



Beatrice Offshore Wind Farm Consent Plan

Construction Programme

February 2017

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Project Title/ Location	Beatrice Offshore Wind Farm
Project Reference Number	LF0000005
Date:	February 2017

Beatrice Offshore Wind Farm Construction Programme

Pursuant to Section 36 Consent Condition 10 and the Marine Licence
(Offshore Transmission Works) Condition 3.2.2.3

For the approval of the Scottish Ministers

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Construction Programme Overview

Purpose of the Plan

This Construction Programme (CoP) has been prepared to address the specific requirements of the relevant conditions attached to Section 36 Consent and Marine Licences issued to Beatrice Offshore Windfarm Limited (BOWL).

The overall aim of the CoP is to set out the intended construction programme for the Beatrice Wind Farm and Offshore Transmission Works (OfTW).

Scope of the Plan

The CoP covers, in line with the requirements of Section 36 and Marine Licence conditions, the following:

- The proposed date for commencement of construction;
- The proposed details of mobilisation of plant and delivery of materials;
- The proposed timings and sequencing of construction work for all elements of the Development;
- Contingency planning for poor weather or other delays; and,
- The scheduled date for final commissioning of the Development.

Structure of the Plan

The CoP is structured as follows:

Sections 1 to 4 set out the scope and objectives of the CoP, provides an overview of the Project, set out broad statements of compliance and detail the process for making updates and amendments to this document.

Sections 5 and 6 sets out the delivery and construction schedule and contingency considerations for the Wind Farm and the OfTW respectively.

Section 7 demonstrates compliance of the CoP with that set out in the Environmental Statement (ES) and Supplementary Environmental Information Statement (SEIS).

Appendices present supporting information.

Plan Audience

This CoP is intended to confirm the timing and programming of offshore construction works to the Marine Scotland Licensing and Operation Team, their advisors and other stakeholders.

Plan Locations

Copies of this CoP are to be held in the following locations:

- BOWL Head Office;
- With the Ecological Clerk of Works (s).

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List of Abbreviations and Definitions

Term	Definition / Description
Application	The Application letters and Environmental Statement submitted to the Scottish Ministers by BOWL on 23 April 2012 and Supplementary Environmental Information Statement submitted to the Scottish Ministers by BOWL on 29 May 2013.
BOWL	Beatrice Offshore Windfarm Limited (Company Number SC350248) and having its registered office at Inveralmond House, 200 Dunkeld Road, Perth, PH1 3AQ.
Commencement of the Wind Farm/OfTW	The date on which Construction begins on the site of the Wind Farm or the OfTW (as appropriate) in accordance with the S.36 Consent or OfTW Marine Licence (as appropriate).
Construction	As defined at section 64(1) of the Electricity Act 1989, read with section 104 of the Energy Act 2004.
CoP	Construction Programme as required for approval under Condition 10 of the S36 Consent and Condition 3.2.2.3 of the OfTW Marine Licence.
Development	The Wind Farm and the OfTW.
ECoW	Ecological Clerk of Works as required for approval under Condition 30 of the S36 Consent and Condition 3.2.2.12 of the OfTW Marine Licence.
ES	The Environmental Statement submitted to the Scottish Ministers by the Company on 23 April 2012 as part of the Application as defined above.
FID	Final Investment Decision.
Inter-array cables	The AC electrical cables that connect the wind turbines to the OTMs.
JNCC	Joint Nature Conservation Committee.
Key Contractors	The Contractors appointed for the individual work streams of Marine Installation; Transmission; and wind turbines.
Licencing Authority	The Scottish Ministers.
Licensable Marine Activity	Means the activities listed in section 66 of the Marine and Coastal Access Act 2009 (as amended) and section 21 of the Marine Scotland Act 2010 authorised under the Marine Licences

Term	Definition / Description
Marine Licences	The Wind Farm Marine Licence and the OfTW Marine Licence.
MCA	Maritime and Coastguard Agency.
MS - LOT	Marine Scotland Licensing Operations Team.
NLB	Northern Lighthouse Board.
OfTW	The Offshore Transmission Works. The OfTW includes the transmission cable required to connect the Wind Farm to the OnTW. This covers the OTMs and the cable route from the OTMs to the Mean High Water Springs (MHWS) at the landfall west of Portgordon on the Moray coast.
OfTW Marine Licence	The written consent for the OfTW granted by the Scottish Ministers under Section 20(1) of the Marine (Scotland) Act 2010 and Section 65 of the Marine and Coastal Access Act 2009, issued on 2 September 2014, as revised by the issue of licence 04461/16/0 on 27 April 2016.
OTM	Offshore Transformer Module means an alternating current (AC) offshore substation platform which is a standalone modular unit that utilises the same substructure and foundation design as a wind turbine generator.
RSPB Scotland	Royal Society for the Protection of Birds, Scotland.
S36 Consent	Consent granted by the Scottish Ministers under Section 36 of The Electricity Act 1989 to construct and operate the Beatrice Offshore Wind farm electricity generating station, dated 19 th March 2014.
SEIS	The Supplementary Environmental Information Statement submitted to the Scottish Ministers by the Company on 29 May 2013 as part of the Application as defined above.
SEPA	Scottish Environment Protection Agency.
SNH	Scottish Natural Heritage.
Subcontractor	Subcontractors to the Key Contractors.
Wind Farm	The offshore array development as assessed in the ES including wind turbines, their foundations, inter-array cabling and meteorological masts.
Wind Farm Marine Licence	The written consent for the Wind Farm granted by the Scottish Ministers under Section 20(1) of the Marine (Scotland) Act 2010, issued on 2 September 2014, as revised by the issue of licence

Term	Definition / Description
	04462/16/0 on 27 April 2016.

1 Introduction

1.1 Background

1.1.1 The Beatrice Offshore Wind Farm received consent under Section 36 of the Electricity Act 1989 from the Scottish Ministers on 19th March 2014 (the S36 Consent) and was granted two Marine Licences from the Scottish Ministers, for the Wind Farm and for the Offshore Transmission Works (OfTW) on 2nd September 2014 (the Marine Licences) and subsequently superseded on 27th April 2016 (Reference: [04461/16/0] and [04462/16/0] respectively).

1.2 Objectives of this Document

- 1.2.1 The S36 Consent and Marine Licences contain a variety of conditions that must be discharged through approval by the Scottish Ministers / the Licensing Authority prior to the commencement of offshore construction. One such requirement is the approval of the proposed timeline for construction for the works consented under the S36 Consent and Marine Licences through the preparation and approval of a Construction Programme (CoP).
- 1.2.2 The relevant conditions setting out the requirement for a CoP to be submitted for approval are set out in full in Table 1.1.
- 1.2.3 This document is intended to allow the discharge of the relevant S36 Consent and Marine Licence (OfTW) conditions by providing proposed timings for commencement of the development, mobilisation, construction works and commissioning.

Table 1.1 - Consent conditions to be discharged by this CoP

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the CoP
Section 36	Condition 10	The Company must, no later than 6 months prior to the Commencement of the [Wind Farm], submit a Construction Programme ("CoP"), in writing, to the Scottish Ministers for their written approval.	This document sets out the CoP for approval by the Scottish Ministers
		Such approval may only be granted following consultation by the Scottish Ministers with the JNCC, SNH, SEPA, MCA, NLB, RSPB Scotland, the Moray Council and any such other advisors or organisations as may be required at the discretion of the Scottish Ministers.	To be undertaken by the Scottish Ministers.
		The CoP must be in accordance with the ES.	Section 7
		The [Wind Farm] must, at all times, be constructed in accordance with the approved CoP (as updated and amended	Section 2

Beatrice Construction Programme

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the CoP
		from time to time by the Company).	
		Any updates or amendments made to the CoP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.	Section 3
		The CoP must set out: a) The proposed date for Commencement of [the Wind Farm]; b) The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas; c) The proposed timings and sequencing of construction work for all elements of the [Wind Farm] infrastructure; d) Contingency planning for poor weather or other unforeseen delays; and e) The scheduled date for Final Commissioning of the [Wind Farm].	Sections 4 and 5
OfTW Marine Licence	3.2.2.3	The Licensee must, no later than 6 months prior to the Commencement of the [OfTW], submit a CoP, in writing, to the Licensing Authority for their written approval.	This CoP.
		Such approval may only be granted following consultation by the Licensing Authority with the JNCC, SNH, SEPA, MCA, NLB, the Highland Council, Moray Council and any such other advisors or organisations as may be required at the discretion of the Licensing Authority.	To be undertaken by the Licensing Authority.
		The CoP must be in accordance with the Application.	Section 7
		The CoP must set out: a) The proposed date for Commencement of the [OfTW]; b) The proposed timings for mobilisation of plant and delivery of materials, including details of onshore lay-down areas; c) The proposed timings and sequencing of construction work for all elements of the [OfTW] infrastructure; d) Contingency planning for poor weather or other unforeseen delays; and e) The scheduled date for Final	Sections 4 and 6

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the CoP
		Commissioning of the [OfTW].	

1.3 CoP Document Structure

1.3.1 In response to the specific requirements of the S36 Consent and Marine Licence (OfTW) conditions, this CoP has been structured so as to be clear that each of the specific requirements have been met in full and that the relevant information to allow the Scottish Ministers to approve the CoP has been provided.

1.3.2 The document structure is set out in Table 1.2.

Table 1.2 - CoP document structure

Section	Title	Overview
1	Introduction	<ul style="list-style-type: none"> Background to consent requirements and overview of the CoP scope and structure; and Identifies those other consent plans to be developed relevant to the construction programme and provides a statement of consistency between the CoP and those plans
2	BOWL Statements of Compliance	<ul style="list-style-type: none"> Sets out the BOWL statements of compliance in relation to the CoP consent conditions
3	Updates and Amendments to this CoP	<ul style="list-style-type: none"> Sets out the procedures for any required updating or amending of the approved CoP and subsequent further approval by the Scottish Ministers/Licensing Authority
4	Programme Overview	<ul style="list-style-type: none"> Provides an overview of the project programme and key milestones
5	Wind Farm Construction Programme	<ul style="list-style-type: none"> Provides, for the Wind Farm, details of commencement of works, mobilisation to site, timings of works, contingency and commissioning
6	Offshore Transmission Works Construction Programme	<ul style="list-style-type: none"> Provides, for the OfTW, details of commencement of works, mobilisation to site, timings of works, contingency and commissioning
7	Compliance with the Environmental Statement	<ul style="list-style-type: none"> Provides confirmation that the details set out in this CoP are in accordance with those assessed in the ES

1.4 Linkages with Other Consent Plans

- 1.4.1 This CoP document sets out the proposed construction programme for the Wind Farm and the OfTW works as consented under the S36 and Marine Licence consents.
- 1.4.2 The consent and licence conditions do not explicitly require the CoP to demonstrate a linkage with other Consent Plans. However, ultimately it forms part of a suite of approved documents that provides the framework for the construction process.

2 BOWL Statements of Compliance

2.1 Introduction

- 2.1.1 The following section is intended to re-affirm the BOWL commitment to ensuring that the Beatrice Offshore Wind Farm is constructed in such a manner as to meet the relevant legislative requirements set out by the project consent and licences.

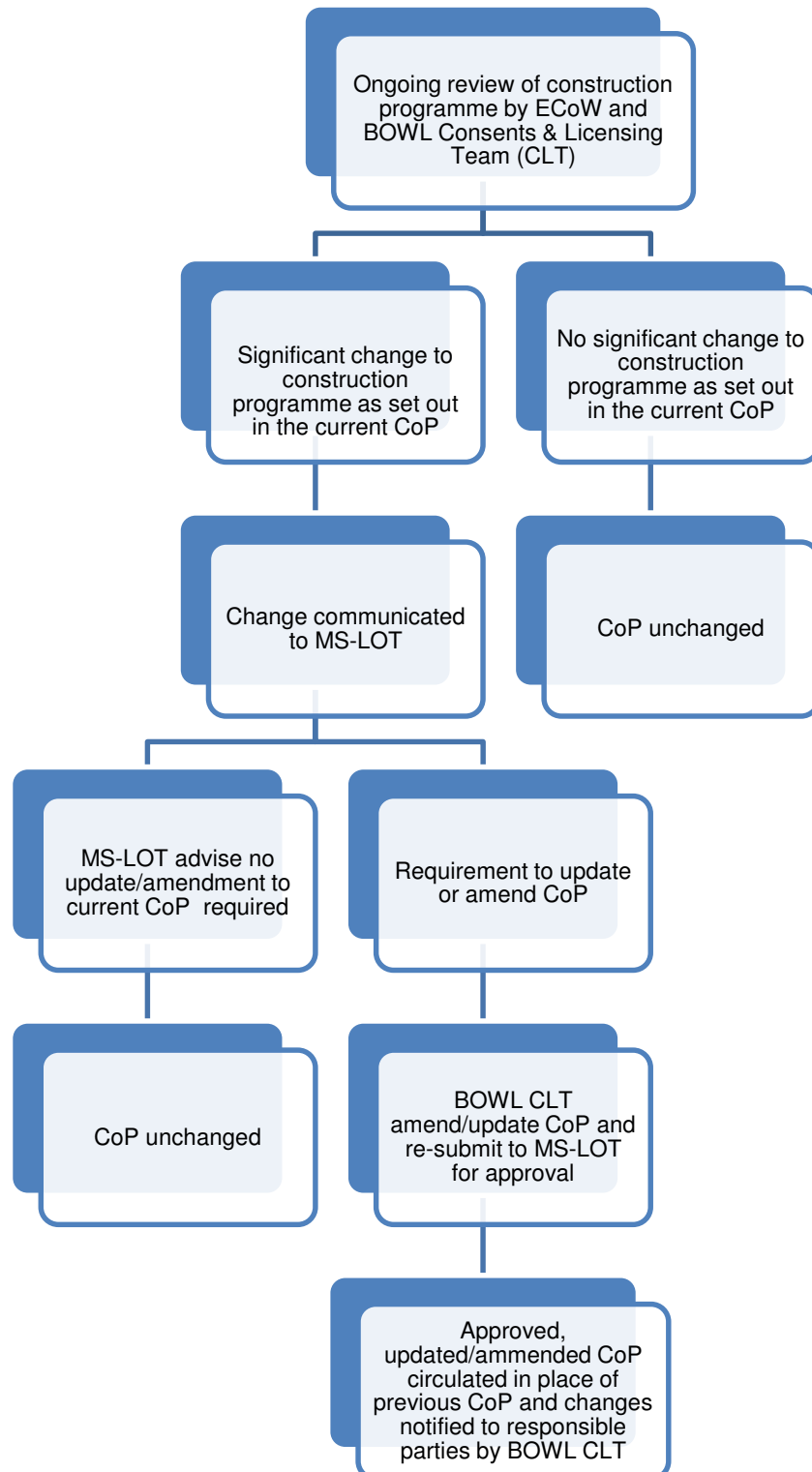
2.2 Statements of Compliance

- 2.2.1 BOWL in undertaking the construction of the project will ensure compliance with this CoP as approved by the Scottish Ministers (and as updated or amended from time to time following the procedure set out in Section 3 of this CoP).
- 2.2.2 Where significant updates or amendments are required to this CoP, BOWL will ensure the Scottish Ministers / the Licensing Authority are informed as soon as reasonably practicable and where necessary the CoP will be updated or amended (see Section 3 below).
- 2.2.3 BOWL in undertaking the construction of the project will ensure compliance with the limits defined by the original application and the project description defined in the Environmental Statement (ES) and Supplementary Environmental Information Statement (SEIS) and referred to in Annex 1 of the S36 Consent in so far as they apply to this CoP (unless otherwise approved in advance by the Scottish Ministers / the Licensing Authority) (see section 7).

3 Updates and Amendments to this CoP

- 3.1.1 This CoP sets out the proposed programme for construction and commissioning of the Beatrice Offshore Wind Farm in detail sufficient to provide the framework of timings around the construction process from commencement of works through to commissioning of the Wind Farm and the OfTW.
- 3.1.2 The S36 Consent condition recognises that updates or amendments to this CoP may be required, stating that:
- The [Wind Farm] must, at all times, be constructed in accordance with the approved CoP (as updated and amended from time to time by the Company). Any updates or amendments made to the CoP by the Company must be submitted, in writing, by the Company to the Scottish Ministers for their written approval.*
- 3.1.3 The sequencing of mobilisation, construction works and commissioning are detailed in this CoP.
- 3.1.4 Where it is necessary to update this CoP in light of any significant new information related to the construction programme, BOWL proposes to use the change management process set out in Figure 3.1 in identifying such information, communicating such change to the Scottish Ministers / the Licensing Authority, re-drafting the CoP, seeking further approval for the necessary amendments or updates and disseminating the approved changes/amendments to responsible parties.

Figure 3.1 CoP Change Management Procedure



4 Construction Programme Overview

4.1 Introduction

4.1.1 This section of the CoP provides a brief summary overview of the Beatrice Offshore Wind Farm development (as consented under the S36 Consent and Marine Licences) and presents the key milestone dates for the commencement of works, the main construction activity and the commissioning of the wind farm.

4.1.2 Further specific detail of the construction programme is then provided in Sections 5 and 6 of this CoP; the full programme is provided in Appendix A.

4.2 Project Overview

4.2.1 The Development is located approximately 13.5km south south-east of Wick, Caithness in the Moray Firth.

4.2.2 The Development will consist of the following main components:

- A total generating capacity of not less than 588MW;
- 84 wind turbines of 7MW rated generating capacity;
- Jacket foundations each installed on four piles driven into the seabed;
- Two AC substation platforms, referred to as Offshore Transformer Modules (OTMs) to collect the generated electricity and convert the electricity from 33kV to 220kV for transmission to shore;
- A network of circa 140km of inter-array cables, buried or (if burying is not possible) mechanically protected, subsea cables to connect strings of turbines together and to connect the turbines to the OTMs;
- Two buried or mechanically protected, subsea Export Cables, totalling circa 140km in length, to transmit the electricity from the OTMs to the land fall at Portgordon and connect to the two onshore buried Export Cables at the transition joint pit for transmission to the onshore substation and connection to the National Grid network.
- One OTM Interconnector cable of circa 1.2km in length that links the OTMs to one another; and,
- Minor ancillary works such as the deployment of met buoys and aids to navigation.

4.3 Key Milestone Dates

4.3.1 The key milestone dates within this CoP are presented in Table 4.1 below. The dates are as presented in the construction programme set out in Appendix A.

Table 4.1 - Summary of key milestone dates

Milestone	Anticipated Programme
Wind Farm	
Commencement of Wind Farm	March 2017
Mobilisation of Plant, Delivery of Materials to Onshore Laydown Areas (where required)	To match installation timings as set out below. Onshore laydown of wind turbine components over the period from Q2 2018 and throughout the turbine installation period.
Timing and Sequencing of Construction Work	<p>Seabed Preparation:</p> <ul style="list-style-type: none"> March 2017 <p>Pile Foundations:</p> <ul style="list-style-type: none"> April 2017 - January 2018 <p>Jackets:</p> <ul style="list-style-type: none"> August 2017 - December 2017 May 2018 – August 2018 <p>Wind turbines:</p> <ul style="list-style-type: none"> July 2018 - March 2019 <p>Inter-array Cables:</p> <ul style="list-style-type: none"> November 2017 - December 2017 March 2018 - April 2018 July 2018 – September 2018
Full Generation	March 2019
Final Commissioning of Wind Farm	March 2019
OfTW	
Commencement of OfTW	March 2017
Mobilisation of Plant and Delivery of Materials	To match installation timings as set out below
Timing and Sequencing of Construction Work	<p>Installation of Horizontal Ducts:</p> <ul style="list-style-type: none"> March 2017 - April 2017 <p>OTM Pile Foundations:</p> <ul style="list-style-type: none"> April 2017 <p>OTM Jackets:</p> <ul style="list-style-type: none"> August 2017 <p>OTM Topsides:</p> <ul style="list-style-type: none"> November – December 2017 <p>Export Cables:</p> <ul style="list-style-type: none"> September 2017 – May 2018
Full Generation	March 2019
Final Commissioning of OfTW	March 2019

- 4.3.2 It is currently anticipated that the offshore construction works will be carried out year-round and around the clock (i.e. 24 hour working, 7 days a week unless noted otherwise).
- 4.3.3 Installation of the piles for the jacket foundations is expected to commence in the shallower southern and eastern areas of the site and progress to the deeper northern and western areas. Further details on the foundation installation sequence are provided in Section 5 below.

5 Wind Farm Construction Programme

5.1 Introduction

5.1.1 The Beatrice Offshore Wind Farm construction programme is presented in Appendix A. With reference to Appendix A and in line with the requirements of the S36 Consent condition, the sections below detail, in relation to the Wind Farm the proposed:

- Date of commencement of the Wind Farm;
- Timings for the mobilisation of plant and delivery of materials, including details of onshore laydown areas (where required);
- Timing and sequencing of construction work for all elements of the wind farm infrastructure;
- Contingency planning for poor weather or other unforeseen delays; and
- Scheduled date for final completion and commissioning of the Wind Farm.

5.1.2 Note that the programme relating to the OfTW works is set out separately under section 6 below.

5.2 Commencement of Wind Farm Construction

5.2.1 The S36 Consent defines the Commencement of the Wind Farm as:

the date on which Construction¹ begins on the site of the [Wind Farm] in accordance with this consent.

5.2.2 Offshore construction begins with seabed preparation operations in March 2017.

5.2.3 The Commencement of the Wind Farm will therefore be in March 2017.

5.2.4 Following Final Investment Decision (FID) and Financial Close on the Beatrice Offshore Wind Farm in May 2016, orders were placed for components of the Development required early in the process, or those with long lead in times, including the wind turbines.

5.2.5 The delivery and stockpiling of materials and onshore fabrication activities to facilitate construction of the Wind Farm will commence prior to Commencement of the Wind Farm, as shown in the programme in Appendix A.

5.3 Seabed Preparation

5.3.1 The first activity to commence within the Wind Farm area will be boulder clearance operations in preparation for inter-array cable installation and foundation installation. Seabed preparation activities will be completed in March 2016.

¹ 'Construction' is as defined in the List of Abbreviations and Definitions provided at the start of this CoP document.

5.4 Mobilisation of Plant, Delivery of Materials, and use of Onshore Laydown Areas

5.4.1 The key components of the Wind Farm are:

- piled foundations,
- jacket substructures,
- wind turbine generators and
- inter-array cabling.

5.4.2 The arrival of the plant required to install the Wind Farm components will be timed to coincide with the timing of the main installation activities, as set out in Section 5.4 below.

5.4.3 The piled foundations, jacket structures and cabling will be delivered directly to the wind farm site and as such will not require the use of onshore laydown areas. The wind turbine components (turbine tower sections, nacelles and blades) will be delivered to the Port of Nigg where the components will be stored in an onshore laydown area for pre-assembly prior to being loaded onto the Pacific Orca jack-up vessel for installation.

5.4.4 The period for mobilisation, delivery, and staging of the wind turbine components is shown on the main construction programme in Appendix A, extending from Quarter 1 2018 and throughout the turbine installation period.

Pile Foundations Fabrication and Supply

5.4.5 It is currently envisaged that it will take approximately 7 months to fabricate the required number of piles, with fabrication commencing in Quarter 4 2016 and ending in Quarter 2 2017.

5.4.6 Piles will be transported to the wind farm site directly from the fabrication location and as required during the installation process.

Jacket Substructures Fabrication and Supply

5.4.7 It is currently envisaged that it will take approximately 15 months to fabricate the required number of jackets, with fabrication commencing in Quarter 2 2017 and ending in Quarter 3 2018.

5.4.8 The jacket structures are expected to be stored at the fabrication location and transported directly to site as required during the installation process.

Wind Turbines Manufacture and Supply

5.4.9 Wind turbine deliveries from the manufacturing facility to the construction port are scheduled from Quarter 2 2018. The delivery schedule is several months ahead of the installation of the turbines.

5.4.10 It is envisaged that the wind turbine nacelles will arrive from the manufacturing facility almost complete and pre-tested, and that turbine tower assembly and pre-commissioning will take place at the onshore laydown areas at the Port of Nigg.

5.4.11 Onshore assembly and pre-commissioning will take approximately 4 weeks per wind turbine and could be completed on a number of turbine towers in parallel.

Inter-array Cables Manufacture and Supply

5.4.12 Deliveries of cables will be phased to match installation requirements. The cables are expected to be transported directly to site from the manufacturing facility.

5.5 Timing and Sequencing of Construction Work

5.5.1 The following sections detail the proposed timings and sequencing of construction work for all elements of the Wind Farm and relate to the construction programme provided in Appendix A.

Piling of Foundations

5.5.2 Pile installation is planned to take place in a single phase between April 2017 and January 2018.

5.5.3 It is anticipated that the majority of piling activity will be completed between April and October 2017. Piling activities have been programmed during the winter months between November 2017 and January 2018 to provide the flexibility required in case delays occur during the summer months.

Jacket Substructure Installation

5.5.4 Jackets will be installed onto the pre-installed piles between the months of August to December 2017 and May to August 2018 inclusive.

Wind Turbine Installation

5.5.5 Once most of the piles and jackets have been installed then wind turbine installation will take place.

5.5.6 Turbine installation is scheduled to be completed over a 9 month period between July 2018 and March 2019. It is likely that wind turbine installation will proceed at a rate of approximately 2.5 turbines per week.

5.5.7 Once installed, wind turbine commissioning is anticipated to be completed approximately 25 days after installation.

Inter-array Cable Installation

5.5.8 Inter-array cable installation will take place in three phases in Quarter 4 2017 (November – December); Quarter 1 2018 (March - April) and Quarter 3 2018 (July – September).

5.5.9 The wind turbines will be connected to the inter-array cables during the wind turbine installation window between July 2018 and March 2019.

5.6 Contingency Planning

5.6.1 Given the nature and scale of the construction project the potential exists for unforeseen delays, including from periods of unsuitable weather and equipment failure which are outwith BOWL's control.

5.6.2 BOWL has undertaken weather analysis and assessed programme risks; the construction programme set out in Appendix A has been designed with contingencies included. The programme includes, on average, a 30% contingency allowance.

5.6.3 Table 5.1 presents the factors for which contingency has been included in the programme for each of the key Wind Farm components.

Table 5.1 - Wind Farm programme contingency factors

Wind Farm Component	Contingency Factor
Pile Foundations	<ul style="list-style-type: none"> Foundations will be fabricated to allow a buffer to be established to ensure that piles are available in advance of installation activities; Where possible, installation during in winter months has been minimised to mitigate weather delays. Allowance for piling during winter months should delays to piling occur during the first summer season.
Jackets	<ul style="list-style-type: none"> Jackets will be fabricated to allow a buffer to be established to ensure that jackets are available in advance of installation activities.
Turbines	<ul style="list-style-type: none"> 2 month lag between delivery of wind turbines and requirement for installation; Wind turbines installed in two phases, with the end of each phase having the fewest number of planned installations to allow any delays earlier in each phase to be recovered.
Inter-array Cables	<ul style="list-style-type: none"> Installation scheduled nine months in advance of wind turbine installation completion.

5.7 Final Commissioning of the Wind Farm

5.7.1 Annex 3 of the S36 Consent defines Final Commissioning of the Wind Farm as

the date on which all wind turbine generators forming the [Wind Farm] have supplied electricity on a commercial basis to the National Grid, or such earlier date as the Scottish Ministers deem the [Wind Farm] to be complete.

- 5.7.2 It is anticipated that the Wind Farm will be commissioned over a 9 month period, with first electricity generation scheduled for July 2018 and the full commissioning of the Wind Farm scheduled for March 2019.
- 5.7.3 The anticipated date of Final Commissioning of the Wind Farm is therefore scheduled to be March 2019.

6 Offshore Transmission Works Construction Programme

6.1 Introduction

6.1.1 The Beatrice Wind Farm construction programme is presented in Appendix A. With reference to Appendix A and in line with the requirements of the Marine Licence condition, the sections below detail, in relation to the OfTW:

- Date of commencement of the OfTW;
- Timings for the mobilisation of plant and delivery of materials, including details of onshore laydown areas (where required);
- Timing and sequencing of construction work for all elements of the OfTW infrastructure;
- Contingency planning for poor weather or other unforeseen delays; and
- Scheduled date for final completion and commissioning of the OfTW.

6.2 Commencement of OfTW

6.2.1 The OfTW Marine Licence defines the Commencement of the OfTW as

the date on which the first vessel arrives on the Site to begin carrying on the Licensable Marine Activity² in connection with the construction of the [OfTW], as described in Part 2 of this licence.

6.2.2 The first elements of the OfTW to be installed will be the horizontal cable ducts at the export cable landfall near Portgordon in March 2017, which is when the first vessel will arrive on site to begin carrying out OfTW Licensable Marine Activity.

6.2.3 The Commencement of the OfTW is therefore March 2017.

6.2.4 Following Financial Close on the Beatrice Offshore Wind Farm in May 2016, orders have been placed for components of the OfTW required early in the process, or those with long lead in times, including, for example, the export cable and steel for OTM fabrication.

6.3 Mobilisation of Plant, Delivery of Materials, and use of Onshore Laydown Areas

6.3.1 The key components of the OfTW are:

- Two OTMs;
- OTM interconnector cable; and
- Two export cables (and cable protection material (as required)).

6.3.2 The OTM topsides will be installed upon the same specification piled jacket foundations as the wind turbines; the installation of the piled foundations and jackets

² See the List of Abbreviations and Definitions for the definition of "Licensable Marine Activity" in the context of the OfTW Marine Licence.

to support the OTMs will fall within the periods of pile and jacket installation described in Section 5.

6.3.3 The arrival of the plant required to install the OfTW components will be timed to coincide with the timing of installation activities, as set out in Section 6.4.

6.3.4 All elements of the OfTW infrastructure will be delivered directly to site from the location of fabrication as required; no onshore laydown areas will therefore be required for the completion of the OfTW installation process.

OTM Fabrication and Supply

6.3.5 OTMs are anticipated to be fabricated between October 2016 and November 2017. The OTM topsides are planned to arrive for installation in November 2017. The topsides will be delivered to site directly from the fabrication site.

Export Cable Manufacture and Supply

6.3.6 Deliveries of cables will be phased to match installation requirements. The cables will be transported to site directly from the manufacturing facility.

6.3.7 Where required cable protection material will be transported directly to site from source.

6.4 Timing and Sequencing of Construction Work

6.4.1 The following sections detail the proposed timings and sequencing of construction for all elements of the OfTW, and relate to the construction programme provided in Appendix A.

Installation of Horizontal Ducts

6.4.2 The export cables make landfall to the west of Portgordon. Installation of two horizontal ducts is required to get the cable ashore. The first vessels will arrive on site to assist with horizontal duct pop-out at the seaward exit location. A length of export cable will be installed through the horizontal ducts and sealed in preparation for the installation of the offshore export cables. Offshore installation of horizontal ducts will be completed between March and May 2017.

OTM Installation

6.4.3 The piled foundations and jackets for the OTMs will be installed in Quarter and 3 of 2017, during the first phase of foundation and jacket installation for the wind turbines and prior to the installation of the export cable (indicatively piling in April 2017 and jacket installation in August 2017).

6.4.4 Both OTM topsides will be installed between November and December 2017.

Export Cable Installation

6.4.5 Each of the export cables (and any required cable protection material) will be installed in two route lengths; the first from the shore to the midway point between the landfall location and the OTM (the mid-point) and the second from the OTM to the mid-point. The installation of both export cables will be completed between September 2017 and May 2018. A short length of export cable, or inter-connector, will be installed between the OTMs during the period when the export cables are installed.

6.5 Contingency Planning

6.5.1 Given the nature and scale of the construction project the potential exists for unforeseen delays, including from periods of unsuitable weather and equipment failure which are outwith BOWL's control.

6.5.2 The construction programme set out in Appendix A has been designed with such contingencies included. The programme includes, on average, a 30% contingency allowance.

6.5.3 Table 6.1 presents the factors for which contingency has been included in the programme for each of the key OfTW components.

Table 6.1 - OfTW programme contingency factors

OfTW Component	Contingency Factors
OTMs	<ul style="list-style-type: none"> Three months contingency is allowed between the installation of the OTM piles and the installation of the OTM jackets; A two month gap is allocated between jacket installation and OTM topside installation; Weather allowances have been included both for the hooking up of the two OTMs and the commissioning of the two OTMs.
Export Cables	<ul style="list-style-type: none"> A period of 11 months has been allocated as the lead in time for the export cables;

6.6 Final Commissioning of OfTW

6.6.1 The OfTW Marine Licence (Section 1.1(n)) defines the Final Commissioning of the OfTW as

the date on which all the [OfTW] have been used to supply electricity on a commercial basis to the National Grid, or such earlier date as the Licensing Authority deem the [OfTW] to be fully commissioned.

6.6.2 Both export cables are scheduled to be installed by May 2018. The OTMs will be installed between November and December 2017 with first generation scheduled for July 2018.

- 6.6.3 It is proposed that the onshore transmission works (OfTW) (including cable installation and substation construction) will be completed by June 2018 following 14 months of civil engineering works (between June 2016 and July 2017).
- 6.6.4 The proposed date for the Final Commissioning of the OfTW is March 2019, which coincides with that for the Wind Farm, as this is the date that electricity will be exported from all wind turbines forming the Wind Farm, and therefore the date that the Wind Farm begins supplying electricity on a commercial basis.

7 Compliance with the Application and Environmental Statement

7.1.1 The S36 Consent and Marine Licence (OfTW) conditions (see Section 1.2) require that this CoP is in accordance with the Environmental Statement / Application.

7.1.2 The ES (and SEIS) made few commitments in relation to construction programme, but did set out an indicative construction programme. This indicative programme:

- Set out the anticipated maximum duration of the Development and key elements of construction activity;
- Assumed sufficient flexibility beyond the timescales proposed to accommodate unforeseen events including:
 - Variations in ground conditions;
 - Critical logistics and supply chain constraints or delays;
 - Delays or acceleration to arrival, or failures, of specialist equipment;
- Assumed construction activities would take place all year round, 24 hours a day, seven days a week (although dependent on weather conditions); and
- Assumed OfTW installation would take approximately 9 months with each export cable laid preferably as a non-stop activity from one end of the route to the other.

7.1.3 Table 7.1 presents the indicative 5-year construction programme provided in the ES (the original expectation was for construction over the 5-year period 2014 to 2018 inclusive).

7.1.4 The grey shading (with highlighted border) shows the indicative timing and duration of activities presented in the ES for the purposes of impact assessment. The red hatching represents the timings/durations from the programme presented in this CoP.

Table 7.1 - ES Indicative Construction Programme Years 1 to 5 (with current construction years below) (grey shading with highlighted border) relative to the timings set out in this CoP (red hatching)

Construction Activity	Year 1 (2016)				Year 2 (2017)				Year 3 (2018)				Year 4 (2019)				Year 5 (2020)			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Pre-installation seabed investigations																				
Installation of Foundations																				
Installation of Inter-Array Cables																				
Installation of Substructures (Jackets)																				
Installation of Wind Turbines/ OTM topsides																				
Offshore Transmission Works (export cables)																				
First Electricity Production and Export																				

7.1.5 The comparison set out in Table 7.1 indicates that the major construction works for the Beatrice Offshore Wind Farm lie within the relative timings and durations suggested by the indicative programme set out in the ES and that in most cases the duration of the main construction activities is considerably less than the total durations suggested by the ES.

7.1.6 The installation of the wind turbines and OTM topsides, although of shorter duration overall, lie outwith the predicted relative timings. This is a result of the OTMs being installed earlier than anticipated in November and December 2017.

7.1.7 The installation of the Export Cable is programmed to commence in Q1 2017 and complete in Q2 2018 which lies beyond the predicted relative timings and durations presented in the ES. This is a result of a planned three-month break in construction between installation of the horizontal ducts at the landfall location and installation of the subsea cable (See Appendix A). The total duration of OfTW works remains within the predicted indicative timings reported in the ES.

7.1.8 First electricity is produced only marginally later than indicated in the ES indicative programme.

7.1.9 On the basis of the above, it can be concluded that the CoP is in accordance with the ES, SEIS and Application.

Appendix A: Construction Programme

BOWL Construction Programme Consent Plan

[illegible]