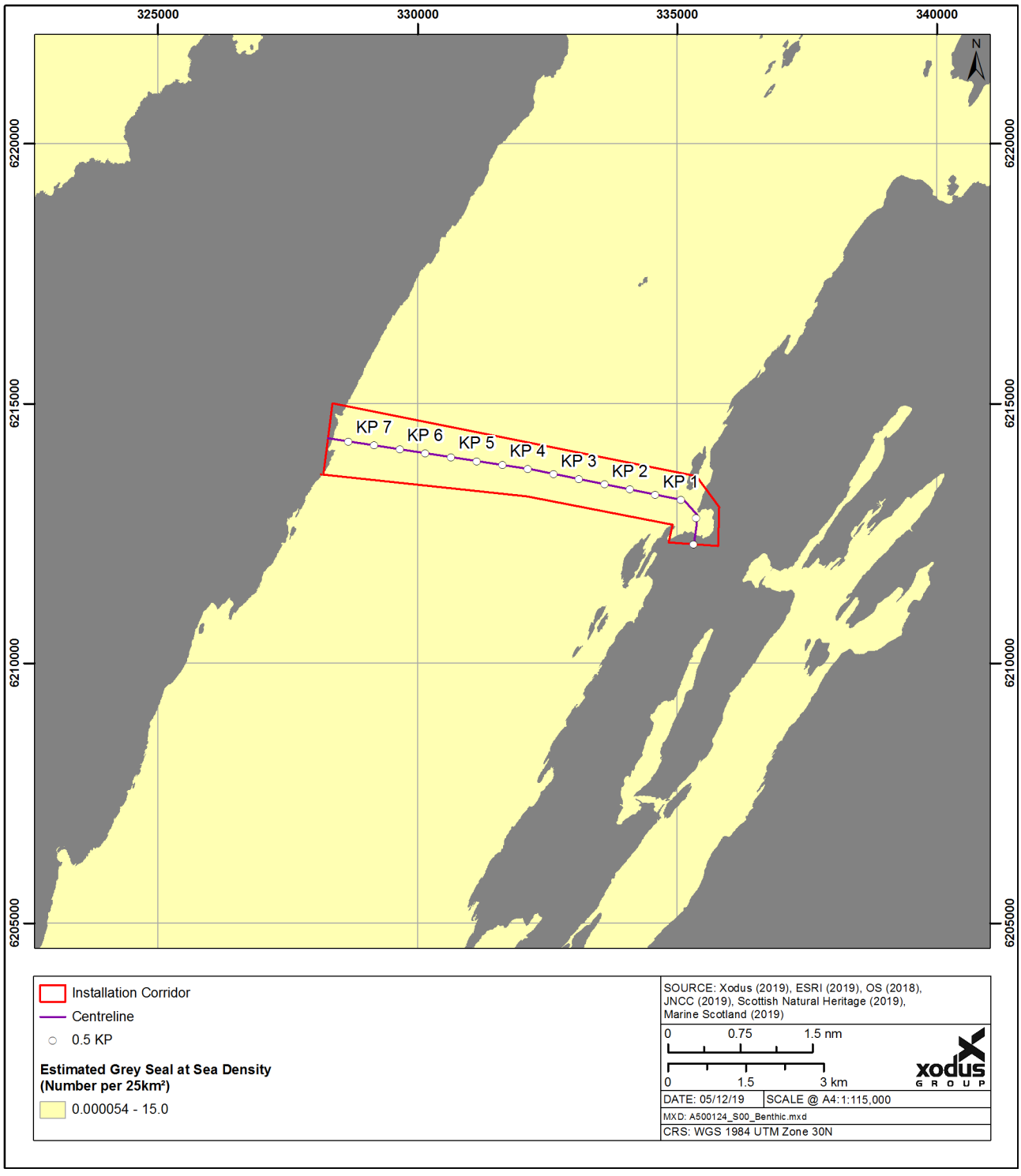

Figure 7-1 Estimated grey seal at sea density

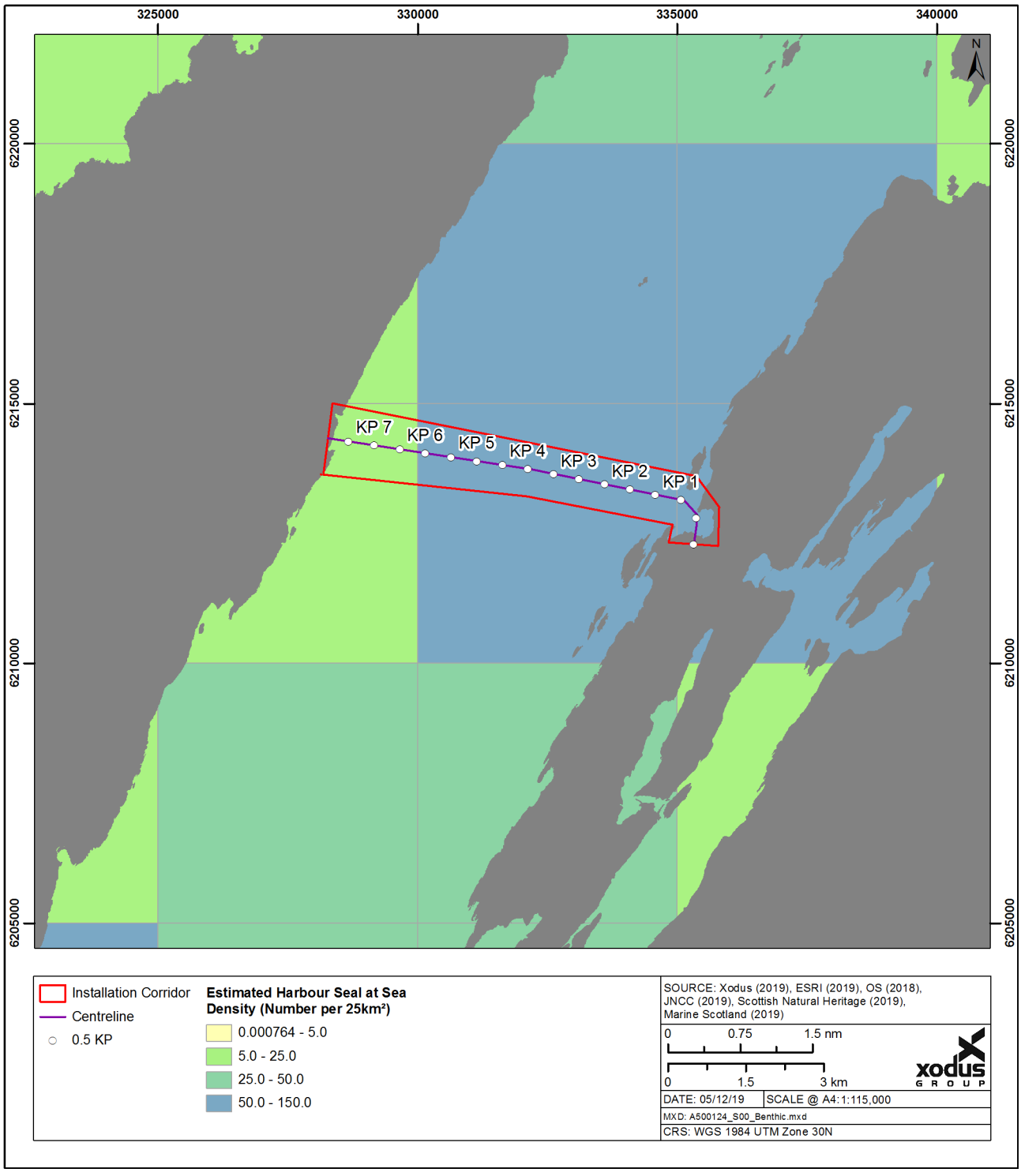

Figure 7-2 Estimated harbour seal at sea density

The mean at-sea usage of grey seals within the vicinity of the cable installation corridor is low (0-15 animals per 25 km^2) compared with the wider Scottish waters (Russell *et al.,* 2017). The mean at-sea usage of harbour seals within the vicinity of the cable installation corridor is moderate – high compared to the wider region, ranging from 5 - 25 individuals per 25 km^2 towards the landfall at Jura to 50 – 150 individuals per 25 km^2 towards the landfall at the Scottish mainland.

The pupping season of harbour seals is mid-June to July with moulting occurring in August. Grey seals in Scotland pup from August/September through to December and then moult until early April (Bowen, 2016; SCOS, 2018). For the west coast of Scotland, pupping is generally September through to October and moulting generally November through to December (SCOS, 2018).

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 head offshore on foraging trips before returning to land (Pollock, 2000). While both species are associated with shallower shelf waters, grey seals often make longer foraging trips to deeper waters than harbour seals.

As discussed in Section 5, the South-East Islay Skerries SAC and the Eileanan agus Sgeiran Lios mor SAC are located within 50 km of the cable installation corridor. Both of these sites are designated for harbour seal (JNCC, 2019a; JNCC, 2019b).

7.3.4 Otters

Otters (*Lutra lutra*) 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 (DECC, 2016).

As discussed in Section 5, the cable installation corridor is located 0.2 km from the Tayvallich Juniper and Coast SAC which is designated for otters (JNCC, 2019c).

7.4 Impact Assessment

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

7.4.1 Identification of Potential Impacts

This section reviews potential impacts to marine megafauna receptor species from the proposed Project and narrows down which Project 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 Impacts on Marine Mammals

Underwater noise emissions from the cable installation activities are likely to constitute the greatest potential risk to marine mammals within the vicinity of the Project. 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 impacts are considered to be very unlikely (NOAA, 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.

Table 7-2 Auditory bandwidths estimated for marine mammals (Southall *et al.*, 2019; NOAA, 2018)

Hearing group	Estimated auditory bandwidth
Low-frequency cetaceans (LF): (e.g. baleen whales, such as minke whales, humpback whales, etc.)	7 Hz to 35 kHz
High-frequency cetaceans (HF): (e.g. dolphins, toothed whales, beaked whales and bottlenose whales)	150 Hz to 160 kHz
Very high-frequency cetaceans (VHF): (e.g. marine mammal species such as harbour porpoises and other 'true' porpoises)	275 Hz to 160 kHz
Phocid carnivores in water (PW): (e.g. earless or 'true' seals, such as grey and harbour seals)	50 Hz to 86 kHz

The main sources of underwater noise associated with cable installation activities include:

- Vessel noise from ships and other marine plant utilised during the works;
- Noise from cable laying activities;
- Noise from the USBL device used to position the ROV to conduct touch down monitoring; and
- Noise from geophysical survey devices used during pre, during and post installation survey and inspection. However, geophysical surveys are subject to existing consents held by SHEPD and are outwith the scope of this assessment.

While vessel noise is broadband and will be audible to marine mammals, the presence of the installation vessels in the Sound of Jura will not constitute a substantive change from baseline vessel numbers, or types of vessels in the area. As such the presence of installation vessels will not result in a significant change to the existing soundscape in the vicinity of the project, 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 sub-marine trenching or burial works are proposed, as described in the Mainland – Jura Emergency Repair Project Description. Trenching works 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. As such, noise from cable laying works does not have any potential for adverse effects on cetaceans, and is not considered further.

USBL devices commonly operate in a frequency range which makes them audible to cetaceans, and hence this activity does have the potential to result in adverse effect on these receptors. The highly mobile nature of cetaceans and the temporary, localised nature of USBL noise emissions associated with the Project dramatically reduce the likelihood of interactions between Project activities and cetacean receptors resulting in significant impacts. However, as the risk of injury or disturbance to a small number of individual animals remains, 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 Project area and may cause mortality and sublethal injury (Laist *et al.* 2001). However, marine mammals are highly mobile and as all of the proposed activities associated with cable installation 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, which include the management of vessel speed and the commitment for project vessels to adhere to the Scottish Marine Wildlife Watching Code (SMWWC) (SNH, 2017). For this reason, vessel movements have not been identified as having the potential to cause adverse or significant impacts to the Favourable Conservation Status (FCS) of any marine mammal population, and has therefore been screened out from further assessment.

The marine mammal species of interest in the Project 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.

Vessel and human presence in the immediate vicinity of seal haul-outs may potentially impact seals. 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. However, given that the proposed cable installation works are likely to occur between the months of January to February, they are unlikely to overlap with the pupping and moulting season for grey and harbour seals. Moreover, there are no known grey or harbour breeding or designated seal haul-outs in the vicinity of the landfall. As such, impacts to seals from landfall activities has not been considered further.

7.4.1.2 Impacts on Otters

Otters are particularly sensitive to anthropogenic changes to their habitats, as their coastal habitat use is highly dependent on the inclusion of freshwater features (Roos *et al.,* 2015). As such, the location of their holts (or dens) is restricted, and anthropogenic changes to their habitat may have dramatic repercussions, including localised extinctions. Otters may be present at the landfalls of the cable installation corridor and may be disturbed by some of the activities associated with installation and open-cut trenching at landfall sites. Although the activities at the landfall will be for a short duration only, there is still the potential for disturbance and as such this has been considered for further assessment.

7.4.2 Potential Disturbance from Nearshore Activities

The taxa which are most likely to be impacted by nearshore activities and at landing points are otters.

Vessel and human presence has the potential to disturb otters at the landfall sites. In addition, it is expected that open cut trenching will be utilised at the nearshore end of the cable corridor and this has the potential to induce additional disturbance to otters.

Otters are particularly sensitive to anthropogenic changes to their selective coastal habitats which are constrained to areas with nearby freshwater features which enable cleaning sea water off their fur (Roos *et al*., 2015). As such, the location of their holts (or dens) is relatively restricted and any changes to the availability of this habitat may have dramatic repercussions on otter populations, including localised extinctions.

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

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 will be implemented to minimise any effects:

- Otter surveys will be conducted by an appropriately qualified ecologist prior to the commencement of the cable replacement operation, and will include the cable landfall and a 500m mitigation zone; or
- An appropriately qualified ecologist 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.

These mitigation measures will minimise any disturbance to otters, or the habitats that they depend on.

Impacts to otter receptors		
Activities due to take place at the landfall sites have the potential to impact otters in the immediate vicinity of cable landfall, including those with young or occupying active holts or shelters. Mitigation measures for minimising potential impacts to otters at the terrestrial landfalls include employing a qualified ecologist to either conduct a dedicated pre-works survey or work with cable installation personnel to ensure otter sites are not disturbed. The temporary nature of Project activities at the landfalls and the described mitigation measures minimise the potential for any significant impacts to local otter populations and, as such, Project activities are not anticipated to impact upon the FCS of this species.		
Sensitivity/value	**Magnitude of effect**	**Level of impact**
High	Negligible	Minor
Impact significance – NOT SIGNIFICANT		

7.4.3 Injury or 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.

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 NOAA and Southall (NOAA, 2018 & Southall *et al*. 2019). The full noise assessment has been presented in Appendix A, a summary of the results is presented below.

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

Under the worst-case scenario, the largest injury range resulting form USBL was 104 m for VHF cetaceans (harbour porpoises), when considering cumulative sound exposure levels for a stationary animal. For whale and dolphin receptors (LF and VHF 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 animals 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 200 dB re 1µPa.

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, the 200 dB re 1µPa source level associated with USBL has 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 Management Units (MU) for harbour porpoise, minke whale and bottlenose dolphin, which all regularly 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 deployment craft (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 animals 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 within 12 nautical miles (as per Regulation 39(2)) (Scottish Government, 2014).

Impacts to cetacean receptors

There will be no injurious impacts to marine mammals as a result of noise-generating Project activities. However, there is potential for disturbance to marine mammals from underwater noise. Project-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 cetacean species.

Sensitivity/value	Magnitude of effect	Level of impact
Medium	Minor	Minor
Impact significance – NOT SIGNIFICANT		

7.5 Conclusion

Underwater noise and disturbance at the landfall sites are considered the impact mechanisms most likely to affect marine megafauna in the Project area. Noise modelling used to inform the assessment, presented in Appendix A, 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 or otters as a result of project activities and no requirement to apply for an EPS Licence in that respect. However, there is potential for disturbance to cetaceans, and SHEPD will therefore apply for an EPS Licence in respect to disturbance of cetaceans. However, this 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 cetacean species.

It is recognised that the risk of disturbance to otters cannot be ruled out, however, the extremely limited nature of this effect will not constitute an offence under the Habitats Regulations, and hence an EPS licence for otters will not be required.

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

Furthermore, the short-term and localised nature of the proposed activities, the fact that the majority activities will occur outside of the important breeding and moulting season and areas, all mean that harbour and grey

seals making use of protected haul-outs will not be significantly disturbed. As such, the protection given by Section 117 or the Marine (Scotland) Act 2010, and the Protection of Seals (Designation of Haul-Out Sites) (Scotland) 2014 will also not be breached.

Considering the temporary and localised nature of the Project activities, there are not anticipated to be any significant impacts to individuals or populations of marine megafauna in the Project 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 vicinity of, the proposed cable corridor and landfall locations. An assessment of potential impacts on key sensitive habitats and species is presented, along with an outline of secondary management and mitigation measures that will be undertaken in order to ensure impacts are minimised. The impact assessment focuses on habitats that are protected or are qualifying features of conservation sites located in the vicinity of the cable route and that have the potential to be impacted.

The formation of the open cut trenches at landfall have the potential for sediment resuspension. However, these activities are expected to be undertaken during low tide.

As outlined in The Mainland – Jura Emergency Repair Project Description, the offshore section cable will be surface laid and the installation activities will not result in significant levels of sediment resuspension, as would be expected from burial activities. Therefore, offshore sedimentation related impacts are screened out of the assessment.

8.2 Data sources

This section draws on a number of data sources including published papers, industry-wide surveys and site-specific investigations. A key data source available for Scottish waters (within 12 nautical miles and offshore) is the NMPi website (NMPi, 2019) which underpins the Scottish NMP (Scottish Government, 2015).

8.3 Baseline and Receptor Identification

The Sound of Islay is a narrow, deep channel separating the islands of Islay and Jura. The sound is mostly sheltered from wave action but experiences strong tidal streams. Biological information is limited in this area, but recorded intertidal and sublittoral species are typical of high energy environments in the west of Scotland (Wilding et al., 2005).

The subtidal seabed habitats in the vicinity of the Project are dominated by “Offshore circalittoral mixed sediment” (EUNIS habitats A5.45), with “Circalittoral mixed sediment” (A5.44) located in patches within Jura Sound, particularly in the nearshore environment (Figure 8-1). The cable route also intersects areas of “Infralittoral mixed sediment” (A5.43) and low energy circalittoral and infralittoral seabed” at the nearshore extents of the route. To the north and south of the proposed cable replacement works, are localised areas of “Offshore circalittoral rock and biogenic reef” (A4.33) (Figure 8-1).

Potential stony/ bedrock reefs, an Annex I protected feature, are situated along the mainland coast, and patchily distributed along the body of the Sound of Jura and along the Jura coast (NMPi, 2019) (Figure 8-1).

The Project is located within the Loch Sunart to the Sound of Jura NCMPA (Figure 8-1), which has been designated for presence of resident mature common skate (*Dipturus batis*). Common skate are listed under the OSPAR Threatened & Declining species and habitats and the Nature Conservation (Scotland) Act 2004 (previously UK Biodiversity Action Plan (UK BAP)) (SNH, 2019). Elasmobranchs are sensitive to electromagnetic fields and thermal radiation (Normandeau et al., 2011), which may be produced during operational activities, outwith the scope of this assessment. Moreover, the current Mainland – Jura cable contributes to the emissions of electromagnetic and thermal radiation in the immediate vicinity of the Project, and therefore the replacement cable will not constitute a shift from the current baseline.

There are no records of any Annex I species and habitats, or Scottish Priority Marine Features (PMF) in the vicinity of the Project (NMPi, 2019).

8.4 Impact Assessment

8.4.1 Area of Impact

Potential impacts associated with the installation of the proposed cable include habitat loss and disturbance, introduction of invasive non-native species, sedimentation, and pollution.

The proposed cable and cable protection installation in direct contact with the seabed has the potential to impact on the benthic species and habitats directly within the Project footprint. The cable installation corridor will cross a variety of benthic habitats and biotopes as described in Section 8. The impact footprint on the sensitive habitats encountered along the cable route has thus been estimated.

The total length of the cable installation corridor is approximately 7.8 km.

At landfall the cable will be installed via and an open trench-based pull. The remaining cable will be surface laid and boulder clearance may be undertaken in discrete areas along the route where surface boulders occur in order to prepare the seabed for cable lay. Lateral movement and protection of the cable will be prevented via the placement of rock filter bags (2 m x 2m) and/ or concrete mattress (3 m x 6 m) directly in top of the cable.

Table 8-1 presents the overall area of seabed impact from the proposed cable installation activities.

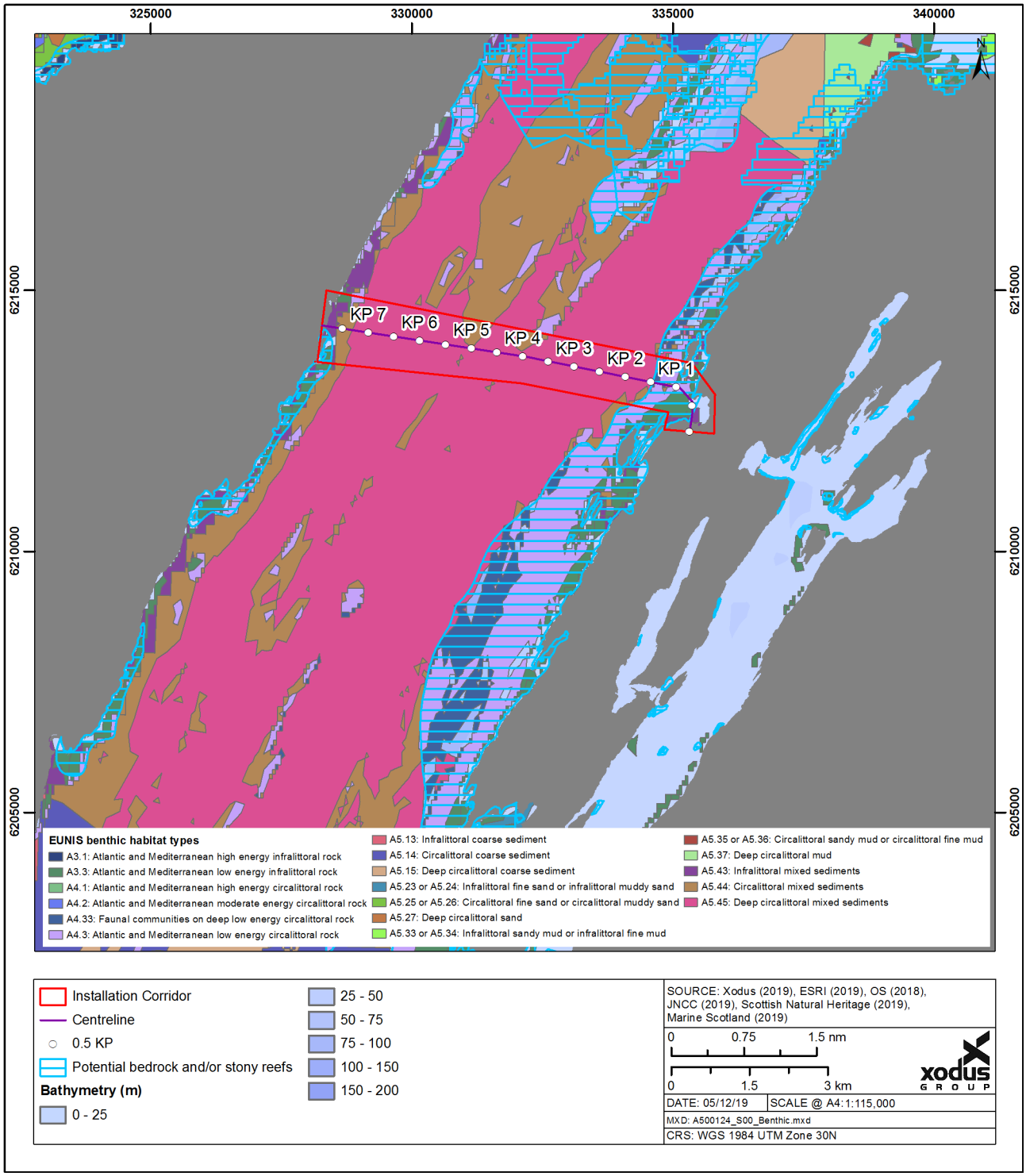

Figure 8-1 Benthic features in the vicinity of the Project

Table 8-1 Footprint of cable installation methods and permanent materials along the cable installation corridor

Cable installation and protection method	Assumptions made for seabed impact calculations	Sensitive habitat type/ biotope	Length of cable installed or protected (m)	Area of seabed impact on biotope/habitat (km^2)
OCT activities between MWLS and MWHS	At each landfall, 100 m length, maximum 10 m width	Outwith any known sensitive habitats	200 (total)	0.002
Surface laid cable	11 cm diameter	Circalittoral mixed sediment, potential rocky/stony reef	10,000	0.0011
Cable protection: Filter bags	100 x filter bag 2 m x 2 m, laid directly onto cable	Circalittoral mixed sediment, potential rocky/stony reef	200	0.0004
Cable protection: mattresses	100 x mattress 3 m x 6 m, laid directly onto cable	Circalittoral mixed sediment, potential rocky/stony reef	600	0.0018
Total area of impact				**0.0053**

8.4.2 Direct Loss of/ Disturbance to Benthic Habitats and Communities

Cable installation works that will temporarily disturb the seabed, including anchor system deployment will lead to a temporary loss of habitat. These activities may affect sensitive seabed features such as the potential rocky reef habitats along the proposed cable installation corridor. It is acknowledged that SHEPD are committed to avoiding sensitive benthic habitats and species insofar as possible during detailed route engineering, informed by the preinstallation survey. However, since it is currently not possible to determine to what extent avoidance of these features will be possible, this embedded mitigation has not been accounted for during the assessment. The assessment therefore represents the worst case.

The activities that will lead to permanent habitat loss within the proposed cable installation corridor include surface laying of cable and placement of rock filter bags and/ or concrete mattresses on the seabed and OCT at landfall. The proposed cable installation works will lead to permanent loss to sandy, coarse and mixed sediments habitats as the benthic organisms living on the surface of sediments will not be able to colonise the hard substrate of the surface-laid cable and filter bags. Considering the small footprint of activities, the permanent habitat loss will result in imperceptible change to the wider habitat and will not change the ecology of the area, therefore the impact is not considered significant.

In rocky habitats, the installation of the cable and external will lead to habitat loss within the direct footprint of these structures. However, the hard structures placed during the installation works represent a substrate to which benthic organisms typically living on hard substrates can attach to, therefore there is potential for recolonisation of the surface laid cable and associated material by epifauna, and habitat loss in this habitat type will only be temporary. Common skate, a conservation feature of the Loch Sunart to the Sound of Jura NCMPA, are highly mobile and are expected to actively avoid subsea activities such as anchor placement. The risk of disturbance or injury to this species is remote, and would not constitute a significant effect at a population level.

Given the small footprint of the proposed emergency cable replacement works (0.005 km^2), no significant loss of habitat to allow these features to colonise will occur.

Assessment of impact significance

Although areas potential rocky or stony reef are located at the nearshore ends of the cable corridor could be affected, the great majority of this area is occupied by biotopes of no specific conservation concern which are present on a wider scale throughout this area. On this basis, the subtidal and intertidal rocky habitats and species potentially affected by the Project are considered to be of moderate sensitivity to disturbance/loss; a minor shift from the baseline conditions is anticipated, however the impact will be localised and temporary/short term with a minor change to a small proportion of the receptor population.

The mixed sediment biotopes along the remainder of the cable corridor are highly sensitive to the installation of the cable and associated protection materials, resulting in permanent loss of habitat. However, the impact will be highly localised, constrained to the direct footprint of the structures and is not anticipated to cause adverse effects on existing benthic communities.

Taking extremely localised footprint, the magnitude of effect as outlined above is considered minor resulting in a minor level of impact. The residual impacts on benthic ecology are not significant.

The proposed cable installation activities will result in a direct long-term habitat loss of only a very limited area of seabed, approximately 0.005 km^2. The impact is therefore assessed as minor and not significant.

As the impact is not significant, no secondary mitigation measures are required. Embedded mitigation measures considered as part of the Project design are listed in Section 4.2.

Sensitivity / value	Magnitude of effect	Level of impact
Medium	Minor	Minor
Impact significance – NOT SIGNIFICANT		

8.4.3 Temporary Increase in Suspended Sediments and Associated Sediment Deposition

At both landfall locations, the cable will be installed via OCT, inshore from the MLWS in which the cable will be trenched and buried. The timing of trench works will be tide dependent (working at low water when the intertidal area is exposed), using terrestrial plant. 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. However, this will not be significantly greater than that expected by high energy wave action causing low-level erosion of the shoreline sediments.

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 OCT 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. The sensitivity of the intertidal community could be considered high on a precautionary basis, however given the temporary and highly localised effects, the magnitude would be negligible.

Assessment of impact significance		
The sensitivity of the varied intertidal community to increased sediment resuspension possible during tide and wave action is considered high on a precautionary basis. However, the highly localised and temporary nature of the impact is of a minor magnitude. Therefore, the significance is considered negligible.		
Sensitivity / value	**Magnitude of effect**	**Significance of impact**
High	Negligible	Minor
Impact significance – NOT SIGNIFICANT		

8.4.4 Impact from Non-Native Marine Species (NNMS)

A number of NNMS in UK waters have the potential to impact benthic species and habitats, including circalittoral and infralittoral mixed sediments and reef habitats. Natural England have commissioned a study that investigated the potential impacts of eight NNMS on marine protected area features in England (Macleod et al., 2016). All eight of the NNMS studied were considered as having the potential to colonise or interact with reefs and two of the NNMS could impact subtidal mixed sediments, resulting in adverse impacts.

An approved ballast water management plan will be adopted by all vessels, according to the International Maritime Organization (IMO) ratified the International Convention for the Control and Management of Ships' Ballast Water and Sediments Management (Ballast Water Management (BWM) Convention) in September 2017. Implementation of the BWM Convention will not mitigate the risk of an NNMS being introduced via biofouling on a vessel. However, this vector is considered to carry a lower risk of NNMS 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 NNS. The rock contained within the filter bags will be washed prior to use, removing any NNMS. The rock filter bags do not therefore present a risk of transport and introduction of NNMS.

The risk of the potential rocky reef features to be adversely impacted by NNMS depends on the severity of the threat, the likelihood of introduction, which is the potential of the activities to create a suitable vector capable of carrying and introducing a NNMS and/or pathogen, and finally on the likelihood of establishment and spread of the NNMS, which is dependent on the ecological preferences and dispersal potential of NNMS within the recipient environment (Macleod et al., 2016). 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 NNMS to be introduced by the proposed works and subsequently spread. Therefore, the likelihood of introduction of NNMS and the likelihood of spread and establishment are reduced to low and the residual impact is not significant.

Assessment of impact significance		
Given that the embedded mitigation measures will ensure that no NNMS are introduced and spread as a result of the proposed works, no residuals impact on reef communities are anticipated. Embedded mitigation measures considered as part of the Project design are listed in Section 4.2.		
Sensitivity / value	**Magnitude of effect**	**Level of impact**
High	Minor	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. As the vessels will be <12 NM from shore, there will be no discharge of grey water, sewage, food waste or drain water.

These discharges can be potentially harmful and can lead to localised organic enrichment and a change in the balance of the food chain. All vessels will be compliant with IMO and MARPOL 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 consenting corridor, occurring sequentially with the location of the installation activity, and near the seabed. The likelihood of highly mobile skate encountering an area of reduced water quality low and should they encounter an area of reduced water quality, they are capable of navigating away and avoiding the area. Similarly, a temporary and localised reduction low in water quality is unlikely to cause a detectable change to the benthic species and habitats along the consenting corridor.

Assessment of impact significance

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.

Embedded mitigation measures considered as part of the Project design are listed in Section 4.2.

Sensitivity / value	Magnitude of effect	Level of impact
High	Negligible	Minor
Impact significance – NOT SIGNIFICANT		

8.5 Conclusion

Physical disturbance through seabed preparation, OCT 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 works. The potential rocky and/or stony reef areas and circalittoral mixed sediments are the only protected/ high value habitats with the potential to be impacted. However, the effects are expected to be highly localised and temporary. Consequently, there will be no significant impact on the benthic and intertidal ecology.

9 ORNITHOLOGY

The proposed marine emergency cable replacement works are considered extremely unlikely to result in any adverse effects on sensitive ornithological receptors. This is concluded for the following reasons:

- The proposed installation works will be conducted during the winter months, and outwith the bird breeding season where ornithological receptors are generally more sensitive. The Sound of Gigha pSPA is designated for wintering bird species, but this is located approximately 16km south of the installation corridor, so no adverse effects are expected;
- No adverse effects on water quality are anticipated, as detailed in Section 6;
- The presence of installation vessels in the sound of Jura will not constitute a substantive change from existing vessel activity in the vicinity of the installation corridor; and
- As detailed in Section 5, the only designated site located within 2 km of the installation corridor with ornithological qualifying features is the Jura, Scarba and the Garvellachs SPA which is designated for breeding golden eagles. Golden eagles are a terrestrial species, and as such are very unlikely to affected by the proposed marine cable replacement works.

As such, no further assessment of potential impacts on ornithological receptors is required.

10 MARINE ARCAHEOLOGY

A brief assessment on potential impacts on marine archaeology including:

- Identification of potentially sensitive marine archaeological features informed by a review of the UKHO wreck database, and the Pastmap website;
- Statement that no impacts on the historic environment are anticipated, based on assumption that a preconstruction geophysical survey will be undertaken prior to cable installation, and any wrecks or potential wrecks would be avoided by a buffer of ≥50 m; and
- Identification of industry best practice to be followed during installation works.

10.1 Introduction

This section provides detail on marine archaeological features in the vicinity of the proposed installation corridor. An assessment of potential impacts on these features is then presented, along with recommendations for additional secondary mitigation measures that may be required in order 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 on the west coast of Scotland was conducted in order to inform this assessment. Tow key sources were utilised:

> UK Hydrographic Office's (UKHO) wrecks database (UKHO, 2019), and

> Canmore Maritime records of marine losses (Canmore, 2019).

10.3 Baseline and Receptor Identification

There are no charted wrecks within 10 km of the cable installation corridor (UKHO, 2019). There are no reported losses within the installation corridor, but 4 are present within approximately 5 km (Canmore, 2019). These include:

> Juno, a 19th century brig reported lost in 1864;

> Alla, a steam yacht that was reported lost in 1912;

> Carrigart, a steam drifter reported lost in 1933; and

> Lord Bangor, a smack reported lost in 1894.

These losses are shown in Figure 10-1, however it should be noted that the positions assigned to these losses are noted as being arbitrary, and hence very little confidence can be placed in them (Canmore, 2019). A further two 19th Century losses are noted as potentially occurring within Carsaig Bay, near the mainland landfall of the installation corridor. However, no position data has been provided for these sites, and no information is available as to the actual locations where the vessels foundered (Canmore, 2019).

Given the available data, it considered unlikely that sites of marine archaeological significance are located within the installation corridor, although their presence cannot be ruled out.

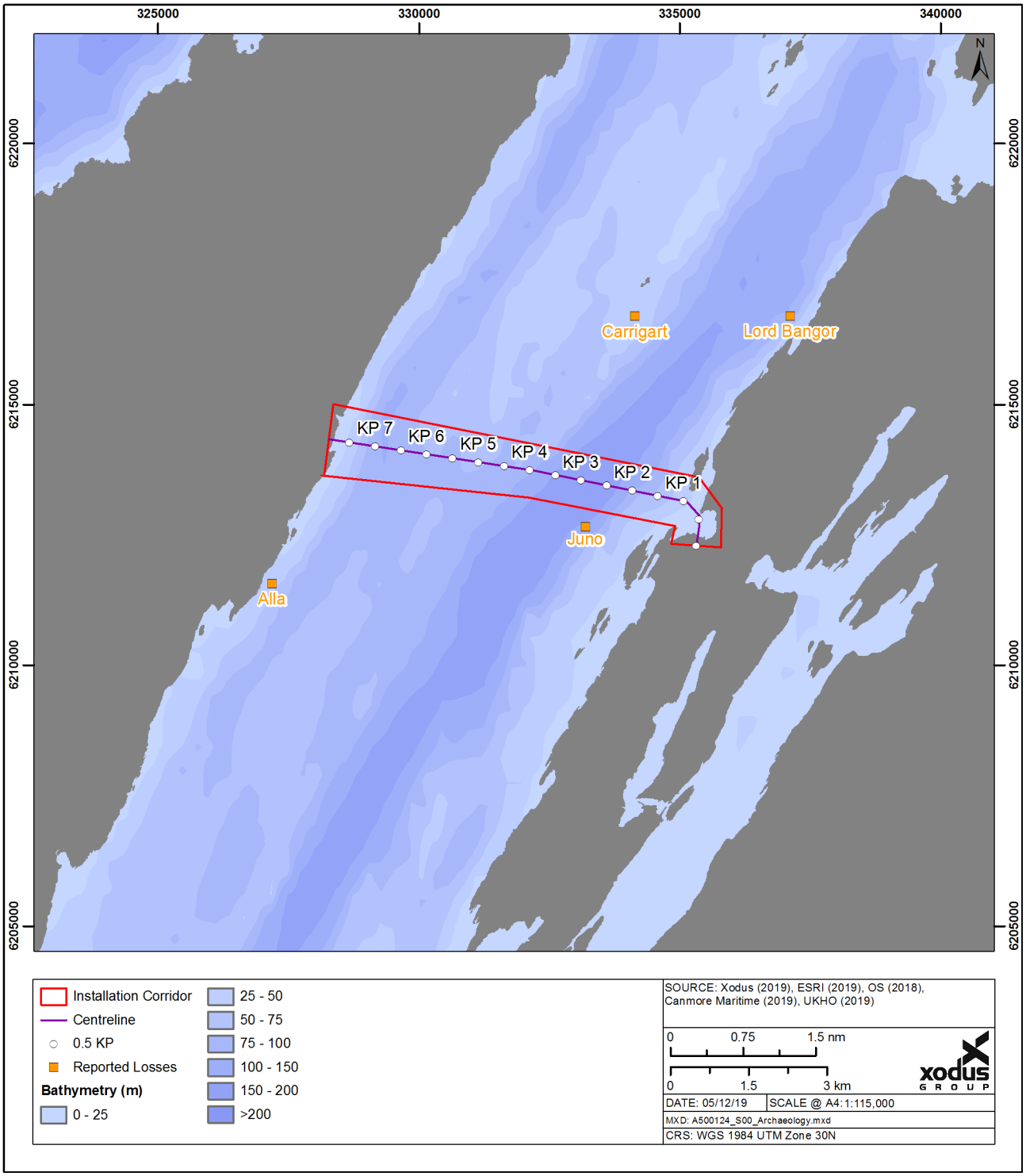

Figure 10-1 Sites of potential archaeological significance in the vicinity of the installation corridor.

10.4 Impact Assessment

As detailed in Section 10.3, while there are no confirmed wrecks within the installation corridor, their presence cannot be ruled out from the available data. As such the cable installation works 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 filter bags. Should such interactions occur, the damage or loss of archaeological features would a permanent effect on a potentially highly sensitive receptor, which has no ability to recover, and as such could constitute a significant impact on the historic record.

However, as detailed in Section 4.2, preconstruction geophysical surveys will be undertaken to inform the final routing of the replacement cable. This will allow sites of potential archaeological significance to be identified prior to cable installation works commencing. During detailed route design the following provisions shall be implemented with regard to wrecks or other features of potential archaeological value identified in the survey data:

- All wrecks or features of potential archaeological significance shall be avoided by a buffer of at least 50m during detailed route design;
- The locations wrecks and features of potential archaeological significance will be clearly identified on electronic charts on board the installation vessel, utilised to guide cable installation operations;
- The location of any wrecks or features of potential archaeological significance will be provided to Historic Environment Scotland, and the UKHO.

It is acknowledged that there is the potential that archaeological features could be present within the installation corridor, which are not identified by preconstruction surveys. In order to account for the provisions of The Crown Estate's 'Protocol for Archaeological Discoveries' (TCE, 2014) will implemented during installation works.

Assessment of impact significance

The presence of significant historic sites within the installation corridor cannot be ruled out, although it thought to be unlikely. This notwithstanding, if such a site is present, and were disturbed or destroyed by the installation works, it would have a significant adverse effect on the historic record. Through the implementation of appropriate mitigation, this risk can be designed out during detailed route engineering, making it extremely unlikely that adverse impacts will occur.

Sensitivity / value	Magnitude of effect	Level of impact
High	Negligible	Minor
Impact significance – NOT SIGNIFICANT		

10.5 Summary

The publicly available data could not rule out the possibility that features of archaeological significance may be present within the installation corridor. As such, it was determined that the proposed emergency cable replacement works had the potential to result in significant adverse effects on the historic record. However, following the implementation of the mitigation measures outlined in Section 10.5, it is considered to be extremely unlikely that the cable installation works would result in the loss or damage of archaeological features. As such this assessment concludes that the Project will not result in any adverse 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 works begin. This approach continues through all phases of the project for each submarine electricity cable, thus enabling co-existence with other marine users as SHEPD and their Contractors carry out the cable replacement activities.

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 Fishing Liaison Mitigation Action Plan – Argyll Jura-Islay (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 operations and provide updates when things change.

11.2 Supporting Documents

11.2.1 FLMAP Argyll Jura-Islay

The purpose of *The FLMAP Argyll Jura-Islay* 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)
- 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 cable works are is given in Chapters 9 and 10 of the FLMAP.

11.2.2 FLMAP Delivery Programme Mainland Jura Fault

The *FLMAP Delivery Programme Mainland Jura Fault* sets out how the CFLO and FIR will communicate during the emergency works and how the deliverables, set out in the Fishing Liaison Mitigation Action Plan, 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 notice to mariners and communicate upcoming works. It will also highlight any ongoing issues which may arise throughout the emergency repair works.

11.2.3 How Scottish Hydro Electric Power Distribution Co-Exists with Other Marine Users

How Scottish Hydro Electric Power Distribution co-exists with other marine users details how we plan to co-exist with other marine users as we carry out these works and follows on from the recent consultation with fishermen in early 2019.

12 CONCLUSIONS

The Marine Environmental Appraisal (MEA) supports SHEPD's application for a Marine Licence to complete the required Jura emergency cable replacement works, by providing an assessment of potential impacts of the cable installation activities on groups of sensitive environmental receptors (Sections 5 – 11). 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 works has been carried out for the following receptors:

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

Table 12-1 gives an overview of the findings from the environmental assessments undertaken within this MEA. On the basis of the findings and recommendations of the impact assessments presented in Sections 5 – 11, and the embedded mitigation requirements discussed in Section 4.2, it is anticipated that the Jura emergency cable replacement activities, will be conducted without significant impact on any relevant environmental receptor.

Table 12-1 Outcomes of Environmental Assessments on Receptors

Environmental Receptor Group	Assessment Undertaken	Level of Impact	Assessment Outcome	Overall LSE / Impact Significance	Additional Mitigations Measures Identified	Post Mitigation Impact
Designated Sites (Section 5)	SACs with Harbour Seals as a Feature	**No LSE**	Due to the temporary and localised nature of the proposed cable replacement works, no LSE is predicted on the conservation objectives of any protected site and as such it is not expected that an Appropriate Assessment (AA) will be required. Overall, the replacement of the Mainland - Jura submarine power cable constitutes work of an overriding public need whilst presenting a trivial and temporary disturbance in a limited area. Therefore, no likely significant effects are expected from the cable replacement activities.	**No LSE Identified**	No additional mitigation measures identified specific to designated sites. See Section 4.2 for embedded mitigation requirements, and topic specific mitigation presented in Chapters 5-11.	**No LSE**
	SACs and MPAs with Highly Mobile Megafauna as a Feature	**No LSE**				
	Loch Sunart to the Sound of Jura MPA	**No LSE**				
	Tayvallich Juniper and Coast SAC	**No LSE**				
Seabed and Water Quality (Section 6)	Coastal Sediment Suspension	**Negligible**	All installation activities at the landfall locations will be tidally dependent. Increased suspended sediment will only occur during the interaction between the incoming tide, the trench walls and spoil heaps. This will result in highly localised and temporary increases in suspended sediment which will not have a significant impact on coastal water quality. Best practice will be followed by all installation vessels, therefore the likelihood of an accidental hydrocarbon release from one of the installation vessels is extremely remote. The level of impact is therefore considered minor and not significant.	**Not Significant**	No additional mitigation measures identified. See Section 4.2 for embedded mitigation requirements.	**Not Significant**
	Changes to Sediment and Water Quality Following Accidental Release of Hydrocarbons	**Minor**				
Marine Megafauna (Section 7)	Potential Disturbance from Nearshore Activities	**Minor**	Underwater noise and disturbance at the landfall sites are considered the impact mechanisms most likely to affect marine megafauna in the Project area. 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. There will be no injurious impacts to cetaceans or otters as a result of project activities and no requirement to apply for an EPS Licence in that respect. However, there is potential for disturbance to cetaceans, and SHEPD will therefore apply for an EPS Licence in respect to this. However, this 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 cetacean species, and no mitigation is proposed for USBL operations. Considering the transitory nature of the Project activities, there are not anticipated to be any significant impacts to individuals or populations of marine megafauna in the Project area.	**Not Significant**	Although no significant impacts to otter populations are anticipated, there is still the potential for disturbance and as such the following mitigation measures will be implemented to minimise any effects: > Otter surveys will be conducted by an appropriately qualified ecologist prior to the commencement of the cable replacement operation, and will include the cable landfall and a 500m mitigation zone; or > An appropriately qualified ecologist 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 during short based cable landfall operations. > These mitigation measures will minimise any disturbance to otters, or the habitats that they depend on	**Not Significant**
	Injury or Disturbance from Noise Emissions	**Minor**				

Environmental Receptor Group	Assessment Undertaken	Level of Impact	Assessment Outcome	Overall LSE / Impact Significance	Additional Mitigations Measures Identified	Post Mitigation Impact
Benthic and Intertidal Ecology (Section 8)	Direct Loss of/ Disturbance to Benthic Habitats and Communities	**Minor**	Physical disturbance through seabed preparation, open cut trenching (OCT), cable laying activities, smothering of benthic habitat and species via sediment re-suspension and settlement are likely to occur within the footprint of the proposed works. The potential rocky and/or stony reef areas and circalittoral mixed sediments are the only protected/ high value habitats with the potential to be impacted. However, the effects are expected to be highly localised and temporary. Consequently, there will be no significant impact on the benthic and intertidal ecology.	**Not Significant**	No additional mitigation measures identified. See Section 4.2 for embedded mitigation requirements.	**Not Significant**
	Temporary Increase in Suspended Sediments and Associated Sediment Deposition	**Minor**				
	Impact from Non-Native Marine Species (NNMS)	**Minor**				
	Accidental Release of Hazardous Substances	**Minor**				
Ornithology (Section 9)	No Aspects Requiring Specific Assessment	**Negligible**	The proposed installation works will be conducted during the winter months, and outwith the bird breeding season where ornithological receptors are generally more sensitive. The Sound of Gigha pSPA is designated for wintering bird species, but this is located approximately 16 km south of the installation corridor, so no adverse effects are expected. Additionally, the only designated site located within 2 km of the installation corridor with ornithological qualifying features is the Jura, Scarba and the Garvellachs SPA which is designated for breeding golden eagles. Golden eagles are a terrestrial species, and as such are very unlikely to affected by the proposed marine cable replacement works. Therefore, no significant effects are anticipated for ornithological features.	**Not Significant**	No additional mitigation measures identified. See Section 4.2 for embedded mitigation requirements.	**Not Significant**
Marine Archaeology (Section 10)	Damage or Loss of Historic Record – Wreck Sites	**Moderate to Major**	The publicly available data could not rule out the possibility that features of arachnological significance may be present within the installation corridor. As such, it was determined that the proposed emergency cable replacement works had the potential to result in significant adverse effects on the historic record. However, following the implementation of the mitigation measures outlined in Section 4.3, it is considered to be extremely unlikely that the cable installation works would result in the loss or damage of archaeological features. As such this assessment concludes that the Project will not result in any adverse impacts on the historic record.	**Significant**	During detailed route design the following provisions shall be implemented with regard to wrecks or other features of potential archaeological value identified in the survey data: > All wrecks or features of potential archaeological significance shall be avoided by a buffer of at least 50m during detailed route design; > The locations wrecks and features of potential archaeological significance will be clearly identified on electronic charts on board the installation vessel, utilised to guide cable installation operations; > The location of any wrecks or features of potential archaeological significance will be provided to Historic Environment Scotland, and the UKHO. It is acknowledged that there is the potential that archaeological features could be present within the installation corridor, which are not identified by preconstruction surveys. In order to account for the provisions of The Crown Estate's 'Protocol for Archaeological Discoveries' (TCE, 2014) will implemented during installation works.	**Not Significant**

Environmental Receptor Group	Assessment Undertaken	Level of Impact	Assessment Outcome	Overall LSE / Impact Significance	Additional Mitigations Measures Identified	Post Mitigation Impact
Commercial Fisheries and Other Sea Users (Section 11)	Assessment of impacts on commercial fisheries and other sea users has been presented in FLMAP Argyll Jura-Islay Finalised 080818.	**Not – significant as per FLMAP**	The cable installation works have the potential to disrupt the activities of commercial fisheries and other legitimate sea users. SHEPD has taken a pro-active approach to minimising impacts on commercial fisheries and other legitimate sea users. Potential impacts have been identified and appropriate mitigation measures and consultations will be in place to minimise these. Once these consultations and mitigation measures have been implemented, no significant impact on commercial fisheries and other sea users are expected. This information has been provided in the supporting documents outlined in Section 11.	**Not – significant as per FLMAP**	Additional mitigation measures identified are provided in the supporting documents in Section 11. See Section 4.2 for embedded mitigation requirements.	**Not – significant as per FLMAP**

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APPENDIX A NOISE IMPACT ASSESSMENT

1 NOISE IMPACT ASSESSMENT

1.1 Acoustic Injury or Disturbance Criteria for Marine Mammals

1.1.1 Impact

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

Table 1-1 Criteria considered in this assessment for the onset of injury in marine mammals from impulsive noise (NOAA, 2018; Southall et al., 2019)

Marine mammal hearing group	Impulsive noise		Non-impulsive noise
	Peak pressure (dB re 1 µPa)	Cumulate SEL (dB re 1 μPa^2s)	Cumulate 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

1.1.2 Disturbance

1.1.2.1 Disturbance regulations

There are two regulations which govern disturbance to EPS: Regulation 39(1) and Regulation 39(2). Regulation 39(1) from the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended) defines disturbance for all EPS in UK waters and individuals which are vulnerable to disturbance due to biological or environmental circumstances. Regulation 39(2) goes beyond the disturbance guidelines provided in Regulation 39(1) by making it an offence to deliberately or recklessly disturb any cetacean in Scottish Territorial Waters (i.e. up to 12 nm) (Marine Scotland, 2014). The definitions of disturbance are provided in Box 1 below.

Box 1 Disturbance regulations in Scottish territorial waters

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)

Regulation 39 (1) makes it an offence —

(a) deliberately or recklessly to capture, injure, or kill a wild animal of a European protected species;

(b) deliberately or recklessly –

(i) to harass a wild animal or group of wild animals of a European protected species;

(ii) to disturb such an animal while it is occupying a structure or place which it uses for shelter or protection;

(iii) to disturb such an animal while it is rearing or otherwise caring for its young;

(iv) to obstruct access to a breeding site or resting place of such an animal, or otherwise to deny the animal use of the breeding site or resting place;

(v) to disturb such an animal in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;

(vi) to disturb such an animal in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; or

(vii) to disturb such an animal while it is migrating or hibernating.

Regulation 39(2) provides that it is an offence —

to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean).

To consider the possibility of a disturbance offence resulting from the proposed survey, it is necessary to consider the likelihood that survey activities would generate a non-trivial disturbance based on the sensitives of the species present and whether the number of individuals impacted would generate population-level consequences. Where there is a possibility of disturbing an individual animal, it is necessary to apply for a Marine EPS Licence to ensure that an offence is not committed. However, in issuing a Marine EPS Licence, Marine Scotland must consider whether the FCS of any species will be affected. Consequently, the impacts of proposed activities on the FCS of all protected species must be considered to satisfy both Regulation 39(1) and 39(2). The impact assessment below addresses the impacts of survey activities on the existing conservation status of protected species within the survey area.

1.1.2.2 Acoustic disturbance criteria

Auditory thresholds for disturbance, as defined by NOAA (2018) and Southall *et al.* (2007), have been adopted for the assessment of potential marine mammal disturbance from both non-impulsive and impulsive noise sources. 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 1-2 below.

Table 1-2 Disturbance threshold criteria for impulsive sounds (Southall *et al.*, 2007).

Behavioural Effect	Threshold Criteria SPL_{rms} (dB re 1 µPa)
Potential strong behavioural reaction	160

1.2 Noise Modelling Approach

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. The duel-metric modelling approach disseminated in NOAA (2018) has been used to identify impacts from: (1) the peak SPL from the root-mean-square (rms) pressure level (as SPL_{rms}); and (2) the cumulative SEL. The SEL represents the total energy

produced by a noise-generating activity 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-based weighting functions (NOAA, 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:

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

It is important to note that the rms value associated with the SPL_{rms} depends upon the length of the integration window used. Using a longer duration integration window results in a lower rms than produced by a shorter integration window.

An acoustic phenomenon results from the elongation of the waveform with distance from the source due to a combination of dispersion and multiple reflections. Measurements presented by Breitzke *et al.* (2008) indicate elongation of the T90 window up to approximately 800 m at 1 km. This temporal "smearing" reduces the rms amplitude with distance by elongating the rms window and has been included within the disturbance modelling scenarios. Since the auditory organs of most marine mammals integrate low frequency sounds over an acoustic window of around 200 ms (Madsen *et al.*, 2006 and references therein), this duration was used as a maximum integration window for the received SPL_{rms}.

The directivity characteristics of the sound sources are also an important factor affecting the received sound pressure levels from noise-generating activities. In geophysical surveys, 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 that emitted directly 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. Directivity corrections can be applied to the model outputs, which provide broadband normalised amplitudes at varying angles of azimuth[1] and dip angle[2]. 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 0º azimuth).

1.3 Injury Impacts

For the proposed surveys, the expected frequency range for USBL overlaps with the hearing range of all cetacean hearing groups (Table 7-2 of the Main Report). Potential injury to cetaceans (i.e. injury which results from a permanent threshold shift in hearing abilities) is limited to impulsive noise sources which exceed the injury thresholds defined in Table 1-3.

Modelling of ranges at which injury impacts may result from the USBL operations has been undertaken, as described in Section 1.1. Impacts from noise sources which are strictly behavioural in nature (i.e. disturbance impacts) are covered in Section 1.4.

[1] 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.
[2] The dip angle is taken as the angle under the boat, progressing from prow to stern.

Table 1-3 Noise modelling results for injury impacts from impulsive noise sources (N/E = no exceedance of thresholds)

Activity	Depth (m)[3]	Frequency (kHz)	SPL_{rms} (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	20 – 33.5	200	104	98	73	86	104	56	36	44	-	-	-	-
	10	20 – 33.5	200	12	11	11	11	12	11	11	11	-	-	-	-

[3] Depth refers to depth below the survey 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 surveys are likely to occur across the project area, based on available bathymetry data.

The model outputs suggest that there is a potential for USBL at 200 dB re 1µPa to result in injury to marine mammals. Across all modelling scenarios and metrics, the injury ranges were generally highest for the VHF hearing group (Table), 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).

Higher 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 injury. The deployment of a hull-mounted USBL in 100 m depths elevated the potential range of impact to a maximum of 104 m for VHFs, when considering cumulative SEL metric. However, the likelihood of a cetacean being this close to operational equipment is extremely low when considering that the source is deployed from a moving vessel and, in some cases, is being towed at depth (e.g. a USBL may be mounted on an ROV within a few metres of the seabed).

The injury ranges were at least slightly reduced when considering animal movement during 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, SNH (2016) has provided standard values for mean swimming speeds of various marine mammal species likely to occur in the project area, including harbour porpoise (1.4 ms^{-1}; Westgate *et al.*, 1995); 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 mean swim speed of 1.5 ms^{-1} has been used in the calculations. Considering that the surveys themselves will take place while the vessel is moving, the cumulative SELs of all equipment types are expected to be even lower based on the premise that animals are likely to move away from the mobile noise source at some angle opposite to the direction of travel of the vessel.

It should also be noted that the modelling scenarios are meant to define the worst-case injury ranges associated with the deployment of the project's survey equipment. The *in-situ* deployment of the noise-generating survey equipment will most frequently occur in waters of intermediate depths (i.e. somewhere between 10-100 m). Moreover, the frequency ranges depicted constitute the lowest and highest reasonably practicable settings for the survey activities modelled, meaning that the spread of sound in the marine environment is also likely to fall somewhere between the modelled extremes. The injury ranges anticipated to result from equipment use are thus likely to fall within the spectrum of those defined by the model outputs, thereby reducing the impact ranges associated with the low frequency survey equipment.

As such, the assessment concludes that there is no realistic risk of injury to EPS which may result from the use of USBL with source levels up 200 dB re 1µPa.

1.4 Disturbance impacts

Whilst no injury impacts are expected, noise emissions have the potential to affect the behaviour of cetaceans in the vicinity of the noise source. Significant or strong disturbance (see Southall *et al.*, 2007) may occur when an animal is at risk of a sustained or chronic disruption of behaviour or habitat use resulting in population-level effects. An assessment of potential disturbance impacts from USBL is provided in the below. The outputs of the noise modelling assessment against the disturbance thresholds are provided in Table 1-5

Table 1-5 Noise modelling results for disturbance impacts from impulsive noise sources

Activity	Depth (m)	Frequency (kHz)	SPL_{rms} (dB re 1µPa)	Range of Behavioural Change (m)
USBL	100	20 – 33.5	200	182
	10	20 – 33.5	200	207

The USBL survey activities have the potential to generate a strong disturbance event (i.e. a disturbance offence) as described in Section 1.1. The sound generated by the USBL has the potential to generate disturbance impacts on the order of a couple hundred metres (Table 1-5).

The number of individuals which may experience disturbance from the worst-case scenario for USBL has been calculated in Table 1-6 below, based on the population parameters supplied in above Table 7-1of the main report. 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 1-6 Number of cetacean individuals and proportion of the MU which may experience a disturbance offence from USBL activities, based on known population parameters of the most frequently occurring species

Species name	Number of individuals which may incur a strong disturbance	Maximum proportion of the MU potentially affected by project activities
	USBL (0.13 km^2 area)	
Harbour porpoise	< 0.1	< 0.1%
Minke whale	< 0.1	< 0.1%
Bottlenose dolphin	< 0.1	<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) (Box 1). However, for the relevant biogeographical population Management Units (MU) for harbour porpoise, minke whale and bottlenose dolphin 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 1-6). 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.