[Redacted]

Marine Directorate Licensing and
Operations Team
375 Victoria Road
Aberdeen
AB11 9DB

[Redacted]

SSEN Transmission

10 Henderson Road
Inverness
IV1 1SN

16th April 2026

By email: [Redacted]

RE: Request for area extension to existing EPS/BS-00010831/00010832 licences.

Dear [Redacted]

As part of the operational survey scope, we require to survey the nearshore extent of the Kintyre Hunterston HVAC cables to determine that these are in a safe condition and appropriately buried such that the cables remain protected in line with the accepted requirements. We currently hold licences to disturb EPS and Basking Shark (EPS/BS-00010831/00010832) that cover survey activities over our cables extending to 15m LAT. We require this area to be extended from 15m LAT to MHWS for our existing licences to allow a full survey of the cable extent.

The nearshore survey area extends from 15m LAT to MHWS (at both the eastern and western ends of the existing EPS area). Please see Figure (Appendix 1) for reference and a co-ordinates list can be found in Appendix 2. The additional area constitutes approximately 1.5km2.

In line with the existing licences (EPS/BS-00010831/00010832), the survey works will cover a maximum of 21 days each year over the period 6th June 2025 to 31st May 2030. There will be no additional survey time required to survey the additional nearshore area (shallower than 15m LAT). The survey equipment will remain as listed within EPS Risk Assessment and Addendum documents (Appendix 3 and 4).

The conclusions of the existing risk assessment remain unchanged with the additional area. They are as follows:

- No change to survey equipment proposed
- No change to number of animals expected to be at risk of disturbance from the geophysical surveys
- It will not reduce the distance to any designated site, so no new impact pathways are introduced and therefore the designated sites assessment remains valid.

More information is provided below to support this statement.

<u>EPS Disturbance Licence</u>

The current EPS licence was issued for potential disturbance of EPS from the use of USBL (see Appendix 3). All other equipment (MBES and SSS) to be used has been identified as operating at frequencies above the hearing ranges of marine mammals and protected species (Table 3-1 in Appendix 3).

The EPS impact assessment provided within the risk assessment (Appendix 3) assesses the impact of noise from USBL on EPS. This assessment covers the relevant species abundance within SCANS block G and as such the following conclusions are still valid:

1. For all of the proposed survey activities, 0.04% or less of the relevant biogeographic populations may be impacted by noise-related disturbance.
2. Given the transient and short-term nature of the survey and vessel 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.

In line with the above, 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, and as such an EPS licence will be required for survey activity between MHWS and 15m LAT.

Basking Shark Disturbance Licence

The change to the existing licence is an area extension only, there will be no additional vessel presence will be introduced in the new area. The original EPS Risk Assessment (Appendix 3) concluded that the risk of injury or disturbance to basking sharks is expected to be very low considering the temporary, transient and spatially limited nature of the survey works. However, as the risk of disturbance remains a possibility, the Basking Shark derogation licence requires update to cover the additional area.

Mitigation

The mitigations set out in in the EPS Risk Assessment and addendum document will be adhered to throughout all survey activities. A complete list of the mitigations captured within the original documentation is below:

- The USBL system will be limited to a maximum source level of 207 dBPEAK;
- All vessels will adhere to the provisions of the Scottish Marine Wildlife Watching Code (NatureScot, 2017) and the Basking Shark Code of Conduct (Shark Trust, undated);
- Survey crew will be made aware of all protected species within the marine environment, and their responsibility to implement the mitigation in this document;
- Survey vessels will be limited to 4 to 8 knots whilst on survey effort; and
- Requirement to carry out a search for basking sharks prior to starting any unmanned vessel activity. If basking sharks are in the vicinity (within 500m of the survey line), the activity should be delayed or moved to a different area. The search should last for 20 minutes and can be carried out by a non-dedicated observer (i.e. a crew member). A watch for basking sharks throughout the survey should also be maintained, and if animals are seen on the survey line, the unmanned vessels should be slowed down or re-routed to avoid the area, where possible.

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Protected Areas Assessment

The protected areas impact assessment (Appendix 3) is still representative of any potential effects posed by survey activities to designated sites or their qualifying species.

The distance to the Inner Hebrides and the Minches SAC from the new survey area is still >100km (actual distance) but given the mobile nature of harbour porpoises there is the potential for disturbance to a small number of individuals. However, less than 1 harbour porpoise (0.007) is expected to be disturbed at any one time (see Table 3-7), this equates is <0.01% of the Western Scotland MU population.

The distance from the new survey area to South-East Islay Skerries SAC remains >100km (actual distance) and as such exceeds the 40-50km feeding range from haul outs of harbour seal. As a result, there is no potential for interaction with harbour seals from the SAC with the underwater noise resulting from the survey activity. Therefore, no LSE to harbour seal or adverse effects on the SAC conservation objectives are expected.

In line with the above, please could Marine Directorate provide an updated EPS disturbance licence and Basking Shark Derogation licence to cover the new area (Appendix 2). We would be grateful if the new licences could be provided by 8th July to allow us to survey in line with our current programme.

Please do not hesitate to contact me with any questions regarding the above.

Kind regards,

[Redacted]

Assistant Marine Consents Manager
[Redacted]

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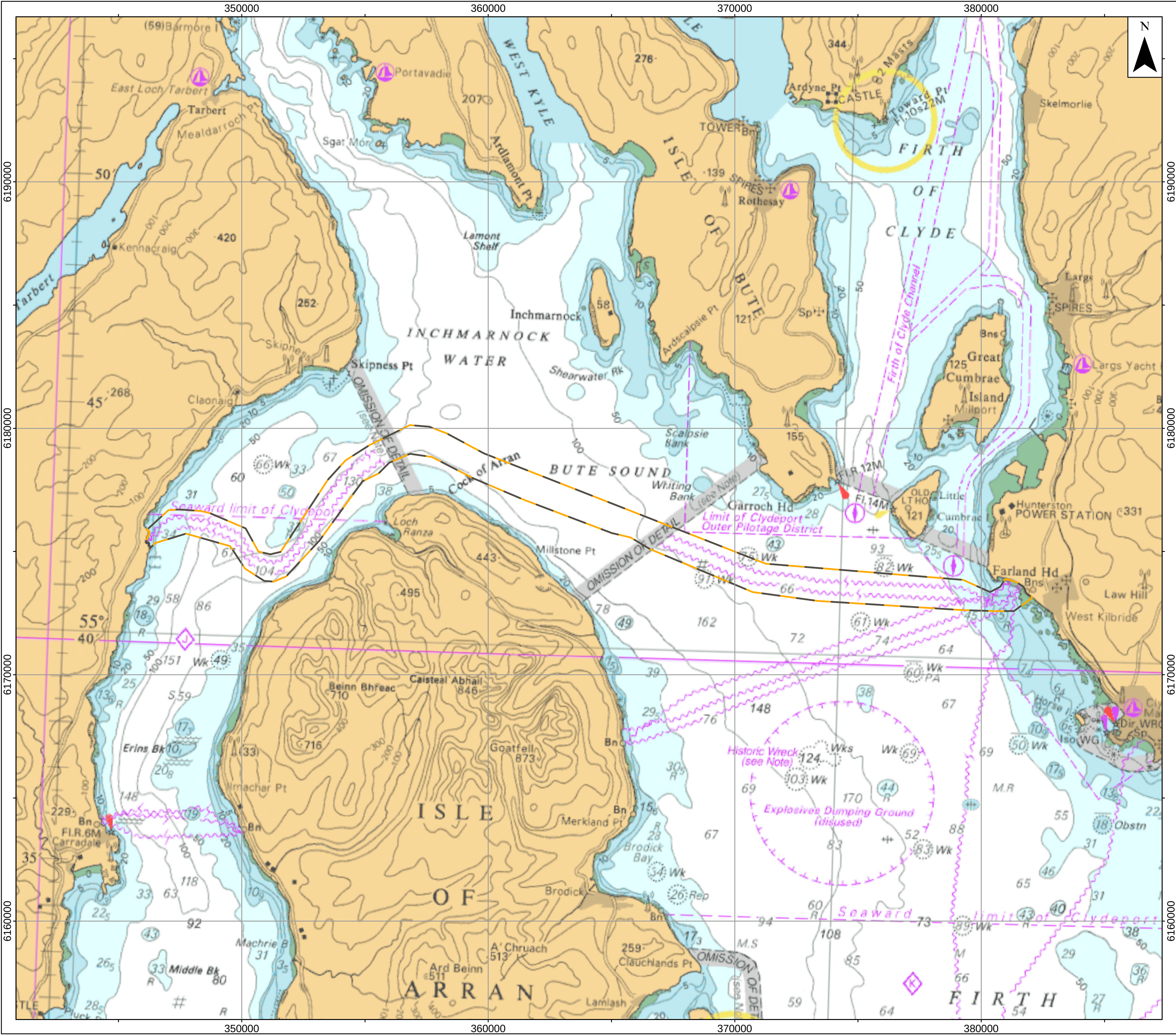
Appendix 1



LEGEND:

EPS License Area

NOTES:

PROJ. TITLE: KINTYRE HUNTERSTON

PROJ. CODE: PT766

MAP TITLE: EPS LICENSE AREA - Rev02

MAP STATUS: FOR REVIEW

TASK NUMBER: SSENT-2026-110

REVISION: 01

SPATIAL REFERENCE INFO:
Name: WGS 1984 UTM Zone 30N;
Datum: WGS 1984
Projection: Transverse Mercator;
Map Units: Meter

PAGE SIZE: A4

SCALE @ A4: 1:200,000

SCALE BAR: 0 1 2 3 4 5 Kilometers

SERVICE LEVEL CREDITS:
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REV	DATE	REASON FOR ISSUE	BY	CHK	APP
01	16/4/26	Issued For Review	SG	GA	AF

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Appendix 2

Scottish & Southern Electricity Networks	PT766 Kintyre Hunterston EPS LICENSE AREA - Rev02	

Project	PT766 Kintyre Hunterston
Reviewing Organisation	SSEN TRANSMISSION
Document Title	SSENT-2026-110_PT766_EPSLicenseArea_Rev02_SSENT_COORDINATE_LISTING
Document Revision	1
Projection	WGS84 UTM Zone 30N

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3	55.696129	-4.893701	55° 41.768' N	004° 53.622' W	55° 41' 46.06" N	004° 53' 37.32" W	380976.90	6173885.44
4	55.696075	-4.893356	55° 41.764' N	004° 53.601' W	55° 41' 45.87" N	004° 53' 36.08" W	380998.40	6173878.85
5	55.696075	-4.892937	55° 41.765' N	004° 53.576' W	55° 41' 45.87" N	004° 53' 34.57" W	381024.76	6173878.15
6	55.696032	-4.892547	55° 41.762' N	004° 53.553' W	55° 41' 45.72" N	004° 53' 33.17" W	381049.14	6173872.70
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8	55.695168	-4.887161	55° 41.71' N	004° 53.23' W	55° 41' 42.61" N	004° 53' 13.78" W	381384.95	6173767.34
9	55.694606	-4.885156	55° 41.676' N	004° 53.109' W	55° 41' 40.58" N	004° 53' 6.56" W	381509.27	6173701.39
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13	55.690998	-4.879664	55° 41.46' N	004° 52.78' W	55° 41' 27.59" N	004° 52' 46.79" W	381843.56	6173290.54
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22	55.684342	-4.920349	55° 41.061' N	004° 55.221' W	55° 41' 3.63" N	004° 55' 13.26" W	379265.91	6172619.99
23	55.686218	-5.014362	55° 41.173' N	005° 0.862' W	55° 41' 10.38" N	005° 00' 51.7" W	373362.16	6172996.40
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88	55.700436	-5.448481	55° 42.026' N	005° 26.909' W	55° 42' 1.57" N	005° 26' 54.53" W	346131.56	6175456.36
89	55.700607	-5.448372	55° 42.036' N	005° 26.902' W	55° 42' 2.19" N	005° 26' 54.14" W	346139.12	6175475.23
90	55.701073	-5.448040	55° 42.064' N	005° 26.882' W	55° 42' 3.86" N	005° 26' 52.95" W	346161.77	6175526.30
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92	55.701429	-5.447920	55° 42.086' N	005° 26.875' W	55° 42' 5.14" N	005° 26' 52.51" W	346170.71	6175565.65
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94	55.701609	-5.447764	55° 42.097' N	005° 26.866' W	55° 42' 5.79" N	005° 26' 51.95" W	346181.24	6175585.32
95	55.701742	-5.447646	55° 42.105' N	005° 26.859' W	55° 42' 6.27" N	005° 26' 51.52" W	346189.19	6175599.83
96	55.701864	-5.447856	55° 42.112' N	005° 26.871' W	55° 42' 6.71" N	005° 26' 52.28" W	346176.47	6175613.94
97	55.701937	-5.447876	55° 42.116' N	005° 26.873' W	55° 42' 6.97" N	005° 26' 52.35" W	346175.48	6175622.08
98	55.701918	-5.447340	55° 42.115' N	005° 26.84' W	55° 42' 6.9" N	005° 26' 50.43" W	346209.06	6175618.71
99	55.702095	-5.447045	55° 42.126' N	005° 26.823' W	55° 42' 7.54" N	005° 26' 49.36" W	346228.34	6175637.78
100	55.702181	-5.447009	55° 42.131' N	005° 26.821' W	55° 42' 7.85" N	005° 26' 49.23" W	346230.92	6175647.32
101	55.702365	-5.446960	55° 42.142' N	005° 26.818' W	55° 42' 8.51" N	005° 26' 49.06" W	346234.70	6175667.59
102	55.702543	-5.446864	55° 42.153' N	005° 26.812' W	55° 42' 9.16" N	005° 26' 48.71" W	346241.45	6175687.26
103	55.702690	-5.446835	55° 42.161' N	005° 26.81' W	55° 42' 9.69" N	005° 26' 48.61" W	346243.84	6175703.56
104	55.702880	-5.446760	55° 42.173' N	005° 26.806' W	55° 42' 10.37" N	005° 26' 48.34" W	346249.31	6175724.52
105	55.703044	-5.446826	55° 42.183' N	005° 26.81' W	55° 42' 10.96" N	005° 26' 48.57" W	346245.82	6175742.90
106	55.703498	-5.446800	55° 42.21' N	005° 26.808' W	55° 42' 12.59" N	005° 26' 48.48" W	346249.20	6175793.30
107	55.703633	-5.446772	55° 42.218' N	005° 26.806' W	55° 42' 13.08" N	005° 26' 48.38" W	346251.48	6175808.31
108	55.703698	-5.446859	55° 42.222' N	005° 26.812' W	55° 42' 13.31" N	005° 26' 48.69" W	346246.27	6175815.69
109	55.703741	-5.446947	55° 42.224' N	005° 26.817' W	55° 42' 13.47" N	005° 26' 49.01" W	346240.93	6175820.65
110	55.703755	-5.447064	55° 42.225' N	005° 26.824' W	55° 42' 13.52" N	005° 26' 49.43" W	346233.68	6175822.55
111	55.703732	-5.447216	55° 42.224' N	005° 26.833' W	55° 42' 13.43" N	005° 26' 49.98" W	346224.01	6175820.26
112	55.703656	-5.447329	55° 42.219' N	005° 26.84' W	55° 42' 13.16" N	005° 26' 50.38" W	346216.64	6175812.12
113	55.703682	-5.447403	55° 42.221' N	005° 26.844' W	55° 42' 13.26" N	005° 26' 50.65" W	346212.06	6175815.18
114	55.703814	-5.447373	55° 42.229' N	005° 26.842' W	55° 42' 13.73" N	005° 26' 50.54" W	346214.48	6175829.80
115	55.704028	-5.447439	55° 42.242' N	005° 26.846' W	55° 42' 14.5" N	005° 26' 50.78" W	346211.17	6175853.71
116	55.704104	-5.447561	55° 42.246' N	005° 26.854' W	55° 42' 14.78" N	005° 26' 51.22" W	346203.79	6175862.49
117	55.704142	-5.447760	55° 42.248' N	005° 26.866' W	55° 42' 14.91" N	005° 26' 51.94" W	346191.46	6175867.07
118	55.704101	-5.448051	55° 42.246' N	005° 26.883' W	55° 42' 14.77" N	005° 26' 52.98" W	346173.02	6175863.25
119	55.704207	-5.448171	55° 42.252' N	005° 26.89' W	55° 42' 15.14" N	005° 26' 53.41" W	346165.89	6175875.20
120	55.704260	-5.448353	55° 42.256' N	005° 26.901' W	55° 42' 15.33" N	005° 26' 54.07" W	346154.62	6175881.53
121	55.711665	-5.434916	55° 42.7' N	005° 26.095' W	55° 42' 41.99" N	005° 26' 5.7" W	347027.74	6176675.67
122	55.712074	-5.427728	55° 42.724' N	005° 25.664' W	55° 42' 43.47" N	005° 25' 39.82" W	347480.82	6176705.33
123	55.711769	-5.414061	55° 42.706' N	005° 24.844' W	55° 42' 42.37" N	005° 24' 50.62" W	348338.06	6176641.42
124	55.711154	-5.408123	55° 42.669' N	005° 24.487' W	55° 42' 40.15" N	005° 24' 29.24" W	348708.66	6176560.02
125	55.705997	-5.384684	55° 42.36' N	005° 23.081' W	55° 42' 21.59" N	005° 23' 4.86" W	350161.17	6175935.36
126	55.697761	-5.376014	55° 41.866' N	005° 22.561' W	55° 41' 51.94" N	005° 22' 33.65" W	350674.41	6175000.34
127	55.696887	-5.368195	55° 41.813' N	005° 22.092' W	55° 41' 48.79" N	005° 22' 5.5" W	351162.39	6174886.29
128	55.697889	-5.361634	55° 41.873' N	005° 21.698' W	55° 41' 52.4" N	005° 21' 41.88" W	351578.45	6174983.71
129	55.724738	-5.332788	55° 43.484' N	005° 19.967' W	55° 43' 29.06" N	005° 19' 58.04" W	353491.51	6177909.51
130	55.732017	-5.321825	55° 43.921' N	005° 19.309' W	55° 43' 55.26" N	005° 19' 18.57" W	354207.03	6178696.25
131	55.737898	-5.306611	55° 44.274' N	005° 18.397' W	55° 44' 16.43" N	005° 18' 23.8" W	355183.94	6179318.66
132	55.745654	-5.281003	55° 44.739' N	005° 16.86' W	55° 44' 44.35" N	005° 16' 51.61" W	356819.79	6180128.39
133	55.745354	-5.268359	55° 44.721' N	005° 16.102' W	55° 44' 43.27" N	005° 16' 6.09" W	357612.22	6180068.95
134	55.743073	-5.256863	55° 44.584' N	005° 15.412' W	55° 44' 35.06" N	005° 15' 24.71" W	358325.43	6179791.61
135	55.736218	-5.232482	55° 44.173' N	005° 13.949' W	55° 44' 10.38" N	005° 13' 56.94" W	359831.09	6178979.33
136	55.699198	-5.048549	55° 41.952' N	005° 2.913' W	55° 41' 57.11" N	005° 02' 54.78" W	371255.91	6174503.59
137	55.695372	-4.920890	55° 41.722' N	004° 55.253' W	55° 41' 43.34" N	004° 55' 15.2" W	379265.90	6173848.23
138	55.691194	-4.903349	55° 41.472' N	004° 54.201' W	55° 41' 28.3" N	004° 54' 12.06" W	380355.50	6173352.95

Appendix 3

Scottish Hydro Electric Transmission Plc

Kintyre Hunterston HVAC Environmental Support

Kintyre Hunterston HVAC EPS Risk Assessment

ASSIGNMENT A200409-S04

DOCUMENT A-200409-S04-REPT-002

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REVISIONS & APPROVALS

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REV	DATE	DESCRIPTION	ISSUED	CHECKED	APPROVED	CLIENT
A02	05/03/2025	Re-issued for Use (SSEN survey date (changes				
A01	19/11/2021	Issued for Use	[redacted]			
R01	17/11/2021	Re-issued for Review				
R01	12/11/2021	Issued for Review				

CONTENTS

ACRONYMS

AA	Appropriate Assessment
EPS	European Protected Species
EU	European Union
FCS	Favourable Conservation Status
HF	High Frequency
HRA	Habitats Regulations Appraisal
HVAC	High Voltage Alternative Current
HVDC	High Voltage Direct Current
Hz	Hertz
IROPI	Imperative Reason of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
kHz	kilohertz
kV	kilovolt
LAT	Lowest Astronomical Tide
LF	Low Frequency
LSE	Likely Significant Effect
MBES	Multi Beam Echosounder
MHWS	Mean High Water Spring
MMO	Marine Mammal Observer
MS-LOT	Marine Scotland Licensing Operations Team
MU	Management Units
NCMPA	Nature Conservation Marine Protected Area
NM	Nautical Mile
NMFS	National Marine Fisheries Service

NOAA	National Oceanic and Atmospheric Administration
PW	Phocid carnivores in water
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation
SEL	Sound Exposure Level
SHEPD	Scottish Hydro Electric Power Distribution plc
SHE Transmission	Scottish Hydro Electric Transmission plc
SMWWC	Scottish Marine Wildlife Watching Code
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPL	Sound Pressure Level
SSS	Sidescan Sonar
UK	United Kingdom
USBL	Ultra-short Baseline
VHF	Very high-frequency
WCA	Wildlife and Countryside Act 1981 as amended

1 INTRODUCTION

Scottish Hydro Electric Transmission plc (SHE Transmission) is required to undertake a condition survey of two twin 220 kilovolt (kV) High Voltage Alternative Current (HVAC) subsea cables, known as Kintyre to Hunterston North and Kintyre to Hunterston South (hereafter referred to as 'The Kintyre Hunterston HVAC cables'). Together the Kintyre Hunterston HVAC cables form the subsea component of the Kintyre Hunterston HVAC Link.

The construction of the Kintyre Hunterston HVAC cables was completed in 2016 and SHE Transmission intend to undertake condition surveys of these assets to ensure that the cables remain in a safe condition and appropriately buried such that the cables remain protected in line with the accepted requirements.

The proposed survey activities will enable SHE Transmission to:

- Gather data on the condition and profile of the seabed along with data and imagery of the cables, their protection and any residual trenches;
- Identify trends in seabed change by comparing survey data with as-built data; and
- Inform requirements for future survey works including the nature and extent of future surveys.

The Kintyre Hunterston HVAC cables connect a substation in Crossaig, Kintyre, to an existing substation at Hunterston, Ayrshire. The Kintyre Hunterston HVAC cables, together with the wider Kintyre Hunterston HVAC Link, reinforce the transmission system in Kintyre to facilitate the growth of renewable energy generation in the area. This transmission link enables the transition to a low carbon economy and aids in fulfilling the target to reach net-zero emissions by 2050 in the UK and 2045 in Scotland. The monitoring of components of the Kintyre Hunterston HVAC cables will ensure a secure energy transmission link continues to be provided by this asset, and therefore constitutes work of overriding public interest.

1.1 Project Overview

The Kintyre Hunterston HVAC cables lie within the Clyde marine region, crossing the Kilbrannan Sound, the Sound of Bute and the Firth of Clyde, in an east-west direction from Crossaig to Hunterston, following the northern coastline of Arran (Figure 1-1).

SHE Transmission are making arrangements with competent marine survey contractors to conduct a geophysical survey which will cover 38 km of the Kintyre Hunterston Cables, encompassing the area of the cables deeper than 15 m Lowest Astronomical Tide (LAT). The survey works will be located in Scottish Territorial Waters (< 12 Nautical Miles (NM) from Mean High Water Spring (MHWS)) only.

There is a total area of approximately 36.3 km^2 within which the surveys will take place (Figure 1-1). This area encompasses both cables, with a 250 m buffer applied to the north of Kintyre to Hunterston North cable and a 250 m buffer applied to the south of Kintyre to Hunterston South cable. The survey corridor ends at 15 m LAT at both shore-ends.

The survey activities covered by the document, will take place within the period 1st June 2025 to 31st May 2030. During the requested period, one inspection survey lasting 21 days will be carried out each year. This is an approximate 21 days of survey effort per year, subject to technical constraints and weather conditions. Further detail on survey activity schedule can be found in Section 2.2.

The co-ordinates for the Kintyre Hunterston HVAC survey corridor have been provided in Appendix A.

1.2 Report Purpose

Ahead of any survey activities, all relevant consents and licences need to be in place. This document provides the necessary information to support the following:

1. An assessment of potential impacts on cetaceans, and determination of the need for a European Protected Species (EPS) Licence under the Conservation (Natural Habitats, &c) Regulations 1994 (as amended in Scotland) (the Habitats Regulations). Where an EPS licence is required, this document also provides the EPS risk assessment to support the application.;
2. An assessment of potential impacts on basking sharks, and determination of whether a derogation licence will be required under the Wildlife and Countryside Act 1981 (as amended);
3. An assessment of the potential for likely significant effects (LSE) on designated sites as required by the Habitats Regulations and the Marine (Scotland) Act 2010; and
4. An assessment of the potential to harass (intentionally or recklessly) any seals at designated seal haul-outs, as defined by section 117 of the Marine (Scotland) Act 2010, as amended by the Protection of Seals (Designation of Haul-Out Sites) (Scotland) Amendment Order 2017.

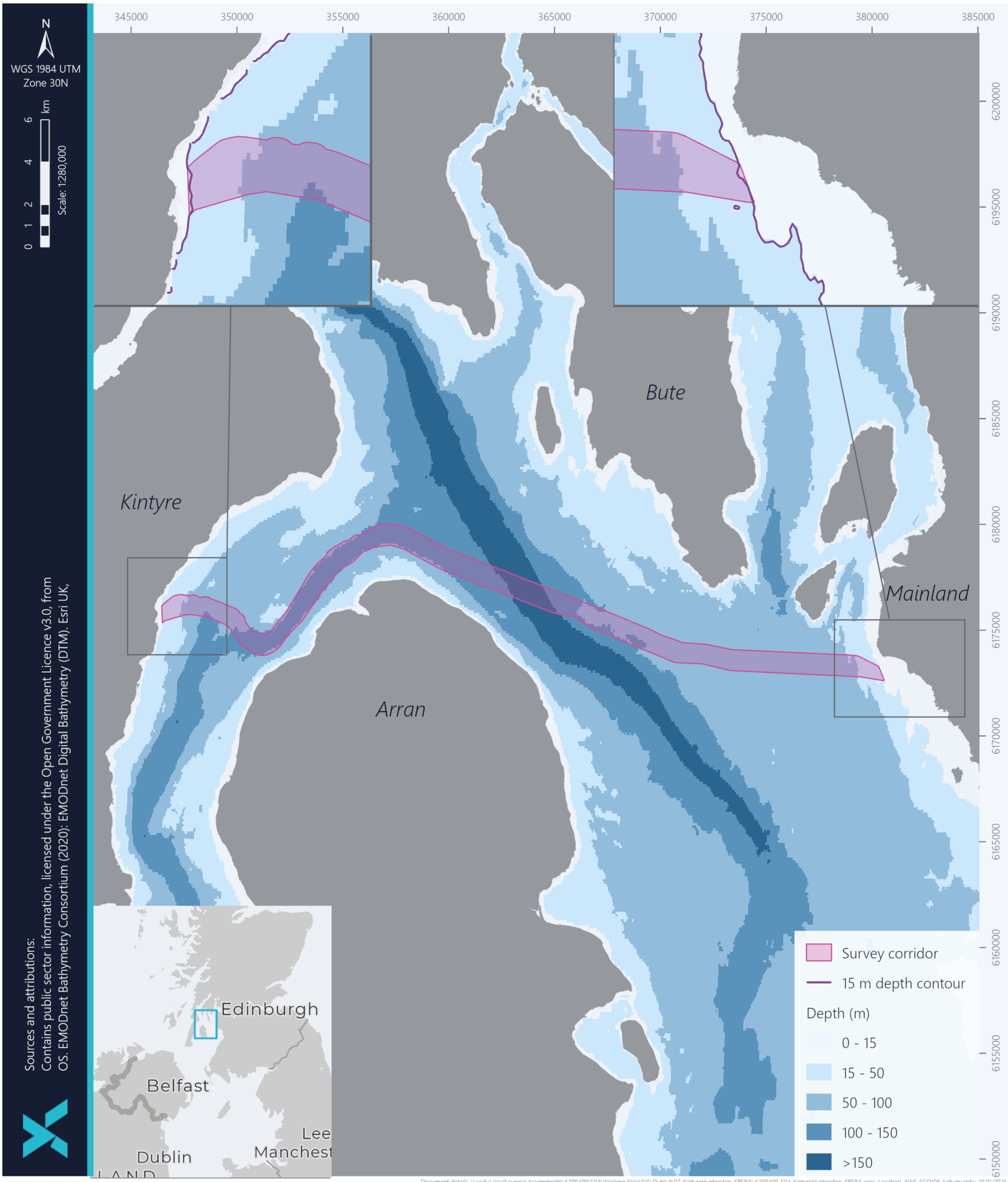


Figure 1-1 Location of the Kintyre Hunterston HVAC Cable Survey Area

1.3 Protected Species Overview

1.3.1 European Protected Species

All species of cetacean (i.e. whale, dolphin and porpoise) occurring in UK waters are listed in Annex IV of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) as EPS. This provision identifies all cetaceans and otters as species of community interest in need of strict protection, as per Article 12 of the Directive. Harbour porpoise (*Phocoena phocoena*) and bottlenose dolphin (*Tursiops truncatus*) are listed as individual EPS and fall under Annex II of the Habitats directive, which enables the designation of SACs for those species, while all other cetaceans are listed as "All other Cetacea" in Annex IV.

Although the UK is no longer part of the EU, in Scotland, the Habitats Directive is transposed into law by The Conservation (Natural Habitats, &C.) Regulations 1994 (as amended) ('The Habitats Regulations') within Scottish Territorial Waters (12 NM Limit). These regulations are still in force following the UK's withdrawal from the EU, meaning the strict protections for EPS remain, as per The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019. An EPS Licence is required where any activity may result in an offence under the Habitats Regulations, which in the context of the marine surveys, pertains to cetaceans.

Part III of the Habitats Regulations defines what is considered an offence, in terms of human interactions with EPS. Regulation 39 (1) and (2) describe what constitutes as an offence, as follows:

(1) *It is an offence:*

a) *To deliberately or recklessly capture, injure or kill a wild animal of a EPS;*

b) *To deliberately or recklessly:*

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

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

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

iv) *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) *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; or*

vi) *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.*

c) *To deliberately or recklessly take or destroy eggs of such an animal; or*

d) *To damage or destroy a breeding site or resting place of such an animal.*

(2) *Subject to the provisions of this Part, it is an offence to deliberately or recklessly disturb any dolphin, porpoise or whale (cetacean).*

An EPS Licence will therefore be required for: (1) any activity that might result in injury to any cetacean or other EPS; and (2) disturbance to any cetacean within Scottish inshore waters.

1.3.1.1 Determining the Need for an EPS Licence

The purpose of the assessments presented in this report is to determine whether, when considering the implementation of appropriate mitigation, there is the potential for the marine survey activities to injure or disturb cetaceans. Where the potential for disturbance remains, an EPS Licence may be required. The requirement for an EPS Licence will be determined based on findings from the EPS Risk Assessment.

If an EPS licence is required, Marine Scotland Licensing Operation Teams (MS-LOT's) consideration of whether an EPS Licence can be granted will comprise three tests:

1. To ascertain whether the licence is to be granted for one of the purposes specified in the Habitat Regulations;
2. To ascertain whether there are no satisfactory alternatives to the activity proposed (that would avoid the risk of offence); and
3. That the licensing of the activity will not be detrimental to the maintenance of the population of the species concerned at a Favourable Conservation Status (FCS).

1.3.2 Basking Sharks

Basking sharks are protected under Schedule 5 of the Wildlife and Countryside Act 1981 as amended (WCA) 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.

Basking sharks are present on the west coast of Scotland between spring and autumn, with peak sighting densities occurring in August (Witt *et al.*, 2012). The migratory movements of basking shark are still unclear. However, recent tracking studies indicate that most basking sharks perform a southerly migration in the post-summer months, departing coastal regions of UK and Ireland returning in Spring (Doherty *et al.*, 2017). The west coast of Scotland has one of the highest encounter rates of basking sharks in the UK. The Clyde marine region, within which the Kintyre Hunterston HVAC cables reside, is historically important for basking sharks. Furthermore, Arran was previously designated as a hotspot for sightings and Solandt & Ricks (2009) recorded high sightings frequencies from Arran and in the Firth of Clyde in 2008 and 2009 (Nicholson *et al.*, 2000). Although in the context of the entire UK coastal waters, basking shark sightings in the vicinity of the Kintyre Hunterston HVAC cables are reasonably frequent, basking shark densities and predicted basking shark habitat suitability are considered to be comparably lower in the vicinity of the Kintyre Hunterston HVAC cables than other areas of the west coast of Scotland which consistently support high basking shark encounter rates (e.g. waters surrounding Mull, Coll and Tiree) (Speedie *et al.*, 2009; Austin *et al.*, 2019). Basking shark densities in the Clyde marine region also appear to fluctuate between surveys carried out in different years, with considerably lower sightings rates recorded in other years surveyed (Nicholson *et al.*, 2000; Speedie *et al.*, 2009; Solandt & Ricks, 2009).

The basking shark is an elasmobranch (sharks and rays) which is a group with generally low sensitivity to noise vibrations due to the fact they do not have a swim bladder. The hearing range of basking sharks is not known; however, five other elasmobranchs have been found to have a hearing range between 20 Hz to 1 kHz. However, this may or may not be transferable to basking sharks (Macleod *et al.*, 2011). As 20 Hz – 1 kHz is below the operating frequency of any geophysical equipment to be utilised during the proposed surveys, and considering the temporary nature of the activities, noise disturbance is not expected to impact basking sharks. On this basis, the potential for noise emissions to impact upon basking sharks is screened out of further assessment.

Vessel collision also poses a threat to this slow-moving species. Collision risk increases with increasing vessel speed. As the survey vessels will be slow-moving, collision risk is generally low. Risk will be reduced further on the basis of mitigation measures that SHE Transmission introduce (Section 5). Furthermore, shipping density in the Clyde marine region is considered to be moderate, with an average density of 5 – 150 transits per week between 2012 and 2017 (Marine Scotland, 2021). Basking sharks in this area are therefore well accustomed to vessel activity, and the vessels used for the proposed survey works will not constitute a discernible change from baseline conditions. However, as disturbance to basking sharks remains a possibility, an application for a Basking Shark Licence under the Wildlife and Countryside Act 1981 (as amended) will be submitted.

1.4 Protected Sites Overview

1.4.1 European Sites

The European Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) are transposed into Scottish Law in the terrestrial environment and within Scottish Territorial Waters by the (12 NM limit) by the Habitats Regulations. The European Habitats Directive (92/43/EEC) aims to promote the maintenance of biodiversity, by requiring EU Member States to maintain or restore representative natural habitats and wild species at a Favourable Conservation Status (FCS), through the introduction of robust protection for those habitats and species of European importance.

Although the UK no longer forms part of the EU, European sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SAC), retain the same protections as prior to EU exit day. However, following the UK's withdrawal from the EU, SPAs and SACs in the UK are referred to as European sites which form part of the UK Site Network, rather than Natura 2000 sites.

As part of the protection measures for European sites under the Habitat Regulations, Competent Authorities are required to undertake assessments to determine whether a plan or project is likely to have an adverse effect on the integrity of a European site. This is implemented in Scotland through the HRA process. The HRA process requires that any proposal which has the potential to result in a negative LSE to European Sites or its designated features, to be subject to an HRA by the Competent Authority, and if necessary an Appropriate Assessment (AA). The HRA and AA processes ensure that an activity cannot be consented if it may cause adverse effects on the integrity of a European Site, unless there no alternatives, and there is an Imperative Reason of Overriding Public Interest (IROPI) for the activity to proceed.

If it is necessary to apply for an EPS licence, this report will provide sufficient detail to support the HRA process.

1.4.2 Marine Protected Areas

Under section 82 of the Marine (Scotland) Act 2010, 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 any ecological or geomorphological process on which the conservation of any protected feature in an NCMPA is dependent. If MS-LOT determine there is or may be a significant risk of a project hindering the achievement of the conservation objectives, then they must notify the relevant conservation bodies (NatureScot in this case).

It is an offence to intentionally or recklessly kill, remove, damage, or destroy any protected feature of an NCMPA. MS-LOT must be sure that consenting/licensing decisions do not cause a significant risk to the conservation objectives of any NCMPA.

If it is necessary to apply for an EPS licence, sufficient detail will be provided to support allow MS-LOT to ascertain potential effects on NCMPAs.

1.4.3 Designated Seal Haul-out

Seal haul-outs are coastal locations that seals use to breed, moult and rest. Nearly 200 seal haul-out sites have been designated through The Protection of Seals (Designation of Haul-Out Sites) (Scotland) Order 2014, which was amended with additional sites in 2017. These haul-out sites are protected under Section 117 of the Marine (Scotland) Act 2010. The Act is designed to strengthen the protection of seals when they are at their most vulnerable and, as such, provides additional protection from intentional or reckless harassment whilst seals occupy these important coastal sites.

1.4.4 Selection Criteria for Protected Sites

Over and above potential impacts on protected species, the potential for the proposed survey activities to impact protected sites (including designated seal haul-outs) needs to be considered. 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 as qualifying features within 50 km of the proposed survey area;
- SACs (including proposed and candidate sites) with harbour seal features within 50 km of the proposed survey area and breeding grey seal within 20 km of the proposed survey area;
- Designated seal haul-outs or seal breeding sites that overlap with or located within 500 m of the proposed survey area;
- 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 survey area; and
- SACs and NCMPAs (including proposed and candidate sites) with otter features that overlap with or located within 500 m of the proposed survey area.

There is not considered to be the potential for impact on benthic qualifying features as a result of geophysical survey activities, since there will be no contact with the seabed. As such, protected sites with benthic features have not been considered within this assessment.

2 DESCRIPTION OF PROJECT ACTIVITIES

2.1 Overview

Geophysical surveys of the Kintyre Hunterston HVAC cables are required to maintain a secure energy transmission link, and to ensure SHE Transmission fulfil the commitments made to the licensing authority and stakeholders. The results of the survey works will be used to inform future inspection and maintenance requirements.

2.1.1 Testing and Calibration of Survey Equipment

Prior to survey activities commencing, the survey equipment and sensors will need to be tested and calibrated. Testing and calibration may be required for all survey equipment that will be utilised during the survey activity, as detailed in Table 2-1. It is anticipated that the testing and calibration will take approximately 12 hours.

The exact location of the testing and calibration sites is unknown at this stage, but where possible this activity will be carried out within the survey corridor. However, it is noted that specific bathymetric conditions and features are required to facilitate testing and calibration; where these are not available within the survey corridor, an alternative location will be utilised.

Since the vessel, equipment, and activities required for testing and calibration will be the same as those used during geophysical survey works, the potential impacts on protected species and sites resulting from testing and calibration will be analogous to those resulting from the main survey phase. As such, testing and calibration is not specifically considered by this assessment.

2.1.2 Survey Activities

It is anticipated that the survey will be caried out by a single vessel suitable for Remote Operational Vehicle (ROV) operations, although additional vessels may be mobilised if required. Table 2-1 presents the types of activity that are associated with the geophysical surveys.

Table 2-1 Summary of the activities associated with the different survey types

ACTIVITIES	
Vessels and vehicles	Survey vessel(s)
	Remotely Operated Vehicle (ROV)
Geophysical Survey	Ultra-short Baseline (USBL) positioning system
	Side Scan Sonar (SSS)
	Multi Beam Echosounder (MBES)
	Cable tracker system
Seabed Imagery	ROV survey / inspection

2.1.3 Survey Equipment

A range of different equipment may be employed during the survey activities (see Table 2-1). The potential survey techniques are described in Table 2-2.

Table 2-2 Details of the equipment to be employed for the survey activities

SYSTEM / SURVEY EQUIPMENT	DESCRIPTION
Geophysical Survey	
Ultra-Short Baseline (USBL)	USBL systems are used to determine the position of subsea survey items, including ROVs, towed devices, grab samplers, etc. This involves the emission of sound from a vessel-mounted transducer to a subsea transponder, thereby introducing sound into the marine environment. A USBL system consists of a transducer, which is mounted on the vessel and a transponder attached to the ROV. The transducer transmits acoustics through the water and the transponder sends a response which is detected by the transducer. The USBL calculates the bearing and time taken for the transmissions to be completed and thus the position of the subsea unit / sampling equipment is determined. These systems can either be used continuously or intermittently through the operation they are supporting.
Multi-beam echosounder (MBES)	Multi-beam echo-sounders are used to obtain detailed 3-dimensional (3D) maps of the seafloor which show water depths. They measure water depth by recording the two-way travel time of a high frequency pulse emitted by a transducer. The beams produce a fanned arc composed of individual beams (also known as a swathe). Multi-beam echo-sounders can, typically, carry out 200 or more simultaneous measurements.
Sidescan Sonar (SSS)	Side-scan sonar is used to generate an accurate image of the seabed, which may include 3D imagery. An acoustic beam is used to obtain an accurate image of a narrow area of seabed to either side of the instrument by measuring the amplitude of back-scattered return signals. The instrument can either be towed behind a ship at a specified depth or mounted on to a ROV. The frequencies used by side-scan sonar are generally very high and outside of the main hearing range of all marine species (NOAA, 2018). The higher frequency systems provide higher resolution but shorter-range measurements.
Cable Tracker System (e.g. TSS 350/440)	Cable tracker survey systems provide positional data on surface laid or buried pipes and cables. It is used to verify the location and burial status of cables and can provide precise details of fault locations. The TSS 350/440 systems are acoustically passive, utilising an active pulse induction survey system. This involves the transmission of electromagnetic energy which induces magnetism within the cable system. This magnetism is then received by the equipment which is used to determine burial depth and location.
Seabed Imagery	
Hi-Resolution Camera (e.g. Cathx camera system)	An ROV mounted camera will be utilised to acquire imagery of the cables and adjacent seabed. This survey equipment does not interact with the seabed, or result in underwater noise emissions and as such does not require any further consideration by this assessment.

2.2 Activity Schedule

The Kintyre Hunterston HVAC cables survey operations are scheduled to be undertaken within the timeframe of 1st June 2025 to 31st May 2030, with a total survey duration of 21 days per year expected within this 5-year period. It is acknowledged that the survey duration may increase as a result of technical constraints or adverse weather conditions.

3 EUROPEAN PROTECTED SPECIES IMPACT ASSESSMENT

The primary function of this EPS Risk Assessment is to determine whether an EPS licence is required for the proposed survey works, by identifying the potential for injury and disturbance to EPS. This section of the risk assessment addresses potential impacts to EPS, regardless of their inclusion as qualifying features of protected sites. An assessment of potential impacts to protected sites and their qualifying features is provided in Section 4. Although not classified as EPS, an assessment of underwater noise impacts to pinnipeds, including noise modelling, has been included in this section to support the Protected Sites Impact Assessment undertaken in Section 4.

Underwater noise emissions from geophysical survey equipment is the primary source of potential injury and disturbance to EPS. It is acknowledged that underwater noise emitted by the survey vessel and the physical presence of the vessels during the survey operations also have the potential to cause disturbance to EPS and pinnipeds.

An overview of survey activities and their potential impacts to EPS and pinnipeds is provided in Table 3-1 below.

While some survey techniques and activities may introduce noise to the marine environment, other activities do not operate in relevant frequency ranges or generate sufficient levels of noise to be considered as potential sources of noise-related injury or disturbance to EPS and pinnipeds, and have been screened out of the detailed assessment, as indicated in Table 3-1.

Table 3-1 Overview of potential impacts of marine survey equipment on EPS and pinnipeds within the vicinity of the Shetland-Yell HVAC Link

ACTIVITY / EQUIPMENT	EXAMPLE EQUIPMENT	POTENTIAL IMPACTS	FREQUENCY RANGE (kHz)	INDICATIVE SPL_{PEAK} (dB re 1 1μPa)	FURTHER INFORMATION REQUIRED FOR EPS RISK ASSESSMENT?
Vessels and Vehicles					
Survey vessel	e.g. Strill Explorer or Havilla Subsea	Propellers, engines, and propulsion activities form the primary noise sources of survey vessels. Vessel noise is generally continuous and comes in both narrowband and broadband emissions. Potential impacts on EPS and other protected species depend on the duration of the survey activities, location of the survey routes and species of cetacean potentially present in the area. Increased vessel activity additionally has the potential to cause injury from collisions. The risk of collision with an animal is influenced by the dimensions of the vessel and its speed.	Acoustic energy from vessels is strongest at frequencies <1 kHz	< 50 m length vessel = 160 – 175 > 50 m length vessel = 165 – 185	No –The source levels associated with vessels are likely to be too low to result in injury, and the presence of three survey vessels in the West Highlands region does not constitute a change from baseline conditions. It is acknowledged that vessels pose a collision risk to EPS and other protected species. While this does not constitute a change from baseline, all vessels will adhere to The Scottish Marine Wildlife Watching Code (SMWWC) (NatureScot, 2017), as detailed in Section 5.2.
Remotely Operated Vehicle (ROV)	Various	Potential impacts to EPS and other marine mammals include disturbance from noise emissions associated with movements underwater. However, these are anticipated to be limited in scale, given the small size of the submerged vehicles. Collision risk is considered an unlikely impact, given the high level of manoeuvrability and slow movement associated with ROVs.	N/A	N/A	No – the predominant noise source during such activities is the USBL, and other geophysical survey sensors deployed on the vehicle, which is expected to mask any sound generated by the vehicle itself. Noise generated by geophysical survey devices has been considered separately (see below).
Geophysical Survey					
Ultra-Low Baseline (USBL) positioning system	HIPAP 501; Ranger USBL	USBL systems involve the emission of impulsive sound from a hull-mounted transducer to a subsea transponder, thereby introducing sound into the marine environment. The potential impacts of this sound on cetaceans depends upon the abundance, distribution and sensitivity of the species, and the duration of the operations.	19.5 – 33.5	170 – 207	Yes – The pressure levels and frequencies at which the USBL operate are not of a level where injury is expected but have the potential to cause disturbance to EPS.
Side Scan Sonar (SSS)	Edge Tech 4200/4205	Side-scan sonar equipment produces impulsive sound emissions through high frequency pulses used to image the seabed habitat. Potential impacts to EPS and other marine mammals depend upon the frequency, location, and duration of the pulses.	500 – 900	190 - 230	No – The SSS used for the proposed survey operations will operate at frequencies above 500 kHz. This is above the hearing threshold of all marine mammals and protected species which may be present in the area (as detailed in Table 3-3). Hence no potential for injury or disturbance exists (NOAA, 2018).
Multibeam echosounder (MBES)	R2Sonic 2024; Reson 7125	High frequency noise pulses created by multi-beam echo sounder equipment generate sound waves which produce impulsive underwater noise. Depending on the frequency of the pulses, location and duration of the operations, and the species present, there could be potential impacts on cetaceans.	200 – 400	180 – 240	No – The MBES used for the proposed survey operations will operate at frequencies between 200-400 kHz. This is above the hearing threshold of all marine mammals and protected species which may be present in the area, as detailed in Table 3-3. Hence no potential for injury or disturbance exists (NOAA, 2018).

ACTIVITY / EQUIPMENT	EXAMPLE EQUIPMENT	POTENTIAL IMPACTS	FREQUENCY RANGE (kHz)	INDICATIVE SPL_{PEAK} (dB re 1 1µPa)	FURTHER INFORMATION REQUIRED FOR EPS RISK ASSESSMENT?
Cable tracker system	TSS 350/440	The TSS 350/440 uses electromagnetic sensors to detect and track buried cables underwater. With these, the depth of burial can be determined through modelling.	N/A	N/A	No – A cable tracker system is acoustically passive and is not considered to pose a risk to EPS.

Around 20 species of cetacean have been recorded off the coast of Scotland, although only nine species of cetacean are regularly recorded off the west coast of Scotland, with three being considered as common to the area (NMPi, 2021; Reid et al, 2003); harbour porpoise (*Phocoena phocoena)*, minke whale (*Balaenoptera acutrostrata)* and bottlenose dolphin (*Tursiops truncatus)* (NMPi, 2021). It should be noted that the project area is located within SCANS Block G. The following summarises those species regularly sighted within the project area:

- Harbour porpoise are the most abundant cetacean species in UK waters and are generally observed in small groups of one to three individuals (Reid *et al*., 2003). They are most commonly sighted between May to September (Reid *et al*., 2003). Harbour porpoise are the most frequently sighted cetacean along the west coast of Scotland where they are present year-round (NMPi, 2021; Reid *et al*., 2003; Hague *et al*., 2020). The density of harbour porpoise within Block G of the SCANS III survey, within which the Kintyre Hunterston HVAC cables reside, was approximately 0.336 animals/km^2, which is average in the context of the wider United Kingdom Continental Shelf (UKCS) region (Hammond *et al*., 2021). According to density modelling data (combining SCANS-III density data with environmental predictive factors), it is predicted that harbour porpoise densities within the area will be low, with higher densities occurring in deeper offshore waters (Hague *et al*., 2020; Hammond *et al*., 2021).
- Minke whale are the smallest, most prevalent baleen whales to occur in Scottish waters. They feed mainly in shallower waters over the continental shelf and regularly appear around shelf banks and mounds, or near fronts where zooplankton and fish are concentrated at the surface (Reid *et al*., 2003). This species shows a large seasonal variation with much lower densities in the winter months, likely driven by variations in sea surface temperature and chlorophyll concentrations (Hague *et al*., 2020). They are also commonly seen in the strong currents around headlands and small islands, where they can come close to land, even entering estuaries, bays and inlets. Breeding locations of this species are currently unknown. Minke whale density within Block G of the SCANS -III survey is considered to be moderate in comparison to the rest of the UKCS, with an estimate 0.027 animals/km^2 (Hammond *et al*., 2021). Predicted densities based on the SCANS-III sightings and environmental predictive factors indicate that densities within the project area would be low. Paxton *et al*., (2014) also predicted that densities within the Kintyre Hunterston HVAC cable would be low, although high predicted densities were recorded to the south of Arran (albeit it is acknowledged that survey effort was lower in this area and that there was more uncertainty in the data).
- Bottlenose dolphin are present in Scottish waters year-round, with the highest encounter rates observed in coastal waters (Hague *et al*., 2020). The main bottlenose dolphin population on the east coast of Scotland resides between the Moray Firth and Fife (Cheney *et al*., 2013). Sightings are less common in western areas of Scotland when compared to coastal eastern areas (e.g. Moray Firth); however, two distinct bottlenose dolphin populations reside on the west coast of Scotland, one found mostly around Skye, and one around Barra with a total population of around 45 individuals (Cheney *et al*., 2013). These bottlenose dolphins are highly mobile and would be expected to move south towards the Kintyre Hunterston HVAC cables in smaller numbers (Cheney *et al*., 2013; NMPi, 2021). Densities within Block G of the SCANS-III survey were approximately 0.121 animals/km^2, which is high when compared to the rest of the UKCS (Hammond *et al*., 2021; Hague *et al*., 2020). Notably, Hammond *et al*., (2021) estimate that the abundance of bottlenose dolphins in Block G, is 1,824 individuals, several orders of magnitude higher than the biogeographic population estimate of 45 individuals for the Coastal west Scotland and Hebrides Management Unit (MU) (IAMMWG, 2021).
- Other species, such as killer whale, white-beaked dolphin, common dolphin, humpback whale and Risso's dolphin are seen infrequently in varying numbers and are occasional and/or seasonal visitors (Hammond *et al*, 2021; Hague *et al*., 2020). However, these species do not occur frequently enough to require specific assessment.

The distribution, density, and abundance of the three most commonly occurring cetacean species in the vicinity of the survey corridor are described in Table 3-2.

Table 3-2 Population parameters of cetacean species potentially affected in the survey area (Hammond et al., 2021)

SPECIES NAME	ESTIMATED DENSITY ACROSS THE PROJECT AREA* (individuals/km^2) (Hammond *et al.*, 2021)	ESTIMATED ABUNDANCE WITHIN THE SURVEY AREA (36.3 km^2)	MANAGEMENT UNIT (MU) / BIOGEOGRAPHICAL POPULATION ESTIMATE (IAMMWG, 2021)	PROPORTION OF THE MU POTENTIALLY AFFECTED BY SURVEY ACTIVITIES
Harbour porpoise	0.336	12.2	27,936	0.04%
Minke whale	0.027	<1 individual	20,118	0.005%
Bottlenose dolphin	0.121	4.4	45	9.8%

Note: Density estimates have been reported for SCANS-III Survey Block G

3.1 Potential Impact from Project Activities

Noise emissions from the proposed survey activities constitute the greatest potential risk of injury or disturbance to cetaceans in the vicinity of the survey area. Injury and disturbance from underwater noise may impact cetaceans in the following 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.

To determine the potential for noise impacts to cetaceans and pinnipeds, predicted emission levels are compared to available empirically-estimated thresholds for injury and disturbance. Several threshold criteria and methods for determining how sound levels are perceived by marine mammals are available (e.g. the dBht method and other hearing weighted and linear measures) and each has its own advantages and disadvantages. Scottish Government (2020) guidance recommends using the injury and disturbance criteria proposed by Southall *et al.* (2007), which is based on a combination of linear (un-weighted) peak sound pressure levels (SPL) and weighted sound exposure levels (SEL). Since the publication of this seminal paper, there has been mounting evidence of marine mammal auditory abilities in novel species and well-researched species alike (e.g. harbour porpoise) which has led to amendments to the auditory thresholds for injury (NOAA, 2018; Southall *et al.*; 2019). In accordance with recent regulator feedback, these amended hearing groups and thresholds for acoustic injury have been adopted herein; they are detailed in 3.2 below.

If a noise emission is composed of frequencies which lie outwith the estimated auditory bandwidth for a given species, then disturbance or injury is extremely unlikely. To understand the potential for noise-related impacts, the likely hearing sensitivities of different cetacean hearing groups has been summarised below in Table 3-3, which is the basis for screening out SSS and MBES from further assessment as detailed in Table 3-1.

Table 3-3 Auditory bandwidths estimated for cetaceans (Southall et al., 2019; NOAA, 2018)

HEARING GROUP	ESTIMATED AUDITORY BANDWIDTH
Low-frequency cetaceans (LF): (e.g. baleen whales, such as humpback whales, minke whales, fin 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. 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)	75 Hz to 100 kHz

3.2 Noise Assessment Criteria

3.2.1 Injury

Injury criteria proposed by NOAA (2018) and Southall *et al.*, (2019) are devised for two different types of sound:

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

The geophysical surveys will comprise acoustic equipment which emits multiple pulsed sound, as detailed within Table 3-1.

The noise emitted from the equipment listed in Table 3-1 will disperse through the water column, with sound pressure reducing as distance from the noise source increases, hence marine mammals will be exposed to a lower source pressure further from the noise source. Therefore, for the survey equipment with potential to cause injury or disturbance to marine mammals, the dispersion of noise through the water column has been modelled to assess the appropriate mitigation zone in which the source pressure levels received by marine mammals are reduced below potentially injurious levels.

A duel-metric approach has been adopted which identifies the range of potential injury to marine mammals which have been derived from the source level including the peak pressure and cumulative SELs experienced for each equipment type identified to require consideration for noise-related injury (see Table 3-1). The thresholds above which each marine mammal and pinniped hearing group may experience noise-related injury are presented in Table 3-4. 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 3-4 Criteria considered in this assessment for the onset of injury in marine mammals from underwater noise (NOAA, 2018; Southall et al., 2019)

MARINE MAMMAL HEARING GROUP[1]	IMPULSIVE NOISE		NON-IMPULSIVE NOISE
	PEAK PRESSURE (dB re 1 µPa)	CUMULATIVE SEL (dB re 1 $\mu Pa^2 s$)	CUMULATIVE SEL (dB re 1 $\mu Pa^2 s$)
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) (PW)	218	185	201

3.2.2 Disturbance

To consider the possibility of a disturbance offence (according to the definitions provided in Section 1.3.1) resulting from the proposed survey, it is necessary to consider the likelihood that survey activities would generate a non-trivial disturbance based on the sensitivities 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 an EPS Licence to ensure that an offence is not committed. However, in issuing an EPS Licence, Marine Scotland must consider whether the FCS of any species will be affected.

The impacts of the proposed activities on the FCS of all protected species must be considered to satisfy Regulation 39(1) and 39(2) of The Habitats Regulations. The risk assessment below addresses the impacts of survey activities on the existing conservation status of protected species within the survey area.

The requirement for an EPS licence for injury and/or disturbance of cetaceans will be in accordance with Regulation 39 (2) (i.e. any potential disturbance to cetaceans). As such, any potential for disturbance and/ or injury to cetaceans, resulting from the survey activities, will warrant an application for an EPS licence.

Auditory thresholds for disturbance, as defined by the National Marine Fisheries Service (NMFS, 2014), coupled with behavioural response criteria detailed in Southall *et al.* (2007) have been adopted for the assessment of potential marine mammal disturbance from both non-impulsive and impulsive noise sources. These thresholds (provided in in SPL_{rms}) and behavioural response severity ratings are detailed in Table 3-5.

[1] *Hearing groups have been defined using the naming conventions provided in Southall et al. (2019), which are based on accepted frequency ranges commonly used in acoustics; however, the groupings and their respective criteria do not differ from NOAA (2018).*

Table 3-5 Disturbance threshold criteria for impulsive sounds (Southall et al., 2007; NMFS, 2014).

BEHAVIOURAL EFFECT	THRESHOLD CRITERIA SPL_{rms} (dB re 1 µPa)
Potential strong behavioural reaction (6 or more on the severity scale)	160

3.3 Noise-related Impacts to EPS and Pinnipeds

3.3.1 Noise Modelling Approach

Underwater modelling has been undertaking using Xodus' SubsoniX noise model which was developed specifically for assessing environmental impacts due to underwater noise. The SubsoniX model approach is based on an extended version of the semi-empirical model developed by Marsh-Schulkin (Marsh and Schulkin, 1962). The sound propagation model uses several concepts including:

- Refractive cycle, or skip distance;
- Geometric divergence;
- Deflection of energy into the bottom at high angles by scattering from the sea surface;
- A simplified Rayleigh two-fluid model of the bottom for sand or mud sediments; and
- Absorption of sound energy by molecules in the water.

The following inputs are required to the model:

- Third-octave band source sound level data;
- Discreet range (distance from source to receiver);
- Water column depth and sediment layer depth;
- Sediment type (sand/mud);
- Sea state; and
- Source directivity characteristics.

Standard assumptions are input into the model for a realistic worst-case assessment. The model is based on a combination of acoustic theory and empirical data from around 100,000 measurements and has been found to provide good predictions.

The duel-metric assessment approach disseminated in National Oceanic and Atmospheric Administration (NOAA, 2018) has been used to estimate injury impact range from: (1) the peak SPL; and (2) the weighted cumulative SEL criteria. 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 detailed in Table 3-3, 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:

- Maximum reported SPLs for all equipment have been used;
- Maximum pulse length and minimum turn around has been used where provided;
- Where data is unavailable, the time between pulses has been calculated as 1.5 times the pulse length;
- Vessels are moving at slow speeds; and
- 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.

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 (Richardson *et al*, 1995). 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[2] and dip angle[3]. Directivity corrections have been applied to the modelling outputs under the assumption that the animal is directly in-line with the vessel.

As detailed in Section 3.2.2, the disturbance threshold uses the SPL_{rms} metric, and hence needs to be evaluated against equipment source levels in SPL_{rms}. 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}.

3.3.2 Injury Impacts

For the proposed surveys, the expected frequency range of noise emissions from the USBL operations overlap with the hearing range of all cetacean hearing groups (Table 3-1 and Table 3-3). 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 3-4.

Modelling of ranges at which injury impacts are likely to result from deployment of survey equipment has been undertaken, as described in Section 3.2. Example equipment has been selected to exemplify the realistic worst-case

[2] *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.*

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

scenario for USBL, including the maximum SPLs across source frequencies meant to encapsulate the hearing abilities of all representative hearing groups. Impacts from noise sources which are strictly behavioural in nature (i.e. disturbance impacts) are covered in Section 3.3.3.

Table 3-6 Noise modelling results for injury impacts from impulsive noise sources (N/E = no exceedance of thresholds)

ACTIVITY	FREQUENCY (kHz)	SPL_{PEAK} (dB re 1μPa)	DEPTH (m)[4]	INJURY RANGE (m)											
				WEIGHTED CUMULATIVE SEL (STATIC MAMMALS)				WEIGHTED CUMULATIVE SEL (MOVING MAMMALS)				UNWEIGHTED SPL_{PEAK}			
				VHF	HF	LF	PW	VHF	HF	LF	PW	VHF	HF	LF	PW
USBL	19.5 – 33.5	207	100	43	8	4	5	38	2	1	1	3	N/E	N/E	N/E
			10	4	4	2	3	4	2	N/E	N/E	3	N/E	N/E	N/E

[4] *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.*

Across modelling scenarios and metrics, the injury ranges were generally highest for the VHF hearing group (Table 3-6), which is represented by harbour porpoise in UK waters. Conversely, LF cetaceans seemed to constitute the hearing group with the lowest potential impact ranges for the cumulative SEC metrics (Table 3-6).

The deployment of USBL in 100 m depths elevated the potential range of impact to a maximum of 43 m for VHFs, when considering cumulative SEL metric for a static animal. However, in order for the cumulative SEL threshold to be exceeded, an animal would have to remain within 43 m of the source for a sustained period. The likelihood of a cetacean remaining this close to operational equipment is extremely low when considering that the source is deployed from a moving vessel travelling at more than 2ms^{-1} (i.e. 4 knots) and, in some cases, is being towed at depth (e.g. a USBL beacon will be mounted on a an ROV within a few metres of the seabed). Whilst USBL may be deployed from a stationary vessel during particular activities (e.g. seabed imagery) these are anticipated to be limited in duration. As such, a realistic risk of injury is not expected from the use of USBL, and no marine mammal mitigation is proposed for USBL operations.

The majority of 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). Furthermore, NatureScot (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 / 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 opposing the direction of vessel travel.

It should also be noted that the modelling scenarios are meant to define the worst-case injury ranges associated with the deployment of the USBL 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 USBL equipment use are thus likely to fall within the spectrum of those defined by the model outputs, thereby reducing the impact ranges.

3.3.3 Disturbance Impacts

In addition to physical injury, noise emissions have the potential to affect the behaviour of cetaceans and pinnipeds in the vicinity of the noise source. Significant or strong disturbance (see Table 3-5; 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 the USBL operations is provided in the sections below. The outputs of the noise modelling assessment against the disturbance thresholds relative to SPL_{rms} values for the survey equipment are provided in Table 3-7.

Table 3-7 Noise modelling results for disturbance impacts from impulsive noise sources

ACTIVITY	FREQUENCY (kHz)	SPL_{rms} (dB re 1µPa)	DEPTH (m)	RANGE OF BEHAVIOURAL CHANGE (m)
USBL	19.5 – 33.5	190	100	63
			10	64

USBL survey activities have the potential to generate a strong disturbance event (i.e. a disturbance offence) as described in Section 3.2.2. The predicted disturbance range from the USBL is approximately 64 m in both shallower (15 m) and deeper (100 m) waters (Table 3-7). Therefore, individuals would be required to remain in close proximity to the survey operations for a severe disturbance event to occur.

The number of individuals which may experience disturbance from the worst-case scenario for the USBL operations has been calculated in Table 3-8 below, based on the population parameters supplied in Table 3-2 above. 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 3-8 Number of cetaceans which may experience a disturbance offence from impulsive survey activities, based on known population parameters of the most frequently occurring species

SPECIES NAME	NUMBER OF INDIVIDUALS WHICH MAY INCUR A STRONG DISTURBANCE	PROPORTION OF THE MU POTENTIALLY AFFECTED BY PROJECT ACTIVITIES
	USBL – 19.5 – 33.5 kHz (0.02 km^2)	
Harbour porpoise	0.007	<0.01%
Minke whale	0.0005	<0.01%
Bottlenose dolphin	0.2	0.04%

The source levels associated with the example USBL survey equipment have the potential to elicit a strong behavioural response in EPS which could be classed as a disturbance offence as defined under the Habitats Regulations. However, none of the biogeographical population MU for any of the EPS species known to regularly occur within the project areas will incur significant impacts. For all of the proposed survey activities, 0.04% or less of the relevant biogeographic populations may be impacted by noise-related disturbance. Notably, for harbour porpoise and minke whale <0.01% of the relevant biogeographic populations may potentially be impacted by noise-related disturbance.

The number of animals within the disturbance range at any one time is predicted to be one fith of an individual or less for bottlenose dolphin, and less than one thousandth of individual for minke whale and harbour porpoise (Table

3-8). This means that on average, there will be no bottlenose dolphin within the disturbance range for 80% of USBL operations and no minke whale and harbour porpoise within disturbance range for 99.999% of the USBL operations, making potential disturbance impacts at the population level arising from this survey equipment negligible. It is also important to reiterate that the density estimates for bottlenose dolphins are taken from SCANS-II survey, which estimated that there were 1,824 individuals in Block G. This estimate is several orders of magnitude higher than the biogeographic population estimate of 45 individuals for the Coastal west Scotland and Hebrides MU (IAMMWG, 2021). Thus, it is expected that the proportion of the biogeographic population actually affected by the USBL operations will be less than what is predicted here.

As the survey vessel will not be stationary for prolonged periods during these activities, 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 noise which may have detrimental effects at the individual or population level (i.e. a significant disturbance), which is highly unlikely.

The survey activities are anticipated to be completed during a period of 21 days, and within this time there will be periods of inactivity during weather downtime. Given the transient and short-term nature of the survey and vessel 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 EPS.

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 survey activities. As such, an EPS Licence is expected to be required for disturbance of EPS potentially resulting from USBL survey activities, in accordance with the Habitat Regulations.

3.4 Cumulative Effects

There are several marine projects within a 40 km radius of the Kintyre Hunterston HVAC cables, including the Western High Voltage Direct Current (HVDC) Link (operational), several Scottish Power Hydro Electric Power Distribution (SHEPD) power cables connecting nearby islands (operational), the Lanis 3 telecommunication cable (operational), the Sirius North telecommunication cable (operational), the BT-HIE Seg1.6 telecommunication cable (operational) and several coastal aquaculture sites.

It is acknowledged that there is the potential for cumulative effects to arise from pre-construction surveys, construction works, operational surveys / works and decommissioning at nearby assets if they were to coincide with the proposed survey activities. However, as described in the sections above, disturbance to EPS from the survey activities is expected to be both spatially and temporally limited with only a very low number of individuals being disturbed, and therefore significant cumulative effects on EPS are not expected.

3.5 Conclusions

There will be no injurious impacts to cetaceans 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 SHE Transmission will therefore apply for an EPS Licence in respect to this disturbance. However, the disturbance is expected to be limited to one or a few individuals of the local population and will therefore not result in any adverse impact to the FCS of any cetacean species.

Overall, the proposed survey operations constitute work of overriding public interest while presenting a trivial and temporary disturbance to a few individual animals in a limited area.

4 PROTECTED SITES IMPACT ASSESSMENT

4.1 Relevant Protected Sites

Given that there is the possibility for EPS to be disturbed, it is also necessary to assess potential impacts from this activity on designated sites to inform the HRA process.

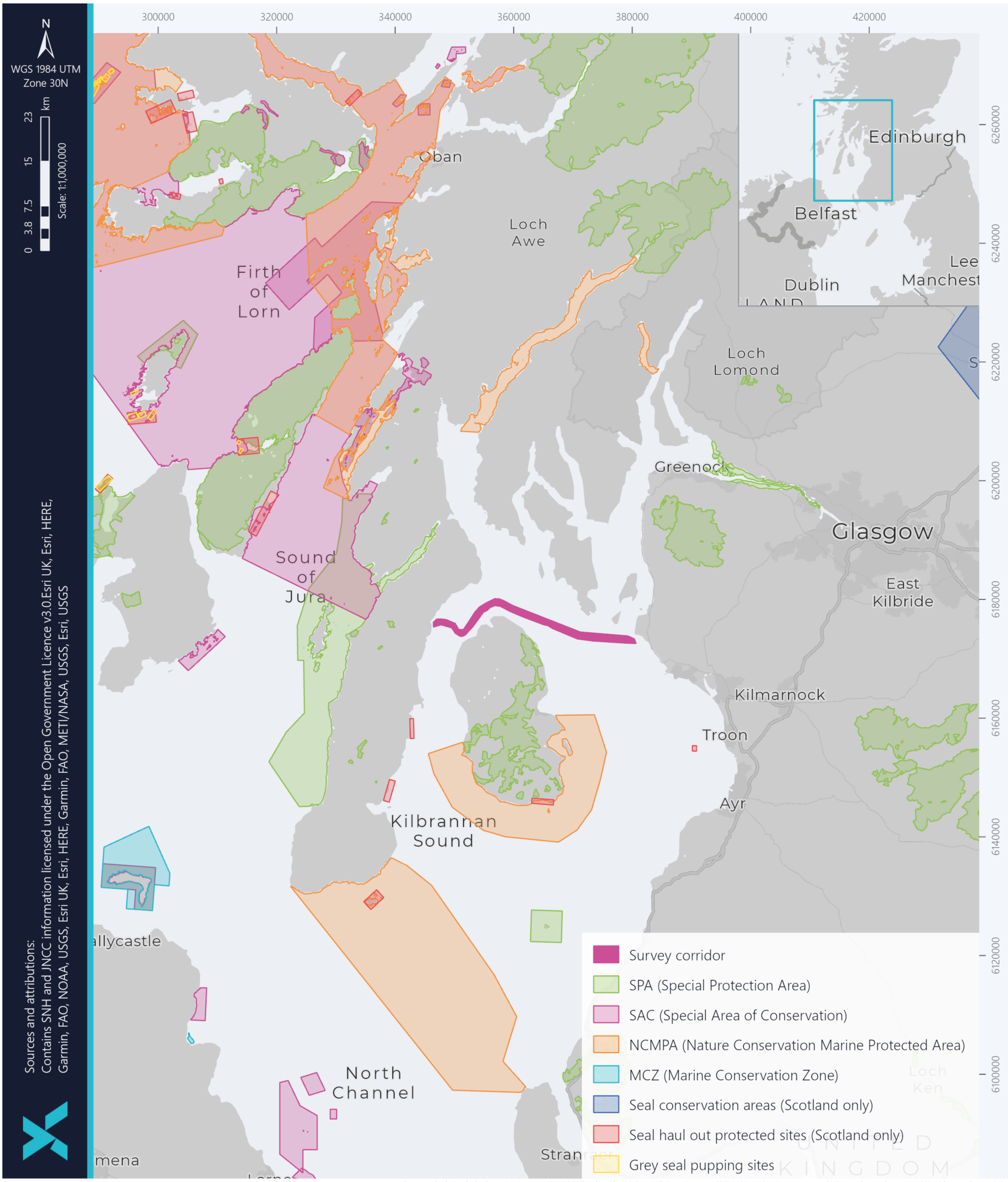
The designated sites located in the vicinity of the Kintyre Hunterston HVAC cables which have the potential to be impacted by the survey activities are outlined in Table 4-1 and shown in Figure 4 1, these are selected based on the criteria outlined in Section 1.4.4.

For each designated site that has the potential to be impacted by the surveys, mitigation measures have been identified relevant to site-specific qualifying features and these are also included within Table 4-1. Further details of the mitigation measures are provided in Section 5. Some of the mitigation measures included in Section 5 may not be listed in Table 4-1 if they are not related to protecting designated features of those sites. However, all mitigation measures in Section 5 will be applied to all activities, regardless of proximity to a protected site.

It should be noted here that sites designated for benthic features have not been included within this assessment, as geophysical surveys are not considered to pose any risk of likely significant effects to these sites.

Table 4-1 Protected Sites in the Vicinity of Survey Area

DESIGNATED SITE POTENTIALLY AFFECTED	CRITERIA FOR POTENTIAL CONNECTIVITY TO THE SITE	MINIMUM STRAIGHT-LINE DISTANCE TO PROTECTED SITE (km)	RELEVANT QUALIFYING FEATURES OF DESIGNATED SITE	ACTIVITY	PROPOSED MITIGATION MEASURES	POTENTIAL FOR LIKELY SIGNIFICANT EFFECT
Inner Hebrides and the Minches SAC	The designated site is within 50 km of the survey corridor.	10.0	Harbour porpoise (*Phocoena phocoena*)	Vessel presence, geophysical surveys and ROV survey / inspection	M1, M2, M3 and M4	Yes
South-East Islay Skerries SAC	The designated site is within 50 km of the survey corridor.	35.2	Harbour seal (*Phoca vitulina*)	Vessel presence, geophysical surveys and ROV survey / inspection	M1, M2, M3 and M4	Yes



Document details: \\xodus.local\aurora\Assignments\A200409\S04\Working Files\GIS\Output\07_KintyreHunterston_EPSRA\A200409_S04_KintyreHunterston_EPSRA.aprx, Protected areas, XWS-SCO106, katy.murphy, 11/11/2021

Figure 4-1 Designated Sites within the Vicinity of the Kintyre Hunterston HVAC Cables

4.2 Assessment of Impacts on Protected Sites

4.2.1 SACs and NCMPAs with Cetaceans as Qualifying Features

The survey corridor lies approximately 10 km southeast of the Inner Hebrides and the Minches SAC, designated for harbour porpoise. However, it should be noted that straight-line distances are provided within this assessment, and that the distance by sea would be >100 km. 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 13,815 km^2. The site contains a mosaic of sediment types which are expected to support a diverse range of fish species preyed upon by harbour porpoise. This productive foraging area is expected to contribute to the high densities of harbour porpoise observed at the site. It is estimated that the SAC supports approximately 5,438 individuals for at least part of the year (NatureScot, 2019).

Harbour porpoises fall within the VHF cetacean hearing range (275 Hz to 160 kHz) (Table 3-3). The injury ranges resulting from the USBL activities are < 50 m for cumulative SEL metrics and there is no exceedance of the injury threshold when considering the peak SPL. As described in Section 3.3.2, given this injury range, and the fact that a cetacean would have to be within 50 m of the noise source for a sustained period of time for any injurious impacts to occur, the likelihood for a circumstance arising which would place a cetacean at risk of injury is considered very low. Furthermore, the range of behavioural change resulting from the underwater noise emissions associated with the USBL activities is expected to be < 65 m, which is expected to impact only a very small number of individuals. Although the survey corridor does not overlap with the Inner Hebrides and the Minches SAC, given the mobile nature of cetaceans, there is the potential for disturbance to a small number of individuals at this SAC, although it is expected that densities within the survey corridor will be lower than those observed within the SAC. Nevertheless, less than 1 harbour porpoise (0.007) is expected to be disturbed at any one time (see Table 3-7) and this equates is <0.01% of the Western Scotland MU population.

Given that the survey activities will occur over approximately 21 days (within a wider survey window of 212 days), any disturbance to harbour porpoise will be temporary, with only a small number of individuals are expected to be disturbed. This disturbance is limited further when accounting for the transient nature of the survey activities.

Considering the small number of individuals expected to be disturbed, the short duration of the survey activities, and the extremely low risk of injury to harbour porpoise, there is no expectation of any LSE to the harbour porpoise qualifying features of the Inner Hebrides and the Minches SAC or adverse effects on the conservation objectives of this protected site.

4.2.2 SACs with Seals as Qualifying Features and Designated Seal Haul-outs

The survey corridor lies approximately 35.2 km from the South-East Islay Skerries SAC, designated for harbour seal. As described above, this represents the straight-line distance from the SAC to the corridor, and the actual distance will be longer than this, at >100 km. This SAC is designated for a nationally important population of harbour seal which support 1.5% to 2% of the UK population of this species (JNCC, 2021). There are no seal haul-outs within 500 m of the survey corridor.

Harbour seals travel approximately 40 to 50 km from their terrestrial haul-outs to feed. Considering the at-sea distance between the corridor and the South-East Islay Skerries SAC is approximately 100 km, there is not considered to be any potential for interactions with harbour seals associated with the South-East Islay Skerries SAC resulting from the underwater noise emissions associated with geophysical surveys or vessel presence (SCOS, 2020). Therefore, no

LSE to harbour seal qualifying features of South-East Islay Skerries SAC are expected or adverse effects on the conservation objectives of this SAC.

4.2.3 SPAs and NCMPAs with Birds as Qualifying Features

There are no designated sites with birds as a feature within 2 km of the survey area. As such, no impacts to SPAs or NCMPAs with birds as a feature are anticipated.

4.2.4 SACs and NCMPAs with Otters as Qualifying Features

There are no designated sites with otters as a feature within 500 m of the survey area. As such, no impacts to SACs or NCMPAs with otters as a feature are anticipated.

4.3 Cumulative Effects

As described in Section 3.4, there are several assets adjacent to the Kintyre Hunterston HVAC cables which could potentially result in cumulative effects to the qualifying features of the designated sites identified above. However, any disturbance to the qualifying features of the designated sites listed in Table 4-1, is anticipated to be extremely spatially and temporally limited. It is not expected that these survey activities could result in a significant increase in the potential for LSEs to occur at the designated sites, and as such, no cumulative effects are anticipated.

4.4 Conclusions

The survey area lies within 50 km of a protected site designated for cetaceans, the Inner Hebrides and the Minches SAC, designated for harbour porpoise. The survey area also lies within 50 km of a protected site for harbour seal, the South-East Islay Skerries SAC. However, it is important to re-iterate that the at-sea distance to these two designated sites is approximately 100 km.

No injurious impacts are expected to result from the survey activities to the qualifying features of the Inner Hebrides and the Minches SAC and the implementation of the mitigation measures presented in Section 5 will further reduce this risk. When considering the mobile nature of harbour porpoise, there may be connectivity of individuals from the relevant biogeographical populations to utilise the Inner Hebrides and the Minches SAC. However, only a small number of harbour porpoise are expected to be disturbed, representing a small proportion of the wider population. Furthermore, considering the conservative approach of the noise assessment, the actual disturbance to the qualifying interests at this site is expected to be lower than calculated. As such, no LSEs are expected on the FCA of harbour porpoise designated within the Inner Hebrides and the Minches SAC.

Additionally, shipping density in the Clyde marine region is considered to be moderate, with an average density of 5 – 150 transits per week between 2012 and 2017 (Marine Scotland, 2021). Harbour porpoise in this area are therefore well accustomed to vessel activity, and the vessels used for the proposed survey works will not constitute a discernible change from baseline conditions. The survey operations also have an extremely limited spatial extent and duration, and hence, there is no potential for LSE to result on the Inner Hebrides and the Minches SAC in this respect.

No LSEs are expected to occur to the harbour seal qualifying features of the South-East Skerries SAC, as this designated site is over 100 km from the survey corridor, when considering the at-sea distance, which exceeds the foraging range for this species (approximately 40 – 50 km).

Due to the temporary and localised nature of the proposed activities within the overall survey window, no significant impact is anticipated on the conservation objectives of any protected site, with no potential for cumulative effects expected. The proposed survey operations are required to facilitate the ongoing operation of the Kintyre Hunterston HVAC cables and maintain secure energy transmission link. Hence, the survey activities constitute work of an overriding public need whilst presenting a trivial and temporary disturbance in a limited area.

5 SPECIES PROTECTION MEASURES

This section summarises the proposed mitigation measures to be implemented for avoiding and reducing potential impacts on species that may be present in the vicinity of the survey works.

The following measures will be implemented during all survey works:

- M1: The USBL system will be limited to a maximum source level of 207 dB_{PEAK};
- M2: All vessels will adhere to the provisions of the Scottish Marine Wildlife Watching Code (NatureScot, 2017) and the Basking Shark Code of Conduct (Shark Trust, undated);
- M3: Survey crew will be made aware of all protected species within the marine environment, and their responsibility to implement the mitigation in this document; and
- M4: Survey vessels will be limited to 4 to 8 knots whilst on survey effort.

6 CONCLUSIONS

This risk assessment has assessed the risk posed by the survey activities (including equipment calibration) associated with the Kintyre Hunterston HVAC Link to cetaceans and protected sites. This has included assessing the risk caused by noise emitted from the vessel and the geophysical survey, collision impact and disturbance to the following receptors:

- Basking sharks;
- Cetaceans;
- SACs with cetacean, seal and otter qualifying features;
- NCMPAs with cetacean, bird and otter qualifying features;
- Designated seal haul-outs and seal breeding sites; and
- SPAs.

Although basking sharks are potentially present in the vicinity of the Kintyre Hunterston cables, the risk or injury or disturbance to basking sharks is expected to be very low, considering the temporary, transient and spatially limited nature of the survey works. Nevertheless, as disturbance to basking sharks remains a possibility, an application for a Basking Shark Licence under the Wildlife and Countryside Act 1981 (as amended) will be submitted.

This assessment has concluded that the nature of the survey works, in combination with the proposed mitigation, means that no adverse impact through injury to EPS is anticipated, and an EPS licence is not required in this regard. However, the use of geophysical survey equipment may cause disturbance to cetaceans and as such an application for EPS Licences (inshore and offshore) for disturbance of EPS will be sought by SHE Transmission.

The survey corridor is located within 50 km of the Inner Hebrides and the Minches SAC, designated for harbour porpoise, and within 50 km of the South-East Islay Skerries SAC, designated for harbour seal. However, due to the temporary and localised nature of the survey activities, long-term impacts to the qualifying interests of these protected sites will not be significant. No LSEs on any other protected sites were considered, based on the screening criteria presented in Section 1.4.4.

Overall, the proposed survey operations constitute work of an overriding public need while presenting a trivial and temporary disturbance in a limited area.

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APPENDIX A KINTYRE – HUNTERSTON HVAC SURVEY CORRIDOR COORDINATES

Coordinates for Survey Works (WGS 84)[1]					
Degrees, Minutes and Seconds		Degrees and Decimal Minutes		Decimal Degrees	
Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
55° 42' 41.99533075" N	005° 26' 05.69721067" W	55° 42.700' N	5° 26.095' W	55.711665	-5.434916
55° 42' 43.46505089" N	005° 25' 39.82045436" W	55° 42.724' N	5° 25.664' W	55.712074	-5.427728
55° 42' 42.36832161" N	005° 24' 50.62132185" W	55° 42.706' N	5° 24.844' W	55.711769	-5.414061
55° 42' 40.15457150" N	005° 24' 29.24365962" W	55° 42.669' N	5° 24.487' W	55.711154	-5.408123
55° 42' 21.58844405" N	005° 23' 04.86373167" W	55° 42.360' N	5° 23.081' W	55.705997	-5.384684
55° 41' 51.93896522" N	005° 22' 33.65153348" W	55° 41.866' N	5° 22.561' W	55.697761	-5.376014
55° 41' 48.79258042" N	005° 22' 05.50312818" W	55° 41.813' N	5° 22.092' W	55.696887	-5.368195
55° 41' 52.40034460" N	005° 21' 41.88206166" W	55° 41.873' N	5° 21.698' W	55.697889	-5.361634
55° 43' 29.05844664" N	005° 19' 58.03671537" W	55° 43.484' N	5° 19.967' W	55.724738	-5.332788
55° 43' 55.26087199" N	005° 19' 18.57022374" W	55° 43.921' N	5° 19.310' W	55.732017	-5.321825
55° 44' 16.43221310" N	005° 18' 23.80135196" W	55° 44.274' N	5° 18.397' W	55.737898	-5.306611
55° 44' 44.35547699" N	005° 16' 51.61032656" W	55° 44.739' N	5° 16.860' W	55.745654	-5.281003
55° 44' 43.27541016" N	005° 16' 06.09073764" W	55° 44.721' N	5° 16.102' W	55.745354	-5.268359
55° 44' 35.06350779" N	005° 15' 24.70575242" W	55° 44.584' N	5° 15.412' W	55.743073	-5.256863
55° 44' 10.38595288" N	005° 13' 56.93450919" W	55° 44.173' N	5° 13.949' W	55.736218	-5.232482
55° 41' 57.11346698" N	005° 02' 54.77598798" W	55° 41.952' N	5° 2.913' W	55.699198	-5.048549
55° 41' 43.34028575" N	004° 55' 15.20390288" W	55° 41.722' N	4° 55.253' W	55.695372	-4.920890
55° 41' 28.29962261" N	004° 54' 12.05524625" W	55° 41.472' N	4° 54.201' W	55.691194	-4.903349
55° 41' 03.58389241" N	004° 53' 53.83626748" W	55° 41.060' N	4° 53.897' W	55.684329	-4.898288
55° 41' 03.63040947" N	004° 55' 13.25673270" W	55° 41.061' N	4° 55.221' W	55.684342	-4.920349
55° 41' 10.38423936" N	005° 00' 51.70291653" W	55° 41.173' N	5° 0.862' W	55.686218	-5.014362
55° 41' 19.41175719" N	005° 03' 23.08283985" W	55° 41.324' N	5° 3.385' W	55.688725	-5.056412
55° 42' 11.71423459" N	005° 07' 24.20945996" W	55° 42.195' N	5° 7.403' W	55.703254	-5.123392
55° 42' 26.29675266" N	005° 08' 10.41128394" W	55° 42.438' N	5° 8.174' W	55.707305	-5.136225
55° 42' 31.30821831" N	005° 08' 53.82666214" W	55° 42.522' N	5° 8.897' W	55.708697	-5.148285
55° 43' 11.33305139" N	005° 12' 21.33713499" W	55° 43.189' N	5° 12.356' W	55.719815	-5.205927
55° 43' 37.63289042" N	005° 14' 20.85109158" W	55° 43.627' N	5° 14.348' W	55.727120	-5.239125
55° 44' 03.67941345" N	005° 15' 58.11282524" W	55° 44.061' N	5° 15.969' W	55.734355	-5.266142
55° 44' 06.76775086" N	005° 16' 49.02830125" W	55° 44.113' N	5° 16.817' W	55.735213	-5.280286
55° 43' 54.16259841" N	005° 17' 36.39486604" W	55° 43.903' N	5° 17.607' W	55.731712	-5.293443
55° 43' 39.60858039" N	005° 18' 00.53123854" W	55° 43.660' N	5° 18.009' W	55.727669	-5.300148
55° 43' 28.66054367" N	005° 18' 37.36942154" W	55° 43.478' N	5° 18.623' W	55.724628	-5.310380
55° 42' 09.29364709" N	005° 20' 12.58053926" W	55° 42.155' N	5° 20.210' W	55.702582	-5.336828
55° 41' 20.21710996" N	005° 21' 27.58119945" W	55° 41.337' N	5° 21.460' W	55.688949	-5.357661
55° 41' 13.06518775" N	005° 21' 55.68562810" W	55° 41.218' N	5° 21.928' W	55.686963	-5.365468
55° 41' 13.58126125" N	005° 22' 17.72468313" W	55° 41.226' N	5° 22.295' W	55.687106	-5.371590
55° 41' 28.84236379" N	005° 23' 02.99746730" W	55° 41.481' N	5° 23.050' W	55.691345	-5.384166
55° 41' 57.73464273" N	005° 23' 39.66979767" W	55° 41.962' N	5° 23.661' W	55.699371	-5.394353
55° 42' 12.17670458" N	005° 25' 22.91160912" W	55° 42.203' N	5° 25.382' W	55.703382	-5.423031
55° 41' 58.29501887" N	005° 26' 34.39056103" W	55° 41.972' N	5° 26.573' W	55.699526	-5.442886
55° 42' 24.25956081" N	005° 26' 37.83546446" W	55° 42.404' N	5° 26.631' W	55.706739	-5.443843

[1] Landward boundaries of the survey corridor are defined by the 15 m depth contour.

Appendix 4

Kintyre Hunterston HVAC EPS Risk Assessment - Addendum

Supplementary Information

Document Classification | **Public**

Scottish & Southern Electricity Networks
TRANSMISSION

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Tables

Introduction

This document aims to provide supplementary information to the original EPS risk assessment document (A-200409-S04-REPT-002) submitted as part of the original EPS and basking shark derogation licence application for survey of the Kintyre-Hunterston HVAC cables. Additional to the vessels and geophysical survey equipment detailed in our application survey scope, Unmanned Surface Vessels (USV), an Autonomous Underwater Vehicle (AUV) or a Remotely Operated Towed Vehicle (ROTV) may be used to complete inspection surveys. This document provides an EPS Impact Assessment for the use of USV, AUV and ROTV survey equipment, in line with the assessment produced in Section 3 of the original EPS risk assessment document.

Survey configuration for AUV, USV, or ROTV

A single AUV, up to two USVs or an ROTV may be used to undertake geophysical surveys. The unmanned vessels would be accompanied by a support vessel. If an ROTV is used this will be towed by a survey vessel. The support vessel or towing vessel mentioned would fall within the parameters of the survey vessel assessed in the main EPS risk assessment.

Specification of AUV, USV, and ROTV

Any USVs used would be less than 24m in length. AUVs used are likely to be less than 10m in length.

When transitting, the average speed of both USV and AUVs are significantly slower than traditional survey vessels, with USV capable of speeds of up to 8 knots, and AUV speeds averaging at 5 knots (J. Hunt, 2013). Average survey speeds for USVs, AUVs and survey vessels towing an ROTV will be approximately 3-4 knots.

Acoustic emissions from AUV, USV, and ROTV

USV vessel noise frequencies largely fall below 1kHz and AUV propulsion noise frequency falls between 10Hz to 100kHz (Cascio, 2010). There is limited evidence of noise intensity from unmanned vessels but it is acknowledged that they produce a lower sound intensity than traditional vessels due to their smaller size and the reduced or lack of engine noise produced.

Summary

The acoustic impact of using these smaller unmanned vessels is likely to be less than that outlined for traditional survey vessels, and therefore the impact assessment in the original risk assessment is largely representative of the worst-case impact. However, the use of the proposed additional vessels may increase the vessel collision risk with marine mammals and basking sharks, associated with the works. A summary of the anticipated impacts of using unmanned vessels is set out in Table 1 and any additional mitigation proposed has been captured.

Risk Assessment USV, AUV and ROTV

Table 1 Overview of potential impacts of USV, AUV and ROTV equipment on EPS and pinnipeds within the vicinity of the Kintyre-Hunterston HVAC Link

Activity/Equipment	Example Equipment	Potential Impacts	Frequency Range	Indicative SPL_{PEAK} (dB re 1 1µPa)	Further Information required for EPS risk assessment
Unmanned Surface Vehicle (USV)	Various	Noise produced is continuous and comes in broadband emissions, similar to other survey vessels. Generally, this noise is of lower intensity than traditional manned vessels. Increased vessel activity additionally has the potential to cause injury to marine mammals and basking sharks from collisions. The risk of collision with an animal is influenced by the dimensions of the vessel and its speed, hence USVs pose a reduced risk when compared with conventional vessels due to their smaller size and slow survey speeds. However, the increased number of vessels in the water may introduce a collision risk for basking sharks as they are less responsive than marine mammals, especially when foraging.	Acoustic range from vessels is strongest at frequencies <1k Hz	<24m length vessel = Variable dependent on the type of USV.	**No** –The source levels associated with vessel noise are likely to be too low to result in injury, and the presence of up to two USVs in the West Highlands region does not constitute a significant change from the impacts set out in the existing EPS risk assessment. The predominant noise source during survey activities is the USBL and other geophysical sensors deployed on the vehicle, which are expected to mask any sound generated by the vehicle itself. It is acknowledged that unmanned vessels could pose a collision risk to EPS and other protected species. All support vessels will adhere to The Scottish Marine Wildlife Watching Code (SMWWC) (NatureScot, 2017), as detailed in Section 5.2 of the EPS Risk Assessment. A search for basking sharks will be carried out prior to starting an unmanned vessel survey as described in 'Additional Mitigations' section below.

Autonomous Underwater Vehicles (AUV)	Various	Potential disturbance of marine mammals and basking sharks could occur from noise emissions associated with AUV movements underwater. However, these are anticipated to be limited, given the small size of the submerged vehicles. Collision risk with marine mammals is considered to be unlikely, given the slow survey speeds associated with AUVs and the responsiveness of marine mammals. A collision risk may be posed to basking sharks as they are less responsive than marine mammals, especially when foraging.	10Hz to 100kHz (Cascio, 2010).	N/A	**No** – the predominant noise source during survey activities is the USBL and other geophysical sensors deployed on the vehicle, which are expected to mask any sound generated by the vehicle itself. The geophysical sensors have been assessed in original EPS risk assessment. A search for basking sharks will be carried out prior to starting an unmanned vessel survey as described in 'Additional Mitigations' section below.
Remotely Operated Towed Vehicle (ROTV)	MacArtney ROTV	Potential impacts to EPS and other marine mammals and basking sharks include collision risk. Collision risk with marine mammals is considered to be unlikely, given the small dimensions and slow towing speed during survey, and the responsiveness of marine mammals. A collision risk may be posed to basking sharks as they are less responsive than marine mammals, especially when foraging.	N/A	N/A	No - the predominant noise source during survey activities is the USBL, and other geophysical sensors deployed on the vehicle, which are expected to mask any sound generated by the vehicle itself. The geophysical sensors have been assessed in original EPS risk assessment. A search for basking sharks will be carried out prior to starting an unmanned vessel survey as described in 'Additional Mitigations' section below.

Additional Mitigation

All mitigations set out in Section 5 of the original risk assessment will still be adhered to during survey.

Additionally, a 20-minute search for basking sharks will be carried out prior to starting an unmanned vessel survey. The survey will be delayed or moved to a different location in the event that the pre-start search identifies basking sharks within 500m of the survey line. A watch for basking shark will be maintained throughout the survey and if basking sharks are observed on the survey line, the unmanned vessel will be slowed down or re-routed to avoid the area, if possible.

Conclusion

The use of Unmanned Surface Vessels (USV), an Autonomous Underwater Vehicle (AUV) or a remotely operated towed vehicle (ROTV) to complete inspection surveys poses no anticipated adverse impacts through injury to EPS. Vessel noise impacts are unlikely to differ from those assessed in the original EPS risk assessment. Collision risk is not deemed to cause a significant risk to marine mammals due to the slow survey movements of the equipment in question and the responsiveness of marine mammals. Any collision risk posed to basking sharks introduced by the use of unmanned vessels will be mitigated for by a basking shark search prior to unmanned vessel survey commencing and throughout the unmanned survey.

All ‘Species Protection Measures’ detailed in Section 5 of the main EPS risk assessment (A-200409-S04-REPT-002) will also be adhered to during the use of USV, AUV or ROTV vehicles. A full assessment and conclusion on any risks posed by geophysical survey equipment are set out in the main risk assessment (A-200409-S04-REPT-002).

References

J. Hunt. 2013. Global Inventory of AUV and Glider Technology available for Routine Marine Surveying.

Cascio, CA. 2010. Acoustic noise estimates for a quiet unmanned underwater vehicle. *The Journal of the Acoustical Scoiety of America*. Vol 127, Issue 3