

**REPORT**



## **Race Bank Offshore Wind Farm**

# **Export Cable Installation Plan Part II: Contingency Plan**

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Organisation for Approval, 13<sup>th</sup> November 2015

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## 1. Introduction

Race Bank Offshore Wind Farm (the Project) is an offshore windfarm development to be constructed 27 km off the north Norfolk coast, occupying an area of approximately 62 km<sup>2</sup>. An Environmental Impact Assessment (EIA) was completed for the Project in 2009 (Centrica, 2009) and consent for generating up to 580 MW was granted in July 2012. An amended export cable route was consented in June 2013, spanning from kilometre point (KP) 3.3 to the sea defences in addition to the introduction of alternative cable installation techniques. A Supplementary Environmental Report (Haskoning, 2012) provides the environmental assessment for the varied consented export cable route and installation methods.

The Project Marine Licence (L/2012/00217 as amended) provides consent for the construction of up to two offshore substations, four export cables and 101 wind turbines. The final design of the Project is expected to provide an installed capacity of 546 MW and will comprise:

- 91 x 6 megawatt (MW) wind turbines mounted on monopile foundations;
- 2 x offshore substations mounted on jacket foundations;
- 1 x 6.3 km interlink cable between the two offshore substations;
- 91 x array cables linking the wind turbines and offshore substations;
- 2 x 71 km export cables linking the windfarm to the onshore export cables at a transition joint bay;
- 2 x onshore export cables; and
- 1 x onshore substation that links the Project to the National Grid.

### 1.1 Purpose of the Contingency Plan

The Project has been awarded a number of consents which relate specifically to export cable installation. Condition 5.2.7 of Marine Licence L/2012/00217 (as amended) requires the following:

*“The Licence Holder must submit a detailed export Cable Installation Plan, including cable landfall works for the approval of the Licensing Authority in consultation with Cefas, relevant SNCB, Historic England (HE), Maritime and Coastguard Agency (MCA), Trinity Lighthouse (TLH), Royal Yachting Association (RYA), the Local Port Authorities, South Holland District Council and King's Lynn and West Norfolk Borough Council at least four months prior to the commencement of export cable installation work. The plan must:*

- *use detailed geotechnical data to ascertain optimal cable burial depth along the length of the export cable (including works in the intertidal zone);*
- *detail the methods used for laying the export cable, minimising where possible the use of jetting in the intertidal area;*
- *detail cable burial depths;*
- *include a burial risk assessment;*
- *include the need, type, sources quantity and installation methods for any scour protection; include an Intertidal Construction Works Plan for specific details of export cable installation, date and methodology within the Intertidal Zone, along with the use of an ecological clerk of*

*works. Bird deterrents must remain in situ from 01 April to either the commencement of works, or 01 July in the construction year; and*

- ***include a detailed Contingency Plan for the intertidal export cable installation.***

*Export cable installation must not take place until such time as the Licensing Authority, has approved the export cable installation plan."*

In addition to this Marine Licence condition, export cable installation works between the primary sea defence and low water are also permitted by planning permissions awarded by King's Lynn and West Norfolk Borough Council and South Holland District Council. Condition 3 to Permission H18-0102-13 awarded by South Holland District Council and Condition 3 to Permission 13/00189/FM awarded by King's Lynn and West Norfolk Borough Council both require the following:

*"Before development can commence the following information shall be submitted to and approved in writing by the Local Planning Authority:*

- *Detailed export cable burial plan.*
- ***Detailed contingency plan***
- *Detailed saltmarsh mitigation and reinstatement plan*
- *Detailed saltmarsh monitoring plan*

*The development shall be carried out strictly in accordance with the approved details."*

While certain conditions of the relevant consents explicitly refer to the need for contingency planning to be included within the Export Cable Installation Plan ("the Plan"), it is also acknowledged that export cable installation is a critical element of the Project's engineering design and in order to achieve successful cable installation, the works will be completed within the short time window as defined in Marine Licence Condition 5.2.48:

*"The Licence Holder must only undertake cable installation operations within the inter-tidal area between 1 May and 31 August each year. Cable installation operations within the inter-tidal area may only be undertaken outside of these dates with the express written permission of the Licensing Authority in consultation with the relevant SNCB."*

For these reasons DONG Energy has developed this document to describe a number of possible risk scenarios, together with the proposed contingency planning in order to ensure that cable installation is completed successfully on time and as planned.

DONG Energy proposes that the approval of the Plan by the Licensing Authority will be provided inclusive of permission to enact all of the contingency measures described in this document. It should be noted that the core cable installation proposals, particularly those for installation in the saltmarsh and mudflats, include a number of inbuilt contingency measures which are considered part of the core works and are therefore assessed accordingly.

## **1.2 Scope of the Contingency Plan**

In order to address those specific elements of Marine Licence condition 5.2.7 and Planning Permission Conditions 3, as highlighted in bold above, the following document has been written to consider contingency plans developed by DONG Energy in association with following elements of the Project:

- Installation of the export cable through the primary sea defence;

- Installation of the export cables within the saltmarsh;
- Installation of export cables within intertidal mudflats;
- Installation of offshore cables

Details of the array cable installation will be submitted in the Array Cable Installation Plan, as required under Condition 5.2.8 of Marine Licence L/2012/00217 (as amended) due for submission in November 2015.

## **2. Nearshore Cable Installation – Contingency Planning**

Table 2.1 below provides a list of the risk scenarios that could potentially arise within the saltmarsh and mudflat environments during export cable installation activities. The table describes the risk scenario, consequences of the scenario and proposed contingencies developed by DONG Energy to remove or reduce the effect of the risk should it arise. Where a contingency proposal is deemed to potentially have a greater environmental impact than that of the core installation activity, it too has been assessed in the accompanying Part III: Environmental Report (Haskoning, 2015).

All the contingency vehicles identified in Table 2.1 are listed within Table 6.1 of the Cable Installation Plan Part I: Technical Proposals, with the associated number of transits listed in Appendix E of the Plan.

**Table 2.1: Contingency plans for operations in the nearshore and intertidal areas**

| Risk Scenario                               | Consequence                                                                       | Contingency                                                                                                                                                                                                                                    | Environmental Assessment                                                                                                                                                                                                                                                                                                                                                                                           | Approval                                                                                             |
|---------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Temporary breakdown of Sunfish in saltmarsh | Stationary Sunfish causes saltmarsh sediment compaction                           | Managed my restoration. Under the guidance of the Statutory Nature Conservation Body (SNCB) and Ecological Clerk of Works (ECOW), saltmarsh reinstatement (as per the approved Saltmarsh Mitigation and Reinstatement Works Plan) is conducted | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works<br><br>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB), avoiding the one year delay experienced on the Lincs Offshore Wind Farm | Approval by virtue of Saltmarsh Mitigation and Reinstatement Works Plan                              |
|                                             | Delay causes extended overall programme time                                      | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017)                                                              | Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1 <sup>st</sup> May and 31 <sup>st</sup> August increases confidence that export cables will be installed within a single season                                                                                                                                                         | Approved as per assessment in the original SEI assessment (Centrica, 2012)                           |
|                                             | Maintenance personnel/vehicles transit the saltmarsh causing damage to vegetation | Aluminium trackway will be utilised for access by foot traffic and/or low ground pressure vehicles<br><br>Only low ground pressure vehicles will be permitted on the trackway<br><br>Transits between Sunfish and trackway to be by foot alone | The laying of a temporary roadway (such as the installation of an aluminium track) was assessed in the original SEI (Centrica, 2012) paragraph 2.4.2 and 2.4.3<br><br>Monitoring results from the 2014 deployment at the site indicate trackway deployment will not in itself result in significant impacts                                                                                                        | Approved as per assessment in the original SEI assessment (Centrica, 2012) paragraph 2.4.2 and 2.4.3 |
|                                             | Tow recovery operation causing damage to vegetation                               | None beyond inbuilt mitigation by tool design                                                                                                                                                                                                  | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works                                                                                                                                                                                                         | N/A                                                                                                  |

| Risk Scenario                               | Consequence                                            | Contingency                                                                                                                                                                       | Environmental Assessment                                                                                                                                                                                                                                                                                                                                               | Approval                                                                   |
|---------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Temporary breakdown of Moonfish in mudflats | Stationary Moonfish causes mudflat sediment compaction | None beyond inbuilt mitigation by tool design                                                                                                                                     | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works                                                                                                                                                             | N/A                                                                        |
|                                             | Delay causes extended overall programme time           | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017) | Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1 <sup>st</sup> May and 31 <sup>st</sup> August increases confidence that export cables will be installed within a single season<br><br>The existing assessment provided by the SEI (Centrica 2012) considered installation over two seasons | Approved as per assessment in the original SEI assessment (Centrica, 2012) |
|                                             | Tow recovery operation causing damage to mudflats      | None - inbuilt mitigation by tool design                                                                                                                                          | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works                                                                                                                                                             | N/A                                                                        |
| Sunfish loses traction in saltmarsh         | Causes damage to saltmarsh vegetation                  | Tow-assist feature                                                                                                                                                                | No direct impact because of no additional need for vehicles on the saltmarsh<br><br>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB)                                                                                                                                                            | N/A                                                                        |
|                                             |                                                        | Inbuilt mitigation through traction control                                                                                                                                       | No direct impact<br><br>The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works                                                                                                                                     | N/A                                                                        |

| Risk Scenario                            | Consequence                                  | Contingency                                                                                                                                                                       | Environmental Assessment                                                                                                                                                                                                                                                                                                                                               | Approval                                                                   |
|------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
|                                          | Causes extended overall programme time       | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017) | Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1 <sup>st</sup> May and 31 <sup>st</sup> August increases confidence that export cables will be installed within a single season<br><br>The existing assessment provided by the SEI (Centrica 2012) considered installation over two seasons | Approved as per assessment in the original SEI assessment (Centrica, 2012) |
| Moonfish loses traction in mudflats      | Causes damage to mudflat sediments           | None - inbuilt mitigation by tool design (i.e. grouser tracks)                                                                                                                    | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works                                                                                                                                                             | N/A                                                                        |
|                                          | Delay causes extended overall programme time | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017) | Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1 <sup>st</sup> May and 31 <sup>st</sup> August increases confidence that export cables will be installed within a single season<br><br>The existing assessment provided by the SEI (Centrica 2012) considered installation over two seasons | Approved as per assessment in the original SEI assessment (Centrica, 2012) |
| Cable roller deployment/recovery failure | Delay causes extended overall programme time | As above                                                                                                                                                                          | As above                                                                                                                                                                                                                                                                                                                                                               | As above                                                                   |

| Risk Scenario                 | Consequence                                                   | Contingency                                                                                                                                                                                                                                                    | Environmental Assessment                                                                                                                                                                                                                                                                                                                                                                                           | Approval                                                                                                                                                  |
|-------------------------------|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                               | Causes sediment/vegetation damage                             | Managed my restoration. Under the guidance of the Statutory Nature Conservation Body (SNCB) and Ecological Clerk of Works (ECOW), saltmarsh reinstatement (as per the approved Saltmarsh Mitigation and Reinstatement Works Plan) is conducted                 | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works<br><br>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB), avoiding the one year delay experienced on the Lincs Offshore Wind Farm | Approved as per assessment in the original SEI assessment (Centrica, 2012)<br><br>Approval by virtue of Saltmarsh Mitigation and Reinstatement Works Plan |
|                               | Causes roller deployment to misalign                          | Rollers repositioned onto additional track plate                                                                                                                                                                                                               | As above                                                                                                                                                                                                                                                                                                                                                                                                           | As above                                                                                                                                                  |
|                               | Causes rollers to tilt                                        | Pins and/or sandbags deployed by hand for stability                                                                                                                                                                                                            | As above                                                                                                                                                                                                                                                                                                                                                                                                           | As above                                                                                                                                                  |
|                               | Personnel and vehicles transiting causes damage to vegetation | Aluminium trackway will be utilised for access by foot traffic and/or low ground pressure vehicles where required for roller adjustment or recovery<br><br>Two low ground pressure excavators and rubber crawlers on standby for roller adjustment or recovery | The laying of a temporary roadway (such as the installation of an aluminium track) was assessed in the original SEI (Centrica, 2012) paragraph 2.4.2 and 2.4.3<br><br>Monitoring results from the 2014 deployment at the site indicate trackway deployment will not in itself result in significant impacts                                                                                                        | Approved as per assessment in the original SEI assessment (Centrica, 2012) paragraph 2.4.2 and 2.4.3                                                      |
| Sunfish hydraulic arm failure | Causes an inability to dig starter pits                       | Two low ground pressure excavators and rubber crawlers on standby to create start pits<br><br>Aluminium trackway will be utilised for access by foot traffic and/or low ground pressure vehicles                                                               | As above                                                                                                                                                                                                                                                                                                                                                                                                           | Approved as per assessment in the original SEI assessment (Centrica, 2012) paragraph 2.4.2 and 2.4.3                                                      |

| Risk Scenario                          | Consequence                                                                 | Contingency                                                                                                                                                                                               | Environmental Assessment                                                                                                                                                                                                                                                                                                                                               | Approval                                                                                             |
|----------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|                                        | Delay causes extended overall programme time                                | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017)                         | Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1 <sup>st</sup> May and 31 <sup>st</sup> August increases confidence that export cables will be installed within a single season<br><br>The existing assessment provided by the SEI (Centrica 2012) considered installation over two seasons | Approved as per assessment in the original SEI assessment (Centrica, 2012)                           |
|                                        | Causes an inability to unload cable                                         | Two low ground pressure excavators to assist<br><br>Aluminium trackway will be utilised for access by foot traffic and/or low ground pressure vehicles                                                    | As above                                                                                                                                                                                                                                                                                                                                                               | Approved as per assessment in the original SEI assessment (Centrica, 2012) paragraph 2.4.2 and 2.4.3 |
| Accidental fuel/oil/chemical discharge | Causes harm to the environment, flora, fauna and contamination to sediments | Marine Pollution Contingency Plan (MPCP) implemented<br><br>Spill kits deployed by trained onsite crews<br><br>Advice on management of contaminated material will be sought from the relevant authorities | N/A                                                                                                                                                                                                                                                                                                                                                                    | N/A                                                                                                  |

| Risk Scenario                                           | Consequence                                             | Contingency                                                                                                                                                                                                                                                                                                                                                             | Environmental Assessment                                                                                                                                                                                                                                                                                                                                                                                                  | Approval                                                                                             |
|---------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Pedestrian/vehicular access across trackway             | Causes damage to saltmarsh vegetation                   | <p>Trackway placed on geotextile membrane, rolled out by hand from base of sea defence out to seaward edge of saltmarsh vegetation</p> <p>Trackway in position for maximum of 25 days plus five days to remove</p> <p>Ecological Clerk of Works to monitor placement and removal of trackway, and record saltmarsh vegetation condition before and after deployment</p> | <p>The laying of a temporary roadway (such as the installation of an aluminium track) was assessed in the original SEI (Centrica, 2012) paragraph 2.4.2 and 2.4.3</p> <p>Monitoring results from the 2014 deployment at the site indicate trackway deployment will not in itself result in significant impacts</p>                                                                                                        | Approved as per assessment in the original SEI assessment (Centrica, 2012) paragraph 2.4.2 and 2.4.3 |
| Buried object within sediments halts cable installation | Delay causes extended overall programme time            | The base case is to install both cables within one season, but the contingency programme incorporates two season working (i.e. 1 May - 31 August 2016 and 1 May - 31 August 2017)                                                                                                                                                                                       | <p>Early commencement (April 2016) of sea defence works in order to maximise the permitted four month working window between 1<sup>st</sup> May and 31<sup>st</sup> August increases confidence that export cables will be installed within a single season</p> <p>The existing assessment provided by the SEI (Centrica 2012) considered installation over two seasons</p>                                               | Approved as per assessment in the original SEI assessment (Centrica, 2012)                           |
|                                                         | Stationary Sunfish causes saltmarsh sediment compaction | Managed my restoration. Under the guidance of the Statutory Nature Conservation Body (SNCB) and Ecological Clerk of Works (ECOW), saltmarsh reinstatement (as per the approved Saltmarsh Mitigation and Reinstatement Works Plan) is conducted                                                                                                                          | <p>The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works</p> <p>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB), avoiding the one year delay experienced on the Lincs Offshore Wind Farm</p> | Approval by virtue of Saltmarsh Mitigation and Reinstatement Works Plan                              |

| Risk Scenario                                               | Consequence                                      | Contingency                                                                                                                                           | Environmental Assessment                                                                                                                                                                                                                                                                                                                                                                                           | Approval                                                                                                                                                  |
|-------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                             | Excavation causes damage to saltmarsh vegetation | Initial attempts to access and inspect obstruction with hand tools only<br><br>If too large to remove by hand, the Sunfish hydraulic arm will be used | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works<br><br>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB), avoiding the one year delay experienced on the Lincs Offshore Wind Farm | Approved as per assessment in the original SEI assessment (Centrica, 2012)<br><br>Approval by virtue of Saltmarsh Mitigation and Reinstatement Works Plan |
| Sunfish unable to bury cable to depth at toe of sea defence | Delay causes extended overall programme time     | As above                                                                                                                                              | As above                                                                                                                                                                                                                                                                                                                                                                                                           | As above                                                                                                                                                  |
|                                                             | Cable depth not achieved                         | Sunfish to excavate a starter pit                                                                                                                     | The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works<br><br>The creation of a starter pit (on the seaward side of the sea defence) of an estimated 67.5m <sup>3</sup> of material was assessed in the original SEI (Centrica, 2012).                         | Approved as per assessment in the original SEI assessment (Centrica, 2012)                                                                                |
|                                                             |                                                  | Low ground pressure excavator to create starter pit                                                                                                   | As above                                                                                                                                                                                                                                                                                                                                                                                                           | As above                                                                                                                                                  |

| Risk Scenario | Consequence                                             | Contingency                                                                                                                                                                                                                                    | Environmental Assessment                                                                                                                                                                                                                                                                                                                                                                                                  | Approval                                                                |
|---------------|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
|               | Stationary Sunfish causes saltmarsh sediment compaction | Managed my restoration. Under the guidance of the Statutory Nature Conservation Body (SNCB) and Ecological Clerk of Works (ECOW), saltmarsh reinstatement (as per the approved Saltmarsh Mitigation and Reinstatement Works Plan) is conducted | <p>The overall footprint and effect of impact is deemed considerably less than that originally assessed in the Environmental Statement (Centrica, 2009) and Appropriate Assessment (DECC, 2012) for the works</p> <p>Saltmarsh reinstatement will be undertaken immediately following cable installation (once agreed with the MMO and SNCB), avoiding the one year delay experienced on the Lincs Offshore Wind Farm</p> | Approval by virtue of Saltmarsh Mitigation and Reinstatement Works Plan |

### 3. Contingency Vessels and Tools

The vessels and tools described in the Part I: Technical Proposals are essential to undertaking the export cables installation. If any aspect of the works run into difficulty, back-up plant and vessels may be required to assist with completion of the works. These contingency plant and vessels are listed in table 3.1 below:

**Table 3.1: Contingency vessels and tools for the nearshore and intertidal**

| Vessel / tool task                              | Vessel / tool type       | Description of task                                                                                                                                                               |
|-------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contingency support in saltmarsh and mudflats   | Amphibious excavator     | If Sunfish has difficulty with deployment or recovery of rollers in saltmarsh, two low ground pressure excavator will assist.<br>Guidance of pulling head over cable rollers.     |
| Intertidal amphibious rescue and survey vehicle | CWIND Avenger or similar | Can access shallow water and offshore mudflats to carry out transfer or rescue of construction workers from locations that are inaccessible by other support vessels at low tide. |
| Offshore seabed levelling                       | Mass flow excavator      | If UTV1200 fails to climb inclinations or fails to achieve burial depth, mass flow excavator may be considered for seabed levelling and joint pits.                               |
| Offshore dive vessel                            | TBC                      | In case of cable damages during the installation, divers including vessel/barge on anchors may be required in the recovery/repair of the damaged cable                            |
| Cable repair vessel/barge                       | TBC                      | In case of cable damages during the installation, a cable repair vessel/barge may be required for making repair joints                                                            |