

A large white offshore wind turbine stands in the middle of the ocean under a clear blue sky. In the background, other smaller wind farm structures are visible. A large splash of white water is in the foreground on the right side.

Beatrice Offshore Wind Farm Consent Plan

Traffic and Transportation Plan

August 2016


Beatrice
Offshore Windfarm Ltd

Project Title/ Location	Beatrice Offshore Wind Farm
Project Reference Number	LF0000005
Date:	August 2016

Beatrice Offshore Wind Farm

Traffic and Transportation Plan

Pursuant to Section 36 Consent Condition 26 and OfTW Marine Licence
Condition 3.2.2.11

For the approval of the Scottish Ministers

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Executive Summary - TTP Overview

Purpose of the Plan

This TTP is intended to provide sufficient detail to allow the discharge of the relevant Section 36 and OfTW Marine Licence conditions.

The overall objective of the TTP is to set out the necessary measures required to mitigate any identified significant traffic and transport related effects. The TTP provides detail on the ports and airports to be used during the construction of the Development and the construction activities and their associated vehicle movements.

No significant traffic or transport effects are anticipated and therefore it is considered by BOWL that specific mitigation will not be required.

Scope of the Plan

The TTP provides an overview of the traffic and transport associated with the construction of the Development, and that will be utilising the road network.

The TTP excludes the components transported by sea from the manufacturing and fabricating facilities to the offshore wind farm site either directly or via a marshalling port. The components excluded include support structures (piles and jackets), inter-array cables, Offshore Transformer Module (OTMs) and Wind Turbine Generators (WTGs). Whilst the major components will be delivered by sea there will be road traffic movements arising from the installation of these components and these are described in this TTP.

This document does not apply to any works associated with the construction of the Marine Coordination Centre at Wick Harbour nor the Onshore Transmission Works (OnTW) as these elements do not form part of the Development which is the subject of the Section 36 consent and Marine Licence conditions.

Structure of the Plan

The TTP is structured as follows:

Sections 1 to 4 set out an introduction to the TTP, the methodology, scope and objectives of the TTP, set out statements of compliance, detail the process for making updates and amendments and provide an overview of the Development.

Section 5 provides an overview of the key roles and responsibilities for BOWL and its key contractors, the harbours and airports used during construction of the Development and their associated vehicle movements.

Section 6 provides details on anticipated road based traffic and transport effects during the construction phase.

Section 7 provides a statement of compliance of the TTP with the original Application, ES and SEIS.

Plan Audience

This TTP will be provided to the Scottish Ministers, Transport Scotland, The Highland Council and the Moray Council.

Plan Locations

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

- BOWL Head Office;
- At the premises of any agent, Key Contractor or Subcontractor acting on behalf of BOWL;
and
- The BOWL Marine Coordination Centre at Wick.

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List of Abbreviations and Definitions

Term	Description
AC	Alternating Current
AHT	Anchor Handling Tug
Application	The application letters, the ES and the SEIS
BOWL	Beatrice Offshore Windfarm Ltd.
CLT	Consents and Licensing Team
CMS	Construction Method Statement as required for approval under Condition 11 of the Section 36 Consent and Condition 3.2.2.4 of the OfTW Marine Licence
Commencement of Development	The date on which construction begins on the site of the Development in accordance with either the s36 Consent or the OfTW Marine Licence.
CoP	Construction Programme as required for approval under Condition 10 of the Section 36 Consent and Condition 3.2.2.3 of the OfTW Marine Licence
Consent Conditions	The conditions that are imposed on BOWL under the S.36 or the OfTW Marine Licence.
CTV	Crew Transfer Vessel
Development	Means the Wind Farm and the OfTW
Electricity Act	Means the Electricity Act 1989 (as amended)
EMP	Environmental Management Plan as required for approval under Condition 15 of the Section 36 Consent and Condition 3.2.1.2 of the OfTW Marine Licence
ES	Environmental Statement submitted to the Scottish Ministers by BOWL on 23 April 2012
Export Cable	The AC electrical cables that connect the OTMs to the landfall at Portgordon
HGV	Heavy Goods Vehicle
HLV	Heavy Lift Vessel

Term	Description
IEMA Guidance	The Institute of Environmental Assessment (IEMA, 1993) 'Guidelines for the Environmental Assessment of Road Traffic
Inter-array cables/ cabling	The AC electrical cables that connect the WTGs to the OTMs (and OTM to OTM)
Key Contractors	The Contractors appointed for the individual work streams of marine installation; transmission; and WTG
Licensing Authority	The Scottish Ministers
LGV	Light Goods Vehicle
Marine Licences	The OfTW Marine Licence and the Wind Farm Marine Licence
MS-LOT	Marine Scotland Licensing Operations Team
MW	Megawatt
OFTO	Offshore Transmission Operator
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 amended by the revised licence issued on 27 April 2016
OnTW	The onshore transmission works from landfall, consisting of onshore buried export cables to the onshore substation and connection to the National Grid network.
OSP	Offshore Substation Platform
OTM	Offshore Transformer Module means an alternating current (AC) OSP which is a standalone module unit that utilises the same substructure and foundation design as a wind turbine generator
OWF	Offshore Wind Farm

Term	Description
PSV	Platform Supply Vessel
Section 36 Consent	Consent granted by the Scottish Ministers under Section 36 of The Electricity Act 1989 to construct and operate the Wind Farm, dated 19 th March 2014
SEIS	The Supplementary Environmental Impact Statement submitted to the Scottish Ministers by BOWL on 29 May 2013 as part of the Application as defined above.
SHL	Seaway Heavy Lifting
STDL	Siemens Transmission and Distribution Ltd
SWPL	Siemens Wind Power Ltd
Subcontractor	Subcontractors to the Key Contractors
TEMPRO	Trip End Model Presentation Program
TS	Transport Scotland
TTP	This Traffic and Transportation Plan
VMP	Vessel Management Plan
Wind Farm	The offshore array development as assessed in the ES and SEIS including WTGs, 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 amended by the revised licence issued on 27 April 2016
WTG	Wind Turbine Generator

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 Section 36 Consent) and was granted two Marine Licences from the Scottish Ministers, one for the Offshore Wind Farm (OWF) and one for the associated Offshore Transmission Works (OfTW), dated the 2nd September 2014, as revised by the issue of licence references 04461/16/0 and 04462/16/0 on the 27th April 2016 (the Marine Licences). For the purposes of this Traffic and Transportation Plan (TTP), the Wind Farm and the OfTW are referred to collectively as “the Development”.

1.2 Objectives of this Document

1.2.1 The Section 36 Consent and Marine Licences contain a number of conditions that must be discharged through approval by the Scottish Ministers of specified plans and other matters prior to the commencement of offshore construction. One such requirement of the Section 36 Consent and the OfTW Marine Licence is the approval a Traffic and Transportation Plan (TTP), the purpose of which is to set out a mitigation strategy for the impact of road based traffic and transportation associated with construction of the Development.

1.2.2 The relevant conditions setting out the requirement for a TTP for approval, and which are to be discharged by this TTP, are set out in full in Table 1.1. Table 1.1 also references where the requirements of the consent conditions have been addressed in this TTP.

Table 1.1: Consent Conditions

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the TTP
Section 36	Condition 26	The Company must, no later than 6 months prior to the Commencement of Development submit a Traffic and Transportation Plan (“TTP”) in writing, to the Scottish Ministers for their written approval.	This document sets out the TTP for approval by the Scottish Ministers.
		Such approval may only be granted following consultation by the Scottish Ministers with Transport Scotland and any other such advisors as may be required at the discretion of the Scottish Ministers.	To be undertaken by the Scottish Ministers.
		The TTP must set out a mitigation strategy for the impact of road based traffic and transportation associated with the construction of the Development.	Section 6
		The Development must, at all times, be constructed and operated in accordance with the approved TTP (as updated and amended from time to time, following written approval by the Scottish Ministers).	Sections 2 and 3

Consent Document	Condition Reference	Condition Text	Reference to relevant Section of the TTP
Marine Licence (OfTW)	3.2.2.11	Traffic and Transportation Plan ("TTP") The Licensee must, no later than 6 months prior to the Commencement of the Works submit a TTP, in writing, to the Licensing Authority for their written approval.	This document sets out the TTP for approval by the Scottish Ministers.
		Such approval may only be granted following consultation by the Licensing Authority with Transport Scotland, the Highland Council and the Moray Council, and any such other advisors as may be required at the discretion of the Licensing Authority.	To be undertaken by the Scottish Ministers.
		The TTP must set out a mitigation strategy for the impact of road based traffic and transportation associated with the Works.	Section 6

1.3 Scope of the TTP

1.3.1 The TTP provides an overview of the traffic and transport associated with the construction of the Development, and that will be utilising the road network.

1.3.2 This document does not cover the Development components transported by sea directly from the manufacturing and fabricating facilities to the OWF and OfTW sites either directly or via a marshalling port (Nigg Energy Park) or storage port (Port of Cromarty Firth at Invergordon). The components to be delivered by sea are:

- Wind Turbine Generators (WTGs);
- WTG foundations (piles) and substructures (jackets);
- Inter-array cables;
- Export cables; and
- Offshore Transformer Modules (OTMs).

1.3.3 Whilst these major components will be delivered by sea there will be road traffic movements arising from the installation of these components and these are included in the TTP.

1.3.4 This document also does not apply to any works associated with the construction of the Marine Coordination Centre at Wick Harbour nor the Onshore Transmission Works (OnTW) as these elements do not form part of the Development which is the subject of the Section 36 consent and Marine Licence conditions.

1.4 Guidance and Methodology

1.4.1 The following guidance documents have been taken into account in completing this TTP:

- The Department for Transport (DfT) Guidance on Transport Assessment (GTA) (DfT, 2007)¹; and
- The Institute of Environmental Assessment (IEMA, 1993) 'Guidelines for the Environmental Assessment of Road Traffic'².

1.4.2 DfT's Guidance suggests that transport assessment is only required for any development that generates 30 or more two-way movements in any hour.

1.4.3 The IEMA guidelines suggest two broad principles to be used as a screening process to delimit the scale and extent of the assessment. These are:

- "Rule 1 - include road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2 - include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more".

1.4.4 Existing traffic levels for the roads in the vicinity of the ports and airports have been established from Department for Transport (DfT) traffic counts³. Traffic count locations on trunk roads closest to the ports and airports have been used to indicate the typical traffic volumes.

1.4.5 Because baseline traffic levels are forecast to increase, these must be extrapolated to the anticipated year in which the development traffic will occur (as a worst case 2019 has been used). This calculation is performed using the Department for Transport's Trip End Model Presentation Program (TEMPRO), following the methodology contained within the TEMPRO guidance document⁴.

¹ Department for Transport (DfT, 2007) *Guidance on Transport Assessment* Available Online At: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/263054/guidance-transport-assessment.pdf [Accessed 02/08/2016].

² Institute of Environmental Assessment (IEA, 1993) *Guidelines for the Environmental Assessment of Road Traffic*

³ Department for Transport Traffic Count Data. Available Online At: <http://www.dft.gov.uk/traffic-counts/> [Accessed 02/08/2016]

⁴ TEMPRO Guidance. Review and Assessment Helpdesk, March 2010. Available Online At: http://laqm.defra.gov.uk/documents/TEMPRO_guidance.pdf [Accessed 02/08/2016]

- 1.4.6 The anticipated traffic generated by the Development can be compared against the estimated baseline traffic. If the IEMA thresholds have not been exceeded, the significance of the effects can be considered to be low or not significant and further detailed assessments and mitigation are not warranted.

1.5 Linkages with Other Consent Plans

- 1.5.1 This TTP ultimately forms part of a suite of approved documents that will provide the framework to control and mitigate the effects of the construction of the Development, namely the other consent plans required under the Section 36 Consent and OfTW and OWF Marine Licences.

- 1.5.2 The TTP, in so far as is reasonably practicable, is informed by other approved consent plans, namely the:

- Construction Programme (CoP, Ref LF000005-PLN-143, dated September 2015) pursuant to Section 36 Consent Condition 10 and OfTW Marine Licence Condition 3.2.2.3;
- OWF Construction Method Statement (CMS, Ref LF000005-PLN-045, dated October 2015) pursuant to Section 36 Consent Condition 11 and OfTW Marine Licence Condition 3.2.2.4;
- Environmental Management Plan (EMP, Ref LF000005-PLN-14, dated October 2015) pursuant to Section 36 Consent Condition 15 and OfTW Marine Licence Condition 3.2.1.2; and
- Vessel Management Plan (VMP, Ref LF000005-PLN-168, dated May 2016), pursuant to Section 36 Consent Condition 16 and OfTW Marine Licence Condition 3.2.2.8.

- 1.5.3 Review of the Consent Plans will take place after any Development changes to ensure consistency. Any updates to these documents, or the TTP, will be reflected where required in the associated documents in accordance with the procedure set out in Section 3.

- 1.5.4 Relevant consent plans are cross-referenced as appropriate in this TTP but the detail from those other plans is not repeated here.

1.6 TTP Document Structure

- 1.6.1 In response to the specific requirements of the Section 36 and the OfTW Marine licence conditions, this TTP has been structured so as to be clear that each part of

the specific requirements have been met and that the relevant information to allow the Scottish Ministers to approve the TTP has been provided. The document structure is set out in Table 1.2.

Table 1.2: TTP Document Structure

Section	Title	Overview
1	Introduction	Background to consent requirements and overview of the TTP scope, methodology, links to other consent plans and structure.
2	BOWL Statements of Compliance	Sets out the BOWL statements of compliance in relation to the TTP consent conditions.
3	Updates and Amendments to this TTP	Sets out the procedures for any required updating to or amending of the approved TTP and subsequent further approval by the Scottish Ministers.
4	Development Overview	Provides an overview of the Development.
5	Development Activities and Vehicle Movements	Provides an overview of the key roles and responsibilities for BOWL and its key contractors, the harbours and airports used and the construction activities proposed and their associated vehicle movements.
6	Construction Traffic	Provides an overview of anticipated road traffic during the construction phase of the Development.
7	Compliance with the Application, ES and SEIS	A statement of any commitments from the Application, ES and SEIS related to this TTP.

2 BOWL Statement of Compliance

2.1 Introduction

2.1.1 The following section re-affirms the BOWL commitment to ensuring that the Development is constructed in such a manner as to meet the relevant requirements set by the Section 36 Consent and Marine Licences and other legislative requirements.

2.2 Statements of Compliance

2.2.1 BOWL will, in undertaking the final design and construction of the Development, require compliance with this TTP 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 TTP).

2.2.2 Where significant updates or amendments are required to this TTP, BOWL will require that the Scottish Ministers are informed of the potential need for an update to the TTP as soon as reasonably practicable and, where necessary, the TTP will be updated or amended (see Section 3).

2.2.3 BOWL will, in undertaking the construction and operation of the Development, require compliance with other, relevant consent plans as approved by the Scottish Ministers including, as set out in Section 1.4.

2.2.4 BOWL will, in undertaking the construction of the Development, require compliance with the limits defined in 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 Section 36 Consent in so far as they apply to works or activities covered by this TTP (unless otherwise approved in advance by the Scottish Ministers).

2.2.5 BOWL will, in undertaking the design and construction of the Development, require compliance with the approved TTP (and all other relevant, approved Consent Plans) by the Key Contractors through condition of contract and by and will verify this through an appropriate auditing process.

2.3 Legislative Requirements

2.3.1 BOWL will, in undertaking the construction and operation of the Development, require compliance with legislation relevant to this TTP and that all necessary licences and permissions are obtained by the Key Contractors and Subcontractors, through conditions of contract and by an appropriate auditing process.

2.3.2 BOWL will comply with, and oblige BOWL contractors to comply with through conditions of contract, the requirements of relevant environmental legislation as standard.

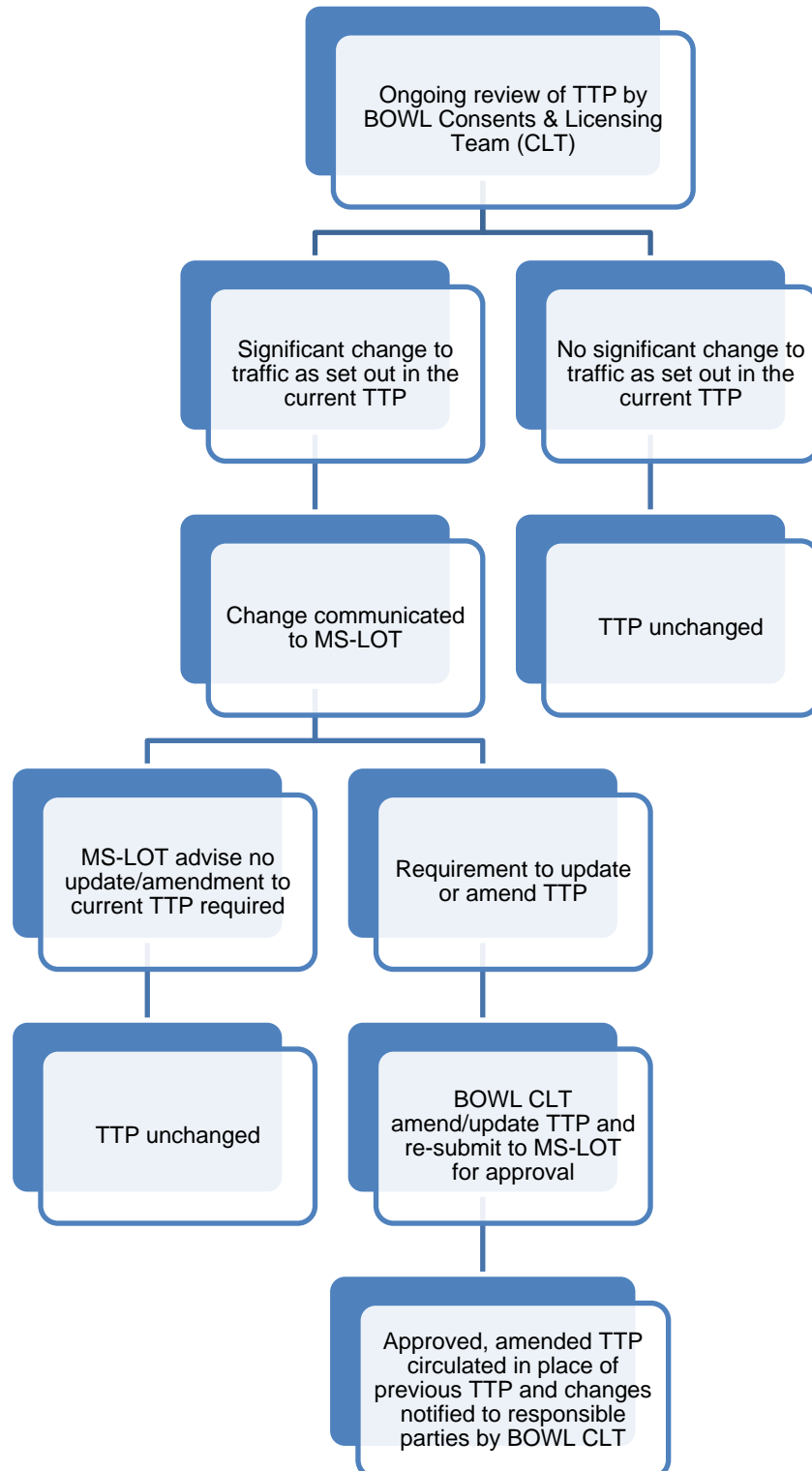
3 Updates and Amendments to this TTP

- 3.1.1 Condition 26 of the Section 36 consent recognises that updates or amendments to this TTP may be required, stating that:

The Development must, at all times, be constructed and operated in accordance with the approved TTP (as updated and amended from time to time, following written approval by the Scottish Ministers).

- 3.1.2 Where it is necessary to update this TTP in light of any significant new information, related to traffic and transportation, BOWL propose to use the change management process set out in Figure 3.1 in identifying such information, communicating such proposed change to the Scottish Ministers, re-drafting the TTP, seeking further approval for the necessary amendments or updates and disseminating the approved changes/ amendments to responsible parties.

Figure 3.1 – Change Management Procedure



4 Development Overview

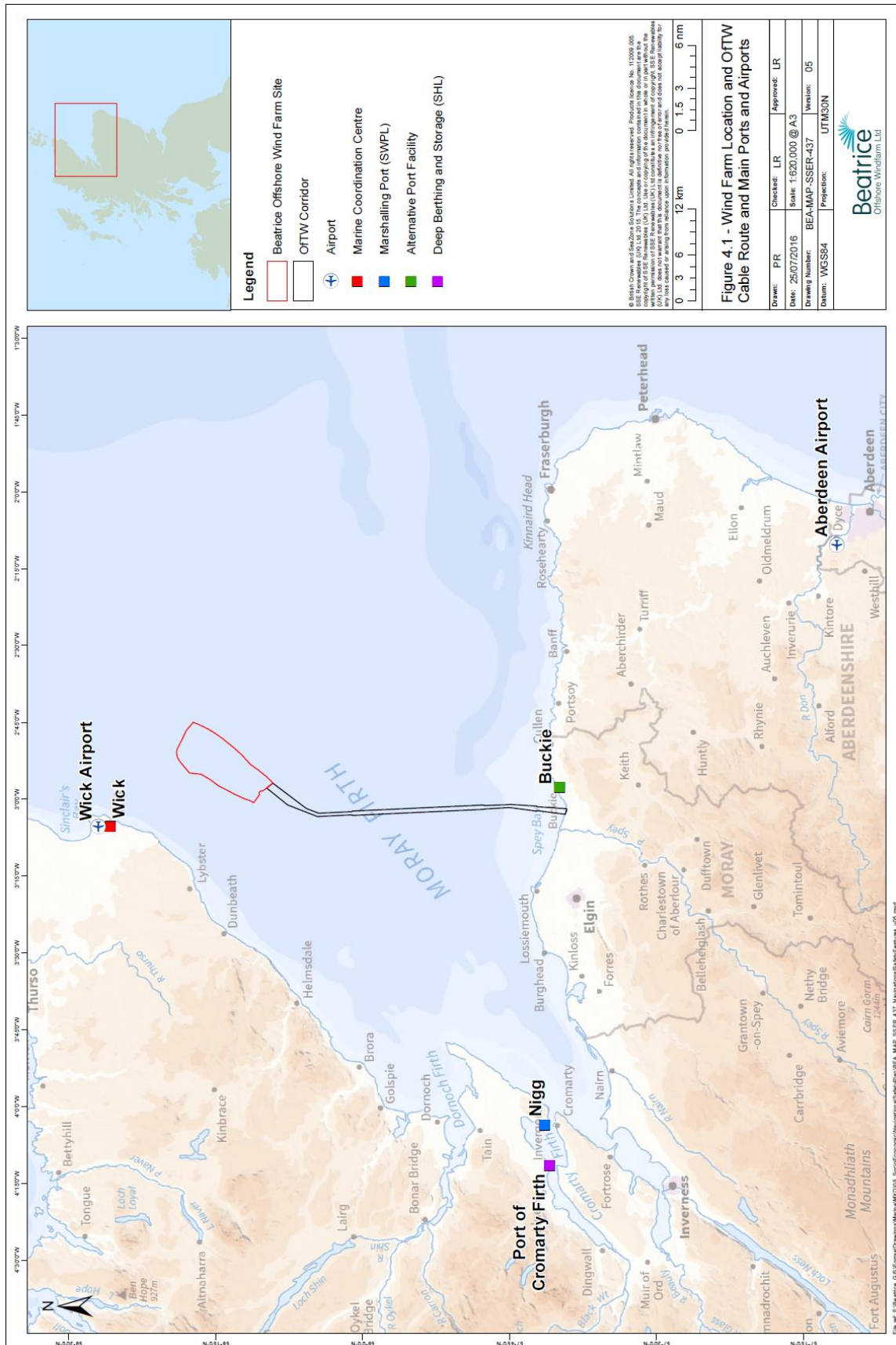
4.1.1 This section provides a brief overview of the Development relevant to the TTP.

4.1.2 The Development will consist of the following main components:

- A total generating capacity of up to 588MW;
- Up to 84 wind turbines of 7MW rated generating capacity;
- Jacket substructures each installed on four pile foundations driven into the seabed;
- Two AC 220 / 22 kV substation platforms, referred to as offshore transformer modules (OTMs) to collect the generated electricity and transform 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 two OTMs to the landfall at Portgordon and connect to the two onshore buried Export Cables for transmission at the transition joint pit.
- 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 permanent navigational marks.

4.1.3 The Development is located approximately 13.5 km offshore from its nearest point to the east Caithness coastline in the Moray Firth as shown on Figure 4.1. The figure also shows the main ports that will be utilised in constructing the Development. Further information on these ports is provided in Section 5.

4.1.4 Details of the construction programme for the construction works are provided in the CoP (Ref LF000005-PLN-143). The CoP provides further information on the key construction periods relevant to the TTP.



5 Development Activities and Movements

5.1 Introduction

5.1.1 This section introduces the key contractors and their roles, the main ports and airports used during the construction phase of the Development and an overview of the main activities associated with the construction of the Development and their associated road traffic effects.

5.2 Key Contractors and their Roles

5.2.1 The Key Contractors, named as Seaway Heavy Lifting Offshore Contractors B.V. (SHL), Siemens Wind Power Ltd (SWPL) and a Joint Venture between Siemens Transmission and Distribution Limited (STDL) and Nexans, will be responsible for constructing the Development as designed. In summary, the main roles and responsibilities of the Key Contractors will be as follows:

SHL

- WTG and OTM jacket foundation and substructure installation using SHL vessel(s) Stanislav Yudin and Oleg Strashnov (with sub-contractors used for additional support vessels including barges, Anchor Handling Tugs (AHT), work boats and towing tugs as required);
- OTM topside lift using SHL heavy lift vessel Stanislav Yudin and Oleg Strashnov (with sub-contractors used for additional barges, AHTs and towing tugs as required); and
- Inter-array cable installation (using a sub-contracted Cable Lay Vessel (CLV) and support vessels).

SWPL

- Management of the marshalling port facility at Nigg where the WTG components will be transported by sea to be stored, pre-assembled and made ready for installation;
- WTG installation (using a subcontracted jack-up vessel, likely to be the Pacific Orca); and

- WTG cable connections and commissioning works (with subcontracted crew transfer vessels used to transport personnel to carry out completion and commissioning activities).

STDL/ Nexans

- Export cable laying and trenching (using subcontracted cable laying, trenching and support vessels); and
- OTM topside supply and commissioning (with sub-contracted CTVs used to transport personnel to carry out OTM completion and commissioning activities).

5.2.2 During the operational phase, BOWL and any appointed contractors will retain responsibility for operating and maintaining the OWF. However, the OfTW assets will be sold to an Offshore Transmission Operator (OFTO) and thereafter the responsibility in so far as it applies to the OfTW assets will transfer to the OFTO.

5.3 Description of Main Ports, Harbours and Airports

5.3.1 Traffic movements will be generated to and from the main ports and airports that will be utilised in the construction of the Development. The sections below provide information on these main facilities. The items that are likely to be transported by the road network to support the Development are described in Section 5.4 below.

5.3.2 Figure 4.1 shows the location of the Development in the Moray Firth, and the locations of the relevant ports and airports that may be used during construction of the Development.

Wick Harbour

5.3.3 The Marine Coordination Centre will be established at Wick Harbour to control all offshore works and vessel movements during construction and operation of the Development. Local crew transfer to the main installation vessels is likely to be undertaken primarily from Wick. The harbour will also be used by small workboats to transport supplies, waste etc. to and from the main installation vessels.

5.3.4 Wick Harbour is located on the Caithness coast. It consists of the inner harbour which serves as the main fishing and leisure berthing area, the outer harbour which is used for temporary berthing, fuelling and smaller cargo vessels. The main commercial quay is in the River harbour (see Figure 5.1).



Figure 5.1 Wick Harbour

- 5.3.5 Wick Harbour is served principally by the A99 (north south coast road between Latherton and John o' Groats) and the A882 (west east road between the A9 near Halkirk and Wick). Both of these major trunk roads are within very close proximity of the harbour (approximately 500 m) and link roads from these routes to the harbour are designed to accommodate the current road traffic to the harbour.

Buckie Harbour

- 5.3.6 Buckie Harbour has been identified as an alternative harbour facility during the construction phase, to be used in the event that Wick Harbour is inaccessible due to adverse weather conditions or where additional capacity is required. When required, it is anticipated that Buckie Harbour would be used for refuelling, by CTVs for crew transfer and by small workboats to transport supplies, waste etc. to and from the main installation vessels.
- 5.3.7 Buckie is served principally by the A942 (coast road between Portknockie and Buckie), the A990 (coast road between Portgordon and Buckie) and the A98 (road between Cullen and the A96 near Fochabers). The A942 runs directly past the harbour providing direct access and is designed to accommodate the current road traffic to the harbour.

Port of Cromarty Firth, Invergordon

- 5.3.8 Invergordon may be used by SHL for deep berthing and storage during construction and may also be used by SHL for the transfer of grout required for the installation of the jackets. The port would service cable laying and trenching vessels, HLV's, tugs and barges, other support work boats and a Platform Support Vessel (PSV). It is

anticipated that Invergordon will only be utilised during the construction phase of the Development

- 5.3.9 The Port of Cromarty Firth at Invergordon is served principally by the A9 (north south coast road between Inverness and Thurso) which is linked directly to the harbour by the B817, which is designed to accommodate the current road traffic to the port.

Nigg Energy Park

- 5.3.10 A local marshalling port will be established at Nigg by SWPL to store, pre-assemble and prepare WTGs for installation offshore. The WTG components that will be transported by marine vessels to Nigg, including turbine tower sections (84 x 3), turbine blades (84 x 3) and turbine nacelles (84). It is anticipated that Nigg will only be utilised during the construction phase of the Development
- 5.3.11 Like Invergordon, Nigg Energy Park is located in the Cromarty Firth and provides a range of quayside loading facilities with extensive laydown areas and large construction and assembly yards, offering direct access to the Moray Firth. The sheltered, deep water access permits navigable access at all states of the wind and tide and to be operational 365 days a year (see Figure 5.2).
- 5.3.12 Nigg is served principally by the A9 (north south coast road between Inverness and Thurso) which is linked directly to the harbour by the B9175, which is designed to accommodate the current road traffic to the harbour.



Figure 5.2 Nigg Energy Park

Other Port and Harbour Options

- 5.3.13 In addition to the ports and harbours detailed above, other ports and harbours inside and outside the Moray Firth may be utilised during construction of the Development. Such facilities are anticipated to be used infrequently for movement of staff, refuelling, vessel sheltering, delivery of supplies and disposal of waste. If ports and harbours other than those described above are used more frequently than currently planned, BOWL will assess the vehicle movements to and from these ports. If required BOWL will update this TTP in line with the procedure set out in Section 3.
- 5.3.14 Smaller vessels such as, but not limited to, guard vessels and small workboats, that will travel to and from the OWF site more frequently are more likely to use these other ports and harbours.

Wick Airport

- 5.3.15 Wick Airport is likely to be used by BOWL and BOWL's Key Contractors as a base for helicopter operations during construction of the Development and this is likely to be managed from the Marine Coordination Centre at Wick Harbour. The helicopter flights will be mainly for crew transfers and potentially the transfer of some supplies.
- 5.3.16 Wick Airport is served principally by the A99 (north south coast road between Latherton and John o' Groats). The A99 runs directly past the airport providing direct access and is designed to accommodate the road traffic to the airport.

Aberdeen Airport

- 5.3.17 Aberdeen Airport may also be used as a base for helicopter operations during the construction phase of the Development. This facility is likely to only be used by one of BOWL's Key Contractors, SHL. As with Wick Airport, the helicopter flights will be mainly for crew transfers and potentially the transfer of some supplies.
- 5.3.18 Aberdeen Airport is located in the suburb of Dyce off the A947 which is served principally by the A96 (linking Elgin and Aberdeen), although the A90 coast road between Dundee and Fraserburgh also passes through Aberdeen just east of the Airport. The surrounding road network is designed to accommodate the road traffic to the airport.

5.4 Construction Activities and Vehicle Movements

Delivery of Major Components for the Development

- 5.4.1 It is not anticipated that any abnormal load deliveries associated with the major components for the Development will be transported by road; all will be delivered by marine vessels either directly from the site of manufacture or fabrication to the OWF site, or via the marshalling port at Nigg or the Port of Cromarty Firth at Invergordon. The delivery of the components below will not use the road network:

- The WTG components (including turbine tower sections, turbine blades and turbine nacelles) will be delivered to the marshalling port at Nigg for storage prior to assembly and installation.
- The major support structure components (piles and jacket structures) will be delivered directly to the OWF site by sea from the site of fabrication or will be shipped by sea and stored at the Port of Cromarty Firth at Invergordon.
- Inter-array cables will be delivered directly to the OWF site by sea transport from the point of manufacture or will be shipped by sea and stored at the Port of Cromarty Firth at Invergordon.
- Export cables are expected to be delivered directly to the OfTW site by sea transport from the point of fabrication.
- The OTMs will be delivered directly to the OWF site by sea transport from the point of fabrication or will be shipped by sea and stored at the Port of Cromarty Firth at Invergordon.

5.4.2 Whilst the major components will be delivered by sea there will be road traffic movements arising from the installation of these components as set out below. These are principally around movement of staff, transportation of grout, transportation of supplies and transportation of waste.

Movement of Staff

- 5.4.3 The process of installation and commissioning of the Development will require the transport of technicians and crew to the OWF and OfTW sites using Crew Transfer Vessels (CTV).
- 5.4.4 CTVs will likely operate between Wick Harbour and the OWF and OfTW sites for the foundation and OTM installation, WTG installation and export cable installation. Where access to Wick Harbour is restricted due to adverse weather Buckie Harbour may be utilised for crew transfer. In this instance it is likely that crew will travel by road from Wick as well as from transport hubs closer to Buckie.
- 5.4.5 CTVs associated with the inter-array cable installation will likely operate between the Port of Cromarty Firth at Invergordon and the OWF site.

Transportation of Grout

- 5.4.6 The CMS reports that dry grout, used for sealing the connection between the jacket substructure and the piles, will be delivered to port by road using HGVs. It is likely that grout will be delivered by HGVs to the Port of Cromarty Firth at Invergordon, which will be used as a buffer after which it will likely be transferred to a PSV for delivery to the OWF site.

Transportation of Supplies

- 5.4.7 Supplies needed during construction include fuel, food, potable water, welfare and medical supplies, installation equipment and tools. These items will largely be transported by road to the ports by vans or HGVs, and then by sea to the OWF and OfTW sites using transport barges and tugs. General workboats may be required to provide general support duties and could also be used to transport these items.
- 5.4.8 Whilst Wick, Nigg and the Port of Cromarty Firth at Invergordon will remain the main ports for construction, and Buckie as an alternative, vessels involved in the construction process and that are likely to make more frequent journeys to port (such as CTVs, guard vessels and work boats) may utilise a variety of smaller local ports and harbours within or outside the Moray Firth.
- 5.4.9 Vessels will visit a number of ports for refuelling during the construction phase. However, the fuel is likely to be obtained directly from the facilities available at the ports and so there will be no direct road traffic associated with delivery of fuel to the ports specifically associated with the Development.

Transportation of Waste

- 5.4.10 Waste generated from the Development will include a range of materials but the principal constituents comprise wood from pallets and frames, metal, general waste and PVC waste. Waste generated during construction will be delivered by marine vessels from the Development to ports where it will be handled by a certified and registered waste carrier. Any waste brought onshore will be transported by HGV from the port to a waste recycling facility.
- 5.4.11 Whilst Wick, Nigg and the Port of Cromarty Firth at Invergordon will remain the main ports for construction, and Buckie as an alternative, vessels transporting waste from the construction process may utilise a variety of smaller local ports and harbours within or outside the Moray Firth.

5.5 Summary of Road Traffic Movements

- 5.5.1 It is not anticipated that any abnormal load deliveries associated with the Development will be transported by road; all will be delivered by marine vessels either directly from the site of manufacture or fabrication to the OWF site, or via the marshalling port at Nigg or the Port of Cromarty Firth at Invergordon.

- 5.5.2 The only HGV movements on the road network are likely to be associated with the delivery of grout to Invergordon and the transfer of supplies to the ports and waste from the ports (most likely to be Wick, Nigg, Port of Cromarty Firth at Invergordon or Buckie, but could also be other ports within or outside the Moray Firth). Wastes would be transported to licensed waste management facilities for recycling.
- 5.5.3 The delivery of staff and some supplies will generate traffic movements on the road networks around the ports in Scotland that may be used. Such traffic will likely be from cars, vans and other light goods vehicles.
- 5.5.4 The anticipated traffic movements during construction of the Development are discussed further in Section 6.

6 Construction Road Traffic

6.1 Baseline Traffic Flow Data

6.1.1 The following baseline traffic data has been collected for trunk roads in the vicinity of the ports and airports detailed in Section 5.3 and has been used to inform the potential traffic impacts arising from construction of the Development. As detailed in the methodology described in Section 1.4 the traffic flow figures in Table 6.1 have been extrapolated to 2019 to account for increases in traffic over time.

Table 6.1 Annual Average Daily Flow (AADF) - 2019

Year	DfT Count No.	Location	Annual Average Daily Flows (2019)	
			Total	HGV
Wick (Harbour and Airport)				
2015	40820	A99, In Wick. Immediately south of Jct with Sinclair Terrace Coordinates - E336200, N950700	8051	139
2015	10823	A99, On bridge over Wick River Coordinates - E336250, N950900	7780	367
2015	30823	A99, South of junction with B874, north of Hill Avenue Coordinates - E336000, N951900	3624	181
Buckie				
2015	30990	A942, East of Findochy, west of Portknockie Coordinates - E347500, N868200	1352	29
2015	21005	A942, West of Buckie, East of Portgordon Coordinates - E340000, N864370	2204	23
2015	10988	A990, South of Buckie, North of junction with A98 Coordinates - E343060, N864500	6443	127
Port of Cromarty Firth				
2015	20724	A9, At Tomich Coordinates - E270000, N870900	11785	888
Nigg Energy Park				
2015	40721	A9, 1 mile south of junction with B9175 Coordinates - E278000, N876110	8613	644
2015	10722	A9, 1 mile north of junction with B9175 Coordinates - E279300, N878000	8593	562
Aberdeen Airport				
2015	20784	A96, North of Blackburn, South of Kintore Coordinates - E380400, N813200	19199	993

6.1.2 The baseline traffic flow data in Table 6.1 is used in Table 6.2 to allow potential traffic arising from the Development to be compared with baseline traffic conditions. The worst case effects, in terms of percentage increase compared against baseline conditions for each of the ports and airports, are discussed in the following sections.

6.2 Wick and Buckie Harbours

6.2.1 Wick Harbour is the principal base to facilitate the construction of the Development. The main road traffic movements generated by operations at Wick will likely be primarily from crew transfer, but also vessel resupply and waste disposal. In the event that Wick Harbour is inaccessible due to adverse weather conditions, or where additional capacity is required, Buckie Harbour may be used as an alternative facility. This section assumes all movements are from Wick, however if Buckie is used the effects would be shared between the two ports.

6.2.2 As reported in the VMP (Ref LF000005-PLN-168) there are likely to be the following approximate number of return CTV journeys to Wick:

- 106 - for the foundation and OTM installation (13 months);
- 546 - for the WTG installation (9 months); and
- 15 - for the export cable installation (9 months).

6.2.3 Based on this it is likely that there will be approximately 2 CTV movements per week for foundation and OTM installation, approximately 2 CTV movements per day for WTG installation and less than 2 CTV movements per month for export cable installation. Based on the CoP there is approximately 2 to 3 months overlap between foundation and OTM installation and WTG installation and approximately 6 months overlap between foundation and OTM installation and export cable installation.

6.2.4 Assuming that there will be up to 30 staff per vessel (based on typical crew and passenger capacities of CTVs of the scale being considered) and an average vehicle occupancy of 1.5⁵ there would be 40 movements per week for foundation and OTM installation, 40 movements per day for WTG installation and 40 movements per month for export cable installation. The increases in road traffic volumes around Wick Harbour, arising from cars, vans and other light goods vehicles, are considered negligible. The 9 month period of WTG installation has by far the greatest daily traffic generation, and this only consists of an anticipated 1.1% increase on baseline levels. Even if Buckie were to be used for all traffic, which is unlikely, this would only lead to an anticipated 2.96% increase in road traffic volumes around Buckie. As these are significantly below the 30% threshold in the IEMA Guidance, there is no requirement for any mitigation measures to be implemented.

6.2.5 A Walk to Work vessel (W2W) may be used as an alternative to CTVs to accommodate wind turbine technicians during completion and commissioning of the

⁵ A value of 1.5 is rounded from the average car and van occupancy data collected between 2002 and 2014, presented in Department for Transport Statistics. Available Online At: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/457001/nts0905.xls [Accessed 02/08/2016].

WTGs. Staff would live on board the W2W vessel and so this would further reduce the number of journeys back to shore.

6.2.6 Further to this, the traffic movements may also be spread across the entire day, to reflect shift patterns, which could result in traffic avoiding peak periods.

6.2.7 Wick may also be used during export cable installation. During this period vessels will return to port every two weeks for crew transfers, refuelling, replenishment and waste disposal. The vessels required for cable installation are detailed in the VMP (Ref LF000005-PLN-168); there will be approximately 16 vessel movements during the 9 month installation period, equating to less than 2 per month. Assuming there will be two HGVs to transport supplies and waste per vessel per port call this equates to approximately 4 HGV movements per month. The increase in HGV road traffic volumes are also considered negligible, consisting of an anticipated 0.09% increase on baseline levels. Even if Buckie were to be used for export cable installation, which is unlikely, this would only lead to an anticipated 0.57% increase on baseline levels around Buckie. These are significantly below the 30% threshold in the IEMA Guidance, as such there is no requirement for any mitigation measures to be implemented.

6.3 Port of Cromarty Firth at Invergordon

6.3.1 The Port of Cromarty Firth at Invergordon will likely be used by SHL for deep berthing and storage during construction. These facilities will be required if the components such as jackets, piles, OTMs etc. need to be temporarily stored prior to delivery to the OWF site, rather than be delivered directly to the OWF site from the port of manufacture. Road traffic movements would be associated with crew transfer, delivery of supplies and transportation of waste.

6.3.2 The port will also likely be used during inter-array cable installation. During this period vessels will return to port every two weeks for crew transfers, refuelling, replenishment and waste disposal. The vessels required for cable installation are detailed in the VMP (Ref LF000005-PLN-168); there will be approximately 140 vessel movements during the 7 month installation period, equating to approximately 20 per month. Assuming there will be two HGVs to transport waste and 1 crew bus carrying up to 30 personnel per vessel per port call this equates to approximately 40 HGV movements and 20 crew bus movements per month.

6.3.3 During the pile, jacket and OTM installation period of 13 months transport barges and tugs will be required to deliver crew and supplies, and will carry out approximately 78 return journeys (approximately 6 return journeys per month). Assuming that for each return journey there would be 2 associated HGV movements for supplies, 3 associated HGV movements for waste and 1 crew bus, this would equate to approximately 30 HGV movements and 6 crew bus movements per month.

- 6.3.4 As part of the above installation works the port may also be used for the delivery of grout by HGVs. It is anticipated that grout will be delivered and temporarily stored at the port before being loaded onto a PSV for delivery to the OWF site. The PSV will make weekly return visits to port to reload with grout. Each jacket requires approximately 130 tonnes of dry grout, resulting in up to four two way HGV movements per day during the jacket installation period of 8 months (approximately 120 HGV movements per month).
- 6.3.5 For 3 of the 8 months jacket installation period there is overlap with the inter-array cable installation, which itself results in a small number of HGV movements (approximately 40 per month) associated with the disposal of waste. During the 3 overlap months the total HGV movements would be 160 movements per month.
- 6.3.6 All of the increases in road traffic volumes as a result of the construction of the Development, arising from buses, vans and HGVs, are considered negligible. The 8 month period of pile, jacket and OTM installation has the greatest traffic generation, and this only consists of an anticipated 0.45% increase on baseline levels (and 0.6% for the months where jacket installation and inter-array cable installation overlap). As this is significantly below the 30% threshold in the IEMA Guidance, there is no requirement for any mitigation measures to be implemented in respect of this road network.

6.4 Nigg Energy Park

- 6.4.1 Nigg Energy Park is to be used by SWPL as the marshalling port during construction. WTG components will be shipped here by sea prior to installation offshore and waste materials generated during construction will be brought ashore here for onward transfer for recycling or disposal. Traffic movements will consist of waste disposal, crew transfer, vessel resupply and general staff movements.
- 6.4.2 As per the VMP (Ref LF000005-PLN-168) the jack-up vessel will take between 4 and 6 complete WTGs per trip and so there will be between 14 and 21 round trips for this vessel during the 9 month WTG installation period. Based on this it is likely that there will be approximately 2 return journeys per month.
- 6.4.3 Waste will be transported to shore by the vessel and disposed of on land. It is likely to be transported between Nigg Energy Park and licensed waste management facilities by HGV. Current estimates are around 2 HGV movements for each of the 14 to 21 jack-up vessel round trips during the 9 month WTG installation period. Based on this it is likely that there will be approximately 5 HGV movements per month.
- 6.4.4 Assuming there will also be two HGV movements to transport supplies per vessel per port call this equates to a further approximately 5 HGV movements per month.

6.4.5 It is assumed that crew transfer during WTG installation will be via Wick and so has already been accounted for in Section 6.1.

6.4.6 The increase in HGV road traffic volumes as a result of WTG installation are considered negligible, consisting of a 0.06% increase to baseline levels. As this is significantly below the 30% threshold in the IEMA Guidance, there is no requirement for any mitigation measures to be implemented in respect of this road network.

6.5 Wick and Aberdeen Airports

6.5.1 It is anticipated that Wick Airport will be used as the main base for helicopter operations during construction of the Development, and Aberdeen Airport is likely to also be used by SHL. Traffic movements to and from the two airports could therefore be generated from crew members accessing the airports for flights. The majority of traffic accessing Wick Airport is likely to originate from the Marine Coordination Centre at Wick Harbour. It is anticipated that approximately 6 helicopter flights will be required per week.

6.5.2 Typically there will be up to 6 personnel travelling to and from the airports per flight, and with an average vehicle occupancy of 1.5 this would generate approximately 120 movements per month. The increase in road traffic volumes are considered negligible, consisting of an anticipated 0.11% increase if Wick Airport is used (or 0.02% increase if Aberdeen Airport is used). If the two airports are used the effect would be to share any associated traffic effects. As this is significantly below the 30% threshold in the IEMA Guidance, there is no requirement for any mitigation measures to be implemented in respect of these road networks.

6.5.3 The traffic movements may also be spread across the entire day, to reflect shift patterns, which could result in traffic avoiding peak periods.

6.6 Other Ports

6.6.1 As detailed in Section 5.3 marine vessels might feasibly be required to occasionally use any other port within or outside the Moray Firth, if operations require. Vehicle movements might therefore be generated at other ports, however such traffic volumes would be considered infrequent and negligible.

6.7 Summary of Construction Related Traffic Effects

6.7.1 Table 6.2 presents a summary of anticipated vehicle movements at each port or airport and compares these against baseline traffic flows, adjusted from 2015 data to a worst case construction year of 2019. The final two columns consider the percentage increase in the traffic arising from the Development when compared to the baseline flows, and is used to compare the impact against the IEMA significance threshold of 30%.

6.7.2 It should be noted that Wick and Buckie are assessed separately as a worst case, i.e. it is assumed that all vehicles will either travel to Wick or Buckie and traffic has not been shared between the two. As detailed in Section 5.3 of in this TTP Buckie will typically only be used when poor weather prohibits the use of Wick.

6.7.3 In addition Wick and Aberdeen airports are assessed separately as a worst case, i.e. it is assumed that all vehicles will either travel to Wick Airport or Aberdeen Airport and traffic has not been shared between the two. As detailed in Section 5.3, in reality traffic effects will be shared between the two airports.

Table 6.2: Summary of Anticipated Vehicle Movements during Construction

Port	Activity	Duration of Activity	Average Daily Movements ⁶		Baseline Traffic Flow (2019)		% Increase from Baseline	
			HGV	LGV	HGV	Total	HGV	Total
Wick	Export cable installation - Transfer of Supplies and Waste	9 months	0.13		139		0.09%	
					367		0.035%	
					181		0.07%	
	WTG, installation – Crew Transfer	9 months		40		8051		0.49%
						7780		0.51%
						3624		1.1%
	Pile, Jacket and OTM installation – Crew Transfer	13 months		6		8051		0.07%
						7780		0.08%
						3624		0.17%
	Export cable installation – Crew Transfer	9 months		1.3		8051		0.02%
						7780		0.02%
						3624		0.04%
Buckie	Export cable installation - Transfer of Supplies and Waste	9 months	0.13		29		0.45%	
					23		0.57%	
					127		0.10%	
	WTG, installation – Crew Transfer	9 months		40		1352		2.96%
						2204		1.81%
						6443		0.62%
	Pile, Jacket and OTM installation – Crew Transfer	13 months		6		1352		0.44%
						2204		0.27%
						6443		0.09%
	Export cable installation – Crew Transfer	9 months		1.3		1352		0.10%
						2204		0.06%
						6443		0.02%

⁶ For the purposes of calculating daily movements it has been assumed that on average a month contains 30 days or 4.5 weeks

Port	Activity	Duration of Activity	Average Daily Movements ⁶		Baseline Traffic Flow (2019)		% Increase from Baseline	
			HGV	LGV	HGV	Total	HGV	Total
Port of Cromarty Firth at Invergordon	Inter-array cable installation -Transfer of Supplies and Waste and Crew by Bus	7 months	2		888		0.22%	
	Pile, Jacket and OTM installation - Transfer of Supplies and Waste and Crew by Bus	13 months	1.2		888		0.14%	
	Pile, Jacket and OTM installation - Transfer of Grout	8 months	4		888		0.45%	
Nigg Energy Park	WTG installation - Transfer of Supplies and Waste	9 months	0.33		644		0.05%	
					562		0.06%	
Wick Airport	Crew Transfer and Transfer of Supplies	Construction Phase		4		8051		0.05%
						7780		0.05%
						3624		0.11%
Aberdeen Airport	Crew Transfer and Transfer of Supplies	Construction Phase		4		19199		0.02%

6.7.4 No abnormal load components need to be delivered via the road network during the construction phase. All such components will be delivered by sea transport to the ports and harbours described in Section 5.3.

6.7.5 The construction phase of the Development will result in a short term and temporary increase in traffic movements, including cars, vans and HGVs, primarily to and from Wick Harbour, Buckie Harbour, Port of Cromarty Firth at Invergordon, Nigg Energy Park and Wick and Aberdeen Airports, and on the local road networks. Very occasionally other ports within or outside the Moray Firth may be used.

6.7.6 The increase in overall traffic volumes for construction traffic movements, particularly HGVs, is considered to be not significant in terms of the DfT and IEMA guidance. The road traffic generated by the Development during the construction phase will not generate more than 30 HGV movements per hour and will not result in a 30% increase to baseline numbers. Given the low predicted traffic flows associated with the Development this conclusion is also considered to be the case for the B9175 to Nigg Energy Park and the B817 to Port of Cromarty Firth at Invergordon which are already designed to accommodate high levels of traffic, in particular HGVs, accessing the port facilities.

6.7.7 No mitigation is therefore assessed to be required for the anticipated road based traffic and transportation associated with the construction of the OWF and OfTW.

7 Compliance with the Application, ES and SEIS

- 7.1.1 Onshore traffic effects were not required to be assessed in the Environmental Statement (ES) or Supplementary Environmental Impact Statement (SEIS).
- 7.1.2 ES and SEIS Commitments Registers have been developed that identify the environmental management, mitigation (and also monitoring) measures set out in ES/ SEIS as developed by the requirements of the consent conditions, and any other commitments made by BOWL to environmental management and mitigation. The Commitments Register is set out under Annex 1 in the EMP (Ref LF000005-PLN-14).
- 7.1.3 There are no commitments in the commitments register that refer to traffic management or a TTP.