Project Title	Seagreen Wind Energy Ltd
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Offshore Wind Farm Cable Plan

Section 36 Consent Condition 18

for the approval of Scottish Ministers

Rev	Date	Reason for Issue	Originator	ECoW	Checker/Approver
06	20/12/2023	Approved for Use	[Redacted]		

Table of Contents

Consent Plan Overview 3
1. Introduction 7
1.1 Consents and Licences 7
1.2 Project Description 7
1.3 Consent and Licence Requirements 9
1.4 Updates and Amendments 10
2. Scope and Objectives of the OWF CaP 11
3. Inter Array Cables Location and Installation Techniques 12
3.1 Location and Layout 12
3.2 Installation Techniques 19
4. Pre-construction Surveys 25
5. Technical Specification of Inter-Array Cables 27
5.1 Introduction 27
5.2 Electromagnetic Fields 30
6. Cable Burial Risk Assessment 36
7. Cable Protection Requirements 38
8. Cable Exposure Monitoring 41
8.1 Cable Exposure Inspection 41
8.2 Remedial Actions 41
8.3 Cable Failure 41
9. Compliance with the ES and ES Addendum 42
9.1 Compliance with Construction Methods Assessed in the ES and ES Addendum 42
9.2 Delivery of Construction-related Mitigation Proposed in the ES and ES Addendum 42
10. References 43
Appendix A – OWF CaP List of Abbreviations and Definitions 44
Appendix B – The OWF CaP Change Management Procedure 46
Appendix C - Compliance with ES Parameters and Processes 47
Appendix D - Summary of Mitigation Commitments 48

Consent Plan Overview

Purpose of the Offshore Wind Farm Cable Plan

This Offshore Wind Farm Cable Plan (OWF CaP) is submitted by Seagreen Wind Energy Limited (SWEL) on behalf of Seagreen Alpha Wind Energy Limited (SAWEL) (hereinafter referred to as Seagreen) to address the specific requirements of Condition 18 of the Section 36 (S36) Consent granted by the Scottish Ministers to SAWEL under section 36 of the Electricity Act 1989 (in respect of the Alpha Offshore Wind Farm) and to Seagreen Bravo Wind Energy Limited (SBWEL) (in respect of the Bravo Offshore Wind Farm) on 10 October 2014 both as varied by the Scottish Ministers by decision letter issued pursuant to applications under section 36C of the Electricity Act 1989 on 28 August 2018, 10 October 2022 and 20 December 2022 and, in respect of the consent applicable to the Bravo Offshore Wind Farm, as assigned to SAWEL on 22 November 2019.

The overall aims and objectives of the OWF CaP are: to set out the proposed location of the cables and proposed cable laying techniques; summarise survey work that will inform cable routing; technical specifications of inter array cables including assessment of attenuation of electro-magnetic field strengths and shielding; burial risk assessment and protection measures; operational survey methodologies and measures to address cable exposure during the lifetime of the OWF inter array cables. The OWF CaP demonstrates that the construction procedures to be employed align with those set out within the Environmental Statement (ES), and that construction related mitigation measures detailed within the ES, ES Addendum and ER will be applied during installation.

All Seagreen Contractors (including their Sub-Contractors) involved in the Seagreen Project are required to comply, with this OWF CaP through conditions of contract.

A separate Offshore Transmission Asset Cable Plan has been produced (Document Reference Number LF000009-CST-OF-PLN-009) which provides details in relation to the subsea export cables and interconnector cables.

Scope of the OWF CaP

This OWF CaP covers, in line with the requirements of Condition 18 of S36 Consent, industry standards and good practice, the following:

- Details of the location and cable laying techniques for the inter-array cables;
- The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;
- Technical specification of inter-array cables, including a desk-based assessment of attenuation of electro-magnetic field strengths and shielding;
- A burial risk assessment to ascertain burial depths and where necessary alternative protection measures;
- Methodologies for surveys (e.g. over trawl) of the inter array cables through the operational life of the wind farm where mechanical protection of cables laid on the seabed is deployed; and
- Methodologies for inter array cable inspection with measures to address and report to the Scottish Ministers any exposure of inter array cables.

Structure of the OWF CaP

The OWF CaP is structured as follows:

Section 1 & 2	Provides an overview of the Project and the consent requirements that underpin the content of this OWF CaP. It also sets out the purpose, objectives and scope of the OWF CaP and sets out the process for making updates and amendments.
Section 3	Details the location and layout of inter-array cables
Section 4	Provides detail on the geophysical, geotechnical and benthic surveys conducted to inform cable routing.
Section 5	Provides the technical specification of the inter-array cables and their components. The results of electromagnetic field assessments are also detailed.
Section 6	Details the results of the Cable Burial Risk Assessment
Section 7	Discusses methodologies for over trawl surveys of the cables through the operational life of the Works where mechanical protection of cables laid on the seabed is deployed;
Section 8	Sets out procedures required to identify risk areas of exposure and the methodologies used to remediate exposed areas.
Section 9	Demonstrates compliance with the ES, ES Addendum and ER, and commitments made.
Section 10	Lists the references made within this OWF CaP.
Appendix A	Abbreviations and Definitions
Appendix B	Change Management Process
Appendix C	Compliance with ES Parameters
Appendix D	Summary Mitigation Measures

OWF CaP Audience

This OWF CaP will be submitted for approval to the Scottish Ministers/Licensing Authority in consultation with other stakeholders in relation to monitoring compliance with the specific requirements of the relevant consent conditions.

Compliance with this OWF CaP will be monitored by: Seagreen's appointed Contractors; Seagreen's Ecological Clerk of Works (ECoW); and the Marine Scotland Licensing and Operations Team (MS-LOT).

Copies of the OWF CaP are to be held in the following locations:

- Seagreen's head office;
- Seagreen's construction office and marine coordination centre;
- At the premises of any Contractor (as appropriate), including the Seagreen ECoW, appointed by Seagreen;
- Aboard any vessel engaged in the OWF construction phase.

1. Introduction

1.1 Consents and Licences

Seagreen Wind Energy Limited (SWEL, hereafter referred to as 'Seagreen') was awarded Section 36 Consents (S36 Consents) under the Electricity Act 1989 by Scottish Ministers in October 2014 for Seagreen Alpha and Seagreen Bravo Offshore Wind Farms (OWFs). Marine Licences for Seagreen Alpha and Bravo OWFs and the Offshore Transmission Asset (OTA) (together the 'Marine Licences') were also awarded by Scottish Ministers in October 2014 under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009. Together the wind farms Seagreen Alpha and Seagreen Bravo and the OTA collectively comprise 'the Seagreen Project'. All Section 36 Consents and Marine Licences have subsequently been varied on application by Seagreen.

In November 2019, a further Marine Licence was granted to SWEL (subsequently varied) to permit an alternative landfall cable installation method (Alternative Landfall Cable Installation Marine Licence). In 2019, the Bravo Marine Licence was transferred from the name of Seagreen Bravo Wind Energy Limited (SBWEL) into the name of Seagreen Alpha Wind Energy Limited (SAWEL).

1.2 Project Description

The Seagreen Project is located in the North Sea, in the outer Firth of Forth and Firth of Tay region and comprises the OWFs (the WTGs, their foundations and associated array cabling), together with associated infrastructure of the OTA (Offshore Substation Platform (OSP), their foundations and the offshore export cable), to facilitate the export of renewable energy to the national electricity transmission grid. The location of the Seagreen Project is shown in Figure 1.0.

The Seagreen Project will consist of the following key components:

- 150 WTGs comprising;
    - 114 WTGs installed on three-legged steel jackets, each installed on suction bucket caissons ('Stage 1');
    - 36 WTGs - foundation type to be determined ('Stage 2');
- Two OSPs, each installed on up to 12 pin pile foundations;
- A network of inter-array subsea cables as detailed below;
    - Circa 355km of inter-array cables to connect strings of WTGs together and to connect the WTGs to the OSPs
    - Circa 3km of interconnector cable to connect the two OSPs
    - Inter-array cables will be buried where possible and where burial is not possible cable protection will be provided
- Three subsea export cables, totalling circa 190km in length, to transmit electricity from the OSP to the landfall at Carnoustie and connecting to the onshore export cables for transmission to the onshore substation and connection to the National Grid network. Export cables will be buried where possible and where burial is not possible cable protection will be provided.

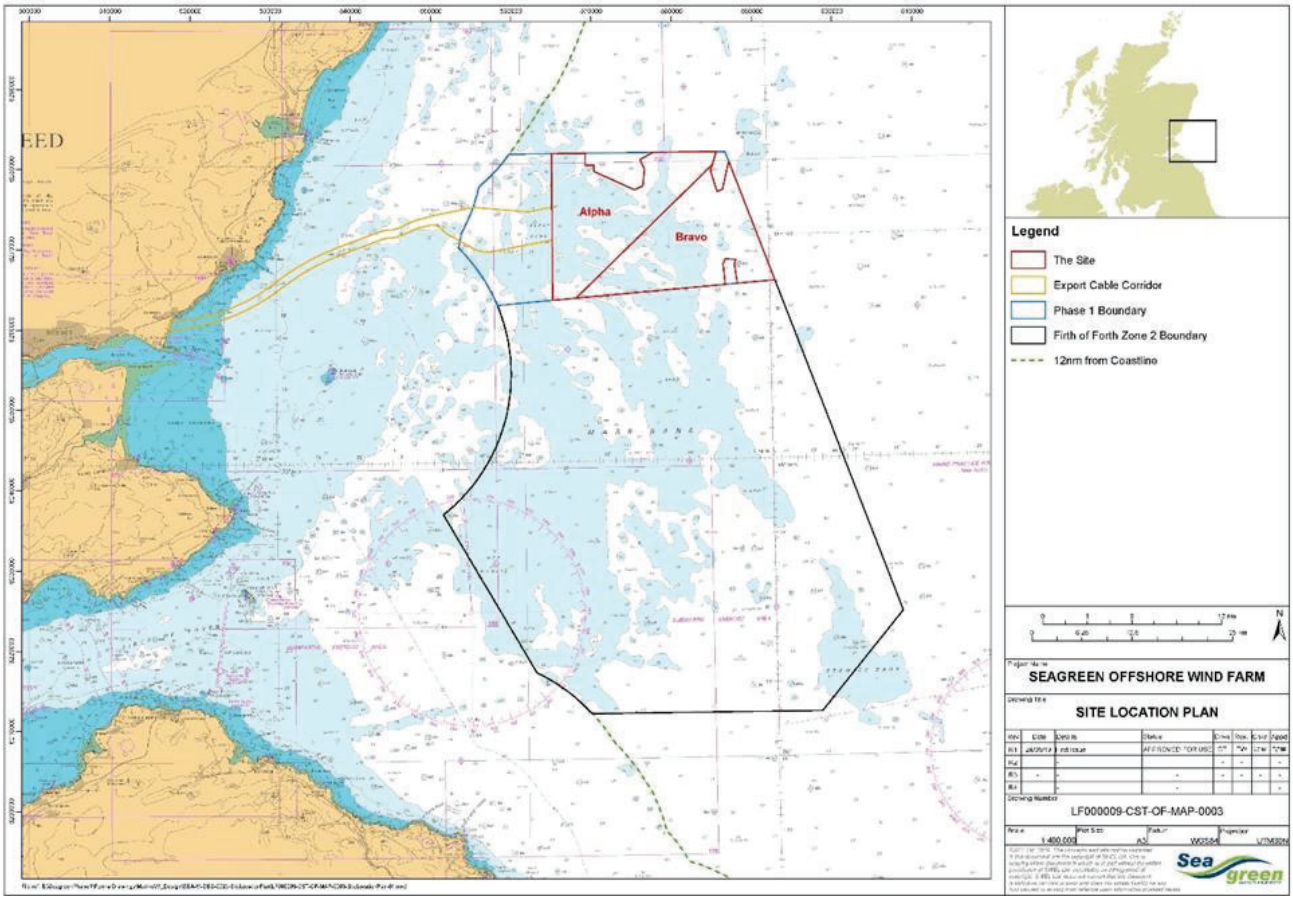


Figure 1.1 - Project Location

1.3 Consent and Licence Requirements

This OWF CaP has been prepared to discharge condition 18 of the S36 Consents, as set out in Table 1-1.

Table 1-1 - Consent Conditions to be discharged by this OWF CaP

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of this OWF CaP
Section 36	Condition 18	The Company must, no later than 6 months prior to the Commencement of the Development, submit a Cable Plan ("CaP"), in writing, to the Scottish Ministers for their written approval.	This document sets out the CaP for approval by the Scottish Ministers.
		Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, MCA, SFF and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers.	Consultation to be undertaken by the Scottish Ministers.
		The CaP must be in accordance with the ES.	Section 9 and Appendices C and D.
		The Development must, at all times, be constructed and operated in accordance with the approved CaP (as updated and amended from time to time by the Company).	Section 2
		Any updates or amendments made to the CaP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.	Section 1.4 and Appendix B
		The CaP must include the following: a. Details of the location and cable laying techniques for the inter array cables;	Section 3
		b. The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;	Section 4
		c. Technical specification of inter array cables, including a desk-based assessment of attenuation of electro-magnetic field strengths and shielding;	Section 5
		d. A burial risk assessment to ascertain burial depths and where necessary alternative protection measures;	Section 6
		e. Methodologies for surveys (e.g. over trawl) of the inter array cables through the operational life of the wind farm where mechanical protection of cables laid on the seabed is deployed; and	Section 7

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of this OWF CaP
		f. Methodologies for inter array cable inspection with measures to address and report to the Scottish Ministers any exposure of inter array cables.	Section 8

1.4 Updates and Amendments

Should any updates to the OWF CaP become necessary, the change management process for any updates required to the OWF CaP, including resubmission of consent plans for approval, is outlined in Appendix B – the OWF CaP Change Management Procedure.

2. Scope and Objectives of the OWF CaP

This OWF CaP has been prepared to address the specific requirements of the relevant condition attached to the S36 Consents issued to Seagreen and applies to all construction as required to be undertaken before the Final Commissioning of the Works.

The overall objective of this OWF CaP is to set out the location of, and installation and management procedures, for the inter-array cables. The OWF CaP includes the following:

a) Details of the location and cable laying techniques for the inter array cables;
b) The results of survey work (including geophysical, geotechnical and benthic surveys) which will help inform cable routing;
c) Technical specification of inter array cables, including a desk-based assessment of attenuation of electro-magnetic field strengths and shielding;
d) A burial risk assessment to ascertain burial depths and where necessary alternative protection measures;
e) Methodologies for surveys (e.g. over trawl) of the inter array cables through the operational life of the wind farm where mechanical protection of cables laid on the seabed is deployed; and
f) Methodologies for inter array cable inspection with measures to address and report to the Scottish Ministers any exposure of inter array cables.

All Seagreen personnel and Seagreen's Contractors (including their Sub-Contractors) involved in the Seagreen Project must comply, with the OWF CaP.

3. Inter Array Cables Location and Installation Techniques

3.1 Location and Layout

The WTGs are connected at a voltage of 66 kV by inter array cabling in 'strings', as follows:

Stage	Number of strings	Approx. length of inter-array cabling (km)
1	15	300
2	5	55
Total	20	355

The proposed arrangement of the inter array cables between the WTGs and the connections to the OSPs is set out in Figure 3.1 below. The lengths of each of the inter array cables between the WTGs and OSP locations (where relevant) are presented in Table 3-1.

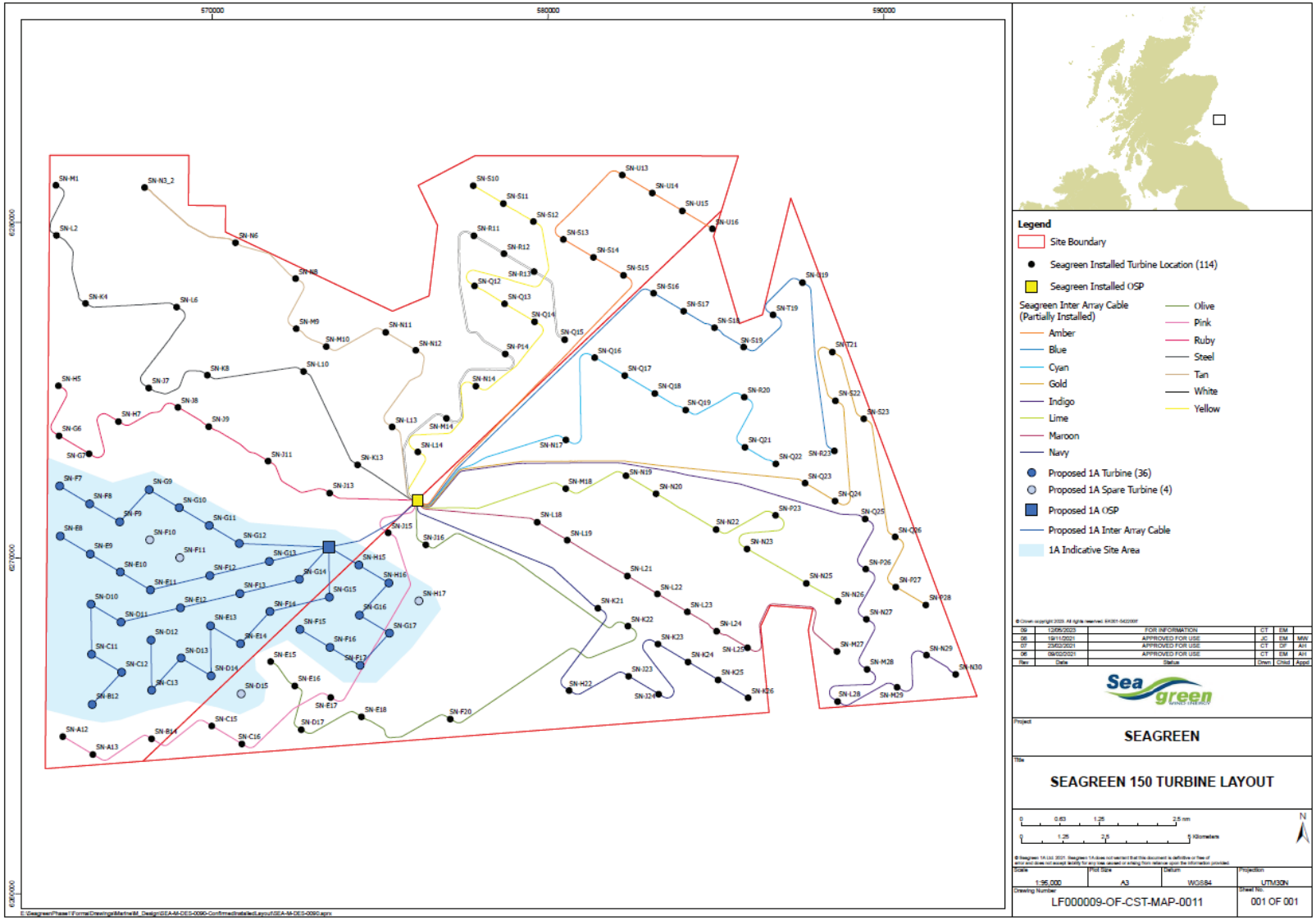


Figure 3-1 - Inter-Array Cabling

Table 3-1 Inter-array string arrangements and cable lengths

Array Layout[1]		Start Point			End Point			Route Length (m) (approx.)
Start	End	Latitude (ddm) (WGS84)	Longitude (ddm) (WGS84)	Depth (m) Below LAT	Latitude (ddm) (WGS84)	Longitude (ddm) (WGS84)	Depth (m) Below LAT	
Stage 1 (confirmed arrangements)								
SN-K15	SN-S15	56° 35.094' N	1° 45.537' W	55.20	56° 38.699' N	1° 39.516' W	56.92	9690.6
SN-S15	SN-S14	56° 38.699' N	1° 39.516' W	56.92	56° 38.989' N	1° 40.389' W	56.95	1045.3
SN-S14	SN-S13	56° 38.989' N	1° 40.389' W	56.95	56° 39.279' N	1° 41.262' W	54.14	1048.2
SN-S13	SN-U13	56° 39.279' N	1° 41.262' W	54.14	56° 40.308' N	1° 39.538' W	57.62	3201.8
SN-U13	SN-U14	56° 40.308' N	1° 39.538' W	57.62	56° 40.018' N	1° 38.665' W	56.15	1042.4
SN-U14	SN-U15	56° 40.018' N	1° 38.665' W	56.15	56° 39.728' N	1° 37.792' W	54.83	1044.6
SN-U15	SN-U16	56° 39.728' N	1° 37.792' W	54.83	56° 39.437' N	1° 36.919' W	56.94	1043.5
SN-K15	SN-S16	56° 35.094' N	1° 45.537' W	55.20	56° 38.408' N	1° 38.643' W	54.56	9767.7
SN-S16	SN-S17	56° 38.408' N	1° 38.643' W	54.56	56° 38.118' N	1° 37.771' W	54.69	1044.1
SN-S17	SN-S18	56° 38.118' N	1° 37.771' W	54.69	56° 37.827' N	1° 36.899' W	57.13	1050.2
SN-S18	SN-S19	56° 37.827' N	1° 36.899' W	57.13	56° 37.537' N	1° 36.027' W	56.75	1051.5
SN-S19	SN-T19	56° 37.537' N	1° 36.027' W	56.75	56° 38.051' N	1° 35.164' W	58.43	1885.0
SN-T19	SN-U19	56° 38.051' N	1° 35.164' W	58.43	56° 38.565' N	1° 34.302' W	53.64	1859.6
SN-U19	SN-R23	56° 38.565' N	1° 34.302' W	53.64	56° 35.859' N	1° 33.403' W	54.90	5277.6
SN-K15	SN-N17	56° 35.094' N	1° 45.537' W	55.20	56° 36.060' N	1° 41.215' W	51.34	5185.1
SN-N17	SN-Q16	56° 36.060' N	1° 41.215' W	51.34	56° 37.379' N	1° 40.366' W	54.18	3475.7
SN-Q16	SN-Q17	56° 37.379' N	1° 40.366' W	54.18	56° 37.089' N	1° 39.494' W	52.58	1042.6
SN-Q17	SN-Q18	56° 37.089' N	1° 39.494' W	52.58	56° 36.799' N	1° 38.621' W	53.66	1043.2
SN-Q18	SN-Q19	56° 36.799' N	1° 38.621' W	53.66	56° 36.508' N	1° 37.750' W	57.22	1049.6
SN-Q19	SN-R20	56° 36.508' N	1° 37.750' W	57.22	56° 36.732' N	1° 36.017' W	54.61	1982.8

[1] SN-K15 is the as-built Stage 1 OSP. SN-H14 is the indicative Stage 2 OSP. Colours represent 'strings' of connected WTGs

SN-R20	SN-Q21	56° 36.732' N	1° 36.017' W	54.61	56° 35.927' N	1° 36.007' W	53.06	1846.0
SN-Q21	SN-Q22	56° 35.927' N	1° 36.007' W	53.06	56° 35.636' N	1° 35.136' W	54.22	1051.0
SN-K15	SN-Q23	56° 35.094' N	1° 45.537' W	55.20	56° 35.345' N	1° 34.265' W	57.38	12175.8
SN-Q23	SN-Q24	56° 35.345' N	1° 34.265' W	57.38	56° 35.054' N	1° 33.394' W	56.56	1044.3
SN-Q24	SN-S22	56° 35.054' N	1° 33.394' W	56.56	56° 36.664' N	1° 33.366' W	54.98	3624.5
SN-S22	SN-T21	56° 36.664' N	1° 33.366' W	54.98	56° 37.469' N	1° 33.421' W	53.61	2136.1
SN-T21	SN-S23	56° 37.469' N	1° 33.421' W	53.61	56° 36.373' N	1° 32.541' W	56.30	2304.9
SN-S23	SN-Q26	56° 36.373' N	1° 32.541' W	56.30	56° 34.472' N	1° 31.653' W	55.60	3788.3
SN-Q26	SN-P27	56° 34.472' N	1° 31.653' W	55.60	56° 33.667' N	1° 31.645' W	55.71	1841.1
SN-P27	SN-P28	56° 33.667' N	1° 31.645' W	55.71	56° 33.376' N	1° 30.775' W	55.27	1042.8
SN-K15	SN-Q25	56° 35.094' N	1° 45.537' W	55.20	56° 34.763' N	1° 32.524' W	53.20	14115.4
SN-Q25	SN-P26	56° 34.763' N	1° 32.524' W	53.20	56° 33.958' N	1° 32.515' W	53.34	1848.4
SN-P26	SN-N27	56° 33.958' N	1° 32.515' W	53.34	56° 33.154' N	1° 32.506' W	54.72	1870.2
SN-N27	SN-M28	56° 33.154' N	1° 32.506' W	54.72	56° 32.349' N	1° 32.498' W	54.23	1844.3
SN-M28	SN-L28	56° 32.349' N	1° 32.498' W	54.23	56° 31.835' N	1° 33.358' W	54.26	2353.7
SN-L28	SN-M29	56° 31.835' N	1° 33.358' W	54.26	56° 32.057' N	1° 31.628' W	55.37	2000.2
SN-M29	SN-N29	56° 32.057' N	1° 31.628' W	55.37	56° 32.571' N	1° 30.767' W	54.56	2000.9
SN-N29	SN-N30	56° 32.571' N	1° 30.767' W	54.56	56° 32.280' N	1° 29.898' W	54.81	1051.6
SN-K15	SN-M18	56° 35.094' N	1° 45.537' W	55.20	56° 35.255' N	1° 41.203' W	46.80	4667.9
SN-M18	SN-N19	56° 35.255' N	1° 41.203' W	46.80	56° 35.479' N	1° 39.471' W	48.90	2023.0
SN-N19	SN-N20	56° 35.479' N	1° 39.471' W	48.90	56° 35.189' N	1° 38.600' W	49.82	1042.4
SN-N20	SN-N22	56° 35.189' N	1° 38.600' W	49.82	56° 34.608' N	1° 36.858' W	56.28	2086.1
SN-N22	SN-P23	56° 34.608' N	1° 36.858' W	56.28	56° 34.831' N	1° 35.126' W	53.92	2000.0
SN-P23	SN-N23	56° 34.831' N	1° 35.126' W	53.92	56° 34.294' N	1° 35.963' W	49.97	2324.2
SN-N23	SN-N25	56° 34.294' N	1° 35.963' W	49.97	56° 33.736' N	1° 34.246' W	57.15	2041.9
SN-N25	SN-N26	56° 33.736' N	1° 34.246' W	57.15	56° 33.445' N	1° 33.330' W	57.84	1083.8
SN-K15	SN-L18	56° 35.094' N	1° 45.537' W	55.20	56° 34.740' N	1° 42.063' W	45.58	3719.1

SN-L18	SN-L19	56° 34.740' N	1° 42.063' W	45.58	56° 34.450' N	1° 41.191' W	46.75	1043.5
SN-L19	SN-L21	56° 34.450' N	1° 41.191' W	46.75	56° 33.869' N	1° 39.449' W	49.17	2087.1
SN-L21	SN-L22	56° 33.869' N	1° 39.449' W	49.17	56° 33.579' N	1° 38.578' W	48.36	1043.5
SN-L22	SN-L23	56° 33.579' N	1° 38.578' W	48.36	56° 33.289' N	1° 37.708' W	52.49	1042.0
SN-L23	SN-L24	56° 33.289' N	1° 37.708' W	52.49	56° 32.998' N	1° 36.837' W	53.31	1051.3
SN-L24	SN-L25	56° 32.998' N	1° 36.837' W	53.31	56° 32.707' N	1° 35.967' W	56.86	1053.4
SN-L25	SN-M27	56° 32.707' N	1° 35.967' W	56.86	56° 32.640' N	1° 33.367' W	55.04	4804.0
SN-K15	SN-K21	56° 35.094' N	1° 45.537' W	55.20	56° 33.355' N	1° 40.309' W	47.28	6474.4
SN-K21	SN-H22	56° 33.355' N	1° 40.309' W	47.28	56° 32.035' N	1° 41.156' W	49.64	3130.4
SN-H22	SN-J23	56° 32.035' N	1° 41.156' W	49.64	56° 32.260' N	1° 39.427' W	50.03	1999.6
SN-J23	SN-J24	56° 32.260' N	1° 39.427' W	50.03	56° 31.969' N	1° 38.556' W	49.49	1042.3
SN-J24	SN-K23	56° 31.969' N	1° 38.556' W	49.49	56° 32.774' N	1° 38.567' W	47.57	2835.4
SN-K23	SN-K24	56° 32.774' N	1° 38.567' W	47.57	56° 32.484' N	1° 37.697' W	52.52	1043.2
SN-K24	SN-K25	56° 32.484' N	1° 37.697' W	52.52	56° 32.193' N	1° 36.827' W	53.28	1043.4
SN-K25	SN-K26	56° 32.193' N	1° 36.827' W	53.28	56° 31.902' N	1° 35.957' W	54.92	1043.8
SN-K15	SN-J16	56° 35.094' N	1° 45.537' W	55.20	56° 34.408' N	1° 45.327' W	48.70	1445.7
SN-J16	SN-K22	56° 34.408' N	1° 45.327' W	48.70	56° 33.064' N	1° 39.438' W	47.50	7092.3
SN-K22	SN-F20	56° 33.064' N	1° 39.438' W	47.50	56° 31.585' N	1° 44.614' W	46.42	6913.7
SN-F20	SN-E18	56° 31.585' N	1° 44.614' W	46.42	56° 31.649' N	1° 47.213' W	46.39	3099.3
SN-E18	SN-D17	56° 31.649' N	1° 47.213' W	46.39	56° 31.422' N	1° 48.941' W	51.95	2030.2
SN-D17	SN-E16	56° 31.422' N	1° 48.941' W	51.95	56° 32.125' N	1° 49.125' W	46.70	1547.4
SN-E16	SN-E15	56° 32.125' N	1° 49.125' W	46.70	56° 32.516' N	1° 49.827' W	50.60	1042.2
SN-K15	SN-J15	56° 35.094' N	1° 45.537' W	55.20	56° 34.579' N	1° 46.396' W	47.71	1837.3
SN-J15	SN-E17	56° 34.579' N	1° 46.396' W	47.71	56° 31.938' N	1° 48.084' W	44.87	6121.4
SN-E17	SN-C16	56° 31.938' N	1° 48.084' W	44.87	56° 31.196' N	1° 50.668' W	54.01	3283.7
SN-C16	SN-C15	56° 31.196' N	1° 50.668' W	54.01	56° 31.484' N	1° 51.540' W	54.28	1042.1
SN-C15	SN-B14	56° 31.484' N	1° 51.540' W	54.28	56° 31.257' N	1° 53.267' W	51.53	2147.5

SN-B14	SN-A13	56° 31.257' N	1° 53.267' W	51.53	56° 31.029' N	1° 54.995' W	56.12	2041.7
SN-A13	SN-A12	56° 31.029' N	1° 54.995' W	56.12	56° 31.318' N	1° 55.867' W	58.60	1042.1
SN-K15	SN-J13	56° 35.094' N	1° 45.537' W	55.20	56° 35.197' N	1° 48.075' W	49.41	2656.3
SN-J13	SN-J11	56° 35.197' N	1° 48.075' W	49.41	56° 35.736' N	1° 49.886' W	47.91	2314.5
SN-J11	SN-J9	56° 35.736' N	1° 49.886' W	47.91	56° 36.314' N	1° 51.633' W	46.32	2060.0
SN-J9	SN-J8	56° 36.314' N	1° 51.633' W	46.32	56° 36.603' N	1° 52.506' W	46.01	1087.7
SN-J8	SN-H7	56° 36.603' N	1° 52.506' W	46.01	56° 36.375' N	1° 54.237' W	45.07	2034.7
SN-H7	SN-G7	56° 36.375' N	1° 54.237' W	45.07	56° 35.859' N	1° 55.095' W	47.38	2339.4
SN-G7	SN-G6	56° 35.859' N	1° 55.095' W	47.38	56° 36.147' N	1° 55.968' W	46.60	1042.5
SN-G6	SN-H5	56° 36.147' N	1° 55.968' W	46.60	56° 36.952' N	1° 55.985' W	42.21	1849.0
SN-K15	SN-K13	56° 35.094' N	1° 45.537' W	55.20	56° 35.673' N	1° 47.282' W	49.28	2092.7
SN-K13	SN-L10	56° 35.673' N	1° 47.282' W	49.28	56° 37.174' N	1° 48.846' W	46.66	3276.4
SN-L10	SN-K8	56° 37.174' N	1° 48.846' W	46.66	56° 37.119' N	1° 51.648' W	45.39	2949.4
SN-K8	SN-J7	56° 37.119' N	1° 51.648' W	45.39	56° 36.915' N	1° 53.355' W	43.83	2166.6
SN-J7	SN-L6	56° 36.915' N	1° 53.355' W	43.83	56° 38.212' N	1° 52.538' W	48.61	3093.7
SN-L6	SN-K4	56° 38.212' N	1° 52.538' W	48.61	56° 38.273' N	1° 55.145' W	43.15	2779.7
SN-K4	SN-L2	56° 38.273' N	1° 55.145' W	43.15	56° 39.367' N	1° 56.036' W	52.64	2377.4
SN-L2	SN-M1	56° 39.367' N	1° 56.036' W	52.64	56° 40.172' N	1° 56.053' W	50.41	1807.9
SN-K15	SN-L13	56° 35.094' N	1° 45.537' W	55.20	56° 36.279' N	1° 46.272' W	46.53	2518.9
SN-L13	SN-N12	56° 36.279' N	1° 46.272' W	46.53	56° 37.509' N	1° 45.577' W	53.30	2979.8
SN-N12	SN-N11	56° 37.509' N	1° 45.577' W	53.30	56° 37.798' N	1° 46.450' W	51.70	1042.0
SN-N11	SN-M10	56° 37.798' N	1° 46.450' W	51.70	56° 37.572' N	1° 48.183' W	44.76	2000.6
SN-M10	SN-M9	56° 37.572' N	1° 48.183' W	44.76	56° 37.861' N	1° 49.057' W	42.22	1056.2
SN-M9	SN-N8	56° 37.861' N	1° 49.057' W	42.22	56° 38.666' N	1° 49.071' W	50.90	1846.6
SN-N8	SN-N6	56° 38.666' N	1° 49.071' W	50.90	56° 39.244' N	1° 50.820' W	57.73	2143.4
SN-N6	SN-N3	56° 39.244' N	1° 50.820' W	57.73	56° 40.111' N	1° 53.444' W	50.52	3256.8
SN-K15	SN-M14	56° 35.094' N	1° 45.537' W	55.20	56° 36.414' N	1° 44.691' W	52.22	3485.8

SN-M14	SN-P14	56° 36.414' N	1° 44.691' W	52.22	56° 37.444' N	1° 42.971' W	51.62	3866.7
SN-P14	SN-R11	56° 37.444' N	1° 42.971' W	51.62	56° 39.344' N	1° 43.870' W	53.30	4711.9
SN-R11	SN-R12	56° 39.344' N	1° 43.870' W	53.30	56° 39.054' N	1° 42.996' W	52.41	1042.9
SN-R12	SN-R13	56° 39.054' N	1° 42.996' W	52.41	56° 38.764' N	1° 42.123' W	52.41	1044.0
SN-R13	SN-Q15	56° 38.764' N	1° 42.123' W	52.41	56° 37.669' N	1° 41.238' W	53.20	2439.9
SN-K15	SN-L14	56° 35.094' N	1° 45.537' W	55.20	56° 35.859' N	1° 45.617' W	49.48	1838.6
SN-L14	SN-N14	56° 35.859' N	1° 45.617' W	49.48	56° 36.929' N	1° 43.832' W	49.15	3832.4
SN-N14	SN-Q14	56° 36.929' N	1° 43.832' W	49.15	56° 37.959' N	1° 42.111' W	49.66	3199.1
SN-Q14	SN-Q13	56° 37.959' N	1° 42.111' W	49.66	56° 38.249' N	1° 42.984' W	51.05	1042.4
SN-Q13	SN-Q12	56° 38.249' N	1° 42.984' W	51.05	56° 38.539' N	1° 43.857' W	51.56	1043.0
SN-Q12	SN-S12	56° 38.539' N	1° 43.857' W	51.56	56° 39.569' N	1° 42.135' W	50.88	4863.6
SN-S12	SN-S11	56° 39.569' N	1° 42.135' W	50.88	56° 39.859' N	1° 43.009' W	48.95	1045.6
SN-S11	SN-S10	56° 39.859' N	1° 43.009' W	48.95	56° 40.149' N	1° 43.882' W	53.88	1043.6
Stage 2 (indicative arrangements)								
SN-H14	SN-H15	56° 34.353' N	1° 48.126' W	54.77	56° 34.063' N	1° 47.254' W	57.62	1042.1
SN-H15	SN-H16	56° 34.063' N	1° 47.254' W	57.62	56° 33.774' N	1° 46.383' W	57.39	1042.1
SN-H16	SN-G16	56° 33.774' N	1° 46.383' W	57.39	56° 33.258' N	1° 47.241' W	52.77	1298.9
SN-G16	SN-G17	56° 33.258' N	1° 47.241' W	52.77	56° 32.969' N	1° 46.369' W	49.23	1042.1
SN-G17	SN-F17	56° 32.969' N	1° 46.369' W	49.23	56° 32.453' N	1° 47.227' W	49.69	1298.9
SN-F17	SN-F16	56° 32.453' N	1° 47.227' W	49.69	56° 32.743' N	1° 48.098' W	54.30	1042.1
SN-F16	SN-F15	56° 32.743' N	1° 48.098' W	54.30	56° 33.032' N	1° 48.970' W	54.40	1042.1
SN-H14	SN-G15	56° 34.353' N	1° 48.126' W	54.77	56° 33.548' N	1° 48.112' W	55.66	1493.4
SN-G15	SN-F14	56° 33.548' N	1° 48.112' W	55.66	56° 33.321' N	1° 49.842' W	49.52	1821.0
SN-F14	SN-E14	56° 33.321' N	1° 49.842' W	49.52	56° 32.805' N	1° 50.699' W	50.64	1298.9
SN-E14	SN-E13	56° 32.805' N	1° 50.699' W	50.64	56° 33.094' N	1° 51.571' W	51.02	1042.1
SN-E13	SN-D14	56° 33.094' N	1° 51.571' W	51.02	56° 32.289' N	1° 51.555' W	49.77	1493.4
SN-D14	SN-D13	56° 32.289' N	1° 51.555' W	49.77	56° 32.578' N	1° 52.427' W	49.95	1042.1

SN-D13	SN-C13	56° 32.578' N	1° 52.427' W	49.95	56° 32.062' N	1° 53.284' W	56.30	1298.9
SN-C13	SN-D12	56° 32.062' N	1° 53.284' W	56.30	56° 32.867' N	1° 53.300' W	51.06	1493.4
SN-H14	SN-G14	56° 34.353' N	1° 48.126' W	54.77	56° 33.837' N	1° 48.984' W	54.69	1298.9
SN-G14	SN-F13	56° 33.837' N	1° 48.984' W	54.69	56° 33.610' N	1° 50.714' W	44.34	1821.0
SN-F13	SN-E12	56° 33.610' N	1° 50.714' W	44.34	56° 33.383' N	1° 52.443' W	51.45	1821.0
SN-E12	SN-D11	56° 33.383' N	1° 52.443' W	51.45	56° 33.156' N	1° 54.172' W	50.41	1821.0
SN-D11	SN-D10	56° 33.156' N	1° 54.172' W	50.41	56° 33.444' N	1° 55.045' W	51.03	1042.1
SN-D10	SN-C11	56° 33.444' N	1° 55.045' W	51.03	56° 32.639' N	1° 55.028' W	48.26	1493.4
SN-C11	SN-C12	56° 32.639' N	1° 55.028' W	48.26	56° 32.351' N	1° 54.156' W	48.57	1042.1
SN-C12	SN-B12	56° 32.351' N	1° 54.156' W	48.57	56° 31.834' N	1° 55.011' W	56.58	1298.9
SN-H14	SN-G13	56° 34.353' N	1° 48.126' W	54.77	56° 34.126' N	1° 49.857' W	50.93	1821.0
SN-G13	SN-F12	56° 34.126' N	1° 49.857' W	50.93	56° 33.899' N	1° 51.586' W	47.85	1821.0
SN-F12	SN-E11	56° 33.899' N	1° 51.586' W	47.85	56° 33.672' N	1° 53.316' W	48.96	1821.0
SN-E11	SN-E10	56° 33.672' N	1° 53.316' W	48.96	56° 33.960' N	1° 54.188' W	48.83	1042.1
SN-E10	SN-E9	56° 33.960' N	1° 54.188' W	48.83	56° 34.249' N	1° 55.061' W	46.84	1042.1
SN-E9	SN-E8	56° 34.249' N	1° 55.061' W	46.84	56° 34.537' N	1° 55.934' W	45.32	1042.1
SN-H14	SN-G12	56° 34.353' N	1° 48.126' W	54.77	56° 34.415' N	1° 50.729' W	47.87	2667.7
SN-G12	SN-G11	56° 34.415' N	1° 50.729' W	47.87	56° 34.704' N	1° 51.602' W	49.85	1042.1
SN-G11	SN-G10	56° 34.704' N	1° 51.602' W	49.85	56° 34.993' N	1° 52.475' W	52.02	1042.1
SN-G10	SN-G9	56° 34.993' N	1° 52.475' W	52.02	56° 35.282' N	1° 53.348' W	50.22	1042.1
SN-G9	SN-F9	56° 35.282' N	1° 53.348' W	50.22	56° 34.765' N	1° 54.205' W	47.82	1298.9
SN-F9	SN-F8	56° 34.765' N	1° 54.205' W	47.82	56° 35.054' N	1° 55.078' W	49.38	1042.1
SN-F8	SN-F7	56° 35.054' N	1° 55.078' W	49.38	56° 35.342' N	1° 55.951' W	46.53	1042.1

3.2 Installation Techniques

Inter array cables connect the WTGs in a series of arrays or ‘strings’ and also provide the connection from the WTGs to the OSPs. Inter array cables will be jet-trenched and buried in the seabed, to a minimum depth

of 0.5 m (except as described in Table 3-2) (and a target depth of 0.7m) to provide protection to the cables. Jet trenching and burial will be carried out by a subsea water jetting, seabed trenching vehicle or hybrid tool. Further detail is provided in Table 3.3.

Where full cable burial is not possible due to seabed conditions, cables will be protected using an engineered rock placement solution. As required by Condition 3.2.2.3 of the OWF Marine Licence the safety of navigation will not be compromised by the Works.

The IAC installation process will occur over two discreet periods. Stage 1 IAC installation commenced in November 2021. All cables were laid by July 2023 and the installation process (including the laying of rock protection) is due to be complete by October 2024. The timing of Stage 2 IAC installation is yet to be determined. Sediments mobilised will be released in a phased approach across the installation periods.

An overview of the cable installation process and indicative durations per cable string is provided in Figure 3-2.

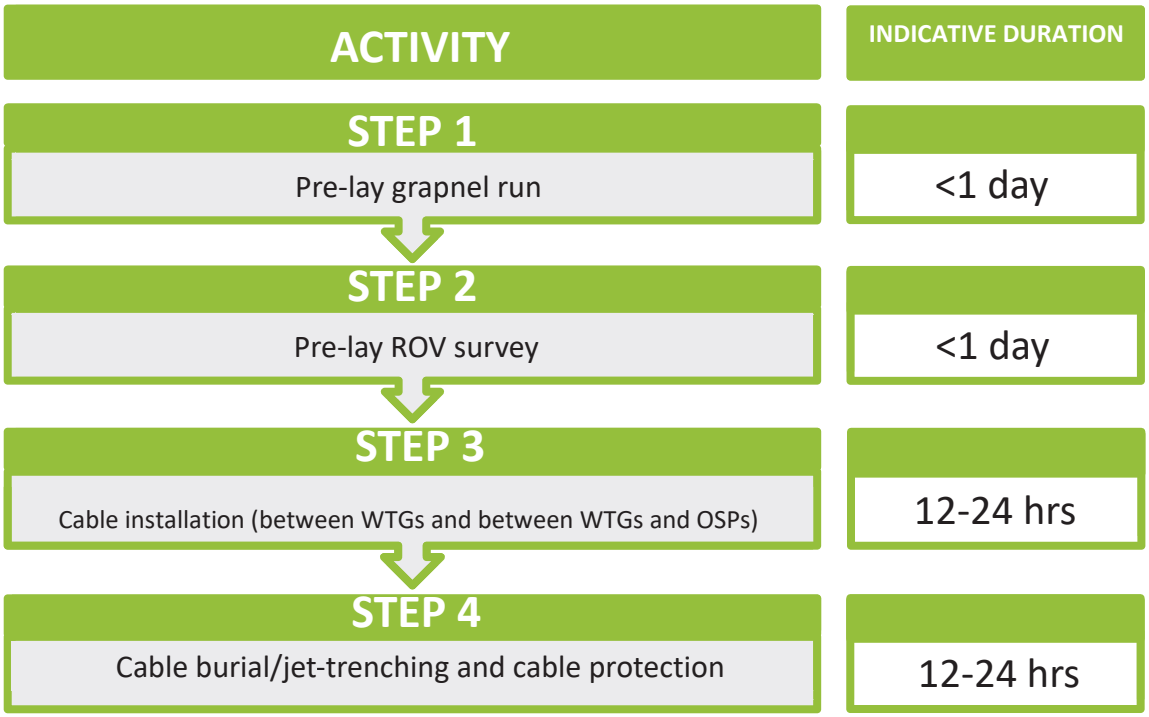


Figure 3-2 Overview of inter array cable string installation process.

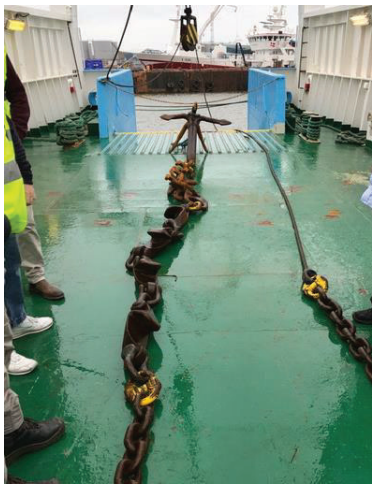
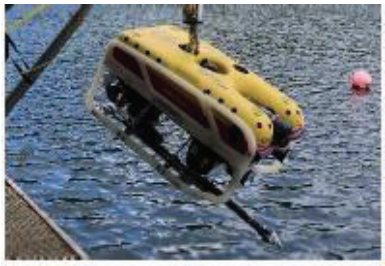
3.2.1 Key Parameters and methodology

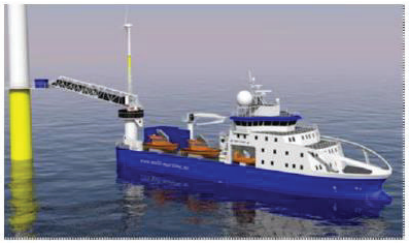
Key parameters for the inter array cables are set out in Table 3-2 with the installation methodology and equipment set out in Table 3-3.

Table 3-2 Key parameters – inter array cables

Parameter	Indicative value
Inter array cables	
Length	Stage 1: circa 300 km Stage 2: circa 55km
Burial depth	0.5 m (minimum)*, 0.7m (target) * in circumstances where isolated stretches of cable buried to 0.4-0.5m occur between lengths of cable that are buried to the minimum depth or greater. In these cases a 0.4m minimum may be applied. This is likely to apply to approximately 10 km of inter-array cables
Width of trench	Up to 3m
Width of seabed disturbance	Up to 10m
Cable protection	
Material (type)	Rock
Material (size)	25-200mm diameter
Cable protection length x width x height	Cable protection will not exceed 174 km* x 7 m x 0.8 m across the Seagreen Project *at a minimum burial depth of 0.5m; this figure would be reduced should the minimum burial depth of 0.4m be applied in the circumstances outlined above

Table 3-3 Installation methodology – inter array cables

Equipment/Vessels	Methodology
Step 1: Pre-lay grapnel run	
Grapnel assembly: 	• The cable route will be cleared of any remaining obstructions by undertaking a pre-lay grapnel run (PLGR). • The PLGR vessel will tow the grapnel rig along the centreline of the cable route with a tolerance of +/- 5 m. Any debris encountered will be recovered to the deck of the vessel for appropriate licensed disposal ashore.
Step 2: Pre-lay survey	
ROV:  Source : https://www.rovco.com/services/rov/ CLV:  Source : https://www.vanoord.com/activities/cablelaying-vessel	• An ROV deployed from the Cable Lay Vessel (CLV) will perform a pre-lay survey immediately prior to the cable installation operation.

Step 3 (1): Cable installation (between WTG and WTG)	
CLV (see Step 2) Installation Support Vessel (ISV):  Source: 23pprox ROV (see Step 2)	• The CLV is pre-loaded with the inter-array subsea cable. • Cables are surface laid between the WTGs. First end pull-in (to WTG): • The Cable Protection System (CPS) is fitted to the cable end on board the CLV. • An ROV will remove the J-tube cap and recover a pre-installed messenger wire within the J-tube. The wire will be winched to deck and connected to the CPS. • The CLV will then pay out the cable, which is winched into the WTG. • On completion of the route length, the end of the cable is then cut, sealed and prepared for second end installation operations.
Subsea quadrant:  Source : http://www.subenesol.co.uk/Rental/Offshore-Wind-Farm-Cable-Lifting-Quadrant	Second end pull in (to WTG or OSP): • The CPS is fitted to the cut and sealed cable end on board the CLV. • An ROV will remove the J-tube cap and recover a pre-installed messenger wire within the second WTG or OSP J-Tube. The wire will be winched to deck and connected to the CPS. The cable and subsea quadrant (semi-circular frame which allows the cable to be suspended and lowered between vessel and structure) are lowered overboard. • The cable is fed through the J-Tube and into the WTG or OSP. The subsea quadrant is lowered as the cable is pulled into the WTG or OSP. Finally, the quadrant is tilted in order that the cable is laid to the seabed. The quadrant is retrieved, and final bight of cable (curved section of cable that remains on the seabed where it has come out of the quadrant) is pulled into the WTG or OSP. • Cable testing will be performed at various stages during the cable lay operations. • The process is then repeated for the remaining inter-array cable lengths, connecting WTGs together in ‘strings’ and those strings of WTGs to the OSP. Note: All jackets are supplied and installed with capped J-tubes. The caps will be removed immediately before cable pull-in therefore eliminating opportunities for seals to enter the tubes

Step 3 (2): Cable installation (between WTG and OSP, where different from WTG-to-WTG methodology)	
	• All OSP pull-ins will be performed as "first end pull-ins" as the OSP is a congested area due to multiple cable approaches.
Step 4: Cable burial/jet-trenching and cable protection	
Seabed trenching tool:  Source : http://www.helixesg.com/	• The inter array cables are trenched into the seabed to the target depth by a dedicated seabed trenching tool. It is anticipated that cable burial will be achieved by the use of a subsea water jetting, seabed trenching vehicle. • The burial strategy will be a single pass approach, followed by rock placement as required. • A second pass is not typically considered necessary. A single pass approach is considered to be appropriate for array cable burial where the target burial depth is less than 1.0m. The jet trencher will be capable of achieving burial to the required depth where stiffer sediments are encountered by reducing forward speed to maintain the jetter sword depth. However, where this is not effective, a second pass may be attempted if the soil profile is suitable. If this is not considered possible, or is unsuccessful then cable protection by means of rock protection will be considered • The presence of boulders along the cable route is expected at some locations, which would potentially present an obstacle to the jet trencher. However, the use of an alternative trenching approach would not provide any benefit in this situation, and rock protection may be required if the target cable burial depth cannot be achieved. This position has been informed by the analysis of ground investigation survey data considered in the Cable Burial Risk Assessment (see Section 6). Boulders will be relocated in a separate seabed clearance campaign prior to cable laying. Cables will be routed around large boulders that cannot be relocated

4. Pre-construction Surveys

4.1 Surveys Conducted

A summary of the surveys carried out for the Seagreen Project is presented in Table 4-1.

Table 4-1 Summary of pre-construction surveys conducted across the wind farm

Survey	Data Source	Results
Geophysical	Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub Bottom Profiler (SBP)	In June and July 2011, a geophysical survey was completed by Osiris Projects. The survey was conducted to provide an understanding of seabed type and potential seabed habitats across the Seagreen Project area.
Benthic	Drop Down Video (DDV), Grab sampling, Epibenthic Beam Trawl	Environmental surveys of the OWF (IECS, 2011) were completed in August 2011. A total of 90 benthic sites were surveyed. Seabed habitats and faunal composition typical of this location were identified with the distribution of epifauna related to sediment type. Areas with sandy gravels and gravelly sands supported a rich epifauna, whilst slightly gravelly sands were generally low in epifauna. No evidence of biogenic reefs was detected. Predictive sediment and habitat maps were generated from the geophysical survey and benthic survey data.
Annex 1 Habitats	Pre-construction Annex 1 reef habitat Drop Down Video (DDV) survey	The geophysical and benthic data collected were integrated into a biological model, which was used to predict areas of potential biogenic reef habitats (Ocean Ecology, 2019)). As no areas of biogenic reef had previously been identified, areas of cobbles and boulders were used as potential indicators in the model, resulting in conservative predictions with low confidence of the actual presence of biogenic reef structures. Three potential reef areas were identified by the model within the wind farm site and were targeted by a pre-construction Annex 1 habitat survey in September 2020, as agreed with Marine Scotland (LF000009-CST-OF-SOW-0018). No evidence of biogenic reef was identified during the survey. The results were considered to correspond to what was mapped in the 2012 ES following the EIA characterisation survey. The survey report will be provided to MS-LOT when available.
Archaeological Surveys	Multi-Beam Echo Sounder (MBES), Side Scan Sonar (SSS), Sub Bottom Profiler (SBP)	Baseline geophysical survey data was gathered for the 2012 ES and updated with information from the United Kingdom Hydrographic Office (UKHO) (reviewed 02/08/2019). These assessments have been used to identify and delineate marine archaeology and cultural heritage receptors and the appropriate buffer zones around these receptors forming Archaeological exclusion zones (AEZs). There are a number of 50m and 100m AEZ's within the wind farm site, however, the project has been designed to avoid these Full details of these AEZs can be found in the Marine Archaeology WSI and PAD (LF000009-CST-OF-PLN-0002).

Survey	Data Source	Results
Bathymetry	MMT (2018)	Seagreen Alpha and Seagreen Bravo
Bathymetry	GEMS (2010)	Seagreen Alpha and Seagreen Bravo
Bathymetry	UKHO (2006)	Regional seabed

5. Technical Specification of Inter-Array Cables

5.1 Introduction

The inter array cables will be 3 core 66 kV armoured submarine power cables. The inter array cables will be arranged in 20 strings, of three different sizes installed as follows:

- Type 1 cable (indicatively 300 mm^2 cores and a total cable outer diameter of 144 mm);
- Type 2 cable (indicatively 630 mm^2 cores and a total cable outer diameter of 161 mm);
- Type 3 cable (indicatively 800 mm^2 cores and a total cable outer diameter of 170 mm).

The cable designs utilize aluminium conductors, XLPE insulation, copper wire screen, aluminium laminated foil as radial water barrier as well as a polyethylene jacket over each core.

Following review of the Inter Array Cable Burial Risk Assessment (Document Reference LF000009-CAS001-REP-H05-015-01) and additional ground investigation survey works undertaken by the project, it was estimated, prior to the commencement of inter-array cable installation, that circa 83% of inter array cable length may be buried through trenching/jetting with circa 17% requiring cable protection. The revised figures for expected cable protection requirements are presented in Table 3-2. Further detail is provided in Section 6.

5.1.1 Inter Array Cable Design

Figure 5-1 illustrates the key components of the inter array cables along with Table 5-1 which describes the key components and Table 5-2 presents the cable specifications for the three cable designs.

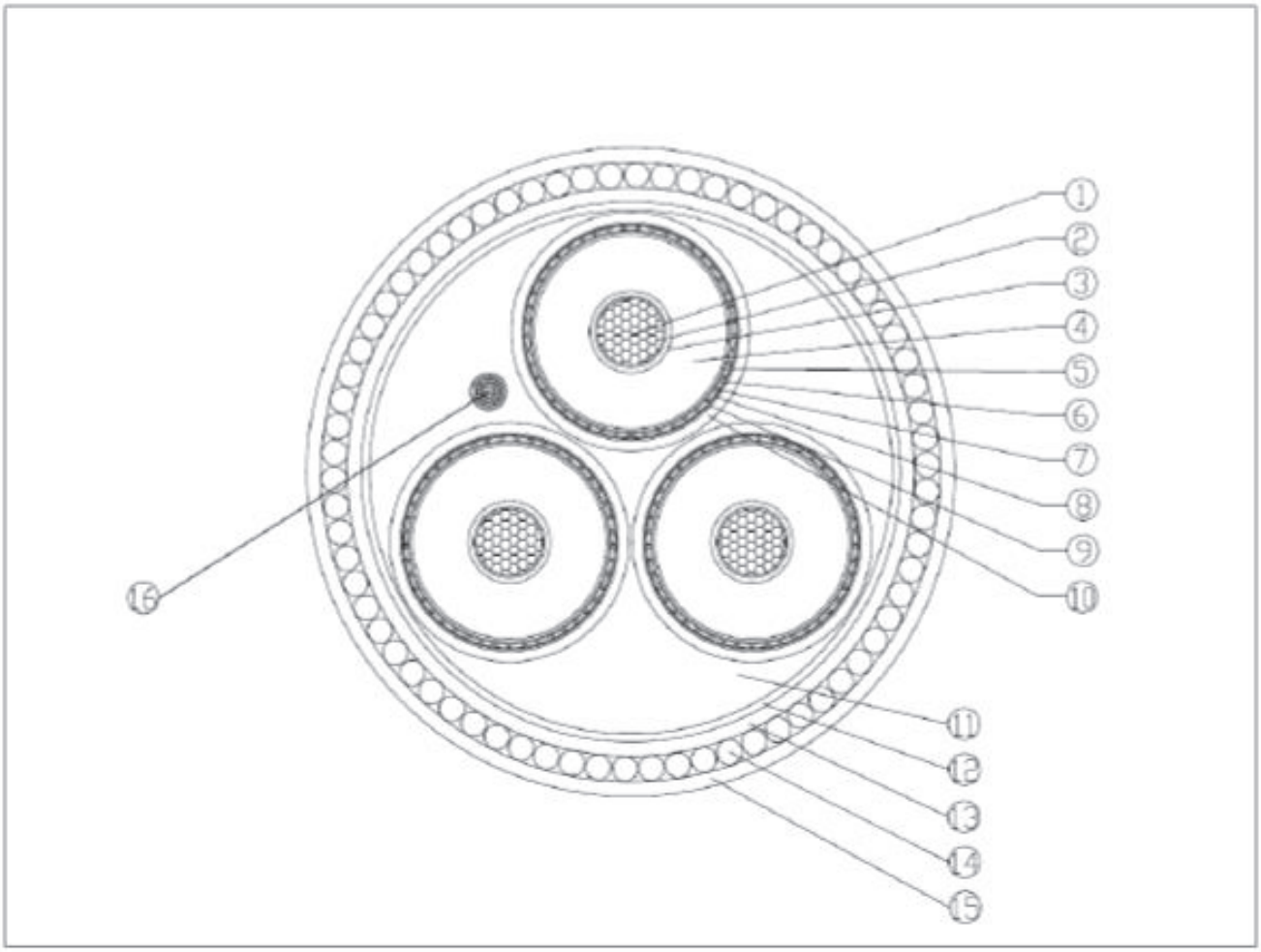


Figure 5-1 Cross section of the inter array cable design

Table 5-1 Description of the inter array cable cross sections

Component	Description
1	Aluminium round stranded compacted class 2 according to IEC 60228 of nominal cross-section equal to 300 sq.mm, 630 sq.mm or 800 sq.mm, longitudinally water sealed.
2	Semiconducting tape applied with overlap.
3	Conductor non-metallic extruded screen: Extruded semiconducting compound.
4	Insulation: XLPE according to IEC 63026 of 9.4 mm (3x300 mm^2), 8.6 mm (3x630 mm^2) or 8.4 mm (3x800 mm^2) nominal thickness.
5	Core non-metallic extruded screen: Extruded semiconducting compound bonded to outer surface of insulation.
6	Semiconducting waterblocking tape(s) applied with overlap.
7	Metallic screen: Copper wires helically applied over each individual core. Nominal cross-section equal to 14 sq.mm (3x300 mm^2), 16 sq.mm (3x630 mm^2) or 17 sq.mm (3x800 mm^2).
8	Semiconducting waterblocking tape(s) applied with overlap.
9	Radial watertightness: Aluminium polyethylene (AL/PE) laminated tape of 0.2 mm nominal thickness bonded to PE core sheath, longitudinally applied with overlap.
10	Sheath: HDPE type ST7 of 2.5 mm nominal thickness and an extruded semiconducting compound serving as electrode for the DC voltage test of the sheath. Sheath colour: Black.
11	Extruded fillers at the outer interstices between cores in order to give the cable a circular cross-section.
12	Binding tape(s) helically applied with overlap.
13	One layer of polypropylene yarns of approximate thickness of 2 mm.
14	Armour consisting of one layer of helically applied bitumen compound coated galvanized round steel wires of grade 34, class A, 5.5 mm (3x300 mm^2 and 3x630 mm^2) or 5.6 mm (3x800 mm^2), according to EN 10257-2.
15	Two layers of polypropylene yarns with total approximate thickness of 3.0 mm. Over the inner (first) layer bitumen compound is applied. Also, the outer (second) layer shall consist of black and yellow polypropylene yarns as to form a helical yellow stripe.
16	Armoured optical unit of 13 mm approximate diameter that consists of a stainless-steel tube (containing 48 single-mode optical fibres), scPE inner sheath, galvanized steel wire armour and scPE oversheath.

Table 5-2 Inter array cable specifications (Hellenic Cables, 2020)

Cable type	Parameter	Description	Nominal value (all approx.)
3x300mm^2	Diameter	Cable diameter	144 mm
	Weight	Cable weight in air (1) and in water (2)	(1) 30 kg/m (2) 15 kg/m
3x630mm^2	Diameter	Cable diameter	161 mm
	Weight	Cable weight in air (1) and in water (2)	(1) 37 kg/m (2) 19 kg/m
3x800mm^2	Diameter	Cable diameter	170 mm
	Weight	Cable weight in air (1) and in water (2)	(1) 41 kg/m (2) 21 kg/m

5.2 Electromagnetic Fields

This section summarises the results of a desk-based assessment carried out on behalf of Seagreen on the attenuation of electromagnetic fields (EMF) associated with the inter array cables.

The study calculated the magnetic field magnitudes at a range of distances from the 66 kV AC inter array cables. 0.5m and 1m were selected as these were the minimum burial depth and maximum burial depth at the time the modelling was undertaken and therefore represent the EMF magnitude at the seabed surface in these scenarios.

Additionally, electromagnetic strength has also been calculated for the 3-core cable protected by a cable protection system (CPS). The CPS is used to protect the cable between the point they emerge from the seabed (or rock protection berm) and enter the WTG or OSP J-tubes. As such, the electromagnetic strength at the surface of the CPS has been calculated as this is the maximum level to which the benthic environmental will be exposed in these locations.

The insulation and sheathing of the cable power cores, and the burial of the cables, encourage shielding of EMF.

An assessment of the magnetic field generated during operation of each size of inter array cable (See Section 5.1), has been conducted taking into account the nominal current requirements for each cross section. It should be noted that the values in Table 5-3 below are worst case values since they have been calculated based on the peak current for each cable type, a value which is only reached when a specific string is operating at full load, and only on certain cables along that string.

EMF attenuation from the inter array cables is shown in Figure 5-2 to Figure 5-7 below. The x axis indicates the distance from the cable centre (metres), and the y axis indicates the magnetic field strength (µTesla) at

the seabed surface above the cable. The plots show the magnitude of magnetic field at multiple distances from top of cable (TOC) (burial depths).

The plots show that the magnetic field decreases rapidly with burial depth and also reduces significantly with horizontal distance from the cable. This confirms the ES conclusion that EMF intensities diminish to background levels within approximately 0.5m of the cable. Since seabed soils have similar magnetic properties to rock, the values apply to both fully buried cables and those requiring protection by rock berms.

As displayed at Table 5.3 below, there are small differences in the magnetic field intensity between the case of directly buried cables and cables installed in CPS.

For both installation conditions for 5m and 10m distances the magnetic field intensity is below 1µT. Due to this fact, field intensity was not further examined for greater distances, as it will be very close to zero even for the 3x800 mm^2 cable. The magnetic field intensity's effect is also negligible at sea level (surface of the sea). At 0.5m, the electromagnetic field intensity for all cable types is equivalent to or less than background levels (approximately 25-65µT).

The decay of magnetic fields follows an inverse square relationship, meaning the field strength diminishes with the square of the distance from the source. Therefore, in relation to a 0.4m minimum burial depth, an inverse square regression has been applied to the values for 0m and 0.5m to calculate a worst-case EMF intensity at 0.4m. For the largest cables, a value of 59µT is seen. This remains at or near background levels.

The information presented in this OWF cable plan and the proposed cable burial methodology is consistent with the studies and conclusion included in the Environmental Statement which concluded that the impact would be minor adverse and not significant for the most sensitive species.

However, Seagreen recognises that the values presented in this section are derived from desktop modelling and evidence to validate these values in situ is limited. Therefore, if a minimum burial depth of 0.4m is utilised, following completion of the cable protection works, Seagreen will monitor and provide a report on the EMF produced at the areas of this lower minimum burial depth to the Licensing Authority as compared to a baseline of the 0.5m burial depth as assessed within the Environmental Statement. The proposed methodologies, locations and timescales of monitoring must be submitted to the Licensing Authority for its written approval no later than 6 months after the completion of the cable protection works – once approved these will be fully implemented by Seagreen.

Alternatively, this monitoring obligation may be discharged by Seagreen contributing to a wider regional monitoring programme such as ScotMER if deemed appropriate by the Licensing Authority. In the event that EMF levels are observed which are above background levels (approximately 60µT) then, following agreement with the Licensing Authority, adaptive management measures will be implemented.

Following completion of cable and rock protection installation, a map of the inter-array cable network will be provided to MD-LOT and NatureScot showing as-laid cable burial depths, rock protection locations and dimensions and, consequently, the modelled EMF levels at the seabed surface.

Table 5-3 Comparison on magnetic field intensities for the 3x300 mm², 3x630 mm² and 3x800 mm² cables for various installation conditions

Distance from cable outer surface	0 m		CPS outer surface	*0.4 m**	0.5 m	1 m		5 m		10 m	
Installation type ▸ / Cable type ▾	Seabed buried	In CPS		*Seabed buried*	Seabed buried	Seabed buried	In CPS	Seabed buried	In CPS	Seabed buried	In CPS
3x300 mm²	1171	1199	316	*33*	16.5	4.7	4.72	0.21	0.21	0.05	0.05
3x630 mm²	1582	1617	525	*44*	26	7.5	7.5	0.34	0.34	0.08	0.08
3x800 mm²	2141	2156	585	*59*	34.8	9.9	10.3	0.51	0.47	0.12	0.12

CPS = Cable installed in a Cable Protection System and laid on the seabed or in the water column. Values in µT

* Calculated values using values for 0 m and 0.5 m. All other values derived from modelling

Cables Buried in Seabed

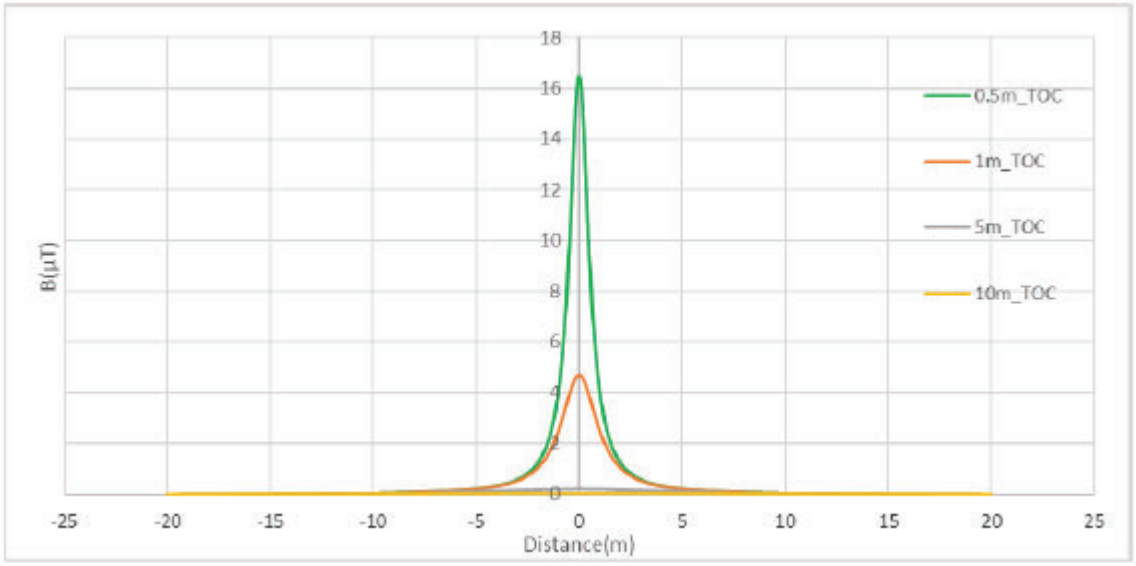


Figure 5-2 – The magnetic field at the seabed surface expected from 3x300 mm^2 inter array cable at various levels of trench depth

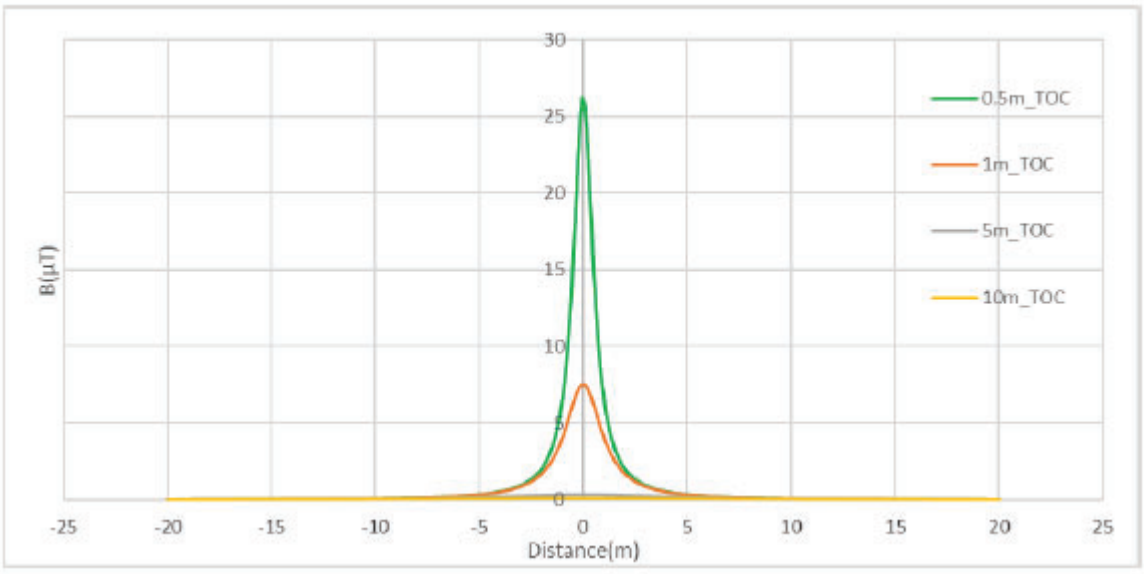


Figure 5-3 – The magnetic field at the seabed surface expected from 3x630 mm^2 inter array cable at various levels of trench depth

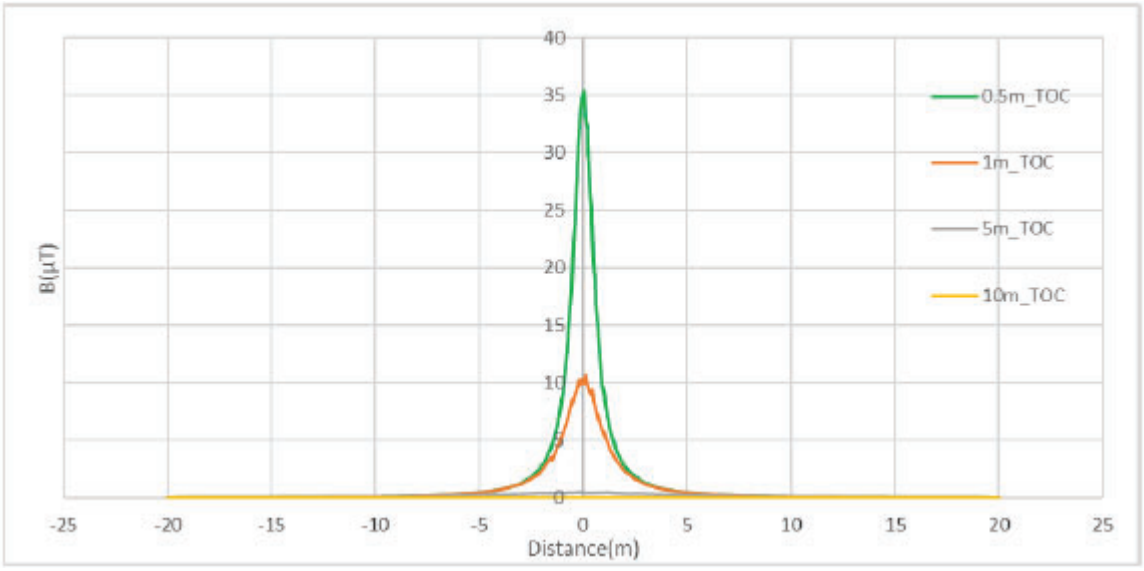


Figure 5-4 – The magnetic field at the seabed surface expected from 3x800 mm2 inter array cable at various levels of trench depth

Cables in CPS

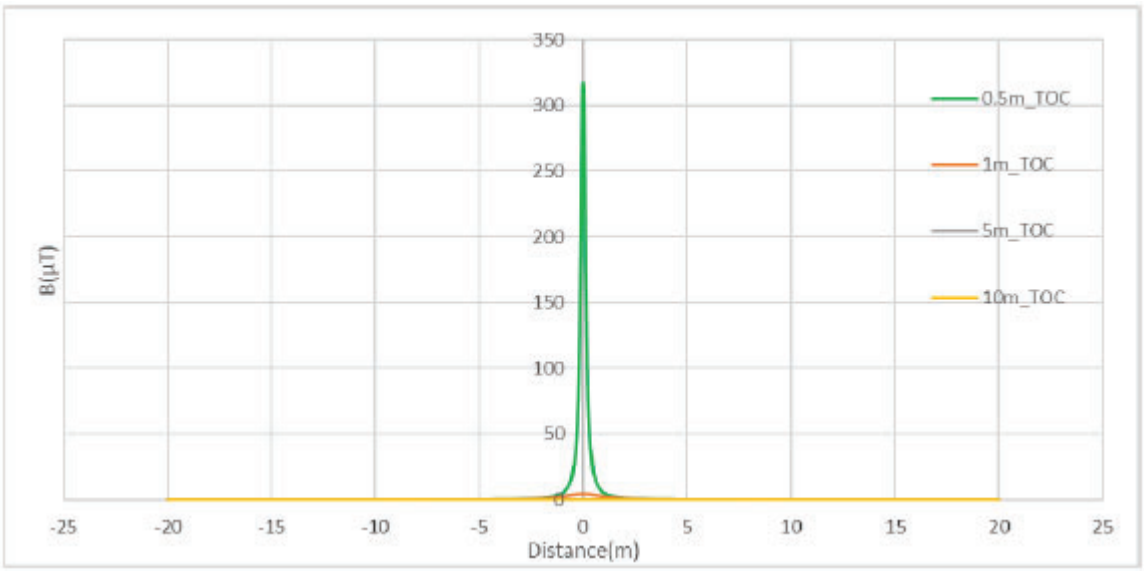


Figure 5-5 – The magnetic field expected at the seabed surface from 3x300 mm2 inter array cable at various levels of trench depth

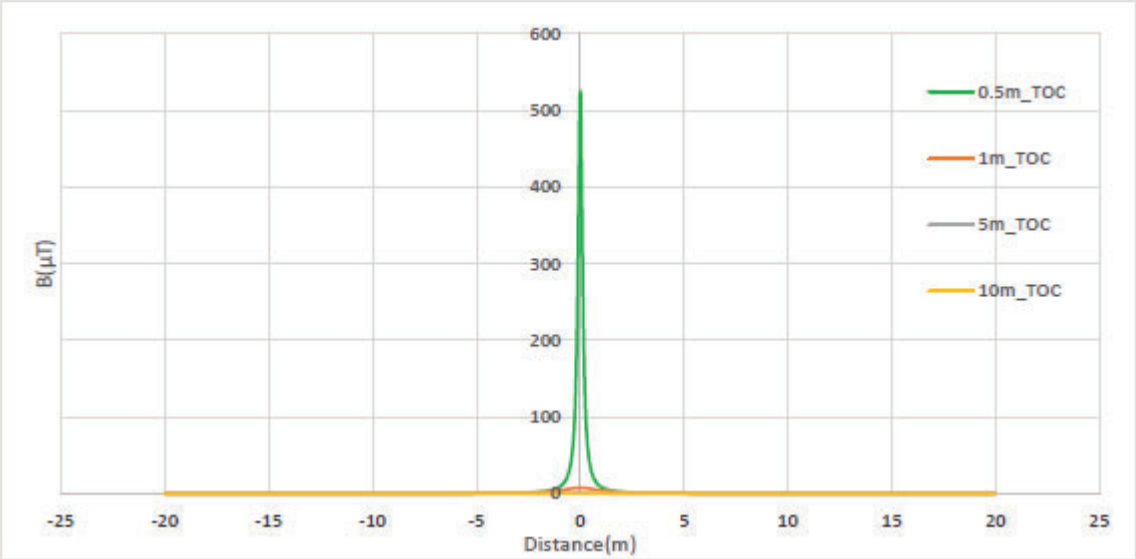


Figure 5-6 – The magnetic field expected at the seabed surface from 3x630 mm^2 inter array cable at various levels of trench depth

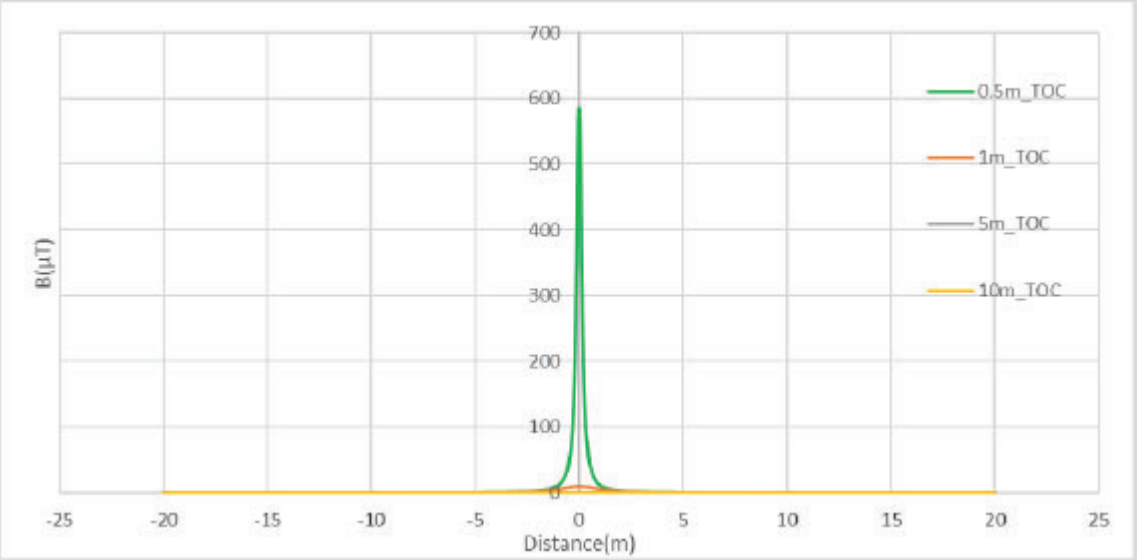


Figure 5-7 – The magnetic field expected at the seabed surface from 3x800 mm^2 inter array cable at various levels of trench depth

6. Cable Burial Risk Assessment

An initial Cable Burial Risk Assessment (CBRA) for the inter array cables and an initial high-level assessment of suitable burial methods (BAS) was undertaken (LF000009-CAS001-REP-H05-015-01). The BAS was updated in 2021 to reflect the revised project layout. The CBRA was further reviewed in 2023 based on ground conditions encountered during cable installation, and updated data on fishing activity in the site. The CBRA involved an assessment of the risk of damage or exposure of the inter array cables by considering the baseline environment within the Seagreen array site.

The activities and processes that have the potential to damage or expose cables were assessed. The CBRA focused on four major risk factors:

- Fishing Equipment
- Mobile sediments
- On-bottom Stability
- Emergency Anchoring

The CBRA utilised geophysical data, including geotechnical, bathymetry, seabed features and sub-bottom profiling alongside site specific data which included sediment mobility, potential unexploded ordinance (pUXO), fishing, wrecks, shipping (Automatic identification system, AIS), dredging and dumping, existing infrastructure and cable specifications.

Table 6-1 presents the results of the analysis, including the unmitigated and mitigated level of risk and the mitigation to be implemented for each risk level, including recommended burial depths.

Table 6-1 Risks to inter array cables and mitigation measures required

Risk	Unmitigated Risk Level	Mitigation	Mitigated Risk Level	Recommended Burial Depth in CBRA
Anchor	ALARP	The proposed mitigation for this hazard is lowering (DOL) to a depth below anchor threat lines such that a return period/acceptable level of risk is achieved.	Acceptable	0.4m – 0.5 m, depending on local seabed conditions
Fishing	Unacceptable	The proposed mitigation for this hazard is lowering (DOL) to a depth below fishing threat lines such that a return period/acceptable level of risk is achieved.	Acceptable	0.2 m – 0.3 m – A minimum burial depth of 0.2 to 0.3 m is recommended for sands/stiff clays and soft clays respectively.
Dredging and dumping	Acceptable	No mitigation.	Acceptable	Not Applicable.

On-bottom stability / cable fatigue	ALARP	The proposed mitigation for this hazard is embedment to provide stability.	Acceptable	0.2 m – 0.3 m – An embedment 0.2 to 0.3 m (bottom of cable).
Sediment mobility	Unacceptable	The most effective mitigation is to lower the cable below the mobile sediments	Acceptable	0.1 m – Max of 0.1m allowance or the height of a sandwave where cables intersect these features.

Based on the results of the CBRA, the initial risk assessment recommended burial depths of 0.1 m to 0.5 m in order to mitigate the potential risks identified across the OWF. It should be noted that burial depths of 0.5 m to 2.1 m, were assessed in the ES. A minimum burial depth of 0.5m is therefore acceptable and will apply. As noted in section 3.2, in specific circumstances, a minimum burial depth of 0.4 m may be adopted. It is not considered that this changes the conclusions of the ES. A minimum burial depth of 0.4 m will only be applied in locations where the CBRA concludes it is acceptable based on the risk factors in Table 6.1. The target burial depth is 0.7 m.

A burial assessment was undertaken to identify the cable lengths where there is a high likelihood that jet trenches will achieve the target trench depth.

Criteria was developed based on the assessed ground conditions across the OWF site to determine whether a jet trencher was suitable for each cable length. Using these criteria, and the geological assessment for each cable route produced for the CBRA, an assessment was made of whether jet trenchers would be suitable for each section. Post remedial treatment by rock placement was identified for those areas where there is a risk where jet trenchers may not be able to achieve the required depth, in order to achieve the same mitigated risk level as burial. It should be noted that rock protection is not anticipated to be required for the full extent of these areas, but at particular locations (still to be defined) within these extents.

These locations are still to be confirmed and will be subject to revision based on seabed conditions encountered during installation (see Section 7 for further discussion). All reasonably practicable efforts, using the equipment and methods described in Table 3-3, will be made to maximise the length of cable that will achieve target burial depth and therefore the amount of cable protection required will be minimised. Cable burial is preferable to the use of rock protection from both economic and environmental perspectives and Seagreen will therefore maximise achievable protection by burial, as far as is reasonably practicable.

Rock placement locations will be confirmed following the completion of cable burial via the required marine safety information channels, including consultation with local fisheries stakeholders (i.e. information will be provided via the NtM procedures, the FLO and via guard vessels strategically placed along the cable route during cable protection installation activities). Consultation meetings will also be arranged with local fisheries stakeholders, as required, to enable direct communication of this information. Marine Scotland will also be informed of rock placement locations following completion of cable burial process.

7. Cable Protection Requirements

As noted in Section 5.1, it was previously estimated that approximately 83% of the inter array cables would be buried to the target depth determined as described in the CBRA process (set out in Section 6) to provide protection to both the cables and to other marine users. Therefore, it was considered that it may not be possible to bury the remaining 17% to the target depth. In this event, rock placement would be required to protect the cable.

The actual extent to which cable burial to target depth is achieved is confirmed by surveys undertaken immediately following the completion of cable installation. Based on the cables laid and buried to date for stage 1, it is expected that approximately 42% of the cables will be buried to a minimum burial depth of 0.5m. The remaining c. 58% are not expected to achieve that burial depth - primarily due to harder than expected seabed substrates. Approximately 31% is expected to require a full (up to 0.8 m height) rock protection berm; a 'partial berm' being sufficient on the remaining lengths.

Seagreen has assessed options for reducing the extent of rock protection required:

- A 'second pass' of the jetting operation has been attempted on the cables laid to date. This has not significantly increased the depth of burial achieved and, on some sections has mobilised and displaced sediments that would otherwise have resettled and backfilled the cable trench, reducing the depth of cover
- The cable installation contractor has reviewed the effectiveness of the existing methodology and options for adjusting or changing the tooling to improve performance. Following trials, the speed of trenching has been slowed to achieve the best possible change of burial and the cable tension and the trenching tool depressors have been confirmed to be optimal. No further optimisation of the tool is possible
- An alternative burial methodology has been investigated but it was concluded that it would not significantly increase burial depth. The methodology requires the deburial and reburial of already laid cables which was assessed as an unacceptable risk to asset integrity
- The CBRA has been reviewed to identify if the minimum burial depth can be reduced (see section 6). The minimum burial depth has been reduced to 0.4 m as reflected in this OWF CaP

While Seagreen continues to explore all available options for achieving the target burial depth, the worst-case scenario is that 174 km (49%) of the total inter-array cables would require rock protection to some extent at the completion of stage 1 (based on a minimum burial depth of 0.5 m). This figure is reduced if the minimum burial depth is reduced to 0.4m in specific circumstances.

Stage 2 of the project has considerable uncertainty regarding the layout of inter-array cables and improvement in technique which can be applied as a result of Stage 1 experience, therefore, this OWF CaP will be updated once more information is available.

Rock protection volumes will be limited to that which is necessary to adequately protect the cable - with berm dimensions engineered accordingly. Berm size will be determined by the depth of burial achieved and therefore the depth of additional protection required. The 2012 ES described the potential safety risks associated with fishing in the vicinity of unburied or insufficiently buried cables as outside of acceptable limits until successful burial and protection was demonstrated. Where cable protection is required, it will

be designed, in line with accepted industry standards to minimise, as far as reasonably practicable the risks of fishing gear snagging on the protection.

In compliance with condition 3.2.2.3 of the OWF Marine Licence and the project Navigational Safety Plan (LF000009-CST-OF-PLN-0007), the placement of cable protection shall not reduce the navigable depth by more than 5% of stated chart datum.

The rock used will be freshly quarried (from a quarry in Norway) in order to minimise the risk of contamination or the introduction of invasive non-native species.

As outlined in Section 6, details of the as-installed cable locations and the location of any areas of cable protection will be made available to other marine users including commercial fishermen (in accordance with the FMMS), through the required marine safety information channels (i.e. information will be provided via the NtM procedures, the FLO and via guard vessels strategically placed along the cable route during cable protection installation activities). Consultation meetings will be arranged with local fisheries stakeholders, as required, to enable direct communication of this information. The Marine Co-ordination Centre (MCC) will also be a focus of communication and will provide a weekly notice of operations detailing project activities. Further details regarding specific engagement related to fisheries is provided in the FMMS (LF000009-CST-OF-PLN-0011).

Condition 18 requires the OWF CaP to include methodologies for over trawl surveys where mechanical protection of cables is used. Where target burial depth is not achieved and additional cable protection has been installed, Seagreen proposes that detailed geophysical surveys (e.g. high-resolution multi-beam echo sounder, side scan sonar, video) of the rock protection berms may be undertaken. These geophysical surveys will be undertaken where fishing using demersal trawl gear is proven to regularly occur, through available information and in consultation and agreement with local fisheries interests and Marine Scotland. The resulting high-resolution data from these surveys would enable the creation of detailed 3D digital terrain maps and 2D cross sections of the rock protection berms and the adjacent seabed. This will provide clear and complete information that can be made available to fishermen regarding the condition of the seabed at all locations where cable protection has been installed. Such surveys could be integrated into the ongoing cable inspection and monitoring regime.

In respect of the requirements of Condition 18, Seagreen will undertake an over trawl survey of the rock protection berms at agreed locations where fishing using demersal trawl gear is proven to regularly occur. Locations shall be informed by geophysical survey results, fishing vessel activity data (including plotter data and AIS, where available), landings records and information provided by fishermen and fisheries organisations. Seagreen will seek a collaborative approach, via local fisheries representatives, to identifying locations where over trawl surveys are necessary based on up-to-date information. Priority will be given to locations along the cable route where regular and sustained fishing activity (using demersal trawl gear) can be demonstrated, therefore targeting those areas where resumption of fishing activity post-installation is most likely. The methodology (timing, duration, equipment and vessel) and location will also be agreed with Marine Scotland, prior to the survey commencing.

In other locations, for example where static fishing gear is extensively deployed, it is taken that no over trawl surveys will be required.

If an over trawl survey of the rock protection berms is agreed, Seagreen proposes to discuss and confirm the full details of the over trawl survey approach with Marine Scotland, in consultation with fisheries stakeholders, following the completion of cable installation, taking into account the extent and type of trawling activity shown to occur in the wind farm site.

Available information indicates a pattern of varying intensities of scallop dredging over time in some parts of the wind farm site. It is understood, however, that in areas of seabed comprising of sands and gravels, which are considered to be suitable habitats for scallops, sufficient cable burial will typically be successful. Areas of harder substrate, such as cobbles and boulders, where cable burial may be more limited, are understood to typically attract static gear activity rather than scallop dredging. In the FMMS, it is confirmed that Seagreen will continue to liaise directly with relevant scallop fishing stakeholders regarding potential mitigation measures that are feasible. In addition, liaison will include the communication of information relating to the required rock protection.

Following successful completion of cable installation and any over trawl surveys Seagreen expects that most fishing activity can resume in the wind farm area, with reasonable and appropriate practices being followed, to avoid any risk to fishing vessels, their gears or to the inter array cables. The inter array cables will be subject to periodic inspection during the operational and maintenance phase. Cable and/or seabed surveys will be undertaken to confirm that cables remain buried to the required depths or the existing seabed remains unchanged. A survey will be undertaken approximately one-year post-installation. The frequency and scope of further monitoring will be proportional to the risk of future cable exposure and determined based on the outcome of the above (see Section 8 for further details). In addition, to monitor changes in burial depth, Seagreen intend to install a temperature sensing system. This will provide a continuous monitoring system whereby changes in burial depth will be identified by a change in temperature. Relevant monitoring outputs will be shared with fisheries stakeholders, as part of ongoing fisheries liaison, to confirm cable burial and the condition of the seabed or to highlight any locations where remedial action is being considered.

8. Cable Exposure Monitoring

8.1 Cable Exposure Inspection

Approximately one year following cable installation, a survey will be undertaken to ensure that the cable remains as installed and to identify areas of cable at potential risk of exposure in the future. Monitoring will focus on any 'at-risk' areas identified. Subject to the findings of the surveys, the frequency of ongoing monitoring will be adapted to the appropriate level of exposure risk.

All array cables are being fitted with a thermal monitoring system that features depth of burial monitoring in near real time which will raise alarms in the control room should any variation in burial be detected. The intention is that once this system is commissioned any physical survey would be by exception to areas identified as seeing a change in burial depth and not on a specific periodic time basis. Should any damage, decay or destruction of cables be identified, Marine Scotland, MCA, Kingfisher and the UKHO will be notified as soon as reasonably practicable and no later than 24 hours following the identification of any such damage, destruction or decay. In case of exposure of cables on or above the seabed, a NtM will be issued and notification to Kingfisher Information Service of the location and extent of exposure within three days, following identification of a potential cable exposure.

8.2 Remedial Actions

In the event that the cable monitoring surveys identify a cable exposure, protection levels will be restored using ROV burial or by alternative means (e.g. rock placement), consented under a separate Marine Licence, if required. The determination of whether burial is possible rather than using rock protection will be based on the nature and location of the exposure. Should additional rock protection be required; marine users will be notified via the standard Notice to Mariners procedures.

The details of remedial actions will be developed once the ducts and cables have been installed and will be described in the Operation and Maintenance Programme (LF000009-CST-OF-PRG-0001) for the Seagreen Project, which will be submitted to the Licensing Authority no later than three months prior to the commissioning of the first OSP.

8.3 Cable Failure

In the event of cable failure, the failed cable sections will be recovered and replaced with new cable if the failure is <5 km. Cables above 5 km will be replaced using joints taken from contingency spare stocks. Replaced cable lengths will be protected by ROV burial, or by alternative means (e.g. rock placement), consented under a separate Marine Licence, if required.

9. Compliance with the ES and ES Addendum

The relevant conditions of the S36 Consent require that the Seagreen Project be constructed in accordance with the methods assessed in the Application.

Sections 9.1 and 9.2 set out information from the ES, ES Addendum and 2012 application with regard to:

- Compliance with the construction methods assessed; and
- Construction related mitigation and management.

9.1 Compliance with Construction Methods Assessed in the ES and ES Addendum

The ES and ES Addendum for the Seagreen project described the range of methods that could be applied during the construction of the Development. This was presented as a 'Rochdale Envelope' incorporating a variety of options in relation to the development design and the approach to installation. In each case, the worst-case design option was assessed in respect of each impact.

Since the grant of the consents for the Seagreen Project, the design of the Project and the approach to installation has been substantially refined, as set out within this OWF CaP and in other relevant consent plans. To demonstrate compliance, with those methods assessed within the ES and ES Addendum, Appendix C provides a tabulated comparison of project construction parameters and methodologies as presented in the ES and ES Addendum with this OWF CaP.

9.2 Delivery of Construction-related Mitigation Proposed in the ES and ES Addendum

The ES and ES Addendum for the Seagreen project detailed a number of mitigation commitments specific to construction and installation activities. Appendix D presents the commitments made by Seagreen in the ES and ES Addendum to mitigation measures relative to construction methods and processes set out in this OWF CaP. The table provides details of the commitments and a cross-reference to where each commitment is implemented.

A complete register of the mitigation, management and monitoring commitments made in the ES and ES Addendum, required by consent conditions is set out in the commitments registers included as part of the Project CEMP.

10. References

IECS. (2011). Firth of Forth (Round 3) Offshore Wind Farm Development: Drop Down Video Report. Report: ZBB776-DDV-D-2011, 82.

OceanEcology. (2019) Seagreen Offshore Windfarm Predictive Modelling of Potential Reef Habitat

Osiris Projects. (2011a). Firth of Forth Offshore Wind Farm Export Cable Geophysical Survey Volume 1 - Operations Report October 2011, 1, 33.

Osiris Projects. (2011b). Firth of Forth Offshore Wind Farm Export Cable Geophysical Survey Volume 2 - Report October 2011, 2, 36.

Cathie Group (2019) Inter Array Cable Burial Risk Assessment (Document Reference LF000009-CAS001-REP-H05-015-01)

Hellenic Cables (2020) Inter Array Cables Magnetic Field Calculation Report (Document Reference LF000009-SWY001-REP-H12-009-01)

Hellenic Cables (2020) Inter Array Cables Design Report (Document Reference LF000009-SWY001-REP-H12-007-01)

Table 10-1 sets out those documents for the Seagreen project in relation to either Consent Plans or other reference documents.

Table 10-1 Seagreen Document References

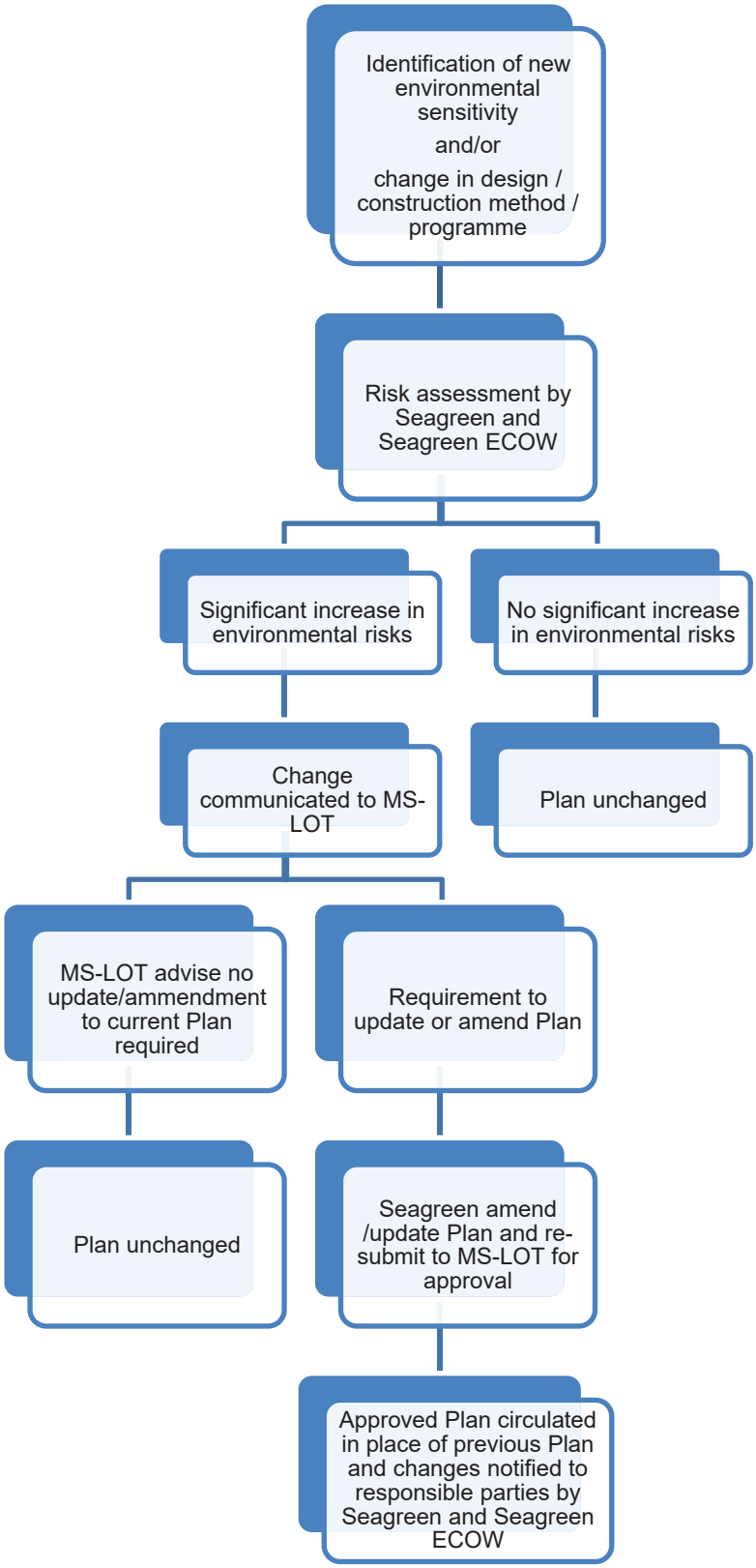
SWEL Document Number	Title
LF000009-CST-OF-PRG-0002	Offshore Construction Programme
LF000009-CST-OF-PLN-0009	Offshore Transmission Assets Cable Plan
LF000009-CST-OF-MST-0001	Offshore Wind Farm Construction Method Statement
LF000009-CST-OF-PRG-0001	Offshore Wind Farm Operations and Maintenance Programme
LF000009-CST-OF-PLN-0011	Fisheries Management and Mitigation Strategy
LF000009-CST-OF-PLN-0014	Offshore Construction Environmental Management Plan
LF000009-CST-OF-PLN-0007	Navigational Safety Plan

Appendix A – OWF CaP List of Abbreviations and Definitions

Term	Description
AIS	Automated Identification System
Alpha Marine Licence	Marine licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 in respect of Seagreen Alpha Wind Farm on 10 October 2014 as amended by the revised marine licence granted by the Scottish Ministers on 28 August 2018 (reference 04676/18/0) and as further amended by the revised marine licence granted by the Scottish Ministers on 12 December 2019 (reference 04676/19/0).
Bravo Marine Licence	Marine licence granted by the Scottish Ministers under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009 in respect of Seagreen Bravo Wind Farm on 10 October 2014 as amended by the revised marine licence granted by the Scottish Ministers on 28 August 2018 (reference 04677/18/0) and as further amended by the revised and transferred marine licence granted by the Scottish Minsters on 12 December 2019 (reference 04677/19/0)
CaP	Cable Plan as required under Seagreen Alpha and Seagreen Bravo OWFs Section 36 Condition 18
Offshore CEMP	Construction Environmental Management Plan as required under Seagreen Alpha and Seagreen Bravo OWFs Section 36 Condition 14
CLV	Cable Lay Vessel
COLREGS	International Regulations for the Prevention of Collisions at Sea
Contractor	The CONTRACTOR as defined by the CONDITIONS OF CONTRACT
CoP	Construction Programme as required under Seagreen Alpha and Seagreen Bravo OWFs Section 36 Condition 9
CPS	Cable Protection System
DOL	Depth of Lowering of cable below mean seabed level
ECoW	Ecological Clerk of Works as required under Seagreen Alpha and Seagreen Bravo OWFs Section 36 Condition 29
EMP	Environmental Management Plan as required under Seagreen Alpha and Seagreen Bravo OWFs Section 36 Condition 14 (see CEMP above)
ES	Environmental Statement
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables Group
ISV	Installation Support Vessel
Marine Licence	The Alpha Marine Licence and/or the Bravo Marine Licence
MCA	Maritime and Coastguard Agency
MHWS	Mean High Water Springs

Term	Description
MS-LOT	Marine Scotland Licensing and Operations Team
NSP	Navigational Safety Plan, as required for approval under Condition 17 of the S36 consent
NTM	Notice to Mariners
OSP	Offshore Substation Platform means an alternating current Offshore substation platform which is a standalone modular unit that utilises the same substructure and foundation design as a wind turbine generator
OTA	Offshore Transmission Asset includes the transmission cable required to connect the Wind Farm to the Onshore Transmission Asset. This covers the OSPs and the cable route from the OSPs to the MHWS at the landfall at Carnoustie
OWF	the Wind Farm Assets
ROV	Remotely Operated Vehicle
S36 Consents	Consent under section 36 of the Electricity Act 1989 granted by the Scottish Ministers on 10 October 2014 in respect of the Seagreen Alpha and Seagreen Bravo offshore wind farms, both as varied by the Scottish Ministers by decision letter issued pursuant to an application under section 36C of the Electricity Act 1989 on 28 August 2018
SAWEL	Seagreen Alpha Wind Energy Limited (company number 07185533) and having its registered office at No. 1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
SBWEL	Seagreen Bravo Wind Energy Limited (company number 07185543) and having its registered office at No. 1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
Seagreen	Seagreen Wind Energy Limited (SWEL), the parent company of Seagreen Alpha Wind Energy Ltd (SAWEL) and Seagreen Bravo Wind Energy Ltd (SBWEL), (company number 06873902) and having its registered office at No.1 Forbury Place, 43 Forbury Road, Reading, United Kingdom, RG1 3JH
SHE	Safety, Health, Environment
Site	The area outlined in red in Figure 1 attached to the S36 consent Annex 1 and the area outlined in red and the area outlined in black in the figure contained in Part 4 of the Marine Licence*
UXO	Unexploded Ordnance
Wind Farm Assets	Collective term to describe the WTGS, jacket structures, foundations and associated inter array cabling
WTG	Wind turbine generator

Appendix B – The OWF CaP Change Management Procedure



Appendix C - Compliance with ES Parameters and Processes

Construction parameter/process	ES	OWF CaP
Inter array Cable voltage	33-66 kV	66 kV
Maximum total length of inter array cable	355 km in each of Alpha and Bravo (combined length of 710km across the Seagreen Project)	Circa 355 km across the Seagreen Project
If trenched width of temporary Zone of Influence (seabed disturbance width)	10m max	Up to 10m
Cables buried 'where feasible' (see section 4) or mechanically protected	100%	100%
Estimated maximum length of cable which will require rock armoured or concrete mattress protection	35.5 km in each of Alpha and Bravo (combined length of 71km across the Seagreen Project)	174km* across the Seagreen Project at completion of Stage 1. *at a minimum burial depth of 0.5m, this figure would be reduced if a minimum burial depth of 0.4m is applied
Maximum height and width of cable protection	Max height 1m Max width 7m	Max height 0.8m Max width 7m
Cable burial depth	0.5-2.1m	Minimum 0.5m A minimum of 0.4m will be applied in the circumstances described in Table 3-2 Target 0.7m
Cable installation techniques considered	• Cable plough • Mechanical trencher • Jetting ROV	• Mechanical trencher • Jetting ROV

Appendix D - Summary of Mitigation Commitments

Source	Reference (ES Chapter)	Details of commitment	Implementation
ES September 2012	Project Description – 5.76	Where cable burial cannot be achieved protection measures will be achieved through rock armouring or placement of concrete mattresses.	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment
ES September 2012	Project Description – 5.114	Once array and export cables have been laid, they will be buried within trenches or by rock placement as soon as is practicable.	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment
ES September 2012	Project Description – 5.168	The preferred array cable routes will be surveyed during the pre-construction geo-physical survey for any obstacles. If any obstructions are identified they will be assessed, and an appropriate strategy will be established to remove or avoid the obstruction	Section 4 – Pre-construction surveys
ES September 2012	Project Description – 5.173	Geotechnical site investigation surveys will be undertaken.	Section 4 – Pre-construction surveys
ES September 2012	Project Description – 5.178	Array cable burial depth will be determined by a detailed hazard identification survey, which will assess the different locations and the various shipping and dredging activities	Section 6 – Cable Burial Risk Assessment

ES September 2012	Physical Environment – 7.182, 7.192, 7.287	The total volume of seabed sediments that might be mobilised - associated with array cable installation- will be released in a phased approach dependent upon the rate of excavation and across a minimum 6-month annual construction period for 3 years.	Section 3 – Cable Location and Installation Techniques
ES September 2012	Physical Environment – 7.273	Efforts will be made to optimise the length of cable that will achieve target burial depth and therefore the amount of cable protection required will be minimised.	Section 6 – Cable Burial Risk Assessment Section 7 – Cable Protection Requirements
ES September 2012	Benthic Ecology and Intertidal Ecology – 11.335	Siting of WTG, array cables and ancillary structures to avoid the areas of sensitive habitat wherever practicable. As part of the pre-construction survey (which will be agreed with Marine Scotland) data will be analysed to ascertain the presences of any rare or important habitats, such as *Sabellaria* or *Modiolus* reefs and microsite infrastructure if necessary.	Section 4 – Pre-Construction Surveys
ES September 2012	Commercial Fisheries – 14.164 and 14.246	For the majority of this length cables will be buried, with approximately 10% being protected by other means (i.e. rock placement or concrete mattresses).	Section 6 – Cable Burial Risk Assessment Section 7 – Cable Protection Requirements
ES September 2012	Commercial Fisheries – 14.383	Protocol for the removal of seabed obstacles. Completion of post installation survey of array cables to ensure fishing activities can be safely resumed. Consultation with fishing interests to ensure that all safety risks are brought within acceptable limits.	Section 7 – Cable Protection Requirements Section 8 – Cable Exposure Monitoring

ES September 2012	Shipping and Navigation – 15.125	The majority of array cables will be buried, with approximately 10% being protected by other means (i.e. rock placement or concrete mattresses).	Section 3 – Cable Location and Installation Techniques Section 6 – Cable Burial Risk Assessment Section 7 – Cable Protection Requirements
ES September 2012	Mitigation and monitoring – 22.31	Burial (where possible) of array cables and post-installation surveys on array cables to confirm 'over-trawlability' of seabed	Section 6 – Cable Burial Risk Assessment Section 7 – Cable Protection Requirements