MORAY WEST
OFFSHORE WINDFARM

Onshore Transmission Infrastructure Environmental Impact Assessment (EIA)

Moray Offshore Windfarm (West) Limited

Chapter 2 Proposed Development

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Acronyms	
Acronym	**Expanded Term**
AC	Aberdeenshire Council
AIS	Air Insulated Switchgear
CEMP	Construction Environmental Management Plan
CION	Connections and Infrastructure Options Note
CTMP	Construction Traffic Management Plan
DMP	Drainage Management Plan
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
FTE	Full Time Equivalent
GIS	Gas Insulated Switchgear
HDD	Horizontal Directional Drilling
HGV	Heavy Goods Vehicle
HMP	Habitat Management Plan
HVAC	High Voltage Alternating Current
kV	Kilovolts
LDP	Local Development Plan
LNCS	Local Nature Conservation Site
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MC	Moray Council
NETS	National Electricity Transmission System
NGET	National Grid Transmission Limited
LGV	Light Goods Vehicle
NGR	National Grid Reference
Moray East	Moray Offshore Windfarm (East) Limited
Moray West	Moray Offshore Windfarm (West) Limited
PAB	Planning Application Boundary
PPP	Planning Permission in Principle
OfTI	Moray West Offshore Transmission Infrastructure
OfTO	Offshore Transmission Owner
OnTI	Moray West Onshore Transmission Infrastructure
SAC	Special Area of Conservation
SDP	Strategic Development Plan
SEPA	Scottish Environment Protection Agency

Acronyms	
Acronym	**Expanded Term**
SHE-T	Scottish Hydro Electric Transmission
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SPP	Scottish Planning Policy
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Urban Drainage Systems
The EIA Regulations	The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017
TJB	Transition Joint Bay
TNO	Transmission Network Operator
SESA	Study of Environmentally Sensitive Areas
SWMP	Site Waste Management Plan
UXO	Unexploded Ordnance

2 The Proposed Development

2.1 Introduction

2.1.1.1 This chapter of the Environmental Impact Assessment (EIA) Report describes the Moray West Onshore Transmission Infrastructure (OnTI). It summarises the location of the Planning Application Boundary (PAB) and discusses the process of its identification. The chapter then describes the key components of the OnTI and how they will be constructed, operated, maintained and ultimately decommissioned.

2.1.1.2 The information provided within this chapter underpins the EIA and the applications for planning permission in principle (PPP). It presents the design parameters that have been considered in determining the OnTI's potential environmental effects.

2.1.2 Overview of the OnTI

2.1.2.1 The purpose of the OnTI will be to transmit power generated by the Moray West Offshore Wind Farm to the National Electricity Transmission System (NETS) onshore; the power will be transmitted as a high voltage alternating current (HVAC). To enable this, the following infrastructure is proposed:

- Offshore export cable circuits – These will transmit power beneath the seabed from the site of the Moray West Offshore Wind Farm ashore to transition joint bays (TJBs) at a location along the Aberdeenshire coastline. The EIA only considers the offshore export cables between Mean Low Water Springs (MLWS) and the TJBs;
- TJBs – These will be buried structures acting as the interface between the offshore export cables and onshore cable circuits;
- Onshore cable circuits – These will transmit power underground between the TJBs and the proposed onshore substation;
- Onshore substation – This is required to transform the power before feeding it into the NETS at the transmission interface point (the existing Blackhillock substation approximately 1.5 km south of Keith, Moray); and
- Onshore cable circuits – Further interconnecting underground cable circuits will link the proposed onshore substation and the existing Blackhillock substation.

2.2 Consideration of Alternatives

2.2.1.1 Schedule 4 of The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017 (the EIA Regulations) sets out the information that should be included within an EIA Report, including:

2.2.1.2 *"A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects"*.

2.2.1.3 By applying for PPP, Moray Offshore Windfarm (West) Limited (Moray West) is taking a multi-stage approach to consenting the OnTI. The following sub-sections set out the process undertaken during the consideration of alternatives, along with how development of the OnTI is envisaged to continue throughout the detailed design stage.

2.2.2 Site Selection for the Moray West Offshore Wind Farm

2.2.2.1 In 2009, Moray Offshore Renewables Limited, now known as Moray Offshore Windfarm (East) Limited (Moray East), was established as a joint venture company which was awarded offshore wind development rights for Zone 1 (Moray Firth Zone) of the Crown Estate's third offshore wind licensing round (EDP Renewables UK Ltd was the lead partner in the venture and is now the sole owner). The Moray Firth Zone is located on the Smith Bank in the outer Moray Firth and covers 520 km^2 (281 nm^2). The Moray West Site is located approximately 22.5 km from the Caithness coastline and 31.5 km from the Moray coastline at its nearest points. The Moray West Site covers an area of approximately 225 km^2 and the Offshore Export Cable Corridor covers an area of approximately 185 km^2 (see Figure 1.1.1).

2.2.2.2 An initial appraisal found that, at the time, due to other human activities, more constraints existed in the west of the Zone than in the east. Such activities were expected to change over time, and consequently the decision was taken to divide the Zone into eastern and western development areas, and to develop the eastern area first. These areas are now referred to as the Moray East and Moray West sites respectively.

2.2.2.3 Once consents had been secured for developments within the Moray East site, investigations into developing the Moray West site commenced. As anticipated, the constraints initially identified had diminished over time. Although some new hard constraints were identified, it was considered that the associated footprints could comfortably be negotiated by new wind farm infrastructure and work began on the Moray West Offshore Wind Farm.

2.2.3 The Connection and Infrastructure Options Note Process

2.2.3.1 In order to identify the transmission interface point for the Moray West Offshore Wind Farm, Moray West began discussions with National Grid Electricity Transmission Limited (NGET) and Scottish Hydro Electric Transmission (SHE-T) in 2016. NGET then commenced the Connections and Infrastructure Options Note (CION) process. This considered a number of potentially suitable transmission interface points on an understanding of the NETS capacity in relation to the location of the Moray West Site, as well as the wind farm's potential generating capacity and development timescales. The transmission interface points initially identified included:

- Blackhillock (Moray);
- Brora / Dunbeath (Highland);
- Cullen / Portgordon (Moray);
- New Deer (Aberdeenshire); and
- Spittal (Highland).

2.2.3.2 The CION process appraises a variety of options. It identifies the preferred onshore transmission interface point and offshore transmission network configuration for an electricity generating development. A CION is initially developed to make a representative offer to an applicant (in this case Moray West), before subsequently identifying the most economic and efficient design option for a development. This is assessed by both NGET / SHE-T and the applicant from an economic and strategic perspective, in terms of the additional costs and investments required based on the capacity requested and the development timescales.

2.2.3.3 An important element of this assessment is the cost to be passed on to the consumer (the public and businesses) as a result of the works required to ensure the NETS can accommodate a development. A CION considers the total life cost of a connection, assessing both the capital and projected operational costs for the NETS (over a development's lifetime) in order to determine the most economic and efficient design option. While an applicant inputs to this process in terms of the comparative costs for different options, the eventual offer is determined by NGET. In addition to assessing options from an economic perspective, a CION will also consider the associated environmental and consenting risks.

2.2.3.4 Primarily based on the likely cost of infrastructure upgrades, the CION process discounted Brora / Dunbeath, Cullen / Portgordon and Spittal as transmission interface points for the Moray West Offshore Wind Farm; a more detailed consideration of Blackhillock and New Deer was undertaken. In April 2017, Moray West was formally offered the transmission interface point of Blackhillock, allowing identification of the PAB to commence.

2.2.4 Identification of the Onshore Landfall Area

2.2.4.1 The identification of the Onshore Landfall Area (the location at which the offshore export cable circuits will come ashore) considered both offshore and onshore constraints. Considerations, which were largely technical or related to environmental and consenting concerns, included the following:

- Identification of the shortest route for the offshore export cable circuits from the Moray West Site to the Onshore Landfall Area in order to minimise transmission losses (and costs);
- Seabed morphology and sediment – maximum horizontal directional drill (HDD) pull in length of 1200 m (HDD is a trenchless technique for installing linear infrastructure that minimises disturbance, see Section 2.4.1);
- Water depth – export cable lay vessel minimum draft of 10 m;
- Avoidance of steep gradients near the shore – maximum desirable overburden of 15 m;
- Ability to access the foreshore for construction activities;
- Avoidance of populated areas - ability to limit construction disturbance;
- Avoidance of Common Land;
- Minimisation of third party interactions;
- Avoidance of known recreational areas where possible, both offshore and onshore;
- Avoidance of statutory and non-statutory designated features where possible, both offshore and onshore; and
- Avoidance of land used for defence purposes.

2.2.4.2 An initial study considered the coastlines of both Moray and Aberdeenshire from Lossiemouth to Portsoy. Much of the coastline between Lossiemouth and Spey Bay, and the River Spey catchment, supports statutory nature designations, including: Moray and Nairn Coast Ramsar; Moray and Nairn Coast Special Protection Area (SPA); Spey Bay / Lower River Spey / River Spey Special Area of Conservation (SAC); and Lower River Spey / River Spey Site of Special Scientific Interest (SSSI). The size of these designations at certain locations makes their avoidance through the use of HDD difficult, and any landfall west of Spey Bay would necessitate the onshore cable circuits crossing the River Spey.

2.2.4.3 Further inland there are several areas of fluvial flood risk in and around Elgin. Immediately east of the River Spey there is extensive plantation woodland for approximately 18 km, much of which is on the Ancient Woodland Inventory and in locations with steep gradients. A large garden and designed landscape, Gordon Castle (Bog Of Gight), is also located immediately east of the River Spey.

2.2.4.4 Offshore export cable circuits associated with the Caithness – Moray transmission reinforcement and Beatrice Offshore Wind Farm take landfall immediately west of Portgordon in a location also covered by the Spey Bay SSSI. It was considered that cumulatively there would be areas where insufficient cable corridors would exist if Moray West sought to follow a similar route. The settlements of Portgordon, Buckie and Portessie occupy approximately 9 km of coastline and offshore the area is constrained by extensive areas of bedrock.

2.2.4.5 The results of this initial study enabled the search for an Onshore Landfall Area to be narrowed to the stretch of coastline between Portessie in Moray and Portsoy in Aberdeenshire (approximately 14 km). Further desk studies identified a number of specific locations along this stretch of coast, which were then visited by a multi-disciplinary team of environmental and consenting specialists, construction and cable installation engineers and commercial managers. These locations and the key considerations associated with them are set out in Table 2.2.1.

Table 2.2.1: Potential Onshore Landfall Areas

Location	Key Considerations
Redhythe	Any works on the foreshore are likely to be at least partly located within the Cullen to Stake Ness Coast SSSI. The Redhythe site is in a field with sufficient room for HDD. A high entry elevation, but exiting in deep water (10 m LAT) with a relatively short HDD length (470 m) ensuring feasible HDD pull length and options. Concern retained about the overburden on the cable and trajectory of any ducting which may place unviable pressures on the cable circuits.
Red Haven / Dunniedeich Beach	Existing accesses operable with upgrades. Sufficient open land on the foreshore or in adjacent fields for an HDD work site; gradual rise of topography inland allows for cable circuit installation. Any works on the foreshore are likely to be at least partly located within the Cullen to Stake Ness Coast SSSI. 10 m contour approximately 300 m offshore ensuring feasible HDD pull length and options to avoid works within the Cullen to Stake Ness Coast SSSI. Site offers potential for a number of technical solutions aiding viability, which may in part include trenched solutions.
Sandend Bay	Offers a break in the Cullen to Stake Ness Coast SSSI present along a large stretch of the Aberdeenshire coastline. Water depth and size of bay suitable for a cable laying vessel, although 10 m contour approximately 900 m offshore resulting in a significant HDD pull length. Sandy bay sheltered from westerly weather, potentially offering increased occurrence of optimal working conditions. Construction access options to the foreshore and inland continuation locations viable. Local population constraints (e.g. residential properties and recreational land uses / activities) and some ecological interest present along the shore and inland.
Garron Point	10 m contour would allow marine vessels to directly access an offshore HDD receiving point. High entry elevation for HDD, similar to Redhythe, but with a slightly longer HDD pull length likely. Bedrock may be of extreme hardness, which could make the HDD process very challenging. Of concern at this location is the risk of encountering tremolite (and asbestos mineral).
Sunnyside Beach	Access to the foreshore highly challenging. Any works on the foreshore likely to be at least partly located within the Cullen to Stake Ness Coast SSSI. Cliffs along the shore likely to overburden the offshore export cable circuits. Use of HDD to pass the offshore export cable circuits beneath the SSSI not possible due to gradient of cliffs along the shore. Considered unviable on further study.
Salmon Bothy (between Cullen and Sunnyside Beach)	Limited access to the foreshore with considerable enabling works required. Any works on the foreshore likely to be at least partly located within the Cullen to Stake Ness Coast SSSI. Cliffs along the shore likely to overburden the offshore export cable circuits. 10 m contour approximately 600 m offshore resulting in a

Table 2.2.1: Potential Onshore Landfall Areas	
Location	**Key Considerations**
	feasible HDD pull length, extending to 800 m if works in the Cullen to Stake Ness Coast SSSI to be avoided. Use of HDD to pass the offshore export cable circuits beneath the Cullen to Stake Ness Coast SSSI not possible due to gradient of cliffs along the shore.
Cullen Bay (west of Cullen)	Offers a break in the Cullen to Stake Ness Coast SSSI present along much of the Aberdeenshire coastline. Golf course along the shore restricts access to the foreshore. Limited options for avoidance of the golf course using HDD. 10 m contour approximately 1100 m offshore resulting in a very long HDD pull length at limit of technical viability. Cliffs behind the golf course likely to overburden the offshore export cable circuits. Various hard constraints on the outskirts of Cullen with limited options for routing the offshore export cable circuits / onshore cable circuits inland due to the presence of a railway viaduct (National Cycle Route 1) and Cullen House Garden and Designed Landscape.

2.2.4.6 Due to the various technical constraints, particularly access difficulties, the siting of works areas and the presence of cliffs along the shore, Garron Point, Sunnyside Beach, Salmon Bothy (between Cullen and Sunnyside Beach) and Cullen Bay were excluded from further consideration. Sandend Bay has many technically favourable characteristics. However, this was also excluded due to the proximity of numerous human receptors and the potential for construction disturbance, along with limited options for routing the onshore cable circuits inland.

2.2.4.7 Following further investigation, it was determined that the PAB should envelope approximately 1.7 km of the Aberdeenshire coastline in the vicinity of Redhythe Point (including the location of Red Haven / Dunniedeich Beach) for siting the Onshore Landfall Area. Further information on how the OnTI will be designed and installed giving due regard to the Cullen to Stake Ness Coast SSSI is provided in Section 2.4.1.

2.2.5 Identification of the Onshore Substation Site

2.2.5.1 An initial search area of 3 km from the existing Blackhillock substation was established to identify a site for the proposed onshore substation; this was used for Scoping the EIA. The ideal location for any substation is adjacent, or as near as possible to the transmission interface point. However, this is not always possible, and due to the relative congestion in terms of transmission infrastructure around the existing Blackhillock substation, 3 km was considered a suitable search area. A search for sites that could provide a minimum area of 60,000 m^2 commenced with an emphasis on the potential landscape and visual effects of the onshore substation. Various possible sites were initially identified, but further refinement reduced this to five potential sites following the gathering of data and site visits.

2.2.5.2 All five sites are located within fields in agricultural use and each is similar regarding their environmental and consenting risks, which are considered limited. None of the sites are located within or immediately adjacent to any statutory environmental designations. Phase 1 habitat survey data identified the sites as being dominated by improved grassland with no notable ecological constraints to development.

2.2.5.3 Only one of these sites is located at a notable distance from residential properties, although it is situated adjacent to a wooded area regularly used for such recreational activities as walking and horse riding. The site is afforded little natural screening, with open views from the north (including from Keith), and is elevated to the south. Additionally, its location may lead to cumulative visual effects due to it being approximately 500 m from the existing Blackhillock substation and 370 m from the site of the Beatrice Offshore Wind Farm substation. To access the site, the onshore cable circuits would need to be routed to the west of Keith and this route was considered to have considerably more technical difficulties than a route to the east of Keith, particularly regarding the crossing of existing infrastructure. The site is also distanced from the road network, making access difficult, and is crossed by a modified watercourse that ultimately drains to the River Isla (the River Isla in turn flows into the River Deveron, an important watercourse for salmon fishing).

2.2.5.4 The remaining four sites are in sparsely populated rural locations. Two of these further sites are situated close together. There are limited residential properties in the surrounding area; there are a small number of properties located a short distance east and some isolated farmhouses in the wider locality. The road network would provide appropriate access for large haulage, although some additional haul route / access track would still be required. Routing the interconnecting cable circuits to Blackhillock substation would necessitate watercourse and road crossings; however, there is potential these could be undertaken with a single HDD.

2.2.5.5 One of the sites is crossed by a modified watercourse that again drains to the River Isla, as well as a wooden pole overhead line. This site has a sloping gradient and is afforded little natural or existing screening. However, the second site is not crossed by any sensitive features or surface infrastructure. Although this site is situated on a slope, the gradient is much less steep than that found on the first site. In general, it is considered that the constraints at this second site could be overcome to accommodate an onshore substation.

2.2.5.6 The final two sites are again located close together. Although the furthest of the five sites from the existing Blackhillock substation, they have relatively level topography, with no visible obstacles. One of the sites was discarded due to it being crossed diagonally by a high-pressure gas main.

2.2.5.7 The remaining site, which has been chosen to underpin the EIA and planning applications, is the closest to the existing public road network with an existing access road that can be utilised. There are only a small number of isolated dwellings in the vicinity. The site has the most level topography of the five sites and existing plantation forestry (Pitlurg Wood) affords it visual screening to the north and west; it is proposed that this plantation forestry is retained, with the onshore cable circuits being installed beneath it using HDD to avoid any felling. The site is considered to offer a high level of technical viability with regard to routing of the interconnecting cable circuits.

2.2.6 Identification of the Planning Application Boundary

2.2.6.1 The PAB largely comprises a corridor that runs approximately 28 km between the Onshore Landfall Area and the onshore substation, before being routed approximately 3 km towards the existing Blackhillock substation. This corridor varies in width from approximately 2.2 km to 270 m, with a 500 m width at numerous locations. It should be noted that installation of the cable circuits will only require a corridor around 30 m wide (widened in locations where there is a technical necessity) known as the working width (see Section 2.4.3). One purpose of the PAB is to provide sufficient area for the identification of this 30 m wide corridor at the detailed design stage (see Chapter 1: Introduction).

2.2.6.2 As with identifying the Onshore Landfall Area, the PAB has been identified through a feasibility and refinement process taking into consideration environmental and consenting constraints, as well as technical requirements. These considerations included the following:

- Allow for identification of the shortest, least constrained route for the cable circuits;

- Allow for the avoidance of statutorily designated features, or for installation of the cable circuits in a manner that mitigates any effects on the reasons for their designation;
- Allow for the avoidance of non-statutorily designated features, unless suitable mitigation is clearly available;
- Allow for the avoidance of sensitive land uses (e.g. recreational areas) and land allocated for future use within Local Development Plans (LDPs);
- Allow for the avoidance of areas of notable gradient and the consideration of slope stability, including whether the ground can be expected to remain stable for the life of the cable circuits;
- Limit the crossing of linear features and other infrastructure and allow for crossings to be made at a perpendicular angle using trenchless techniques. For watercourse crossings, consider the height and steepness of banks;
- Allow for the avoidance of open water, wetlands and area at risk of flooding;
- Allow for the avoidance of tree felling. Where commercial forestry is present, allow for installing the cable circuits within tracks and rides where possible to limit disturbance;
- Allow for the cable circuits to be routed along field boundaries and existing linear features, particularly where they have already resulted in habitat and / or hydrological disturbance;
- Allow for the minimisation, or mitigation of construction disturbance to third parties; and
- Consider the ease of construction access. Allow for use of the existing road network without excessive disruption, e.g. provide for the use of existing crossings at roads and railway lines.

2.2.6.3 Due to the large area covered, it is not possible for the PAB to exclude all the constraints considered during its identification. In some locations the PAB has been widened to provide greater options for the working width to negotiate constraints, for instance where it is necessary for the cable circuits to cross the River Isla.

2.2.6.4 At one location, the PAB includes an optional corridor (Figure 1.1.3, Page 1 of 3). Approximately 3 km inland from the Onshore Landfall Area, a divide has been included within the PAB to provide options for the working width to negotiate the Cotton Hill plantation and avoid the Cotton Hill, Fordyce area of search for minerals as identified in the Aberdeenshire LDP (Area of Search and Safeguard for Minerals Supplementary Guidance). It should be noted that only one of these options will be utilised when identifying the working width for the cable circuits at the detailed design stage.

2.3 The Planning Application Boundary

2.3.1.1 The PAB covers a generally linear area of 29.4 km^2 located in both the Aberdeenshire Council (AC) area (approximately 7.8 km^2 to the north) and the Moray Council (MC) area (approximately 21.6 km^2 to the south). The PAB is in a predominantly rural location with agriculture being the main land use. Arable farming dominates to the north, with increased livestock farming further inland.

2.3.1.2 Land within the PAB has a generally undulating topography, with more level areas in the north near the coast. The coast largely comprises rocky outcrops with some cliffs and shingle bays. Regarding Landscape Character Types, in Aberdeenshire the PAB is situated within Coastal Farmlands. On entering Moray, the PAB is temporarily divided between Rolling Coastal Farmlands and Broad Forested Hill within Upland Farmlands. The approximate southern half of the PAB is all located within Upland Farmland.

2.3.1.3 Habitats within and adjacent to the PAB include arable land, improved and semi-improved grassland, dense and scattered scrub, trees and woodland (mainly coniferous plantation), heath and watercourses. At the coast, the PAB includes part of the Cullen to Stake Ness Coast SSSI. Non-statutory nature conversation designation sites include the Cullen to Whitehills Coast Local Nature Conservation Site (LNCS) and several areas of ancient woodland. There are four Study of Environmentally Sensitive Areas (SESAs) throughout the PAB.

2.3.1.4 The River Isla crosses the PAB to the north-east of Keith. The river is approximately 29 km in length and flows in an easterly direction from its source near Loch Park to the north-east of Dufftown before discharging into the River Deveron in Aberdeenshire (National Gird Reference [NGR] 352996 847968). A number of smaller watercourses cross, or have their sub catchment boundaries within the PAB, including Burn of Deskford, Burn of Fordyce, Scattery Burn, Burn of Paithnick and Burn of Drum.

2.3.1.5 There are no substantial settlements within the PAB. The village of Fordyce is situated approximately 2.5 km inland. Other than this, residential properties within the PAB are generally isolated or within small hamlets. There are two small towns immediately out with the PAB, these being Portsoy in Aberdeenshire at the coast, and Keith in Moray approximately 1.5 km north of Blackhillock substation. The nearest large town is Elgin, located approximately 28 km west in Moray.

2.3.1.6 Two trunk roads traverse the PAB. The A96 trunk road runs roughly east / west through the PAB in Moray approximately 3 km south / south-east of Keith; this serves as the main route between Aberdeen and Inverness and is the road from which the proposed onshore substation access will be taken. Approximately 3 km north-west, the A95 trunk road passes east / west through the PAB; this runs between Keith and the A98 south-west of Boyndie. Main roads traversing the PAB include the A98 running east / west approximately 1.5 km inland from the coast in Aberdeenshire. The Aberdeen – Inverness railway line also passes through the PAB to the south; the closest railway station is at Keith.

2.4 Key Components of the OnTI

2.4.1 Offshore Export Cable Circuits

2.4.1.1 Electricity generated by the Moray West Offshore Wind Farm will be transmitted to shore by two offshore export cable circuits. Each cable circuit will comprise a number of conductor cores, usually made from copper or aluminium. These will be surrounded by layers of insulating material and armouring to protect them from external damage, as well as material to ensure they are watertight.

2.4.1.2 This EIA Report only considers the offshore export cables where they are located landward of MLWS. The offshore export cables below MLWS are described in detail within the Moray West Offshore EIA Report that will support applications for Section 36 consent under the Electricity Act 1989, and Marine Licences under the Marine (Scotland) Act 2010 and Marine and Coastal Access Act 2009 for the Offshore Transmission Infrastructure (OfTI) and the Moray West Offshore Wind Farm. Chapter 14: Whole Project Assessment considers the potentially significant environmental effects of the Moray West Offshore Wind Farm, the OfTI and the OnTI together as single development.

Installation

2.4.1.3 The offshore export cable circuits will be installed by either open cut trenching or HDD, or a combination of the two. The method(s) will depend on ground conditions and environmental sensitivities at the Onshore Landfall Area and will be finalised at the detailed design stage. Outline methods for both open cut trenching and HDD activities in the intertidal area are as follows:

- Jetting / open-cut trenching – This involves excavating a trench from a point below MLWS to the TJBs. From the cable laying vessel, the offshore export cable circuits are brought to the Onshore Landfall Area by a combination of floating and pulling ashore. Once in position the cables are sunk to the seabed and then laid in the trench before the trench is backfilled; and
- HDD – HDD involves drilling holes from the landward side of the Onshore Landfall Area to a point where marine installation equipment can operate. Ducts or pipes are installed in the drilled holes and the cables are then pulled into the ducts.

2.4.1.4 There are differing terrains and sediments along the coastline within the PAB, although it largely comprises rocky outcrops / cliffs with some shingle bays.

2.4.1.5 Should the offshore export cable circuits be installed within a shingle bay, open cut trenching may be used in the intertidal zone (between MLWS and MHWS). The possible methods of open cut trenching include:

- A trench is excavated and the sediment stored alongside while the cable is laid, the excavated sediment is then returned to the trench;
- A large trench is cut in one or multiple passes to the correct depth before the cable is laid back in trench at a later date (pre-lay cutting or pre-trenching). The trench can be backfilled naturally or mechanically; and
- Open cut trenching at the landfall may include up to two cable trenches through mobile sediments in intertidal areas (a burial depth of a minimum of 1m below seabed (to be confirmed by cable burial risk assessment and prevailing seabed conditions), a trench affected width of up to 15 m with trenches open for a period of days to a few weeks).

2.4.1.6 From the marine cable laying vessel, the offshore export cable circuits will be brought ashore by a combination of floating and pulling.

2.4.1.7 It is likely that HDD will be employed in locations where there are environmental sensitivities. It may be possible to drill from the location of the TJBs above MHWS to a point below MLWS where marine installation equipment can operate. Where this is not possible, HDD may be used to avoid construction activities in the most environmentally sensitive areas, with open cut trenching techniques being employed in the areas that are less sensitive.

2.4.1.8 The Cullen to Stake Ness Coast SSSI occupies the rocky coastline within the PAB; the Cullen and Whitehills LNCS (as identified in the Aberdeenshire Local Development Plan) also partly follows the boundary of the SSSI. The SSSI is designated for both earth science and habitat features.

2.4.1.9 The preferred method of installation within the Cullen to Stake Ness Coast SSSI will be HDD. In this instance, efforts will be made to locate all construction work areas outside the boundary of the site, with sufficient standoff distances applied to ensure no disturbance to its features. The exact location of the works will be informed by surveys and ground investigations undertaken at the detailed design stage as required. Detailed method statements will be prepared which will include onsite best practice measures to ensure the features of the SSSI are protected during construction (e.g. the fencing off, of sensitive areas).

2.4.1.10 Depending on the exact location of the works, it may be necessary to undertake some construction activities within the boundary of the SSSI. These may include the creation of temporary works areas (e.g. compounds and access tracks) and / or excavations for the installation of infrastructure. As noted, surveys and ground investigations at the detailed design stage will inform selection of the landfall location. Careful design will seek to ensure the most sensitive locations within the SSSI are avoided and the most suitable techniques for installing the cable circuits are selected. A detailed method statement will include onsite best practice measures to ensure the key features of the SSSI are afforded protection during construction.

2.4.1.11 All works within the SSSI will be temporary, with all permanent infrastructure being buried. In the event of sensitive habitat loss, where this is temporary, suitable restoration and maintenance measures will be developed. Where restoration is not feasible and sensitive habitat loss is likely to be permanent, this will be suitably compensated, either within the SSSI or at other locations identified. For further details see Chapter 5: Hydrology, Hydrogeology and Geology and Chapter 6: Ecology and Nature Conservation.

2.4.2 Transition Joint Bays

2.4.2.1 The offshore export cable circuits and the onshore cable circuits will be jointed within TJBs. There will be two TJBs installed as close to the coast as possible, but landward of MHWS accounting for environmental sensitivities. The footprint of each TJB will measure approximately 20 m x 5 m, with an approximate spacing of 5 m depending on ground conditions and the chosen installation method for the offshore export cable circuits.

2.4.2.2 It is likely that the TJBs will be concrete lined excavations containing the cable joints and cable circuits; there will be no surface structures with the exception of the link box, adjacent to each TJB. These are required at cable joints and terminations to provide easy access for cable testing and fault location purposes. The link boxes will require several surface level access covers near the TJBs; these will measure approximately 1.5 m x 4 m. A permanent access track may be required for maintenance purposes, although the requirement for, and nature of this will be determined at the detailed design stage. A plan and cross section of a typical single circuit joint bay are presented as Image 2.4.1.

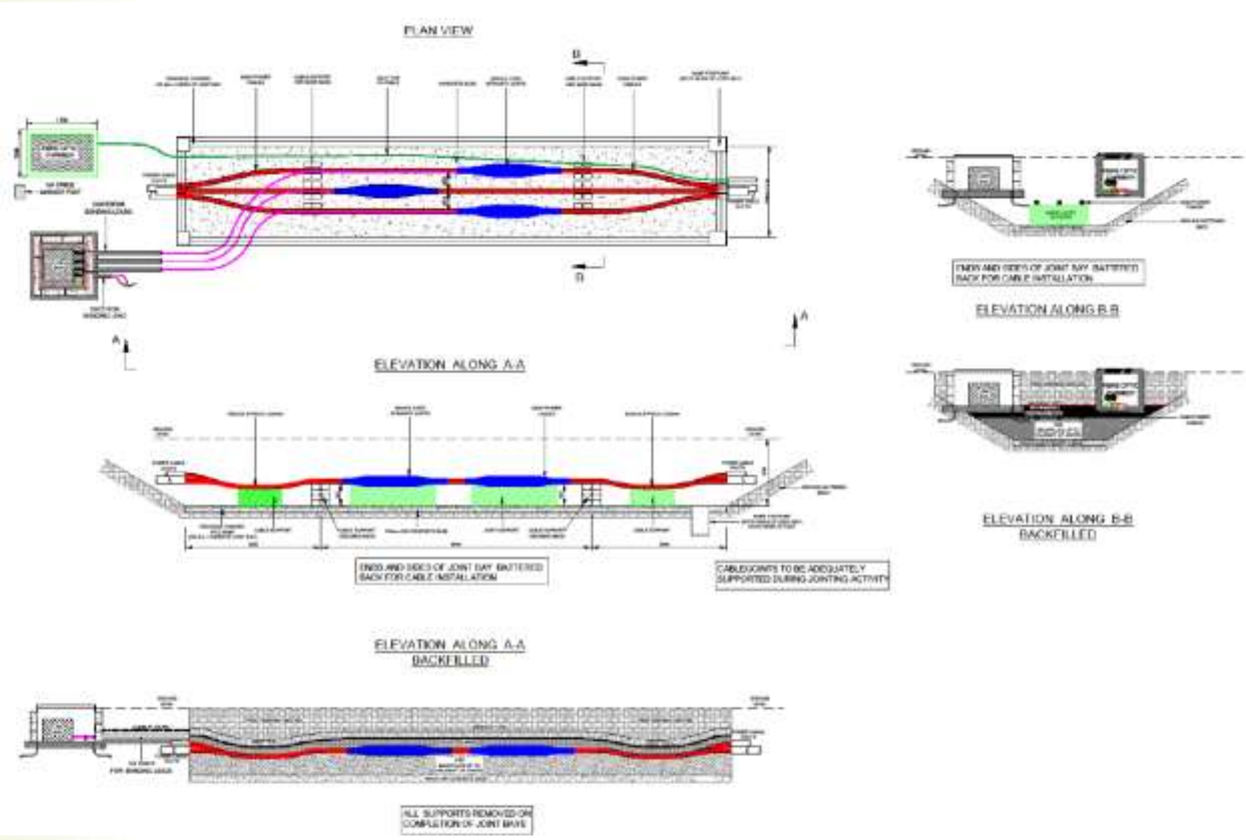

Image 2.4.1: Plan and Cross Section of a Typical Single Circuit Joint Bay

<u>Installation</u>

2.4.2.3 Mechanical excavators will be used to create the TJBs. The excavations, which will be approximately 2.5 m deep, will be contained within the working width for the onshore cable circuits. Installation of the TJBs will generally follow the same methods as set out for the onshore cable circuits in Section 2.4.3.

2.4.3 Onshore Cable Circuits

2.4.3.1 On exiting the TJBs, the onshore cable circuits will be routed inland towards the onshore substation site. The HVAC system will comprise two cable circuits, with each circuit comprising three separate cables; a typical voltage for the cables will between 132 and 400 kV. The cable circuits will be buried, and it is likely that each cable will be contained within a ~200 mm PVC duct for the majority of the route. Fibre optic and distributed temperature sensing cables will be buried alongside the cable circuits in separate smaller ducts. A cover (usually recycled plastic) will be placed over the cable circuits with marker tape to warn of their presence. A cross section of a typical buried cable circuit is presented as Image 2.4.2.

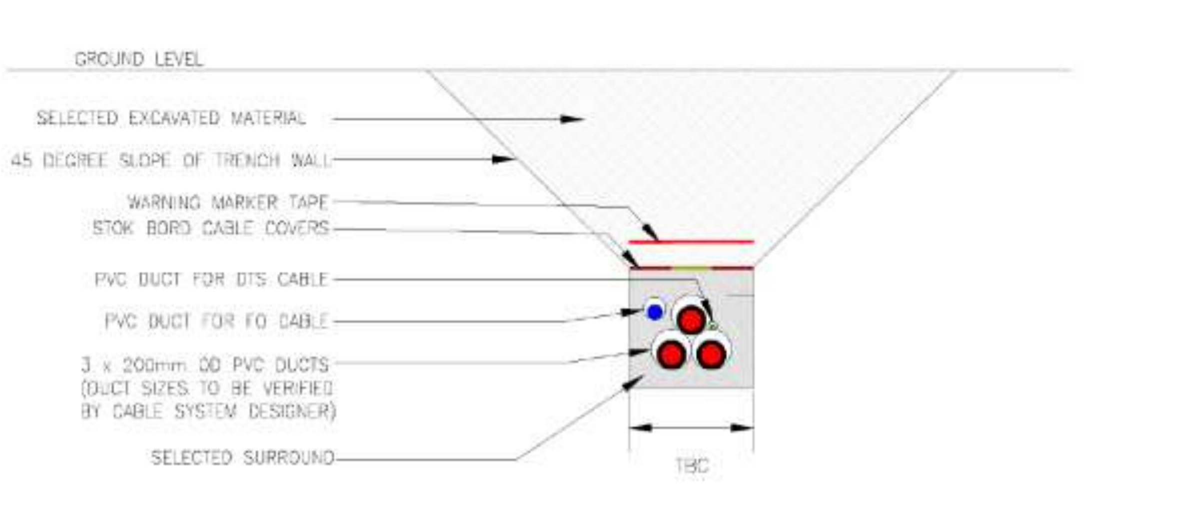

Image 2.4.2: Cross Section of a Typical Buried Cable Circuit

2.4.3.2 The onshore cable circuits will be installed in 750 m to 1,000 m lengths, which will be connected in joint bays. These will be installations similar to the TJBs, also with surface level access covers for maintenance. As far as reasonably practical, joint bays will be located near to existing boundaries and roads to provide easy access during maintenance visits.

Installation

2.4.3.3 For the majority of the route, the cable circuits will be installed by open cut trenching. Each circuit will be buried in individual parallel trenches excavated by mechanical excavators. It is likely that the trenches will be v-shaped. The excavation width at the surface will depend upon the trench depth. Initial technical design suggests that, with a target burial depth for the cable circuits of 1 m (to the top of the ducting), the trenches will be approximately 3 m wide. However, this could be increased at the detailed design stage depending upon technical / locational requirements and the Contractor’s construction methods. The cable circuits be buried in selected excavation materials, or If required, imported burial materials may be used to line the trench, e.g. sand. A cross section of a typical buried cable circuit is presented as Image 2.4.2.

2.4.3.4 The working width for installation of the onshore cable circuits will generally be 30 m, although this may be varied at certain locations, e.g. reduced where negotiating constraints or expanded on approaching areas of complexity. In addition to the cable circuit trenches, the working width will contain a haul route, areas of stripped topsoil (for the use and laydown of construction plant and other activities) and areas sufficient for the separate storage of different excavated materials. Depending on ground conditions, the haul route is likely to be constructed by overlaying stripped ground with aggregate materials. Alternatively, plastic or metal sheeting may be laid directly on the ground. A typical plan and cross section of a working width are presented as Image 2.4.3.

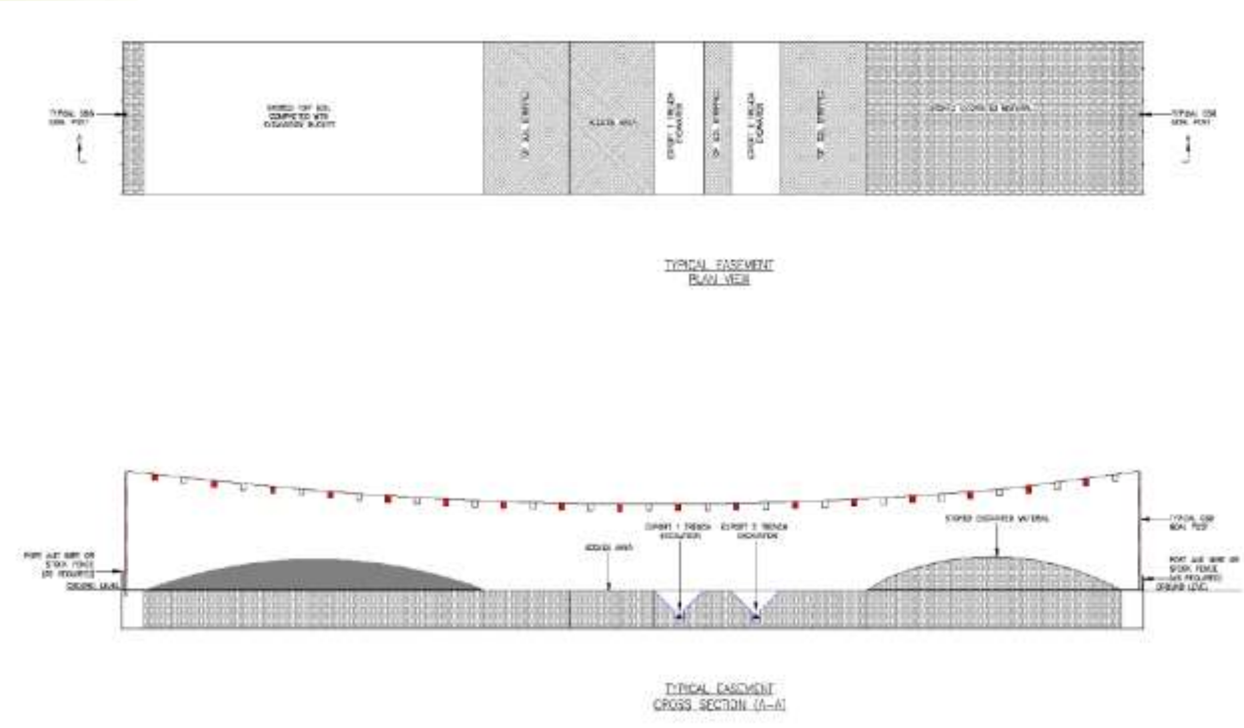

Image 2.4.3: Plan and Cross Section of a Typical Working Width

2.4.3.5 Shortly before installation, temporary fencing will be erected along the boundaries of the working width; gates or stiles will be incorporated where existing access needs to be maintained. The working width will then be cleared of vegetation. Wherever practicable, established trees will be fenced off and worked around.

2.4.3.6 Following vegetation clearance, topsoil will be stripped. The topsoil will be stored in such a way that it is not mixed with subsoil or traversed by vehicles. This will typically be in an earth bund with a maximum height of 2 m to avoid compaction. Storage time will be kept to the practicable minimum to prevent deteriorating soil quality. Topsoil stripped from different fields will be stored separately, as will soil from hedgerow banks or woodland strips. Subsoil will be excavated to the required depth for each trench.

2.4.3.7 Particular care will be taken to ensure the existing land drainage regime is not compromised. Land drainage systems will be maintained during construction and reinstated on completion. Before construction commences, temporary cut-off drains will be installed parallel to the trench-lines to prevent soil and groundwater entering the trenches. These field drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release.

2.4.3.8 It is likely that installation of the cable circuits will occur in two campaigns. Firstly, the ducting will be installed within the trenches and the working width reinstated. Once in place, the cables will be pulled through the ducting via the joint bays. To minimise construction disturbance, the cable ducts will ideally be installed in a linear fashion from one end of the route to the other, with reinstatement following in stages. However, it is likely that some works will need to occur simultaneously at different locations along the route. For example, HDD works may be undertaken at various points along the route while trenching activities occur elsewhere.

Special Crossings

2.4.3.9 Different methods of installing the cable circuits will be employed when crossing linear features such as roads and watercourses. The method will depend upon the importance of the feature, the results of ground investigations and consultations with the relevant consenting authorities. The following methods are generally expected:

- Major roads, railway lines, main rivers, and sensitive watercourses and habitats – trenchless techniques wherever practicable;
- Minor roads, private access tracks and disused railways – open cut techniques, subject to consultations with the landowners / occupiers and the relevant consenting authorities; and
- Small / modified watercourses with straightforward reinstatement potential – open cut techniques, subject to the agreement of SEPA and other relevant consultees.

Open Cut Crossing Techniques

2.4.3.10 To prevent road closures, a temporary road or diversion will be constructed / implemented where the cable circuits are to be installed within a single-track road. Where a single carriageway road is to be crossed using open cut techniques, traffic flow will be maintained with one lane of the road remaining open and under signal control. Once the cable circuits have been installed, all roads will be reinstated.

2.4.3.11 Different techniques may be used for open cut crossing of watercourses. Techniques may include:

- Maintaining water flow by installing temporary flumes in the bed of a watercourse over the point of the crossing. The watercourse bed is then excavated beneath the flume and the cable ducts installed. Following installation, the trench is backfilled and the flumes removed before the banks of the watercourse are reinstated;
- Construction of a temporary dam upstream of the crossing point. Water is then pumped downstream of the crossing point in pipes and the cable circuits are installed in the dry bed of the watercourse. The watercourse bed is then reinstated and the dam removed; and
- Use of 'in-river' works by means of an open cut trench. This method is only used for the crossing of watercourses that are generally dry or too wide to employ other methods.

Trenchless Crossing Techniques

2.4.3.12 At crossing locations where, open cut trenching is not possible, trenchless techniques will be employed to install the cable circuits. The most likely technique is horizontal directional drilling (HDD).

2.4.3.13 A typical HDD operation commences with the drilling of a pilot hole between two points (known as the launch and receiving pits). Drilling fluid is pumped down the drill rods to the drilling face. This usually comprises water and bentonite (a non-toxic clay recommended by SEPA) and works to lubricate the drilling rods and pick up cuttings before returning to the surface via the pilot hole. The position and progress of the drill head is monitored and controlled at the surface using electromagnetic detection equipment. If the drill encounters groundwater, the pressure under which the drilling fluid or mud is pumped down the borehole is controlled to prevent migration into the groundwater and vice versa. Drill fluid usage is also monitored at the surface to confirm no significant losses are occurring.

2.4.3.14 Once completed, reaming devices are pulled back through the pilot hole until it is enlarged to the required diameter; the hole will typically be 25 % to 50 % larger than the duct. The duct is then attached to the reaming device and drawn into the hole in one continuous length; this minimises the risk of it becoming stuck during the operation. Support may be given to the sides of the hole by injecting bentonite around the reamer. Drilling and duct installation may be continuous 24-hour operations. Once the duct is in place the cable may be pulled through it during the same operation, or at a later stage.

2.4.3.15 It will be necessary to prepare the ground in the locations of both a launch and a receiving pit. Where possible, these works areas will be located within the 30 m working width; however, the working width may need to be widened to accommodate HDD activities at certain locations. A launch pit must accommodate the drilling rig itself, which will generally require an excavation of 5 m x 2 m (and 1 m deep). A receiving pit will include a duct stringing area, the size of which will depend on the length of the drill; this can often be accommodated within the working width for the cable circuits. Larger laydown areas may be established in the vicinity of both pits to enable plant and materials to be delivered direct to the work locations. In addition, the working width for the cable circuits may expand at a HDD crossing point as it can be necessary to install the cables beneath a feature in flat rather than trefoil formation. This necessitates separate drill holes for each cable and subsequently the HDD rig will need to be moved alongside the crossing point.

2.4.3.16 A non-saline supply of water will be required for the drilling fluid and general site usage. Water demand will depend on the drill hole diameter and length, as well as pump capacity. Depending on the water source and its distance from the operation, some preparatory works may be necessary, including the construction of a temporary water storage lagoon onsite. Alternatively, water supplies may be brought in by road in tankers. A silt sediment pond will be required to capture and recycle the drilling fluid at the surface and ensure it does not escape to the wider water environment. This will be a maximum of 7 m x 7 m (and generally 0.8 m deep). It will be a plastic lined excavation fenced off for protection.

2.4.3.17 Following an HDD operation, the work locations will be reinstated with the excavated materials. If not suitable to be used for reinstatement, the mud waste from the silt sediment ponds will be disposed of in accordance with the Site Waste Management Plan (SWMP).

2.4.3.18 The exact number and location of trenchless crossings will be identified at the detailed design stage. However, some indicative locations considered likely include the Onshore Landfall Area, the A98, the A95 trunk road, the A96 trunk road, the River Isla, Pitlurg Wood and the Aberdeen – Inverness railway line.

2.4.4 Onshore Substation

2.4.4.1 The proposed location of the onshore substation is shown on Figure 2.4.1. The area currently comprises two fields located either side of a single-track road that provides access to the buildings of Whitehillock from the A96. It should be noted that permanent infrastructure, i.e. the onshore substation itself and landscape mitigation, will only be located within the western field. It is currently proposed that the eastern field be used for temporary works only, although it may be used for permanent landscaping if the detailed design process identifies a need.

2.4.4.2 The exact location and layout of the proposed infrastructure within the western field will also be determined as part of the detailed design process; however, its footprint will be up to approximately 60,000 m^2 (including landscaping and parking space). External ground is likely to be overlaid with aggregate materials, with concrete being used around some equipment substructures. The remainder of the western site may be used for landscaping, or other forms of visual and noise screening. The western field is currently afforded visual screening to the north and west by Pitlurg Wood and this will be fully retained as part of the detailed design. A perimeter fence will be erected around the site and external lighting will be installed, although this will only be used during maintenance visits.

2.4.4.3 The onshore substation will utilise either Gas Insulated Switchgear (GIS) or Air Insulated Switchgear (AIS). GIS typically requires more equipment to be housed in buildings. For the purposes of the EIA it is assumed that the onshore substation will reach a maximum height of 13 m. An illustration of a typical layout for such a substation is presented as Figure 2.4.2, with an illustration on the typical elevation presented as Figure 2.4.3. Regardless of whether GIS or AIS technology is selected, the equipment likely to be installed (externally or within buildings) includes the following:

- Circuit breakers;
- Super grid transformers;
- Dynamic reactive compensation equipment;
- Harmonic filtering equipment;
- Associated cooling equipment;
- Electrical busbars / connections;
- Supervisory control and data acquisition equipment;
- Metering; and
- Ancillary equipment and services.

2.4.4.4 The onshore substation will require a permanent access. This will be taken from the existing single-track road that provides access to the buildings of Whitehillock from the A96 trunk road and borders the site to the east. Depending upon requirements, upgrades to this road may be necessary to facilitate construction of the onshore substation. A swept path for the junction of this road with the A96 is provided as Figure 10.1 in Appendix 9.1. This provides an estimate of the area of temporary hardstanding that will be required during construction of the onshore substation.

Installation

2.4.4.5 Precise construction methods for the onshore substation will vary depending on the results of pre-construction surveys and ground investigations. The underlying soils and strata, as well as other physical constraints such as services, will be of particular importance. It is expected that foundations for much of the equipment will be concrete, although depending upon ground conditions, piling may be necessary.

2.4.4.6 Prior to construction, temporary fencing will be erected around the site before earthworks are implemented. As with the cable circuits, particular care will also be taken to ensure the existing land drainage regime is not compromised, with measures to ensure it is maintained during construction and reinstated on completion. Any temporary drains will discharge to local drainage ditches through silt traps, as appropriate, to minimise sediment release. All aspects of the detailed engineering design and construction work will be in accordance with the Construction Design and Management Regulations 2015.

2.4.5 Transmission Interface

2.4.5.1 The transmission interface point, i.e. the location where the OnTI will connect to the NETS, is Blackhillock substation. The works required at Blackhillock substation to facilitate the connection of the OnTI will be completed by Scottish Hydro Electric Transmission Limited (the Transmission Network Operator [TNO]). It is expected that the works will be completed under the OnTO's permitted development rights and be located within the footprint of Blackhillock substation.

2.5 Construction of the OnTI

2.5.1 Pre-Construction Activities

2.5.1.1 Before construction can commence, and in part to inform detailed design of the OnTI, a number of surveys and ground investigations will be undertaken. These may include the following:

- Pre-construction ecological surveys;
- Archaeological investigations;
- Drainage surveys;
- Thermal resistivity surveys;
- Geotechnical and ground stability surveys;
- Unexploded ordnance (UXO) surveys (if relevant); and
- Site investigations (if areas of potential contamination are present).

2.5.2 Construction Environmental Management

2.5.2.1 It is envisaged that many of the best practice and mitigation measures identified within the technical assessments presented within Chapters 5 to 13 will be secured by planning conditions and implemented via OnTI specific construction guidance / plans prepared by MW and / or its Contractors as appropriate. Such measures are likely to include, but will not be limited to:

- The appointment of an Ecological Clerk of Works (ECoW) to oversee the correct implementation of agreed commitments;
- Details of all staff training and attendance at tool box talks;
- Completion and implementation of a Construction Traffic Management Plan (CTMP) presenting detailed access routes and delivery timings, car parking arrangements, temporary signage etc.;
- Completion and implementation of a Drainage Management Plan (DMP);
- Completion and implementation of a SWMP;
- Demarcation of working areas with temporary fencing following any micrositing exercise. This should acknowledge any location specific method statements in relation to environmental sensitivities;
- Development of an infrastructure monitoring programme to identify any requirement for remedial work; and
- Exclusion of equipment from watercourses and, as far as possible from immediate riparian zones during watercourse crossing construction along with measures to minimise change in in-stream substrates.

2.5.3 Construction Compounds

2.5.3.1 Four temporary construction compounds will be required for installation of the OnTI. The exact location and size of these will be determined by the contractor prior to construction in agreement with the relevant Council as part of detailed design. However, as noted in Section 2.4.4, it is expected that a single main compound will be located in the eastern field of the onshore substation site.

2.5.3.2 The land available within the eastern field is 8 ha, although the presence of an overhead line and the screening measures required for the OnTI (e.g. earthworks and planting) will prevent this from being used in full for the construction compound. A further three satellite compounds (approximately 70 m x 70 m) will be established at selected locations within the PAB for installation of the onshore cable circuits and infrastructure at the Onshore Landfall Area.

2.5.3.3 Compounds will be secure, fenced areas. Ground conditions will determine how each compound is established, but it is likely that vegetation will be stripped and overlaid with aggregate materials. Alternatively, plastic or metal sheeting may be laid directly on the ground. Compounds will be used for the storage of construction plant, machinery and materials, as well as the provision of welfare facilities, site offices and parking areas.

2.5.4 Construction Access

2.5.4.1 Depending on the final route of the cable circuits, it likely that a number of temporary access tracks will be required for installation of the OnTI. The requirement for these and their locations will be determined by the contractor prior to construction in agreement with the landowners and relevant Council as part of detailed design.

2.5.4.2 Access tracks will be necessary to connect the working width for the cable circuits with the local road network and will be constructed in parallel with cable circuit installation. Depending on ground conditions, they are likely to be constructed by overlaying stripped ground with aggregate materials. Alternatively, plastic or metal sheeting may be laid directly on the ground. Where they are deemed necessary, access tracks will be 5 m to 6 m in width.

2.5.5 Construction Traffic

2.5.5.1 Construction of the OnTI will generate traffic on the local road network. This is likely to include flatbed trucks and Heavy Goods Vehicles (HGVs) delivering plant and equipment, as well as Light Goods Vehicles (LGVs) and cars associated with construction staff movements. Indicative traffic numbers are discussed within Chapter 9: Traffic and Transport.

2.5.5.2 As noted, a CTMP will be prepared and agreed with MC and AC. This will set out all traffic management measures including any diversions, programming, stacking areas and vehicle movements on and off-site etc. A preliminary CTMP is provided in Technical Appendix 9.2. A preliminary access study is also provided as Appendix 9.3. This considers the roads that may be used to deliver any abnormal or special loads and any works necessary to accommodate them.

2.5.6 Construction Workforce and Hours of Works

2.5.6.1 The number of construction staff onsite will vary depending on the tasks being undertaken. In total, it is expected that there could be up to 350 staff employed to construct the OnTI. Between 200 and 250 staff could be located at the onshore substation site, with a further 50 to 100 staff working on installation of the onshore cable circuits and associated infrastructure.

2.5.6.2 General construction activities are likely to take place between 07:00 to 19:00 hours on weekdays (Monday to Friday) and 07:00 to 13:00 hours on Saturdays. However, there may be exceptions for certain activities. Quiet onsite working activities, such as electrical commissioning, may extend outside the core working times where required. Working hours may be reduced at times due to seasonal or weather restrictions. Some works, such as delivery of large equipment, may take place outside the core working hours to reduce disturbance to other users of the public road network. HDD activities may take place over 24 hour periods if environmental sensitives at the proposed locations allow.

2.5.7 Construction Programme

2.5.7.1 It is currently proposed that any necessary pre-construction surveys and site investigations will occur during Q2 2020 until Q3 2021. Following the detailed design processes, and on securing the necessary consents and licences, construction of the OnTI itself is expected to commence during Q1 / Q2 2022. Assuming no undue constraints, construction will continue until Q3 2024. First generation for the Moray West Offshore Wind Farm is planned for Q4 2024, with the completion of commissioning and handover of the Offshore Transmission Infrastructure (OfTI) and OnTI to the Offshore Transmission Owner (OfTO) following thereafter.

2.5.7.2 Where possible, construction activities will be carried out concurrently, thus minimising the overall length of the construction programme. It is likely that installation of the OnTI's key components will be phased as follows:

- Q2 / Q3 2022 – Site preparation and construction activities at the Onshore Landfall Area;
- Q2 2022 to Q1 2024 – Installation of the onshore substation;
- Q2 2023 to Q1 2024 – Installation of the onshore cable circuits, including TJBs;
- Q1 2024 to Q3 2024 – Site reinstatement.

2.6 Operation and Maintenance of the OnTI

2.6.1.1 It is intended that the OnTI will operate 24 hours a day for 365 days a year. Maintenance of the infrastructure will generally be separated into the following three categories:

- Periodic overhauls – Carried out in accordance with the manufacturer's warranty. These are usually scheduled to occur with planned maintenance outages;
- Scheduled maintenance – Largely required for the inspection and testing of equipment; and
- Unscheduled maintenance – Required in the event of unplanned defects or failures.

2.6.1.2 Installation of the onshore cable circuits will seek to ensure they are securely buried and protected from damage, such that their operation will largely be maintenance free. Maintenance activities are likely to be limited to routine testing during outages. In the event of damage or faults, testing will identify their location so that disruption from any intrusive works, e.g. equipment replacement, will be isolated.

2.6.1.3 The cable circuits will be installed with marker tape and protective tiles to warn of their presence below ground in the event of nearby excavation. They will be marked on service plans, which will be provided to other utility companies for their records.

2.6.1.4 The onshore substation will not be permanently staffed. Site visits during operation will typically be limited to fortnightly routine inspections and annual routine maintenance activities. Each visit will generally involve one or two service engineers attending site in a LGV. The frequency and duration of visits will be dependent on manufacturer recommendations for the installed equipment and the final maintenance regime developed by the OfTO.

2.6.2 Electromagnetic Fields

2.6.2.1 The OnTI will generate electromagnetic fields (EMFs). EMFs are part of the natural world and are also produced wherever electricity is generated, transmitted or used. Public exposure to EMFs comes from a range of sources, including household wiring and appliances.

2.6.2.2 Strong EMFs are known to have a detectible physiological effect on the body, and extensive scientific research has been undertaken to investigate whether there is potential for adverse health effects from exposure to EMFs. International and national health protection bodies have recommended conservative guidelines for public EMFs exposure, set to protect health. These guidelines have been adopted in the UK and are applied using a Code of Practice for electricity transmission infrastructure (Department of Energy and Climate Change, 2012).

2.6.2.3 Building walls within the onshore substation and the perimeter fence will offer screening of the EMFs. Due to the likely distance between onshore substation components and the closest publicly accessible point (the perimeter fence), the greatest exposure to EMFs is likely to be from the onshore cable circuits. EMFs generated by the onshore cable circuits will be fully screened by sheaths and their burial in the ground. No EMFs will be experienced above ground.

The maximum EMF strength will be significantly below the guideline public exposure limit set to protect health.

2.6.2.4 The OnTI will be designed and operated in accordance with all relevant health and safety legislation and the occupational exposure guidelines for EMF. It is considered that EMFs from the OnTI will be well below the adopted guideline public exposure limits set to protect health.

2.7 Decommissioning Plan

2.7.1.1 It is considered that the Moray West Offshore Wind Farm will have a design life of up to 50 years and that the OnTI may continue to operate throughout this period. Although individual pieces of equipment will be replaced as and when required, no major refurbishment works are currently envisaged.

2.7.1.2 It is possible that the OnTI will remain in-situ once the Moray West Offshore Wind Farm has been decommissioned, with the onshore substation continuing to operate as part of transmission infrastructure. However, for the purposes of the EIA the most likely decommissioning scenario has been considered. In this scenario, with the exception of the offshore export cable circuits below MHWS, all underground equipment and the onshore substation foundations will remain in-situ. Above ground equipment at the onshore substation site will be cleared and the site reinstated. It is considered that the removal of underground infrastructure will cause unnecessary disturbance and therefore the proposal to leave it in-situ is the most desirable approach to decommissioning. For the offshore export cable circuits within the intertidal zone, although it is expected that these will be left in-situ (Offshore EIA Report Chapter 4: Development Description), for the purposes of the EIA it has been assumed that all export cables will be removed during decommissioning.

2.7.1.3 The most appropriate method of decommissioning and the handling and disposal of materials will be undertaken in agreement with the relevant authorities at the time. Any applicable new legislation or guidelines published prior to decommissioning will be taken into account in relation to any design of mitigation prior to decommissioning occurring.

2.8 References

Department of Energy and Climate Change (2012). Power Lines: Demonstrating compliance with EMF public exposure guidelines. A voluntary Code of Practice.

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