INNOVATION™

Nova Innovation Ltd

Bluemull Sound Tidal Array

Cable Plan

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Executive Summary

This report on the proposed Cable Plan (CaP) has been prepared by Nova Innovation Limited to discharge Condition 3.2.1 of the Marine License for the Development.

The purpose of the CaP is to ensure all environmental and navigational issues are considered for the location and construction of the subsea cables for the Development.

The CaP establishes the policies and measures required to manage the environmental and navigational issues of the Development prior to construction, through construction and operation of the Development.

The CaP presented within this document is considered sufficient to satisfy Condition 3.2.1 and enable the construction and operation of the Development to progress, subject to the CaP being implemented.

The CaP will be presented to Marine Scotland for distribution to the relevant stakeholders.

1 Introduction

The Nova Innovation Shetland Tidal Array ("the Development") received a Marine License (04859/15/0) from Scottish Ministers ("the License"). The purpose of the Cable Plan (CaP) is to ensure all environmental and navigational issues are considered for the location and construction of the array cables.

This CaP is prepared to enable Condition 3.2.1 of the License ("the Condition") to be discharged. Condition 3.2.1 states:

> *The licensee shall conduct the works strictly in accordance with a Navigational Risk Assessment, Cable Plan (to include cable protection risk assessment) and ERCoP. No works shall commence until such time as these documents are agreed with the licensing authority and the Maritime & Coastguard Agency (MCA). Final agreed documents must be held by the licensing authority prior to installation.*

This document sets out the proposed CaP that Nova Innovation Ltd. intends to prepare and undertake to allow the Condition to be discharged. Where applicable, it cross-references other documents addressing conditions in the License where these contain information on the implementation of environmental and navigational issues.

The document contains the following sections:

- Introduction;
- Scope of Cable Plan;
- Communications Plan;
- Consultation;
- Environmental and Navigational Sensitivities (other users);
- Nova Innovation Commitments;
- Cable Laying Techniques;
- Construction Exclusion Zones;
- Results of Survey Works;
- Technical Specification;
- Burial Risk Assessment;
- Proposals for Over Trawl Surveys;
- Emergency Measures; and
- Linkages with Other Conditions;

2 Scope of Cable Plan

The CaP applies to the Development which incorporates the cables. The CaP may also cross reference other existing plans as required under the License, including the Construction Method Statement (CMS).

Where relevant the CaP will make reference to relevant best practice guidance notes such as:

- Subsea Cables UK (2012) The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters; and
- ICPC (2009) Fishing and submarine cables: working together.

It is intended that the CaP will be regularly reviewed and revisions approved by the Scottish Ministers in accordance with the Condition. The Development will, at all times, be constructed and operated in accordance with the approved CaP (as updated and amended from time to time by Nova Innovation Ltd). Any updates or amendments made to the CaP by Nova Innovation Ltd will be submitted, in writing, by Nova Innovation Ltd to the Scottish Ministers for their written approval.

3 Communications plan

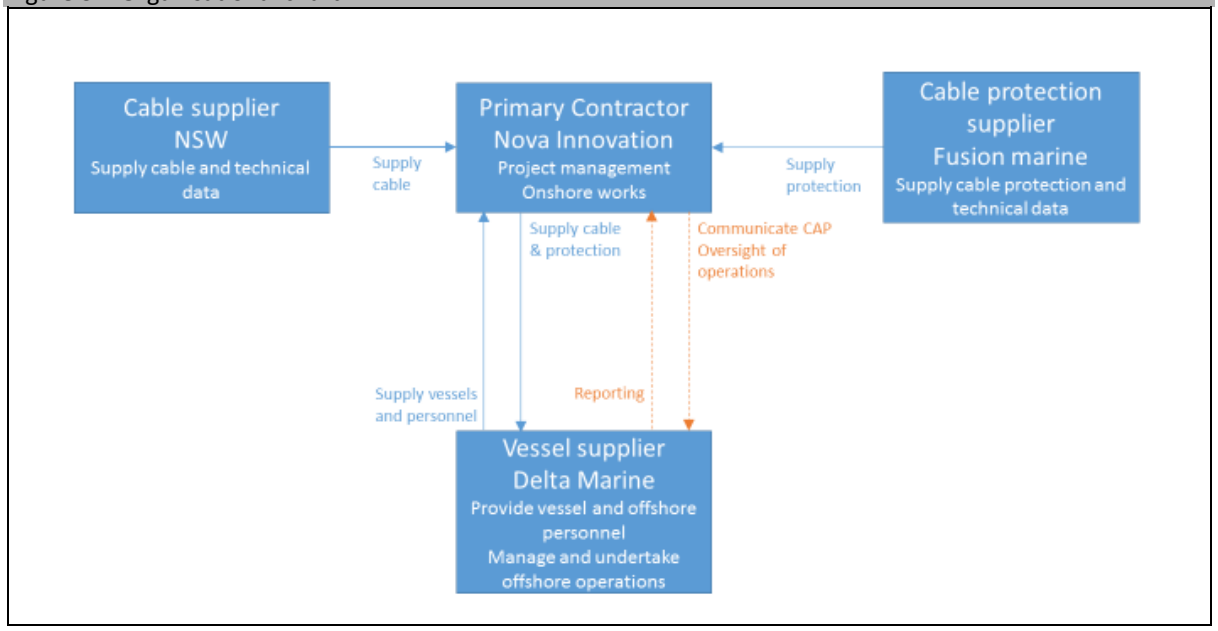
3.1 Responsibilities and Ownership

The CaP has been prepared by the "Principal Contractor" (PC) – Nova Innovation Ltd – with input from Cable and Vessel Suppliers. The PC has primary responsibility for implementing the CaP. The CaP details the project team roles, responsibilities and lines of communication during the construction of the Development. Operational responsibility will be determined at a later stage.

3.2 Organisational Chart

An organisational chart is provided in Figure 3.1 illustrating the key interfaces and responsibilities.

Figure 3.1 Organisational chart



Source: Copyright © Nova Innovation 2015

Nova Innovation as Project Manager and Principal Contractor, is responsible for all onshore works and will supply all materials to the Vessel Supplier. As such, the only interface with direct relevant to the CaP is between Nova Innovation and the Vessel Suppler (Delta Marine). Nova Innovation and the Vessel Supplier will be the only parties on-site as construction associated with the CaP progresses.

Nova Innovation is responsible for communicating the CaP to the Vessel Supplier. Nova Innovation will report to Marine Scotland on progress on the CaP.

3.3 Reporting

The operations involved in this cable plan involve laying five individual cables from site to shore, with each operation expected to be completed in less than a day. Marine Scotland will be informed in advance and on completion of any project work associated with the CaP. Where relevant, additional updates on construction activity will be reported to Marine Scotland. Marine Scotland will be responsible for coordinating dissemination to wider stakeholders (e.g. Joint Nature Conservation Committee (JNCC), Scottish Natural Heritage (SNH), and the Marine and Coastguard Agency (MCA)).

4 Consultation

4.1 Consultation on the CaP

Consultations on the cable plan will be conducted with the following bodies:

- Shetland Ports and Harbours
- Maritime and Coastguard Agency
- Scottish Natural Heritage
- Shetland Fishermen's Association
- Lerwick Boating Club
- Shetland Shellfish Management Organisation (SSMO)
- Scottish and Southern Energy
- British Telecom

Consultations will be conducted by email and telephone.

4.2 Ongoing CaP Consultation

Any changes to the CaP will be communicated to the parties above by email and telephone.

5 Environmental and Navigational Sensitivities

This section sets out the main environmental and navigational sensitivities associated with the Development. Detailed information regarding the sensitivities of the receptors to the Development are provided in the Environmental Monitoring and Mitigation Plan (EMMP) and the Navigational Risk Assessment (NRA).

5.1 Environmental sensitivities

As detailed in the EMMP, a video survey of the site and cable route will be conducted prior to installation using a subsea camera sled lowered from a survey vessel. The survey will identify the location and extent of any benthic habitat or species on the recommended Marine Priority Features list. The survey will be used to inform the precise location for device and cable deployment.

5.2 Navigational sensitivities

The position of the cables was selected to avoid any area used for safe anchorage and to minimise any risk to shipping in the area.

During construction, all vessels involved in the cable works will comply with all aspects of the International Regulations for Preventing Collisions at Sea (COLREGS). The vessels used will carry all equipment as required under the vessels' registration, e.g. the Code of practice for the safety of small workboats and pilot boats. Navigational Warnings will be issued and any temporary buoys will comply with all aspects of COLREGS. Notice of works will be promulgated through Notices to Mariners.

A video survey will be conducted of each cable following deployment in order to confirm the cable has been deployed correctly and to determine the precise cable coordinates for communication to UKHO.

6 Nova Innovation Commitments

This section provides an overview of the commitments made in the EMMP and NRA.

6.1 Environmental Monitoring and Mitigation Plan

Table 6.1 Commitments relevant to the CaP made in the EMMP

Commitment	Description	Implementation in the CaP
Pre-deployment benthic survey	**A** video survey of the site and cable route will be conducted using a subsea camera sled lowered from a survey vessel. The survey will identify the location and extent of any benthic habitat or species on the recommended Marine Priority Features list. The survey will be used to inform the precise location for device and cable deployment.	Section 5.1

Post-deployment benthic survey	A video survey will be conducted of the cables after deployment, to confirm the cable has been deployed correctly and to determine the cable coordinates for communication to UKHO	Section 5.2 Section 11
Reporting	Reports will be submitted to Marine Scotland every 6 months following deployment for a period of two years. An update on the cable status will be included in this report.	Section 3.3

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6.2 Navigational Risk Assessment

Table 6.2 Commitments relevant to the CaP made in the NRA

Commitment	Description	Implementation in the CaP
Notice of works	Promulgation of Navigational Warnings will take place ahead of all phases of the project including planning, construction, operation and decommissioning. Notice of works will be promulgated through Notices to Mariners.	Section 5.2
Vessel compliance	All vessels involved in the installation, maintenance and decommissioning of the device will comply with all aspects of the International Regulations for Preventing Collisions at Sea (COLREGS). All vessels used will carry all equipment as required under the vessels' registration, e.g. the Code of practice for the safety of small workboats and pilot boats.	Section 5.2
Marker buoys	Any temporary buoys used during operations will comply with all aspects of COLREGS.	Section 5.2
Updating navigational charts	A video survey will be conducted of the cables after deployment, to confirm the cable has been deployed correctly and to determine the precise cable coordinates for communication to UKHO.	Section 5.2 Section 11
Emergency response	Before installation commences, Nova Innovation will consult with the MCA Maritime Operations Branch to develop an Emergency Response Cooperation Plan for the project. This plan will include a familiarisation programme to train project staff on the MRCC plan and MRCC staff on the array.	Section 12

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6.3 Consent Conditions

Table 6.3 Commitments relevant to the CaP from the Marine License for the array

Commitment	Description	Implementation in the CaP
Notice of vessels	The vessels, vehicles and operators engaging in the activity must be notified to the Licensing Authority under prior to their engagement in the Works	Section 7.1
Reporting	Submit monthly reports to the licensing authority for the first three months following deployment and thereafter at a frequency determined by the EMMP.	Section 3.3
Environmental protection	All reasonable, appropriate and practicable steps are taken at all times to minimise damage to the Scottish marine area caused by the activity. Works are to be conducted in strict accordance with the project EMMP.	Section 5.1
Updating navigational charts	UKHO will be notified of both commencement and progress of the Works, and on completion of the Works supply 'as built plans', in order that all necessary amendments to nautical publications are made.	Section 5.2 Section 11

Notice of works	Promulgation of Navigational Warnings will take place ahead of all phases of the project including planning, construction, operation and decommissioning.	Section 5.2
Post consent plans	Works shall be conducted in accordance with an agreed Navigational Risk Assessment, Cable Plan (to include cable protection risk assessment) and ERCoP.	This CaP and risk assessment

Source: Copyright © Nova Innovation 2015

6.4 Legal Requirements

This section lists the relevant legislation regarding: environmental protection; safety, health and environmental regulations; laws governing marine construction; and the safe navigation at sea.

- Marine (Scotland) Act 2010
- Marine and Coastal Access Act 2009
- Marine Strategy Framework Directive (MSFD) (2008/56/EC) (transposed into Scottish law in 2010 through the Marine (Scotland) Act);
- Coast Protection Act 1949;
- Harbours Act 1964;
- European Protected Species (EPS) (The Conservation (Natural Habitats &c.) Regulations 1994 (as amended);
- The Conservation and Habitats Regulations 2010 and the Offshore Marine Regulations 2007 (as amended)); transposed via the (Wildlife and Countryside Act 1981 (as amended) and Wildlife and the Natural Environment (Scotland) Act 2011);
- Basking Shark Licence (Wildlife and Countryside Act 1981 (as amended) and the Wildlife and Natural Environment (Scotland) Act 2011).
- The Convention for the Protection of the marine Environment of the North-East Atlantic (OSPAR);
- Rio Convention on Biological Diversity 1992;
- Bonn Convention on migratory species (implemented through the Bern Convention on the Conservation of European Wildlife and Natural Habitats 1979)
- Priority Substances Directive (2008/105/EC);
- Revised Shellfish Waters Directive (2006/113/EC) (to be repealed);
- Revised Bathing Waters Directive (2006/7/EC);
- Dangerous Substances Directive 1976 (76/464/EEC) (to be repealed);
- Wildlife and Countryside Act 1981;
- Nature Conservation (Scotland) Act 2004;
- Water Environment and Water Services (Scotland) Act 2003;
- Environment Act 1995;
- Control of Pollution Act 1974;
- Health and Safety at Work Act 1974;
- Merchant Shipping Act 1995;
- Management Of Health And Safety At Work Regulations 1999;
- Construction (Design And Management) Regulations 2007;
- Reporting Of Industrial Diseases And Dangerous Occurrences Regulations 2013;
- Supply Of Machinery (Safety) Regulations And Harmonised Standards (European Communities Act 1972);
- Provision And Use Of Work Equipment Regulations 1998;
- Personal Protective Equipment Regulations 2002;
- Merchant Shipping and Maritime Security Act 1997;
- Water Environment (Register of Protected Areas) (Scotland) Regulations 2004;
- Water Environment (Oil Storage) (Scotland) Regulations 2006.
- The Countryside (Scotland) Act 1967 and its enabling legislation the Natural Heritage (Scotland) Act;
- The Land Reform Scotland Act 2003 outlining statutory rights to most land and inland waters;
- Energy Act 2004 and subsequent commencement orders, the latest issued in 2010;
- Merchant Shipping Act 1995;
- The Protection of Wrecks Act (PWA) 1973;
- Protection of Military Remains Act (PMRA) 1986.

7 Cable Laying & Burial Techniques

This section provides overarching information regarding the proposed approach to installation of the array cables.

7.1 Transportation and Installation Vessels

The cables will be transported to site by road. A Multicat vessel similar to that shown in Figure 7.1 will be used to install the cables.

Figure 7.1 Representative cable installation vessel

Source: Delta Marine

The actual vessel to be used has yet to be finalised, but the specification will be similar to that for the Voe Viking, outlined below[1]. Vessels to be used for the works will be notified to the licensing authorities in advance of any work taking place.

Table 7.1 Specification of potential installation vessel (Voe Viking)

Property	Value/description
Bollard Pull	32 ton
Speed	10.7 knots
Main Engines	2435 bhp
Thrusters	271 bhp
Length	26.00 m
Beam	11.50 m
Draft	2.25 m
Fuel	116 m^3
Freshwater	49 m^3
Cranes	2 x 180 t/m Effer3S (10 ton @ 16 m)
A/H Winch	100 ton pull
Tow Winch	30 ton pull

[1] More details are available online: http://www.delta-marine.co.uk/vessels/voe-viking/

Tugger Winches	13 ton pull
Hydraulic pop-ups	1 x fork + 2 x guide pins

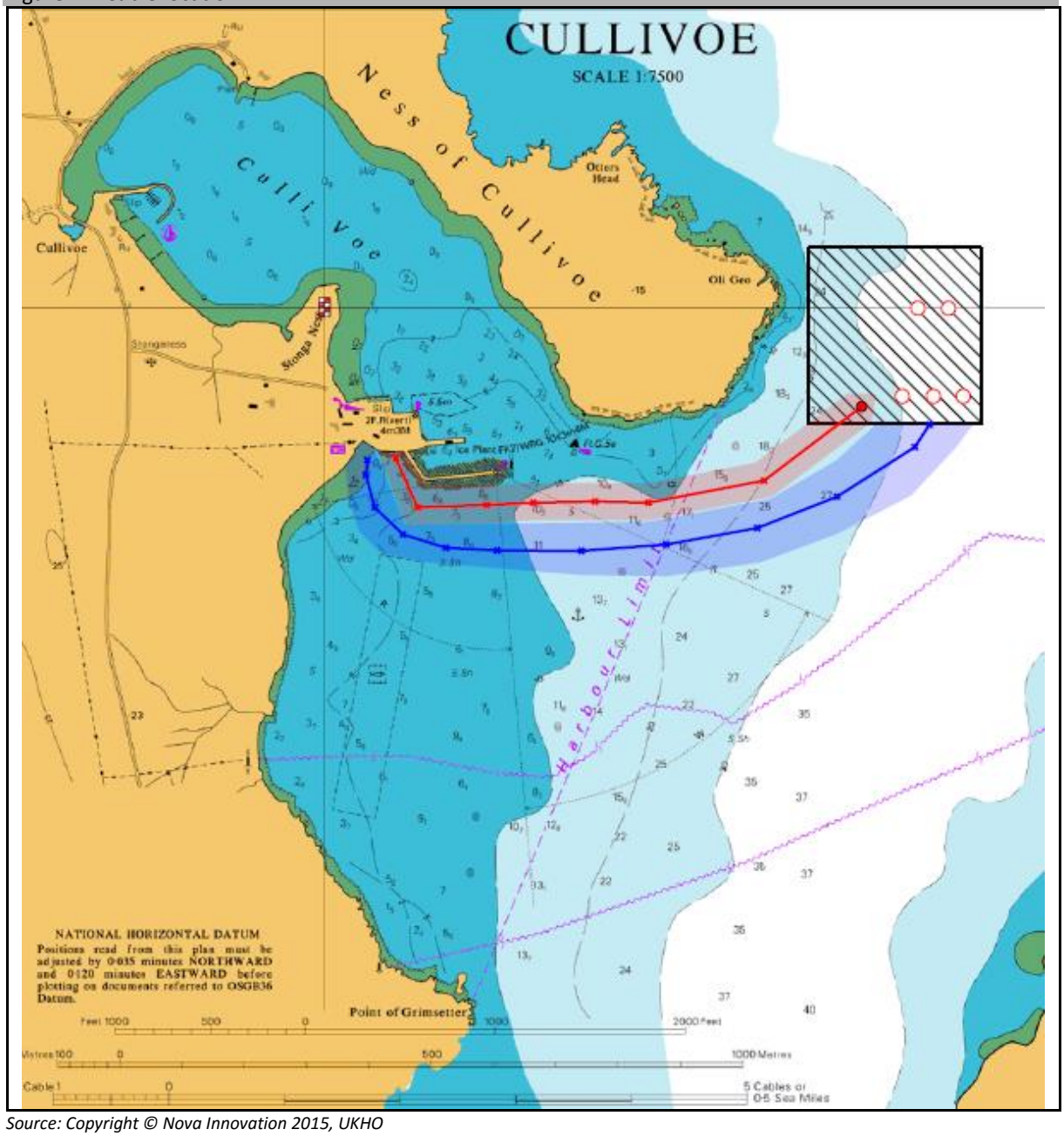
Source: Delta Marine

7.2 Proposed Locations of Cables

Figure 7.2 shows the corridor in which all five array cables will be laid.

- The lease area is marked by a hatched rectangle. Red circles illustrate the proposed location of the turbines.
- The red dot indicates the location of the existing Nova Innovation demonstrator turbine. The red line shows the path of the cable from this turbine to shore; the red shaded area is the Crown Estate lease area for this cable.
- The five array cables will follow the track of the blue line to shore, and will lie within the blue shaded area.

Figure 7.2 Cable location



Source: Copyright © Nova Innovation 2015, UKHO

7.3 Proposed Cable Laying Techniques

The cable will be laid from the stern of the Multicat as a single length from the turbine location to the pier at Cullivoe. A marker buoy connected to cable will temporarily mark the location of the cable turbine end. The cable is not fixed to the seabed, but lies on top of the sea bed with cable protection utilised for stability and protection as required. The cable will not be buried.

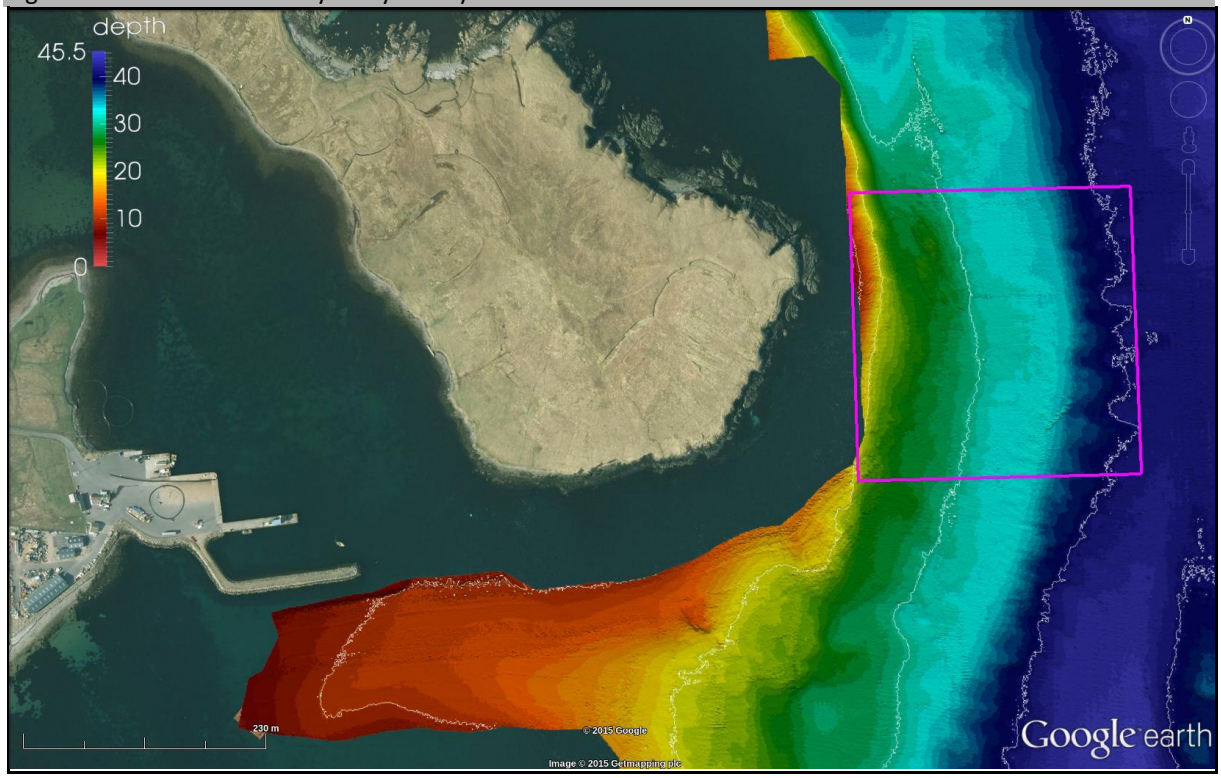
8 Results of Survey Work

An initial site survey has been undertaken using underwater cameras to establish that the seabed in the area is free from hazards and to identify the nature of the seabed. The sea bottom at the site consists of relatively flat shattered rock and small boulders that forms a stable seabed. An additional detailed survey of the sea bed in the designated area will be carried before any works begin.

Figure 8.1 Still picture from ROV footage on the array site

Source: Nova Innovation 2015 ©

Figure 8.2 Result of site bathymetry survey

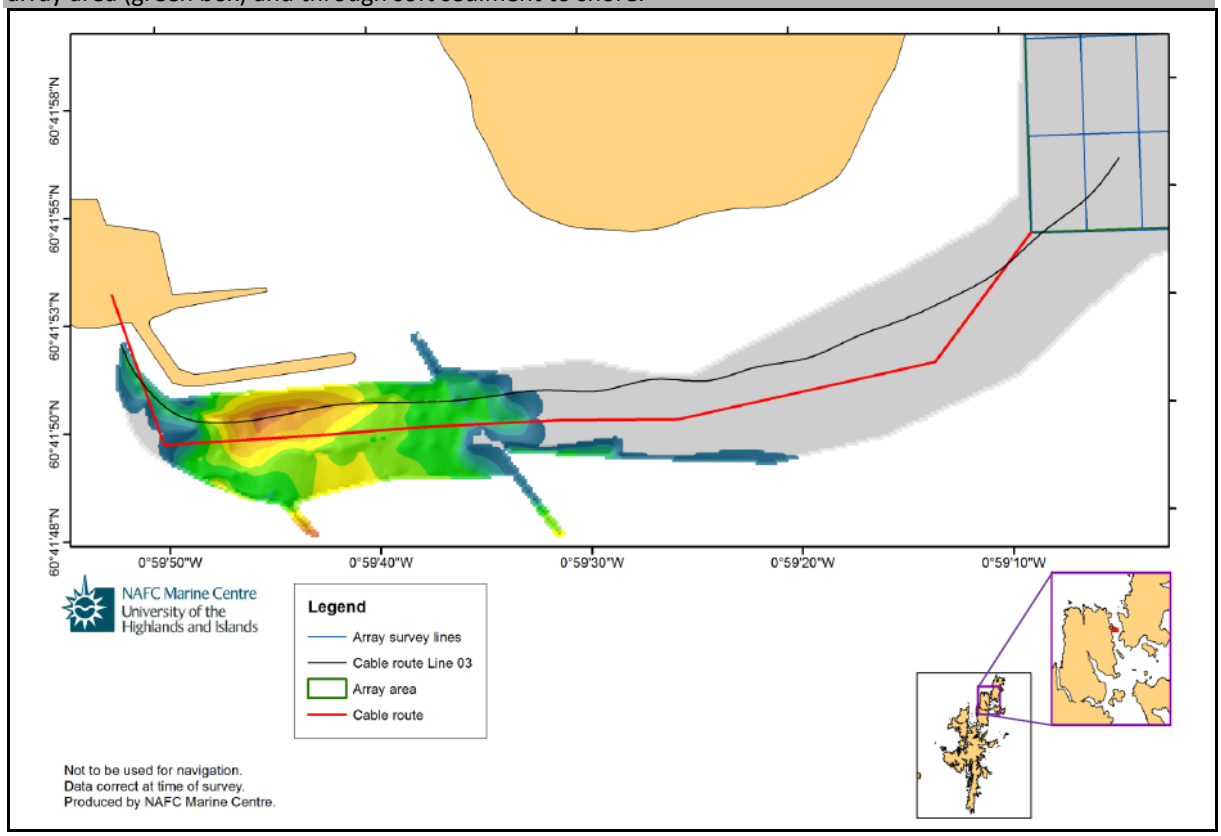


Source: Nova Innovation 2015 ©, Google earth

Figure 8.2 shows the results of the bathymetry survey, which indicates that the depth in the array area varies relatively smoothly from 10m depth at the west of the site to 40m depth at the east. The bathymetry survey was conducted to IHO Standard 1a.

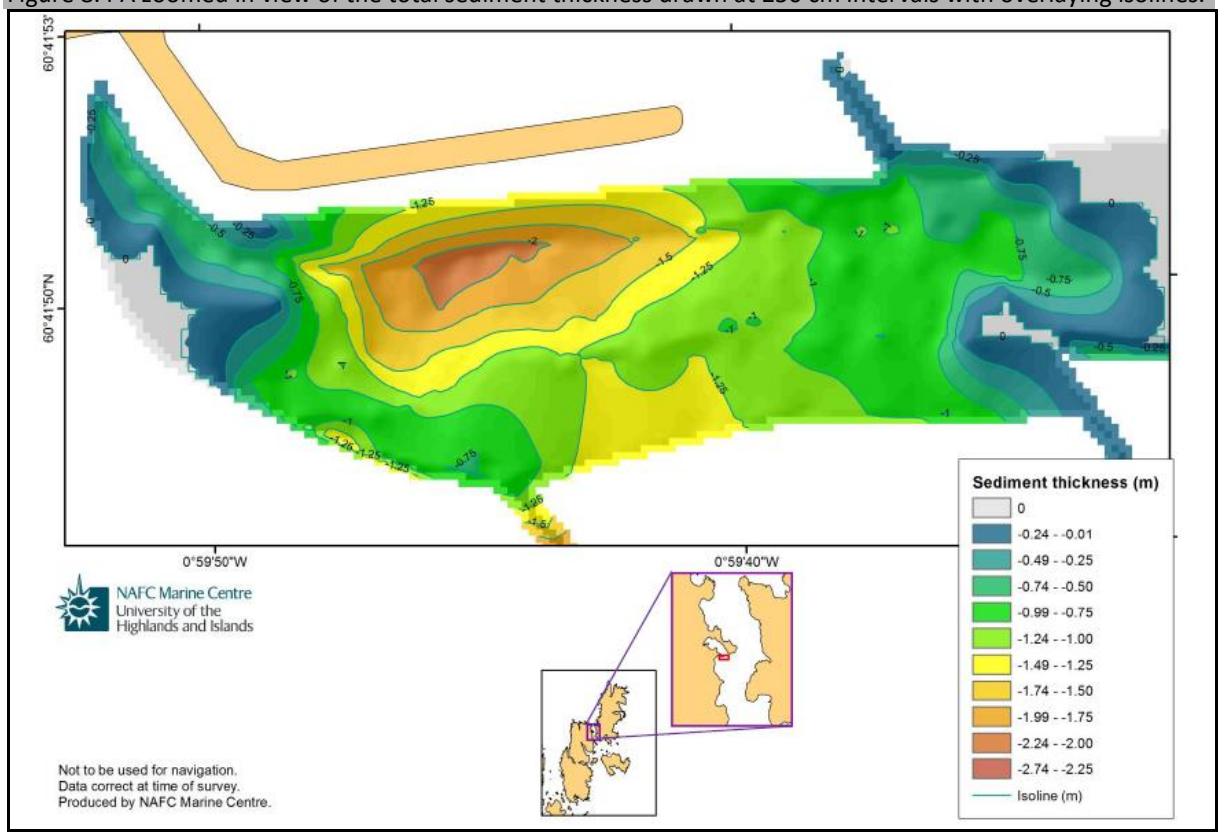
A sub-bottom survey was conducted in March 2014; the results are shown in Figure 8.3 with further detail in Figure 8.4.

Figure 8.3 Result of sub-bottom survey. Vessel track (black line); cable route (red line) running from inside the array area (green box) and through soft sediment to shore.



Source: NAFC Marine Centre. Copyright © Nova Innovation 2015

Figure 8.4 A zoomed in view of the total sediment thickness drawn at 250 cm intervals with overlaying isolines.



Source: NAFC Marine Centre. Copyright © Nova Innovation 2015

The results show that no soft sediment was found in the array area or along the majority of the cable route. Soft sediment was located along the cable route from the entrance to the harbour and along the south side of the harbour breakwater. The deepest sediment was found to be 2.2 m thick and located to the south of the breakwater.

9 Technical Specification

Five individual cables will be laid, one from each device to shore. The length of each cable is in the range 800 to 1000 m, depending on the location of the device within the array.

The primary EMF emitted directly from the cables will be shielded by the steel mesh wire protection enclosing the cable, which acts like a Faraday cage – effectively stopping any electric fields. The magnetic fields and resultant induced EMF in the sea around the cable will be negligible. As a comparator any residual field will be much smaller than for the two single-armoured 33 kV cables linking Yell to Unst further south of Cullivoe.

10 Risk Assessment

A risk assessment was conducted of different cable protection options, and is described in the separate document: *Cable protection risk assessment 29072015.pdf*. The conclusion of the risk assessment is that hazards to the cables and to other users of the sea along the proposed route are as low as reasonably practicable. The cables are protected by two armour layers and an HDPE shell, and will be unprotected along the majority of the route. Additional protection in the form of concrete mats will be added if required for cable stability.

11 Proposals for Cable Monitoring and Over Trawl Surveys

The cables will be surveyed immediately after installation using video and GPS, and their location communicated to UKHO for recording on Admiralty charts.

The cables will be surveyed again one month after deployment (one full tidal cycle); if significant movement is observed then these sections of the cable will be anchored using concrete mats. The cables will be re-surveyed one month later and further protection applied as necessary until no further instability is observed.

During operation, cables will be surveyed once per year (or as required – e.g. should a snagging or other event occur). Any changes to cable location will be communicated to UKHO for recording on Admiralty charts.

12 Emergency Measures

The cables are designed not to be buried, so cable exposure is not a concern. Should an emergency occur relating to the cables (e.g. snagging) during construction, operation or decommissioning then the procedures outlined in the relevant Emergency Response Co-operation Plan (ERCoP) will be followed, as agreed with the MCA.

Arrangements for emergency situations
Marine Operations Coordinator contact number (24 hours)

- Gary Connor, Project Manager: [redacted]

Company key emergency response personnel (Emergency management team or similar) e.g. on-call contact details and arrangements.

- The first point of contact for emergency response will be Project Manager, Gary Connor. He will be on-call for the duration of the construction phase.
- In the event that Gary cannot be reached then the next point of contact is Project Officer, Patrick Ross-Smith. Either Gary or Patrick will be present in Cullivoe for the duration of the construction phase. They can be reached on the numbers below.
    - Emergency Response Manager: Gary Connor, [redacted]
    - Shetland Project Officer: Patrick Ross-Smith, [redacted]
- Routine contacts.

- Main office: 0131 554 2242 (T)

Additional emergency contact numbers are listed below.

24 hour initial contact number	**Gary Connor, Project Manager:** [redacted]
24 hour alternative contact number	Patrick Ross Smith, Site Manager: [redacted]
24 hour alternative contact number	Simon Forrest, Director: [redacted]
24 hour alternative contact number	Paul Connor, Engineer: [redacted]
24 hour alternative contact number	Gavin McPherson, Engineer: [redacted]

13 Linkages to Other Conditions

Linkages with other Conditions of the License will be set out in this section.

14 References

Specification for representative installation vessel, the Voe Viking Multicat. Available online at: http://www.delta-marine.co.uk/vessels/voe-viking/ [accessed 26/06/15]

Subsea Cables UK (2012) The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure in UK Waters. Subsea Cables UK Guideline No 6, Version 4. Available online at: http://www.thecrownestate.co.uk/media/5658/proximity-of-offshore-renewable-energy-installations-submarine-cable-infrastructure-in-uk-waters-guideline.pdf [accessed 26/06/15]

ICPC (2009) Fishing and submarine cables: working together. International Cable Protection Committee. Available online at: http://www.iscpc.org/information/Openly%20Published%20Members%20Area%20Items/ICPC_Fishing_Booklet_Rev_2.pdf [accessed 26/06/15]