

moray offshore renewables ltd

Developing Wind Energy In The Outer Moray Firth

Environmental Statement

Modified Transmission Infrastructure for
Telford, Stevenson and MacColl Wind Farms

Volume 1

Non Technical Summary





Introduction – Dan Finch (MORL Project Director)



In 2010, Moray Offshore Renewables Ltd (MORL) began work to develop offshore wind generation in the outer Moray Firth. Since then, considerable progress has been made, and in March of this year, the Scottish Government awarded consent for the Telford, Stevenson and MacColl offshore wind farms, which will have the capacity to generate 1,116 MW between them. This is a significant amount of power – roughly equivalent to a conventional thermal power station, and, on conservative wind estimates, capable of meeting the equivalent electricity needs of 688,000 households.

In order to get that power to the homes and businesses where it is needed, MORL proposes to construct the transmission infrastructure, which is the subject of the Environmental Statement. Its primary elements are: offshore substation platforms; subsea cabling which is buried in the seabed; and onshore underground cables running from the cable landing point at Inverboyndie to new substation infrastructure, which will be installed adjacent to the existing overhead transmission lines of the national grid, southwest of New Deer.

We have designed the transmission infrastructure (TI) to minimise environmental effects in a number of ways, including our decision to use underground cabling instead of a new overhead line. We have also chosen to use gas insulated switch-gear, which reduces the land required for the substation, and allows much of the electrical infrastructure to be housed within buildings of similar character to those already found in the area. This infrastructure will allow the power generated in the outer Moray Firth to be supplied to the national grid in an efficient and cost-effective way.



Introduction

This document is the Non Technical Summary which forms the first Volume of the Environmental Statement for the MORL modified TI. The Non Technical Summary provides an overview of the project details and the potential effects and associated mitigation associated with the modified TI. Both the Non Technical Summary and the other sections of the Environmental Statement have been submitted to Aberdeenshire Council and Marine Scotland. These support applications for a Planning Permission in Principle and a Marine Licence, respectively, to install modified TI connecting the consented Telford, Stevenson and MacColl wind farms in the outer Moray Firth to the national grid to the southwest of New Deer, Aberdeenshire.



Above: Inverboyndie Beach



Overview of the Project

MORL is a joint venture that was established by EDP Renewables (EDPR UK) and Repsol Nuevas Energias UK to develop, construct and operate offshore wind farms within the Round 3 offshore wind farm zone in the Moray Firth, Scotland. In March 2014, MORL was granted consent to construct the Telford, Stevenson and MacColl wind farms within the Round 3 zone.

Transmission Infrastructure, including offshore and onshore substations and export cables, is required to connect the wind farms to the National Grid Transmission Network. MORL was granted a Marine Licence to install offshore infrastructure between the three wind farms and Fraserburgh earlier in 2014. However, MORL has been offered and agreed an amended connection to the existing 275 kV overhead transmission line, owned and operated by Scottish Hydro-Electric Transmission, located to the southwest of New Deer in Aberdeenshire.

This change was brought about due to MORL's participation in the Connections Infrastructure and Options Note process. This is a joint process between National Grid, the regional Transmission Owners and the generator builder (in this case MORL). The outcome of this process was that consumers would benefit from a more economic and efficient connection if MORL was connected to the grid where it passes New Deer. As a result, MORL has reviewed and modified the export cable route corridor and required interconnection infrastructure and is applying for new consents for the TI elements, both onshore and offshore.

A Project Parameter Plan approach (called the Rochdale Envelope), which outlines the proposed infrastructure, and the construction, operation and decommissioning methods, has been used in all impact assessments in the Environmental Statement. The reasoning behind the use of this approach is that in the case of large developments such as this, the developer must apply for consents several years in advance of commencing the construction process. At this stage in the MORL project, much of the infrastructure will not be designed in detail or selected until closer to construction.

The Rochdale Envelope sets out the minimum and maximum limits in terms of the quantity of elements installed and the dimensions of the infrastructure. The Rochdale Envelope serves two purposes with regards to the consent application process. First, it allows developers to assess the worst case scenario for each effect assessed, so that the potential effects are well understood and adequate mitigation can be put in place before any works commence. Second, the Rochdale Envelope provides the range of parameters within which further engineering design must work.



The modified TI can be considered in two groups: the offshore transmission infrastructure (OfTI) and the onshore transmission infrastructure (OnTI).

For the OnTI, MORL has applied for a Planning Permission in Principle (PPP) rather than for detailed Planning Permission. Therefore, once detailed engineering has been advanced, MORL expects to submit an application for detailed Planning Permission drawing upon the requirements set out at the PPP stage and within the limits of the Rochdale Envelope.

The OfTI will comprise:

- Up to two offshore substation platforms (OSPs), located within the boundary of the three consented wind farms). These will house substations which will form the interface between the inter-array (between the turbines) cables and the offshore export cables;
- Export cables (up to four triplecore cables, separated by approximately four times water depth), buried to a target depth of 1 m. Where this burial depth cannot be achieved, cable protection will be implemented (e.g. rock placement or concrete mattresses);
- Inter-platform cables in between the OSPs
- Cable landfall: the point at which the submarine cables are physically brought ashore;
- Subsea cabling specification: AC, voltage levels 220kV.

The OnTI will comprise:

- Onshore transition jointing pit: the interface between the offshore and onshore cables systems;
- Underground cables (up to four bundled trefoil arrangements in total, comprising a working corridor up to 60 m wide) from landfall point to grid connection point;
- Onshore cabling specification: AC, voltage levels 220kV;
- Associated civil ground works;
- Access roads;
- Temporary construction compounds, storage facilities, laydown areas and access tracks during the construction period;
- Onshore substations comprising:
 - Grid transformers;
 - HVAC switchgear;
 - Reactive compensation;
 - Auxiliary transformers;
 - Control and instrumentation equipment;
 - Telecoms equipment;



- Control buildings;
- Fenced compounds; and
- Welfare facilities

The offshore infrastructure will include two OSPs (which will be installed within the area of the three consented wind farms) and four high voltage alternating current (HVAC) export cables. The export cables will be located within the offshore export cable route corridor which, from the southern boundary of the wind farm sites, is a 3 km wide (although wider in places) corridor shown on the plan (Figure 1). Up to four cables will be buried in up to four trenches, each of which will be up to 3 m wide. The overall area of the seabed affected by each cable installation will up to 6 m wide (including the 3 m wide trench). The final route of the cables will be within the corridor described above, with a maximum width of the offshore cable route of 1,200 m to ensure appropriate spacing between each cable trench. The offshore export cables will be buried to a target depth of 1 m where possible and will follow a route south for approximately 52 km from the southern boundary of the consented wind farms and come to shore at a landfall site at Inverboyndie Bay.

The offshore export cables will be connected to the onshore underground export cables in an onshore, underground transition jointing pit.

The onshore infrastructure will include up to four onshore HVAC export cables which will be laid in underground trenches to the onshore substations which will be built southwest of New Deer. Each trench would be a maximum of 4 m wide (assuming the cables are laid in

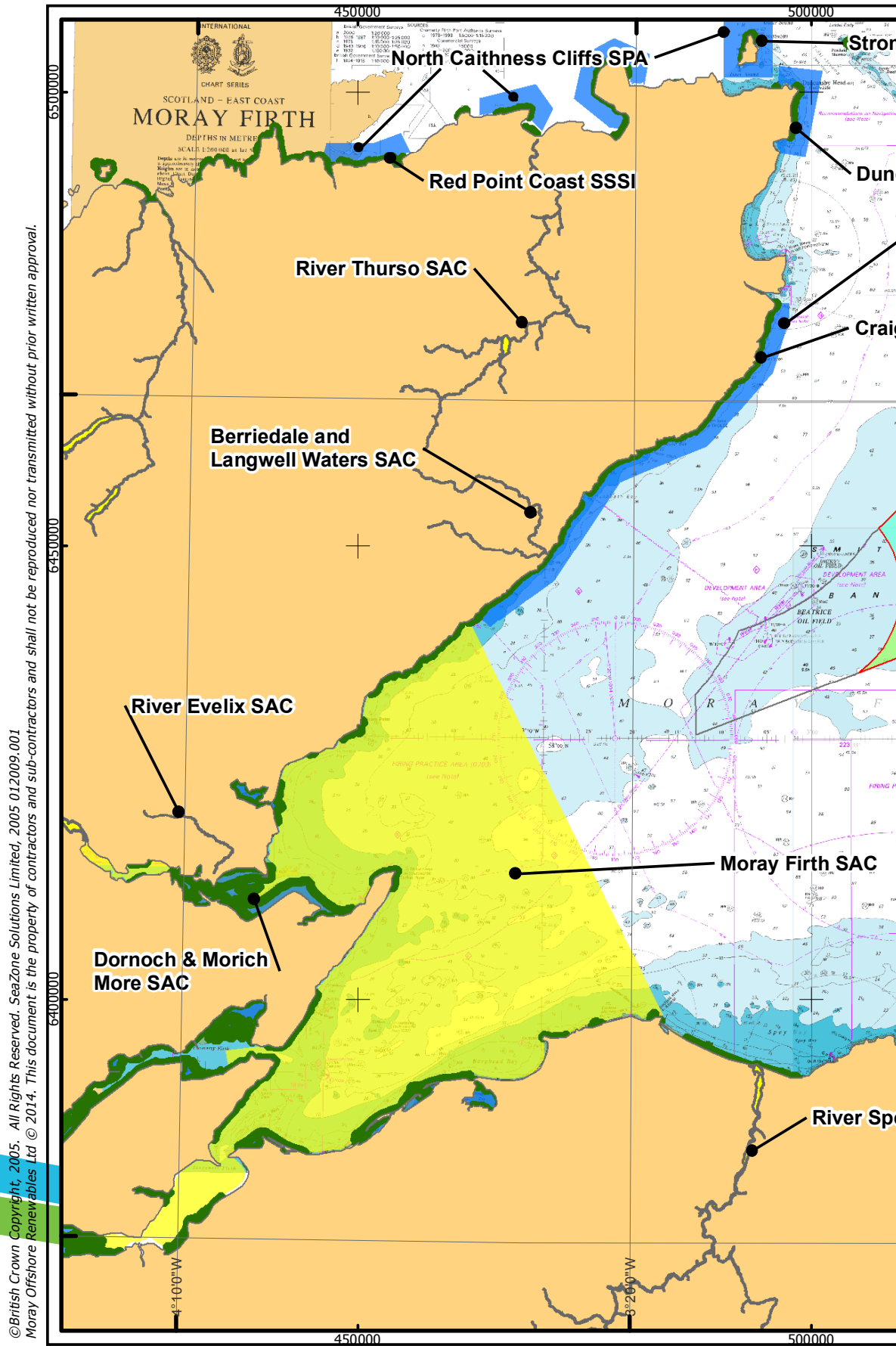
individual trenches) and in total, a maximum total working width of 60 m would be needed for installation of all four cables. If the cables are bundled into two trenches then the trench width would be 6 m but there would be no increase in the maximum total working width of 60 m. The onshore cable route will be located within the 500 m onshore export cable route corridor shown in Figures 1 and 2. This wider corridor has been assessed in the Environmental Statement to enable the precise cable route to be determined once further engineering design and investigations have been carried out. The onshore export cable route would be approximately 33 km in length from Inverboyndie Bay to the onshore substations southwest of New Deer. It is possible that the cables may be laid in two phases within a five year period.

The planning application for the OnTI included two onshore substations consisting of grid transformers and HVAC switchgear which will be co-located in a single compound adjacent to the existing 275 kV line south of New Deer on the substation area shown in Figure 2. Both substations will be a maximum of 13 m in height. Both substations will use Gas Insulated Switchgear (GIS) which means that the key electrical equipment (the switchgear) is enclosed in buildings rather than being exposed to the open air. By housing this equipment in buildings the footprint of the substations can be reduced by 25%. The two onshore substations will together occupy an area no more than 10 hectares in size. In addition, further land up to approximately 10 hectares will be required for the formation of a permanent access track and landscaping.

An indicative layout for the substations is shown in Figure 3.



Figure 1 - Original MORL Transmission Infrastructure and MORL Modified Transmission Infrastructure with Natural Heritage Designated Sites Shown



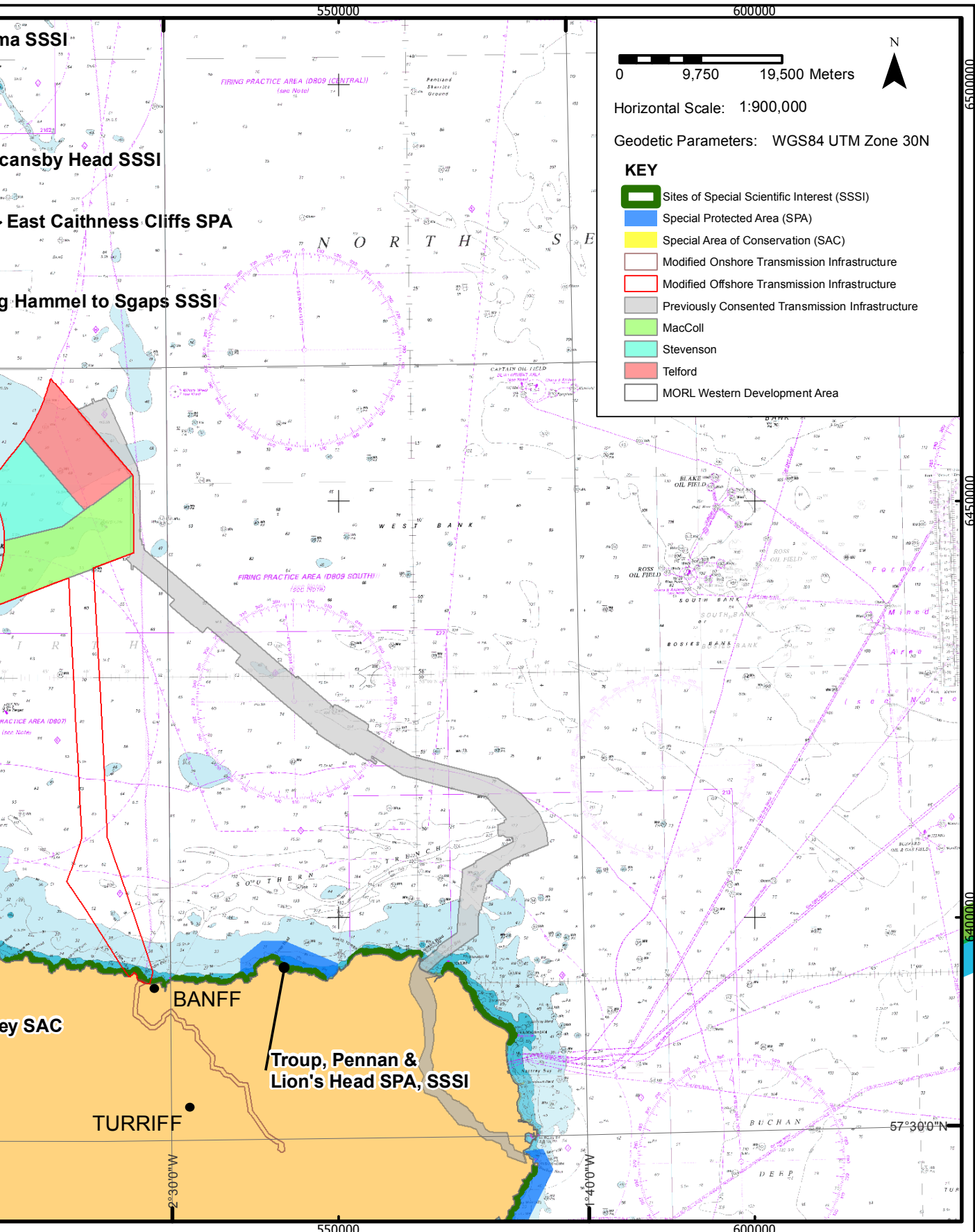
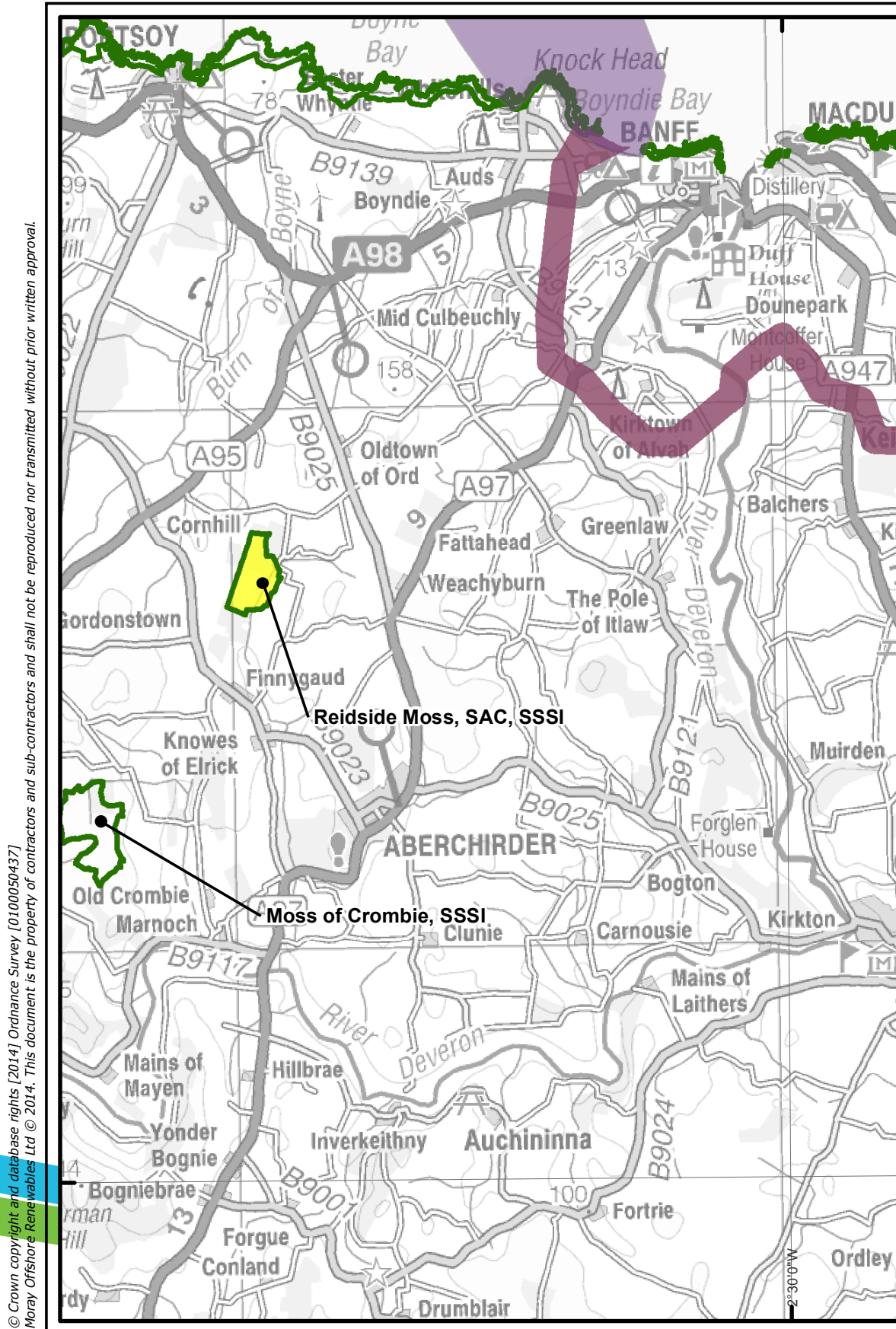


Figure 2 – Onshore Transmission Corridor and Substation Area with Natural Heritage Designated Sites Shown



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Map 006-2

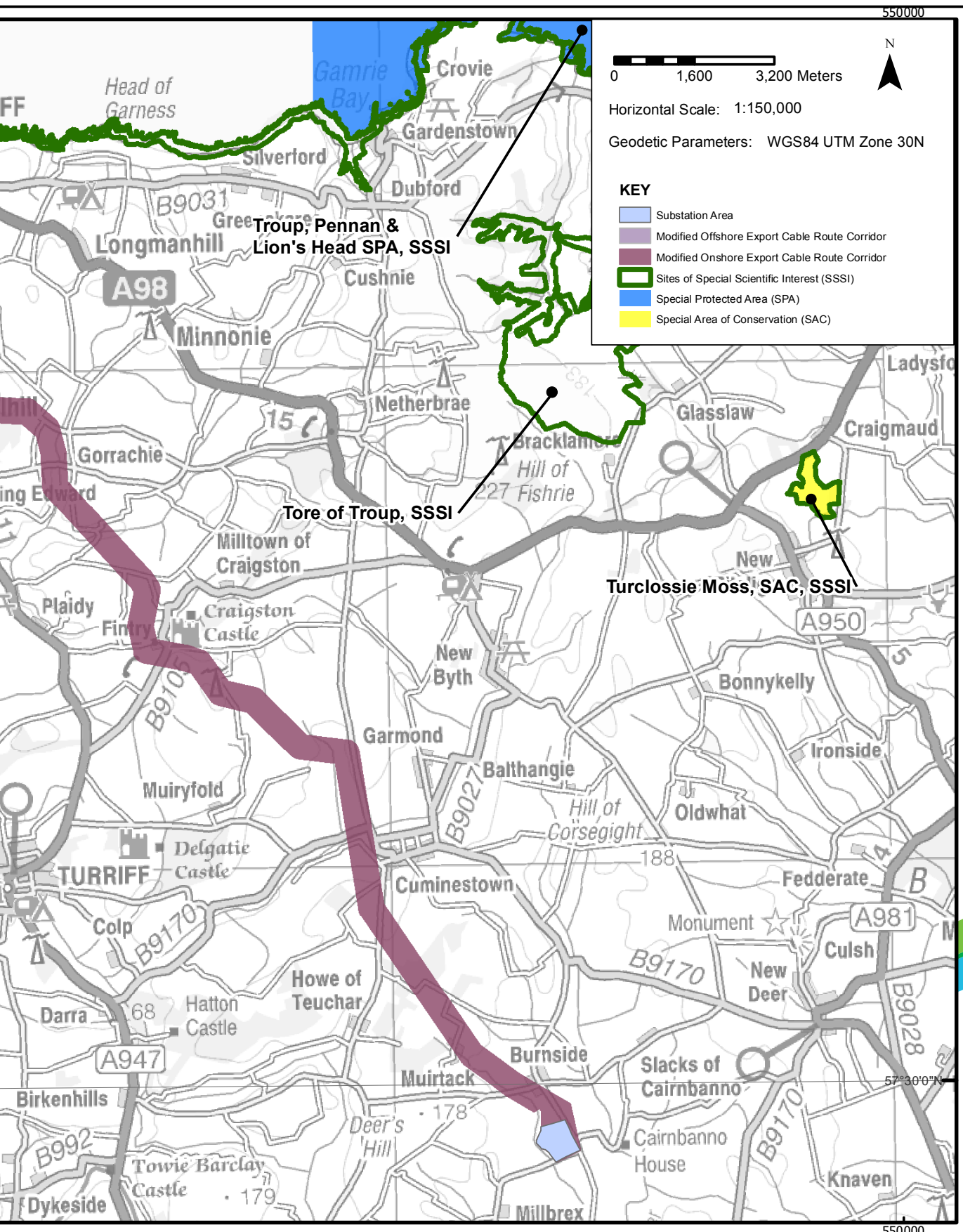
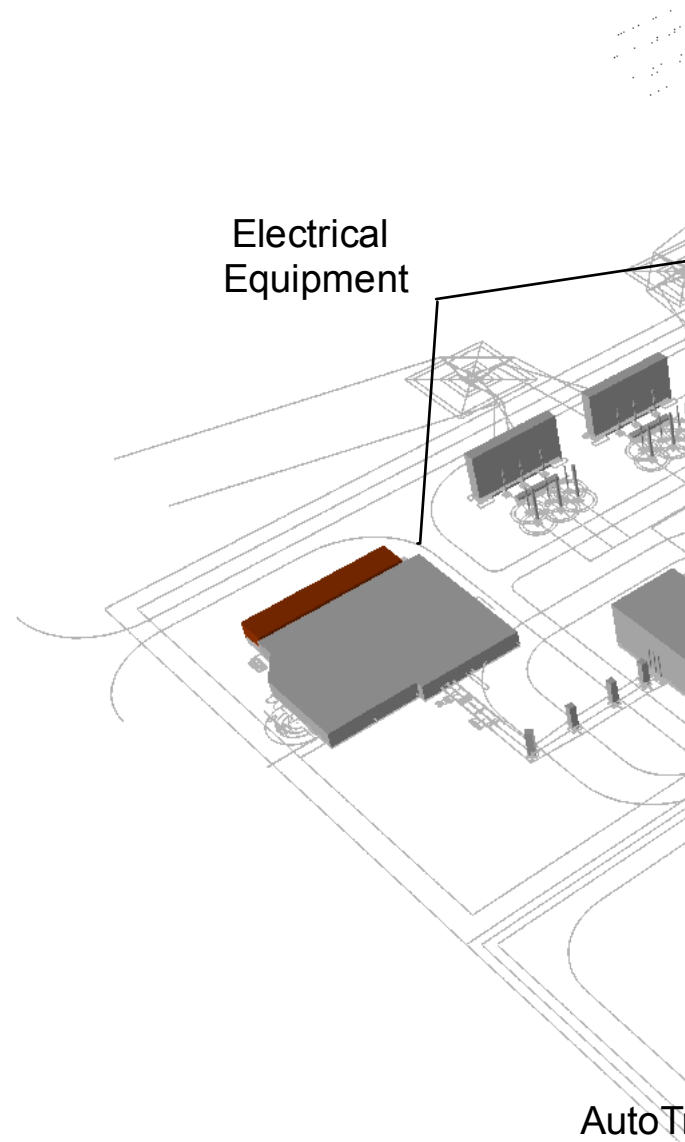
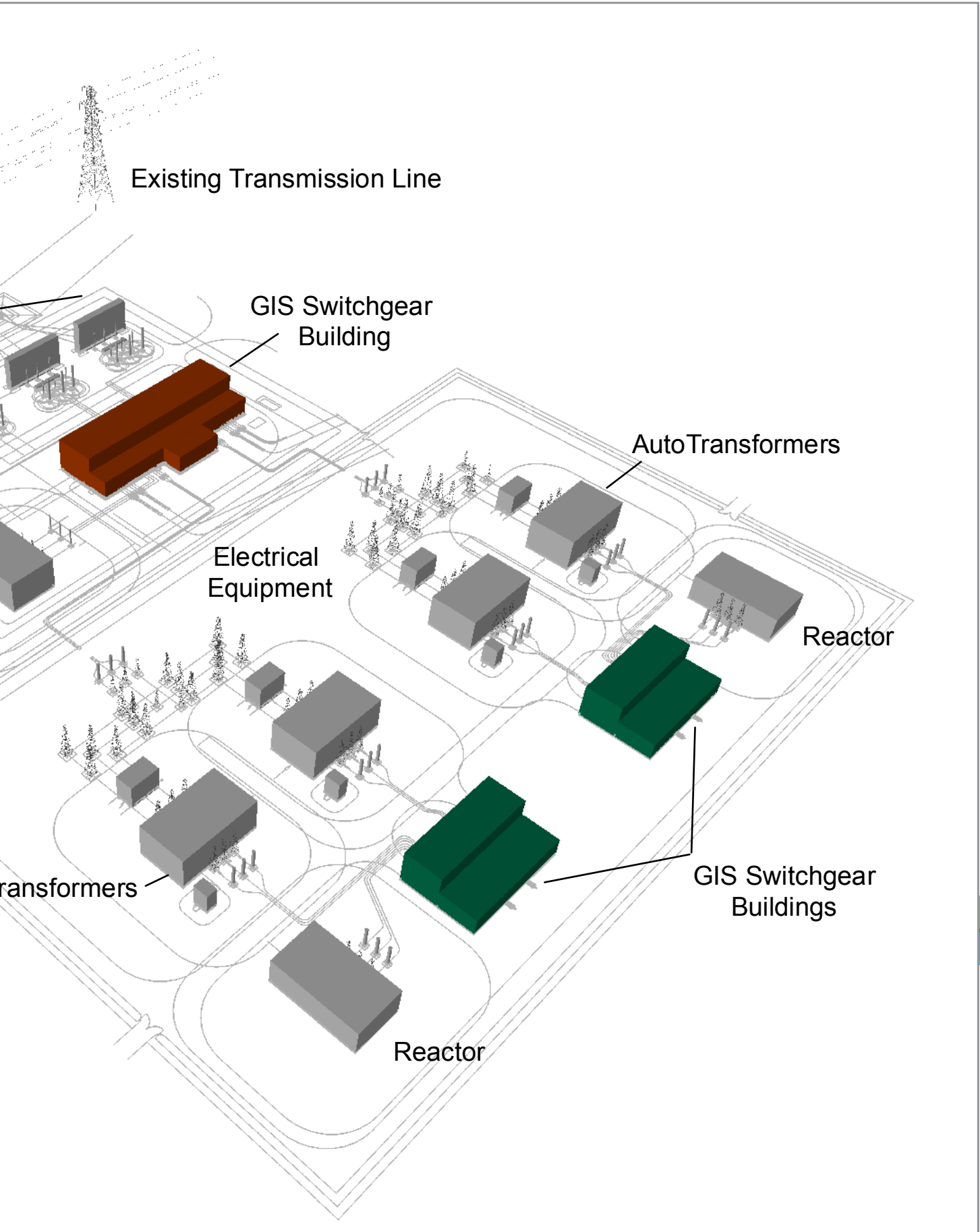


Figure 3- Substations Electrical Infrastructure (Indicative Layout)

It should be noted that colours are used solely to differentiate between the two substations and to differentiate between buildings and external electrical equipment. The colours and architectural treatments will be agreed with Aberdeenshire Council at the detailed planning stage to help reduce the visual impact of the onshore substations.

Oblique View





The Planning Process

The modified TI is located offshore and onshore and therefore requires two separate consents: a Marine Licence for the offshore elements and a Planning Permission in Principle for the onshore elements (and infrastructure located in the marine zone above the mean low water mark of ordinary spring tide).

Marine Scotland is responsible for consenting works in the marine area up to the mean high water springs mark. An application has been submitted to Marine Scotland for a Marine Licence for the construction of the offshore substation platforms and the offshore export cables.

As the modified OnTI is located in Aberdeenshire, Aberdeenshire Council is responsible for consent determination of the onshore elements of the works. Therefore an application for Planning Permission in Principle for the construction of the onshore elements of the TI has been submitted.

Regulations require that the applications are supported by an Environmental Statement. Under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, the onshore substations are classified as Schedule 2 development (given the development area) and therefore require an Environmental Impact Assessment (EIA). MORL has elected to include the export cables (onshore and offshore) and Offshore Substation Platforms (OSPs) in the EIA as they form an integral part of the modified TI and therefore are a part of EIA development.

It is MORL's view that the OfTI may also be subject to the requirement for an EIA under the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) and so MORL have also followed these Regulations in the preparation of this EIA.

The purpose of the Environmental Statement is to provide the following information to inform stakeholders and authorities of the potential effects of the project. The Environmental Statement includes:

- Background on why the TI is needed;
- In-depth details of the proposals;
- Information on the environment in the vicinity of the TI proposals;
- Details of the potential significant effects that may arise from the TI proposals, how these impacts were assessed and the results of the assessment;



- Details of the proposed mitigation measures to be used to minimise any adverse effects; and
- Details of potential significant effect when the TI is considered as a whole, with the three consented wind farms and other consented or known development proposals.

The Environmental Statement also includes information on potential effects upon Special Areas of Conservation (SACs) and Special Protected Areas (SPAs). The UK SACs and SPAs form the Natura 2000 network form the core of the Habitats Directive, an EU Directive which provides for the conservation of natural habitats and of wild flora and fauna in both onshore and offshore areas.



Consultation

Since commencing work on the proposals for the Telford, Stevenson and MacColl offshore wind farms and associated TI, MORL has been committed to delivering high standards of consultation, both with the general public and various organisations which have an interest in the Moray Firth or offshore wind development. The proposals for the modified TI follow on from extensive engagement work which has been undertaken to secure the original consent applications Section 36 consents for the construction and operation of the Telford, Stevenson and MacColl offshore wind farms.

Earlier in 2014, a Scoping Report, establishing the nature of the modified TI and its potential effect on different receptors, was released for consultation with stakeholders. The Scoping process provided the basis for identification of issues across the range of stakeholder groups and involved engagement with both statutory and non-statutory organisations.

Specific consultation for the onshore elements of the modified TI has been carried out based on the Town and Country Planning application procedure. A proposal of application notice was submitted to Aberdeenshire Council on 31 March 2014 and pre-application consultation letters containing copies of the notice were sent to the relevant Community Councils at this time. This informed the councils of the forthcoming public consultation for the modified TI and provided the relevant supporting information including a description of the modified OnTI.

Public exhibitions were held between the 10th and 12th June at the Village Hall (New Deer), the Fife Lodge Hotel (Banff) and the Station Hotel (Portsoy). The public exhibitions included a story-board display and literature, providing information on the location and details of the modified Project. The exhibitions were staffed by members of the project team, from consenting and engineering divisions. In total, 135 members of the public attended the exhibitions. Feedback from the public on the proposals was collected through opinion survey leaflets.

A programme of post-application engagement is planned in order to provide broad public awareness of the modified TI and the associated application for consent.



Impact Assessments

The following sections provide a summary of the existing environmental conditions and impact assessments undertaken. The environment is broken down into three categories:

- **The Physical Environment** - which provides information on features such as: seabed and onshore geology; wave, tidal and sedimentary regimes in the offshore environment; hydrology and contaminated land onshore, noise onshore and onshore electromagnetic fields.
- **The Biological Environment** – which provides information on flora and fauna offshore and onshore.
- **The Human Environment** – which provides information on human activities within the Moray Firth (e.g. commercial fisheries, shipping, oil and gas activities etc) and onshore (e.g. archaeological and cultural heritage features, traffic and transport etc).

With respect to the “Potential Effects” discussed in each section, it should be noted that unless stated otherwise, the effects of the eventual decommissioning of the TI are assumed to be no worse than the construction effect.



Physical Environment

Hydrodynamics, Sedimentary and Coastal Processes

Existing Environmental Conditions

The Smith Bank, a raised geological feature covered by gravel and sand, is one of the main seabed features in the Moray Firth and is where the three consented wind farms and where the proposed offshore substation platforms of the modified OfTI will be located. Water depths in this area range from 35-55 m.

The modified export cable corridor traverses water depths of up to 100m. The seabed is formed of gravel, sands and mud, which sit upon underlying clay from the Cretaceous period. The export cable corridor passes to the west of the Southern Trench feature (a seabed valley with depths ranging to over 200 m) in the Moray Firth.

Current speeds in the area of the modified export cable route corridor can reach up to 0.5 m/s and waves can reach up to 9 m during storm events.

Inverboyndie Beach, the location of the export cable landfall, is a sandy beach with rocky headlands to the east and west and managed ground and mature vegetated sand dunes inland.

Potential Effects

Numerical models were used to simulate wave, current, tidal and sediment transport in order to predict the potential effects of the proposed development on the existing environment. The models were calibrated using publicly available data for the Moray Firth and data collected during surveys of the Moray Firth. The surveys included wave measurement devices, tidal current metres, water depth and seabed sediment surveys.

The construction of the proposed development is not expected to have any significant effects on tidal and wave regimes or cause any disturbance to coastal geological features.

The installation of the offshore substation platforms and export cables may temporarily increase the level of sediment in the water column but any increases are expected to be limited to the area of the installation activities and the sediment will return to natural levels quickly after the installation has been completed. These effects are therefore considered not significant.

Once the TI is installed, there may be some scour (wearing away of the seabed) around the bases of the offshore substation platforms and around any areas of exposed cables. However, the quantity of scour will be minimised by laying scour protection mattresses or rock placement in vulnerable areas and thus there will not be a significant effect. All other effects on hydrodynamic, sedimentary and coastal processes are not expected to be significant.

The cumulative impact assessment predicts that there will be no significant effects on hydrodynamic, sedimentary and coastal processes when effects from the modified TI are considered with other developments in the area.



Hydrology, Geology and Contaminated Land

Existing Environmental Conditions

The modified onshore export cable route corridor primarily passes through agricultural countryside. There are a number of rivers, including the River Deveron, other water courses and aquifers in the area. The geology of the area has been formed through historic glacial activity. The local rivers and aquifers are used locally for water supply and could be sensitive to pollution arising from disturbance to contaminated land or pollution incidents. Some of the rivers are also prone to flooding.

There are both historical and current mineral extraction activities in the area and there is a large operational quarry to the west of South Gorrachie.

Potential Effects

Information on the hydrology, geology and contaminated land in the area was taken from publicly available sources and surveys. The site surveys collected information on surface water features and water supplies.

The impact assessments looked at effects from the modified OnTI on geology, aquifers, water supplies, surface water (e.g. rivers), coastal waters, flood risk and human health.

During the construction phase of the works, significant effects to the above features could result. However, MORL will put in place mitigation measures which will minimise the potential for effects to a level which will not be significant in EIA terms. These measures will include surveys of the proposed construction area to identify vulnerable features, the design of the infrastructure and its construction will include flood prevention measures,

flood risk mitigation where necessary, an environmental management protocol, active drainage management schemes, horizontal directional drilling to cross beneath sensitive water courses and best working practice to minimise incidents of pollution and sediment run-off.

During the operational phase of the works, the potential for effects to hydrology and geology are considered to be low. The most significant effect will arise should there be a pollution incident. MORL will employ mitigation including environmental management plans, maintenance plans and inspections of facilities to minimise the potential risks. Using this mitigation, the operational effects are not considered to be significant.

The potential for cumulative effects with other developments is expected to be the same as that predicted for the modified TI and therefore, no significant cumulative effects are anticipated following the use of mitigation measures.



Onshore Noise and Electromagnetic Fields

Existing Environmental Conditions

The route of the modified onshore export cable corridor runs through mainly rural areas and passes close to a number of towns / villages such as Cuminestown and Banff. In the area of the modified OnTI, the main existing sources of noise result from traffic, livestock, birdsong and the wind in the trees.



Top: Aberdeenshire Countryside, Bottom: View Across The Moray Firth

Potential Effects

A number of residential and business buildings and a caravan site are within 100 m of the modified onshore export cable route corridor. Noise surveys were undertaken at 52 of these locations to measure noise levels during the day and night, on weekdays and during weekends.

The collected noise data were used to develop computer models, which were used to assess the potential changes in daily noise levels during the construction and operational phases of the works. The models were also used to assess whether any locations would also be sensitive to vibration.

The assessment concluded that the construction works were unlikely to have a significant effect on receptors during the day but could have a significant effect during the night. MORL will therefore restrict working hours and ensure contractors adhere to British Standard on the Code of Practice for Noise and Vibration Control on Construction and Open Sites. Therefore, there will be no significant effect from construction noise. No significant effects from vibration associated with construction works are anticipated.

The substations will be designed to British Standards for noise reduction and therefore they are not predicted to have a significant effect on ambient noise levels.

No cumulative effects for noise or vibration are expected. A report on electromagnetic fields and their potential influence on human health is also provided. It confirms that the electromagnetic fields generated by the OnTI will be well below the adopted guideline public exposure limits set to protect health and there will be no measurable adverse health impacts as a result of electromagnetic fields from the OnTI.



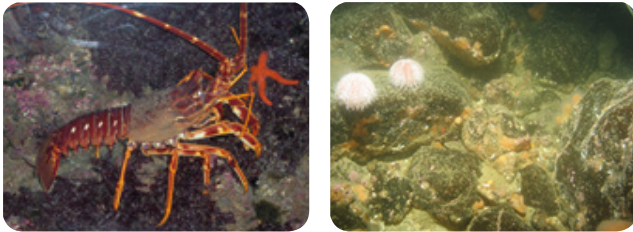
Biological Environment

Benthic Ecology

Existing Environmental Conditions

Benthic Ecology refers to the study of organisms which live on or within the sediment surface and some sub-surface layers of the seabed. There are a range of species on the Smith Bank and along the offshore export cable corridor. In the sandy areas species include burrowing worms, bivalves and small crustaceans, whereas in areas with gravel and cobbles, species include hydroids (sea firs), bryozoans (sea mats). There are also more mobile species including flatfish, crabs and starfish. In areas of deeper waters with muddy bottoms, seapens and Norway lobster can be found.

Closer inshore, there are areas of cobbles, outcrops of rock and areas of sand and gravel. In this area species include worms, barnacles, sea mats, sea firs, lobsters, soft corals and seaweed species, such as kelp and red algae.



Left: Spiny Lobster, Right: Cobble Boulders and Bedrock With Red Algae And Sea Urchins.

There were no areas which, under European legislation (and thus conferring a European level of conservation status) would be considered Annex I habitats.

Potential Effects

A number of survey and sampling techniques were used in order to identify the habitats and species which can be found along the modified OfTI corridor. Geophysical surveys were completed and samples of the seabed were

taken and analysed to determine what types of habitats were within the corridor. Video and grab samples were taken to allow marine biologists to identify the flora and fauna in the area.

The impact assessment investigated the effects of construction that could:

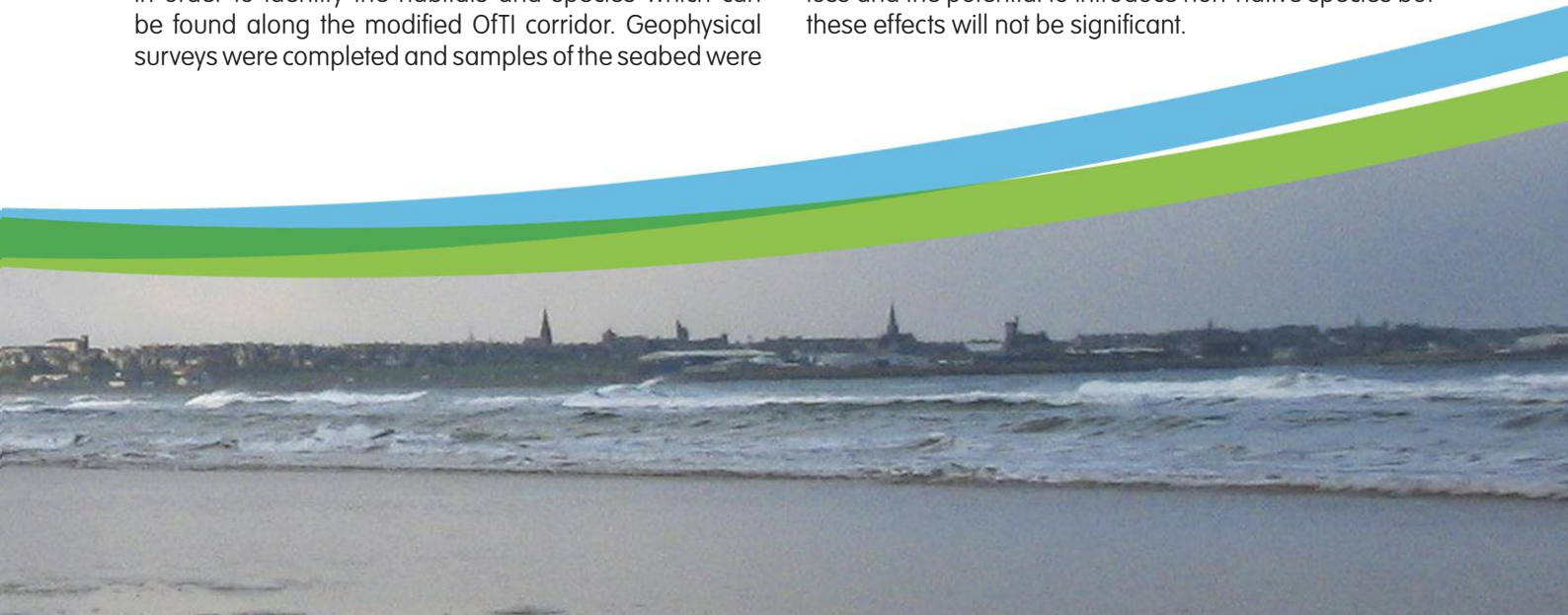
- cause mortality of individuals;
- affect the ability of marine species to feed, respire (breathe) and reproduce; and
- could cause damage or disturbance to habitats.

The effects on species and habitats arising from increases in the amount of sediment disturbed from the seabed and mixed with the water column were assessed for the period of construction. No significant effects are predicted.

It was determined that accidental chemical spills from construction vessels could have a major effect on marine species and habitats but this will be mitigated through the use of best practice procedures for containing and controlling the use of chemicals. Using these mitigation measures, the effect is considered to be not significant.

Installation of the OfTI will cause some habitat loss but this is not considered to be significant. The potential for introducing non-native species to the area was considered to be not significant but MORL will ensure good practice in vessel maintenance as a precautionary measure. There are not expected to be any effects associated with electromagnetic fields on seabed species arising from the operation of cables.

The cumulative effects, considering the modified OfTI with other developments, are expected to include habitat loss and the potential to introduce non-native species but these effects will not be significant.



Fish and Shellfish Ecology

Existing Environmental Conditions

The Moray Firth contains a range of fish and shellfish species. These include:

- pelagic fish, such as herring, sprat and mackerel;
- whitefish, such as haddock, whiting, cod and monkfish;
- flatfish, such as lemon sole and plaice;
- elasmobranchs, such as rays and sharks;
- crustacea, such as Norway lobster and squid; and
- bivalves, such as scallops.

The Moray Firth contains a number of fish spawning and nursery grounds.

There are a number of freshwater rivers which feed into the Moray Firth which are used by diadromous fish (i.e. fish that can live in both sea water and fresh water). Some of these rivers, such as the Spey are listed as Special Areas of Conservation, which is a European conservation designation. Both salmon and sea trout are diadromous fish species. Salmon migrate between their natal rivers and feeding grounds in offshore areas, such as around Iceland. Salmon will travel through the Moray Firth but the exact route they take is currently unknown. Sea trout are thought to use the Moray Firth as a feeding ground and are known to feed on sandeels. Other diadromous fish in the Moray Firth area include allis and twaite shad, European eel and sea and river lamprey.

Potential Effects

Information on fish species in the Moray Firth was collected from publicly available data and surveys by MORL were done to collect information on sandeel populations and cod spawning activity on the Smith Bank. The information was used to assess the potential effects of the construction and operation of the modified TI on fish and shellfish ecology.

Increases in the amount of sediment disturbed from the seabed and mixed with the water column caused by construction works are predicted to have a minor effect on fish and shellfish species. The possible use of piling to install offshore substation platforms is predicted to have an effect on those species which are sensitive to noise. To minimise any effects on species, MORL will use soft-start piling techniques (i.e. the ramping up of the energy used in the hammer blows). This piling method allows fish species time to move away from the noise source. Using mitigation measures, it is predicted that there will be no significant effects from construction activities on most fish and shellfish species.

During the operational phase, there is not expected to be any significant effects on fish or shellfish populations. Although it is thought that some behavioural effects may occur as a result of direct exposure to electromagnetic fields created by the cables, such effects will be minimised because all cables will be buried or protected, thus reducing the strength of the fields and the overall effect will not be significant.



The effects of construction and operation outlined above were also assessed for the modified OfTI in combination with other relevant developments. With the proposed mitigation, it was concluded that the effects will not be significant.



Above: Image from the MORL Cod Survey undertaken in 2013

Marine Mammals

Existing Environmental Conditions

At least 14 species of cetacean (whale, dolphin and porpoise) have been recorded within the Moray Firth along with two species of seals. The most common marine mammals are bottlenose dolphin, common dolphin, white-beaked dolphin, minke whale, harbour porpoise, harbour seal and common seal.

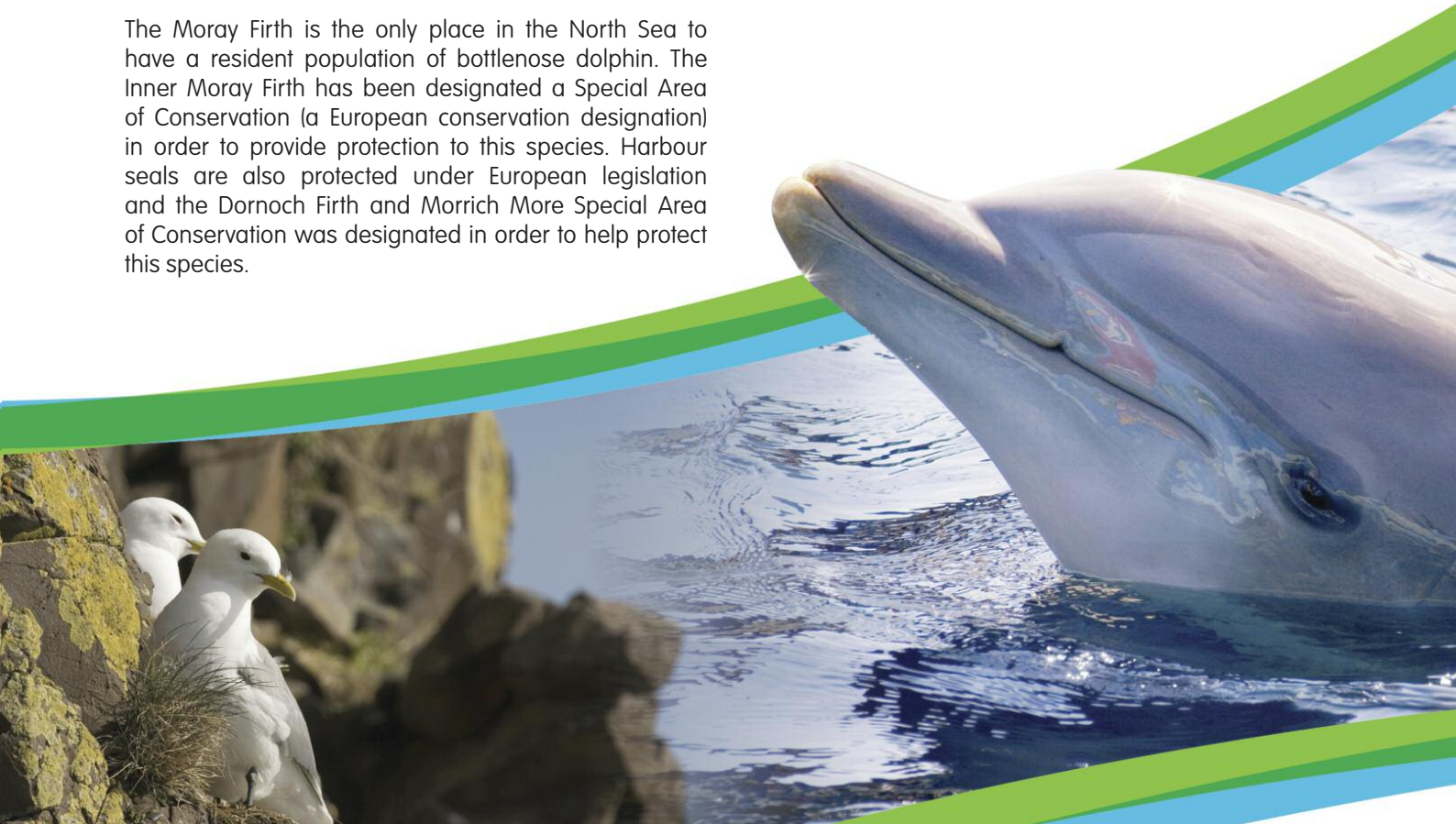
The Moray Firth is the only place in the North Sea to have a resident population of bottlenose dolphin. The Inner Moray Firth has been designated a Special Area of Conservation (a European conservation designation) in order to provide protection to this species. Harbour seals are also protected under European legislation and the Dornoch Firth and Morrich More Special Area of Conservation was designated in order to help protect this species.

Potential Effects

Information on marine mammals within the Moray Firth was collected using publicly available data and various survey methods. These surveys included devices which recorded the noises made by marine mammals, visual surveys from boats and planes and photographic recognition studies. The data were used to prepare numerical models, which were used to simulate behavioural effects which could be caused by the construction and operation of the works.

The proposal for the modified OfTI involves two OSPs, which, if consented, will replace the eight OSPs included in the infrastructure of the three consented wind farms and associated transmission infrastructure. This reduction in infrastructure and corresponding reduction in effect is reflected in this ES.

During the construction phase of the works, potential exists for marine mammals to be disturbed from the areas they regularly use for activities such as feeding. Decreases in prey species and the ability to forage for prey, the potential to collide with vessels and contamination with pollution were other potential effects assessed. With the implementation of designated vessel routes for construction vessels, the use of soft-start piling and regular monitoring of the species, it is predicted that there will be no long-term significant effects on any of the species assessed.



During the operational phase of the works, there exists the potential for collision with vessels, behavioural responses to electromagnetic fields generated by cables, changes in prey availability and contamination with pollution. With the implementation of designated vessel routes for maintenance vessels, it is predicted that there will be no-long term significant effects on any of the species assessed.

The modified OfTI will have some cumulative effect on marine mammal species when considered with other relevant developments but these effects are not expected to be significant.



Above: Bottlenose Dolphin

Marine Ornithology

Existing Environmental Conditions

There are numerous bird nesting and over-wintering sites around the coastline of the Moray Firth and the Moray Firth itself is used by birds for feeding, moulting and resting. Bird species will also fly through the Moray Firth area to other feeding grounds and during migration. There are three Special Protected Areas (European conservation status areas designated for bird conservation purposes) along the Moray Firth coastline including the North Caithness Cliffs, the East Caithness Cliffs and Troup, Pennan and Lion's Head sites (Figure 1).



Above: Gannet

Sixteen bird species commonly found in the Moray Firth area, including gulls, ducks, divers and auks, were included within the impact assessment.

Potential Effects

Information on the bird species used in the impact assessment was collected from publicly available sources and from surveys, including visual surveys from boats and planes and tagging studies. The assessment investigated the potential for birds to be disturbed by increases in vessel traffic, displacement from areas that they regularly use and effects on prey species both during the construction and operational phases of the modified TI.

There is a minor risk that all the species studied would be affected by the works but with the use of designated vessel routes, these effects will be minimised and are considered not be significant. When considering the cumulative effect with other developments, the risks were also assessed to be the minor and not significant. The risk to gannets and herring gulls could be slightly greater during the operational phase of wind farms than for other species, however they are still considered not significant.

Intertidal Ecology

Existing Environmental Conditions

Inverboyndie Bay has a sandy beach with rocky outcrops to the east and west and is exposed to waves from the Moray Firth. On the rocks, green and red algae, winkles, mussels, limpets and dog whelk can be found.

The sandy inter-tidal area of the bay is highly dynamic due to wave and tidal action and has few species but those that do survive are primarily crustaceans.

The beach landfall site at Inverboyndie does not hold any statutory designation for nature conservation.

Potential Effects

Surveys of the Inverboyndie Bay and its inter-tidal area were done to identify and quantify the species present in the area.

The potential for effects during construction resulting from disturbance of the sediments, mixing of sediments with the water column and direct disturbance to habitats was investigated. No significant effects were identified. Behavioural effects associated with the operation of the cable and changes to habitat were also investigated but again, no significant effects are identified.

No cumulative effects with other developments are predicted.

Terrestrial Ecology

Existing Environmental Conditions

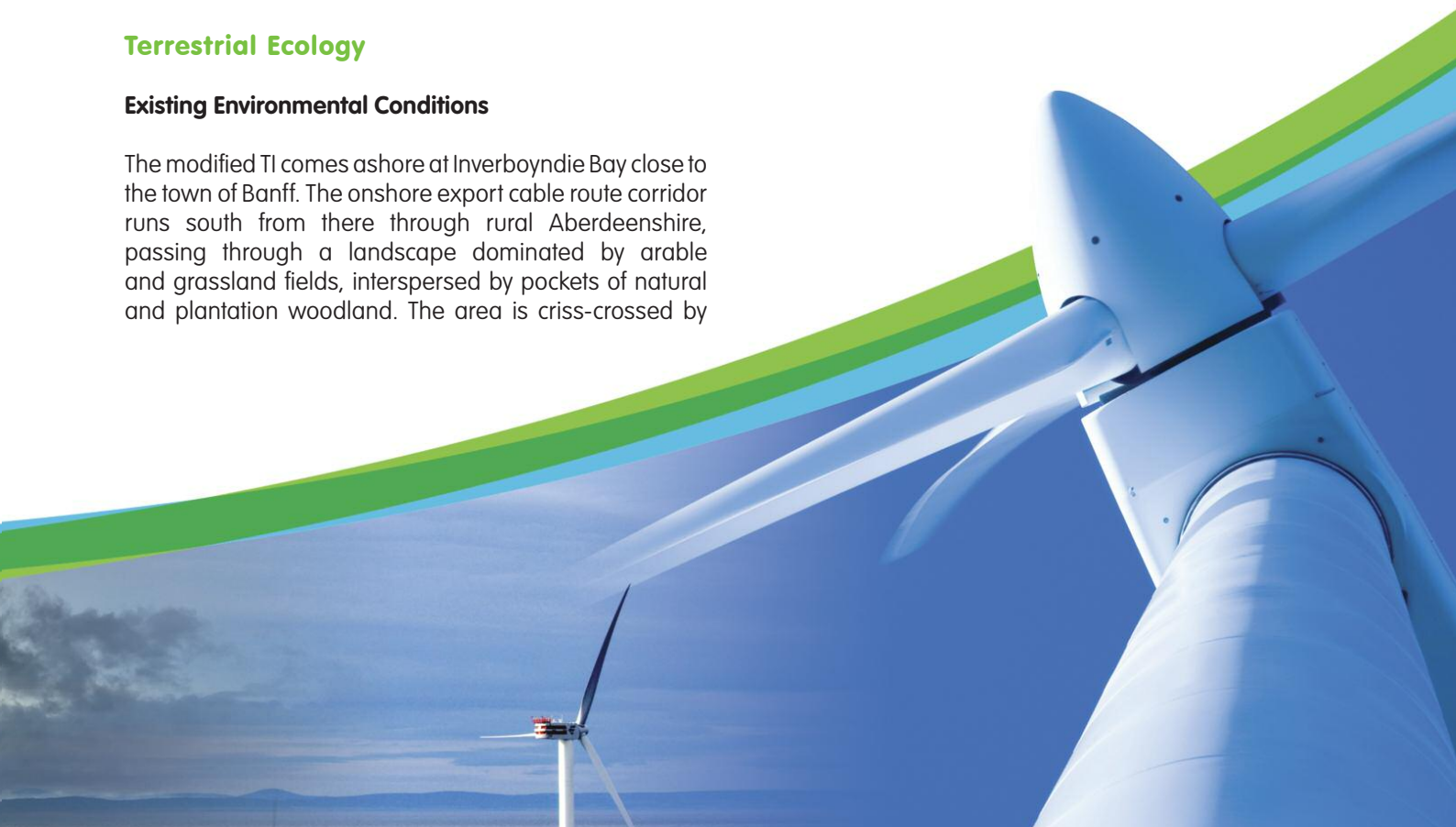
The modified TI comes ashore at Inverboyndie Bay close to the town of Banff. The onshore export cable route corridor runs south from there through rural Aberdeenshire, passing through a landscape dominated by arable and grassland fields, interspersed by pockets of natural and plantation woodland. The area is criss-crossed by

small watercourses and field boundaries demarcated by hedgerows and fence lines. There are farms and associated agricultural outbuildings scattered along the cable route corridor. The river Deveron, which has its mouth at Banff, is a main feature in the area.

The wildlife that can be found in the area around the OnTI includes birds, bats, badgers, red squirrel, water vole and otters.



Above: Pipistrelle Bat



Potential Effects

Information on the terrestrial ecology of the area was collected from publicly available information sources and field surveys, including breeding bird surveys, coastal bird surveys, Phase I habitat surveys, protected species surveys (such as badgers and otters) and bat roost and bat habitat suitability surveys.

The impact assessment investigated the potential for effects on terrestrial species and habitats from damage to habitats, habitat loss, displacement from habitats, disturbance and pollution.

Effects on birds, bats, badgers, red squirrel, water vole and otters during construction and ongoing maintenance and repair works will be mitigated using a suite of measures including careful siting of the infrastructure, habitat restoration and best working practices including pre-construction surveys. Effects on habitats will be mitigated through the use of measures including limiting the size of working areas, controlling sediment release during construction works, habitat restoration and best working practice. Following the use of mitigation measures, the effects will not be significant.

The potential for cumulative effects with other relevant developments is considered to be the same as those for the construction and operation of the modified TI alone and therefore is not significant.

Habitats Regulations Assessment

Habitats Regulations Appraisal (HRA) is an assessment undertaken by the competent authority (i.e. the authority making the decision) where a development is assessed against conservation objectives of Special Areas of Conservation and Special Protection Areas. These objectives are identified by each of the European member states to ensure that the integrity of these sites are maintained by avoiding deterioration of the habitats of qualifying species or significant disturbance to qualifying species

It was therefore considered whether any of the potential effects to marine mammals and fish and shellfish could have any effect on the conservation objectives of the relevant Special Areas of Conservation

Information on these species and the likely effects were presented in the Environmental Statement.

It is predicted that there will not be adverse effects on the integrity of any European site either alone or in combination with other projects.



Human Environment

Commercial Fisheries

Existing Environmental Conditions

In the Moray Firth, the main fisheries are for Norway lobster (Nephrops), scallops, whitefish (e.g. cod and haddock), mackerel and crab and lobster (Figure 4).

Norway lobster are primarily caught using trawls, with smaller vessels (under-15 m) fishing within inshore waters and larger (over-15 m) vessels fishing offshore. Norway lobster is fished all year round but the main catch is landed in June and July. Scallops in the Moray Firth are caught using dredges by vessels which come from all round the UK including the Moray Firth. Although scallops are fished all year, the bulk of the catch is landed between June and September.

The squid fishery in the Moray Firth is seasonal (July – November) and is linked to the migratory behaviour of the species. Often vessels which target Norway lobster will also fish for squid by reconfiguring their trawls.

There are only a few vessels which trawl for whitefish in the Moray Firth.

Crab and lobster are caught using creels in inshore waters, mostly by vessels of under 10 m in length. This fishery is active all year but with the majority of landings between June and November. During the summer months, these vessels may also catch mackerel using hand-lines.

Potential Effects

To assess the potential effects of the modified OfTI on commercial fisheries, data was gathered from local fishermen, fisheries organisations and Marine Scotland. The effects assessed were in line with advice from these stakeholders and national guidance documents.

The main disturbance to fish species is expected to arise from the noise associated with the installation of the offshore substation platform foundations, which may require piles to be hammered into the seabed. A technique called “soft-start” piling, which is the gradual ramp up of energy of the hammer blows, has been proposed to minimise the impact on fish, allowing fish time to move away from the noise source. Using this mitigation, the effect will not be significant. However, the cumulative effect of underwater noise of the modified OfTI with other developments will potentially cause a significant but temporary effect to commercial fish species sensitive to noise (i.e. cod, herring, salmon and sea trout).

During operation, fish may be sensitive to electromagnetic fields from the sub-sea cables. However, electromagnetic fields are detectable for only a very short distance from the cable and the cables will be buried or protected, which will reduce the potential for any behavioural effect. There will therefore be no significant effect on commercial fish species from electromagnetic fields. The cumulative effect of electromagnetic fields from other subsea cables in addition to the modified TI cables is also considered not significant.

The installation works may result in new obstacles on the seabed which could cause a hazard to fishing vessels. To minimise the potential for this, MORL will undertake surveys to ensure that there are no new obstacles on the seabed following construction works, will remove any new obstacles and will require contractors to follow obligatory standards. Following the use of mitigation measures, there will not be a significant effect on commercial fisheries.

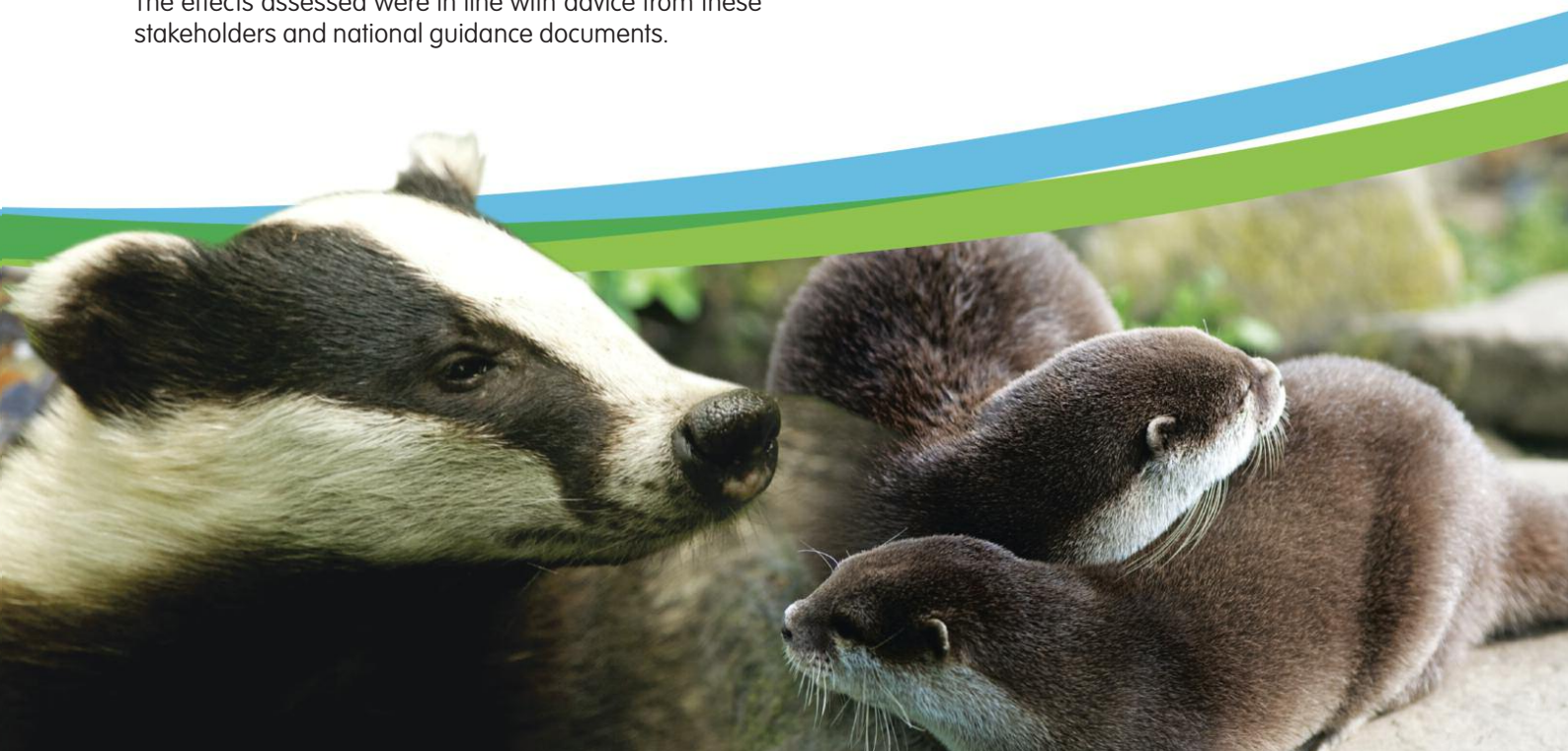
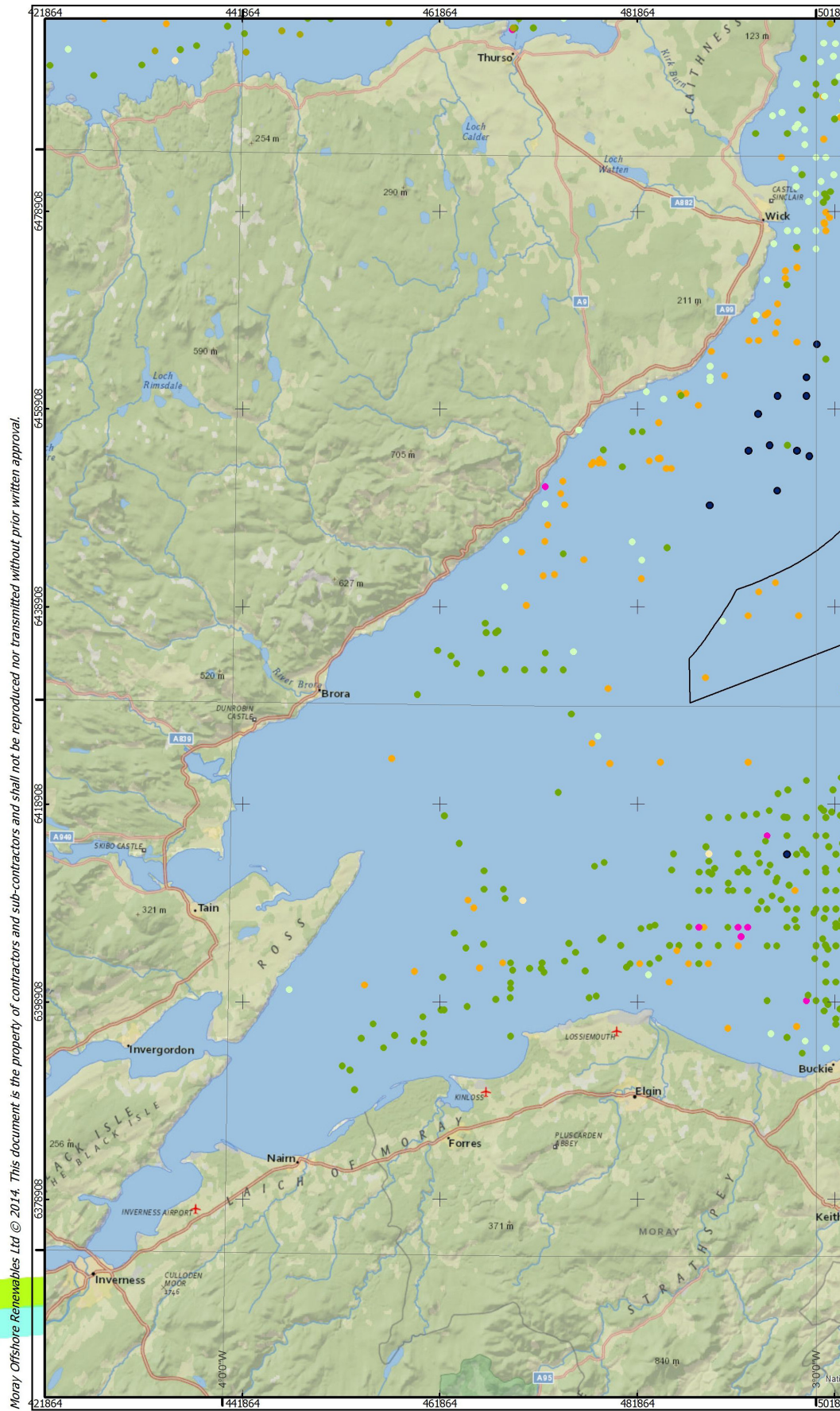
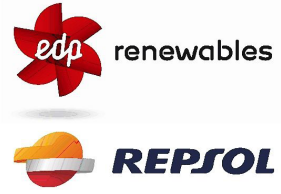
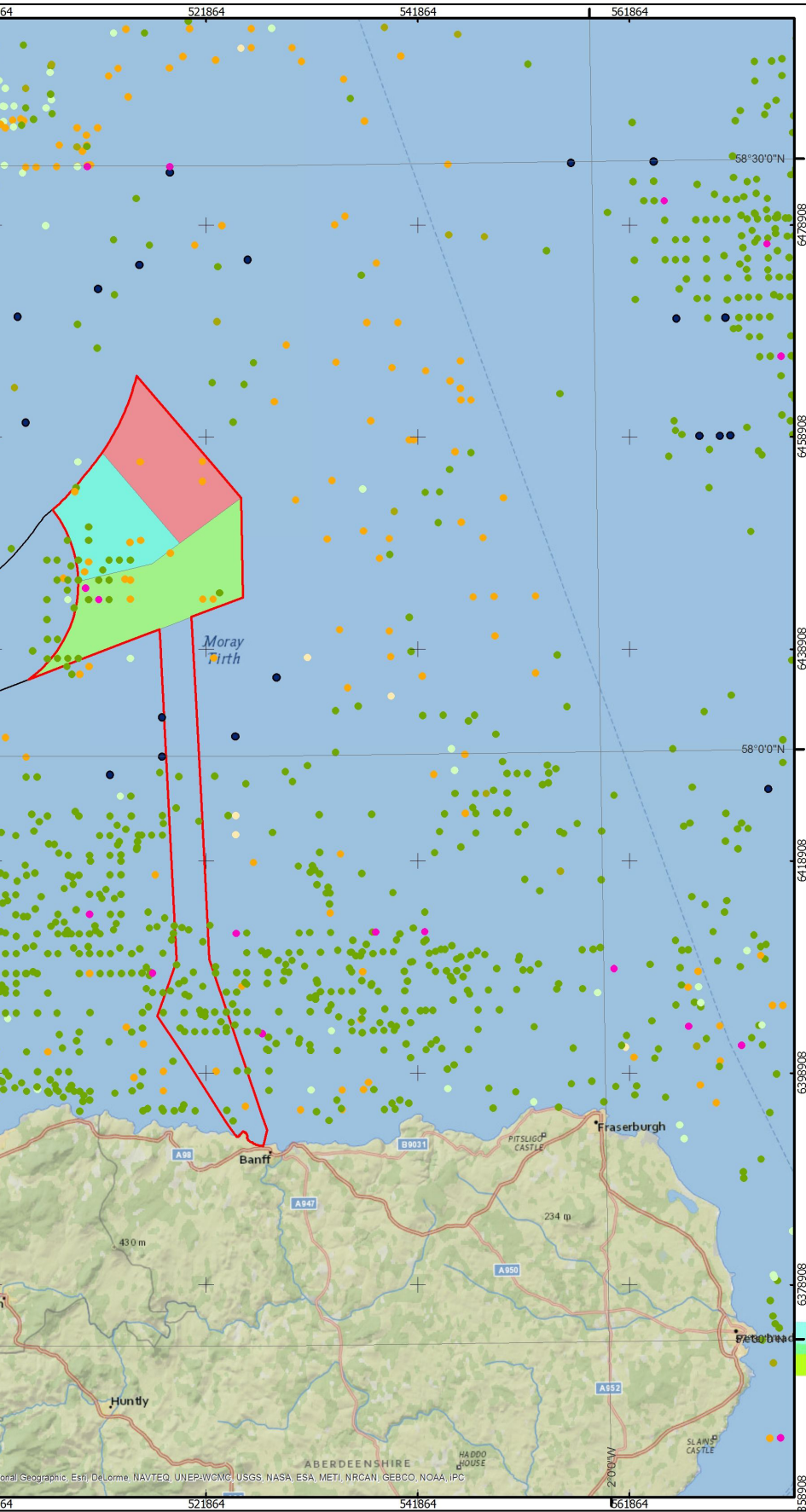


Figure 4 – Fisheries Activity In The Moray Firth





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KEY

- Modified Offshore Transmission Infrastructure
- MacColl
- Stevenson
- Telford
- Western Development Area

Method

- Demersal Trawler
- Scallop Dredger
- Creeler
- Trawler (Unspecified)
- Seine Netter
- Pelagic Trawler
- Other Method

Horizontal Scale: 1:500,000 A3 Chart

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: RP
 Reviewed:
 Approved:

Date: 18/06/2014	Revision: C
REF: 8460001-PSO0162-BMM-MAP-002	

Figure 5.2
Surveillance Sightings by Method,
UK Only 2008 - 2012

Moray Offshore
Renewables Ltd

During construction and operation, there is expected to be some loss / restricted access to fishing grounds. This will also cause some displacement of fishermen to grounds other than their regular fishing areas. Vessels travelling to fishing sites may also experience increased journey times. The construction and operating of the wind farms will also present a safety issue for vessels in the area and could interfere with the ability to use fishing gears.

To minimise these effects, a working group has been set up between MORL, the Scottish Fishermen's Federation and other relevant stakeholders in order to ensure communication of construction schedules and allow for the development of appropriate mitigation strategies. Construction works will also be notified to all mariners using established communication methods. In addition, MORL will bury or, where this isn't possible, protect cables to reduce the potential for gears to snag on exposed cables. MORL will also perform over-trawl surveys to ensure fishing activities can re-commence safely after construction. Furthermore, MORL will continue to liaise with the wider fisheries industry on the progress of the development and other issues. Using these mitigation measures, there will be no significant effect on commercial fisheries.

When the cumulative effects of the modified TI are considered with other developments, the effects are considered to be not significant on commercial fisheries with the exception of the scallop fishery. In this case there is expected to be loss or restriction to fishing

grounds and therefore the potential displacement of this fishery. These effects are considered to be significant. These effects will be mitigated using the measures proposed above. In addition, MORL is currently working on trials of alternative scallop gears with the aim of identifying novel technology and working practices that will foster coexistence of scallop fisheries and wind farms.



Above: An Image From the MORL Fish Survey Undertaken in 2013



Shipping and Navigation

Existing Environmental Conditions

Vessel activity is slightly greater in the Moray Firth during summer than in winter. Maritime users include fishing vessels, cargo and tanker vessels, vessels servicing the Beatrice oil field, survey vessels and recreational users (e.g. yachts). Of these, fishing vessels are by far the greatest maritime user of the Moray Firth area.

Along the southern coastline of the Moray Firth, there is a shipping route which provides access between the inner Moray Firth ports and other ports in the UK as well as mainland Europe. There are two anchorages in the vicinity of the proposed offshore export cable corridor; one in Cullen Bay and one servicing Banff and Macduff. The main ports in the area are MacDuff, Banff, Portknockie and Buckie. There are also various routes for yachting in the area (Figure 5).

Since 2003, there have been five maritime incidents in the southern Moray Firth.

Potential Effects

Information on the number and types of ship transiting the area of the modified TI was collected between July and December 2013 using the Automatic Identification System installed on vessels. This information was used to perform a series of analyses on the potential risk to navigation and shipping activity.

During the construction and decommissioning of the works, there are no major predicted risks of allision (where a ship runs against a stationary object). In addition, increased risks of collision or route deviations are not predicted. However, the risk of collision for fishing vessels and snagging of fishing gear is considered to be of moderate significance. In order to mitigate these risks, MORL will enforce safety zones around construction works and use guard vessels to patrol the works. There will be a maritime control centre to coordinate works vessels and information on works will be distributed through established maritime communication methods. After mitigation, the effects will not be significant.

During operation, the risks of allision, collision, route deviations, anchoring on the cable, snagging of fishing gear and effects on navigational radar are not expected to be significant. The risk of allision will be mitigated through the establishment of a maritime control centre to monitor vessels and information on works will be distributed through established maritime communication methods. There is also the potential for anchoring vessels to snag the export cables. This risk will be mitigated by ensuring that where the export cable is close to anchoring areas, the export cable is suitably buried or protected. The cables will also be surveyed once they are installed to ensure they are not exposed. MORL will also establish a marine control centre and warning zones for anchoring operations.

The cumulative impact assessment found that, with mitigation, there will be no significant effects on navigation when considering the modified TI with other relevant developments.

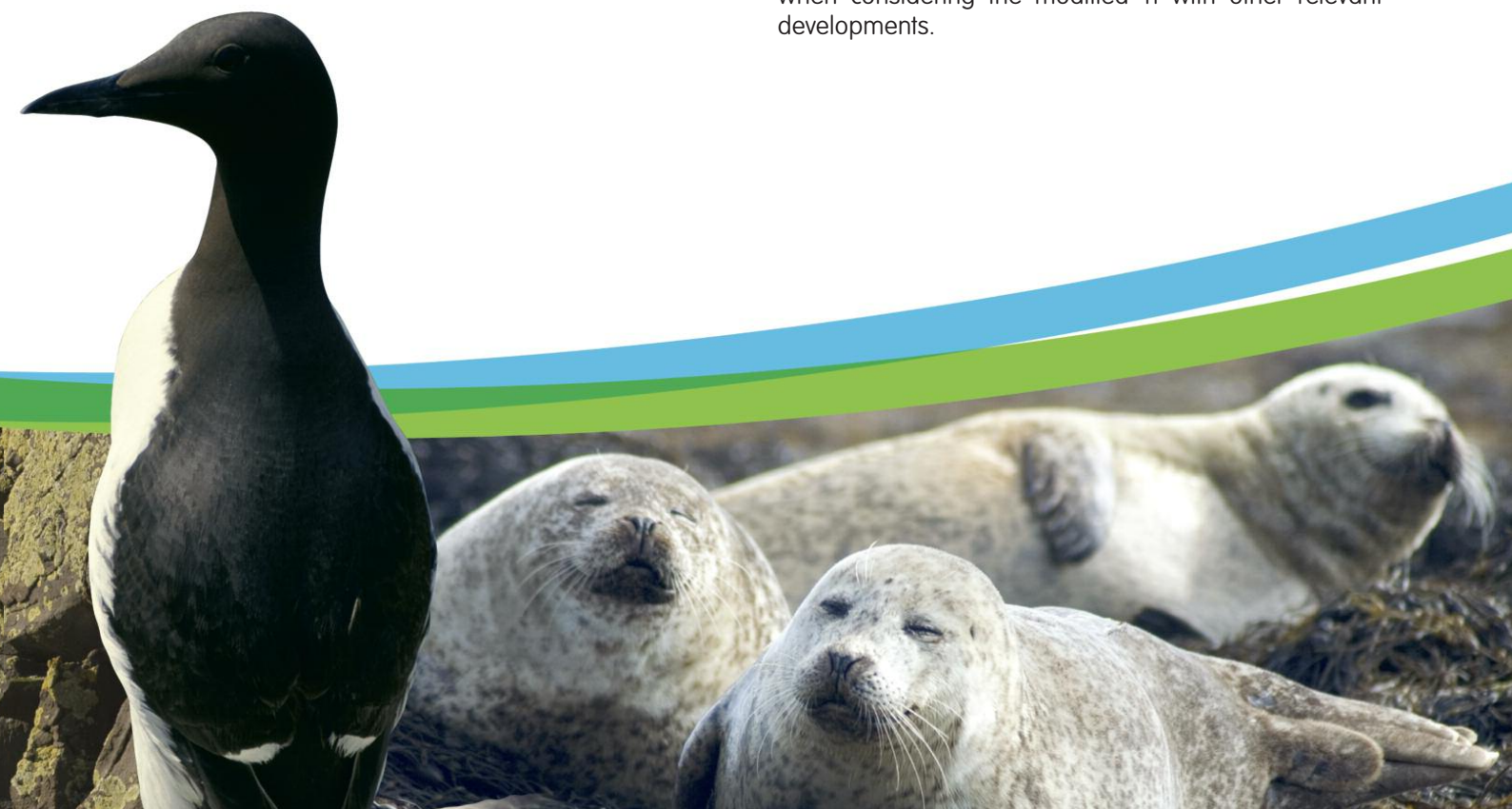
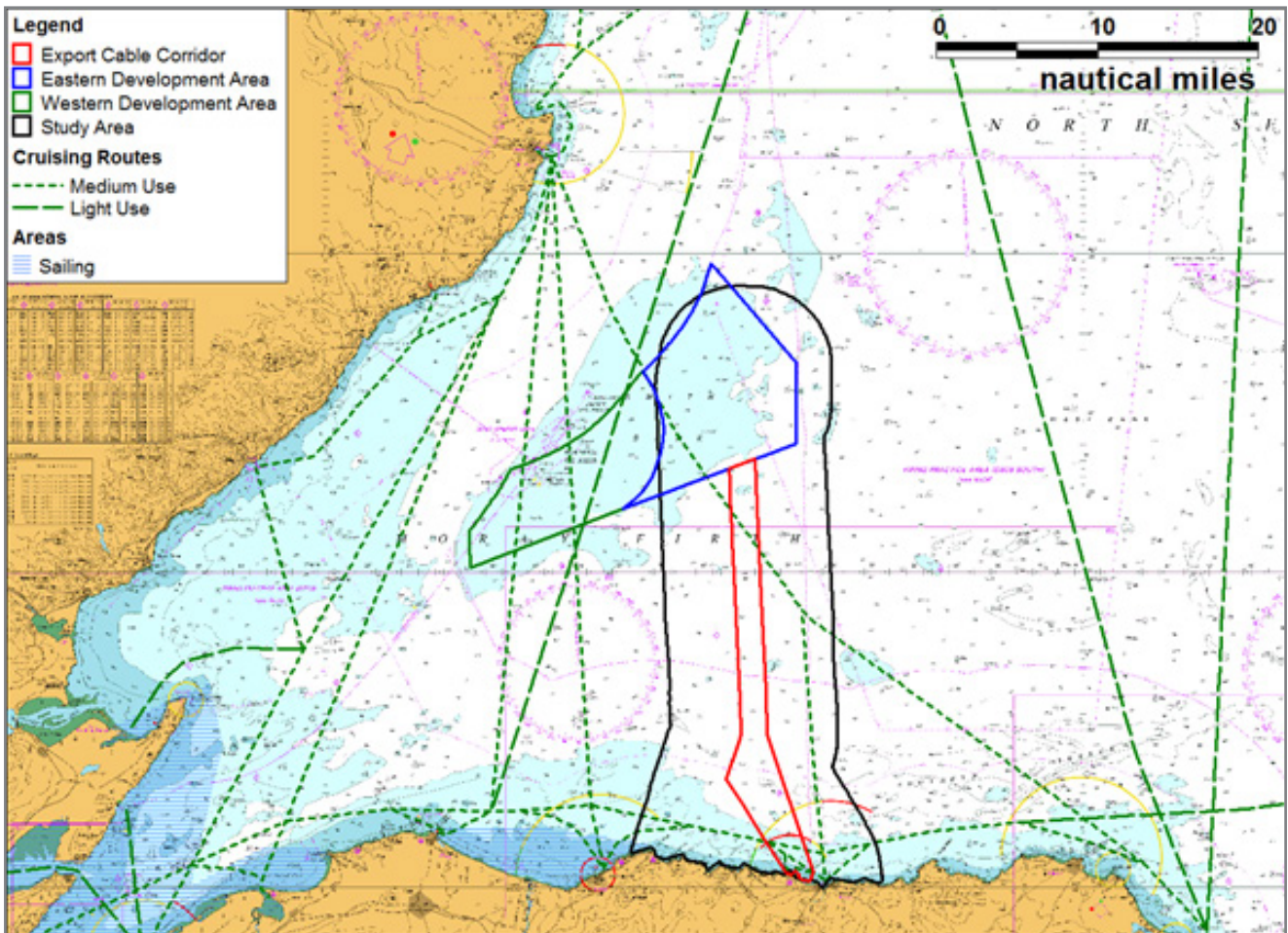


Figure 5 - Recreational Sailing Routes in the Moray Firth



Seascape, Landscape and Visual Assessment

Existing Environmental Conditions

The offshore elements of the modified TI are located within the Moray Firth, which has a coastline including cliffs, rocky coastlines and sandy beaches. The coastline provides open views out across the Firth. Shipping is a common feature in the Moray Firth and the infrastructure of the Beatrice oil field can be seen from some locations. Along the onshore section of the TI, the land is predominantly agricultural, with large arable and pastoral fields which are surrounded by burns. The area is scattered with settlements, hedgerows and woodland. There are also areas of mossy-wet grassland and occasional surface water bodies in lower lying areas.

The majority of the modified onshore export cable route corridor is not subject to landscape designation. The modified onshore export cable route corridor passes to the west and south of Duff House Garden and Designed Landscape. It will pass through some landscape areas which are defined by Aberdeenshire Council as Areas of Increased Sensitivity.

Potential Effects

Detailed information on the seascape, landscape and visual amenity features was collected from publicly available sources and site visits.

The impact assessment predicts that there will be no significant effects on the seascape during the construction or operation of the modified TI.

Construction works are expected to have temporary significant effects on the coastal and onshore landscape and visual amenity. These effects will be minimised through the use of landscape and habitat restoration, the use of routing and siting of infrastructure to avoid sensitive features and the use of horizontal directional drilling, where necessary, under water courses. These mitigation measures are predicted to reduce the effects to a minimal level with the exception of some localised areas where the effects will remain significant but temporary.

The proposals have been developed to ensure that the routing of the modified onshore export cable route will minimise the effects of construction on specific landscape features, particularly valued landscapes or features, including Sites of Special Scientific Interest, Garden Designed Landscapes, ancient woodland and areas of surface water. The modified onshore export cable route corridor was selected to avoid, in particular, Duff House Garden and Designed Landscape and ancient woodlands within the Deveron Valley (as well as other sensitive receptors).

The presence of the operational onshore substations will also create localised significant visual effects. These will be minimised through sensitive siting of infrastructure (Figure 6), reinstatement of habitats and vegetation, avoiding the removal of woodland and planting vegetation to screen the substations. These mitigation measures are predicted to reduce the effects to a minimal level that is not significant with the exception of some localised areas, where the effects will remain significant but most will reduce over time as the landscaping matures. Montages of the appearance of the substations from the closest viewpoint assessed, Upper Mains of Asleid, are provided at the end of this NTS. Instructions on how to view these montages are included next to the images.

As well as careful siting of the substations MORL has committed using Gas Insulated Switchgear (GIS) which means that the key electrical equipment is enclosed in buildings rather than being exposed in the open air. By housing this equipment in buildings, this reduces the footprint of the substations by 25%.

When the modified OfTI is considered in combination with other developments in the area, it is predicted that there will be no additional significant effects on seascape, landscape and visual features.

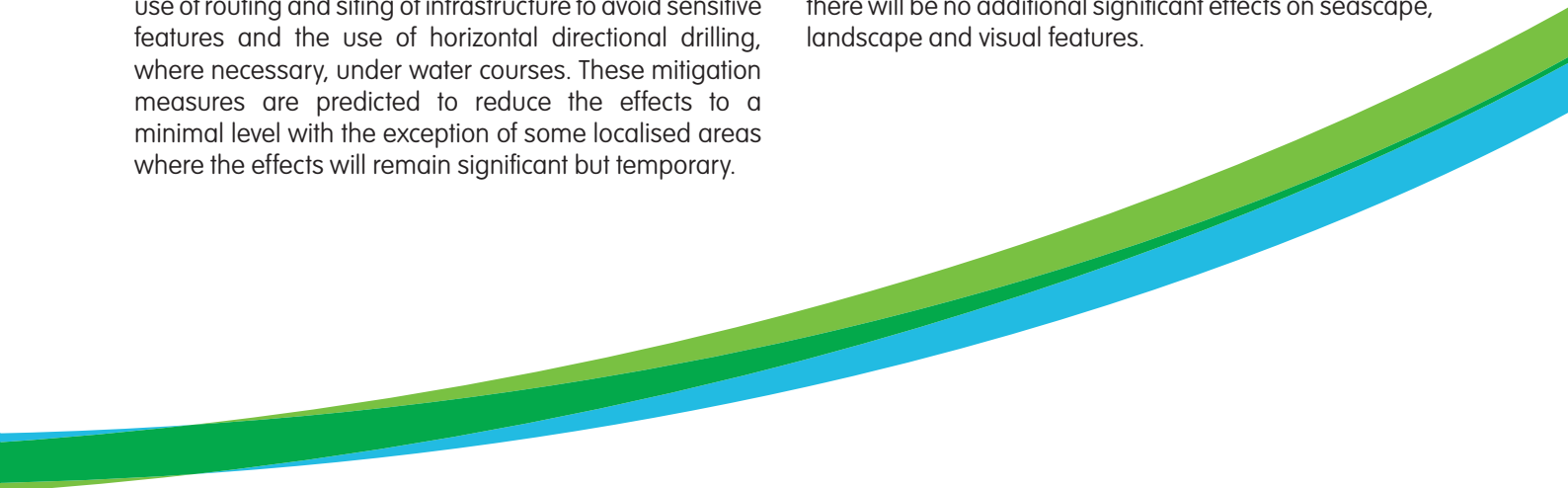


Figure 6 - Onshore Substations Area Indicative Landscaping Mitigation Proposals

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Please note this visualisation is indicative. Full photomontages can be found in Volume 4 of the ES



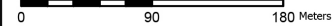
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KEY

- Onshore Substation
- Substation Land Options
- Transmission Line
- Existing Woodland
- Proposed Native Woodland
- Proposed Unimproved Grassland
- Agricultural Fields
- Marshy Grassland
- Surface Water
- Proposed SUDs
- Proposed Riparian Planting
- Proposed Contours (5m)
- Hedgerow Planting

1. Woodland block providing screening to views from north and west.
2. Wooded slopes above Burn of Asleid screen views from west and south.
3. New SUDs/wildlife pond in lowest lying area near Burn of Asleid.
4. Shelterbelt woodlands characteristic in the local landscape and screen views from the north, south and east.
5. New shelterbelts link riparian planting to areas of existing woodland.
6. Marshy grassland with riparian planting on low-lying land adjacent to Burn of Asleid.
7. Hedgerow planting around field boundaries to screen views from local roads to east and south.

Horizontal Scale: 1:4,000 A3 Chart



Geodetic Parameters: OSGB British National Grid

Produced: FC
 Reviewed: SM
 Approved: LT

Date: 17/06/2014 Revision: A

REF: 8460001-PSO0021-OPE-MAP-029

Figure 5.3-29
Onshore Substations:
Landscape Mitigation Proposals

Moray Offshore
Renewables Ltd

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

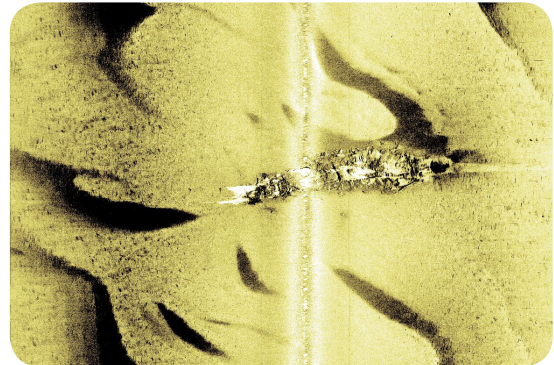
Archaeology and Visual Receptors

Existing Environmental Conditions

Within the area of the modified OfTI, there are twelve recorded wrecks and one known aircraft loss, although this has not yet been found. Site specific surveys have identified a further 20 areas of potential archaeological interest. As survey techniques have limitations, there is the potential for other unknown wrecks to be discovered. It is considered that there is a very limited chance that prehistoric remains will be encountered in the Moray Firth area.

Within the area of the OnTI, there are 190 known cultural heritage assets and there is the potential for encountering unknown cultural heritage assets of prehistoric or more recent date. The onshore cultural heritage features which have been included within the assessment, include:

- Lower Inchdrewer;
- St Brandon's Church, Inverboyndie;
- Hill of Alvah, (Scheduled Monument);
- Boyndie Old Kirk (Scheduled Monument);
- Hills of Boyndie, barrows & enclosures (Scheduled Monument);
- the recumbent Stone circle at Auchmaliddie;
- the remains of Gight Castle (Scheduled Monument) and doocot;
- the Designed Landscapes of Fyvie Castle and Hatton Castle;
- the Battle of Fyvie battlefield; and
- Other assets ranging from possible prehistoric cropmark features to post-medieval agricultural sites.



Above: Wreck On Seabed of Moray Firth

Potential Effects

Information on the features of archaeology and cultural heritage in the area of the modified TI was collected using publicly available information and field surveys of the sites.

Construction and maintenance works can affect archaeology and cultural heritage features by causing direct damage to the feature or by disturbance to the environment in which the feature resides, which in turn causes an effect to the feature itself. For example, in the marine environment, increases in sediment in the water column could lead to an artefact exposed at the seabed being buried, when the sediment settles.

In addition, for onshore features, it is important to consider the changes in the visual aspect of cultural heritage features caused by the presence of the proposed substations.

To avoid causing significant impacts to onshore and offshore archaeological and cultural heritage features, MORL will put in place several types of mitigation measures. These will include:



- The use of specialist surveys to support the routing of cables to avoid features of interest;
- Written Schemes of Investigation (for offshore works) / Programmes of Archaeological Works (for onshore works), which detail the process to be followed when undertaking works to avoid damage to archaeological features;
- A reporting protocol for archaeological discoveries; and
- The use of exclusion zones around important archaeological features.

Using these mitigation measures, there are no predicted significant effects arising from the construction and operational phases of the works on archaeological or cultural receptors.

Any effects on the visual setting of cultural heritage features caused by the onshore substations will be minimised, by planting vegetation to screen infrastructure.

The cumulative impact assessment found that when considering other relevant developments, with mitigation, there will be no significant effects on archaeology and cultural heritage features (both onshore and offshore) and no significant effect on the visual setting of onshore features.

Socio-Economics

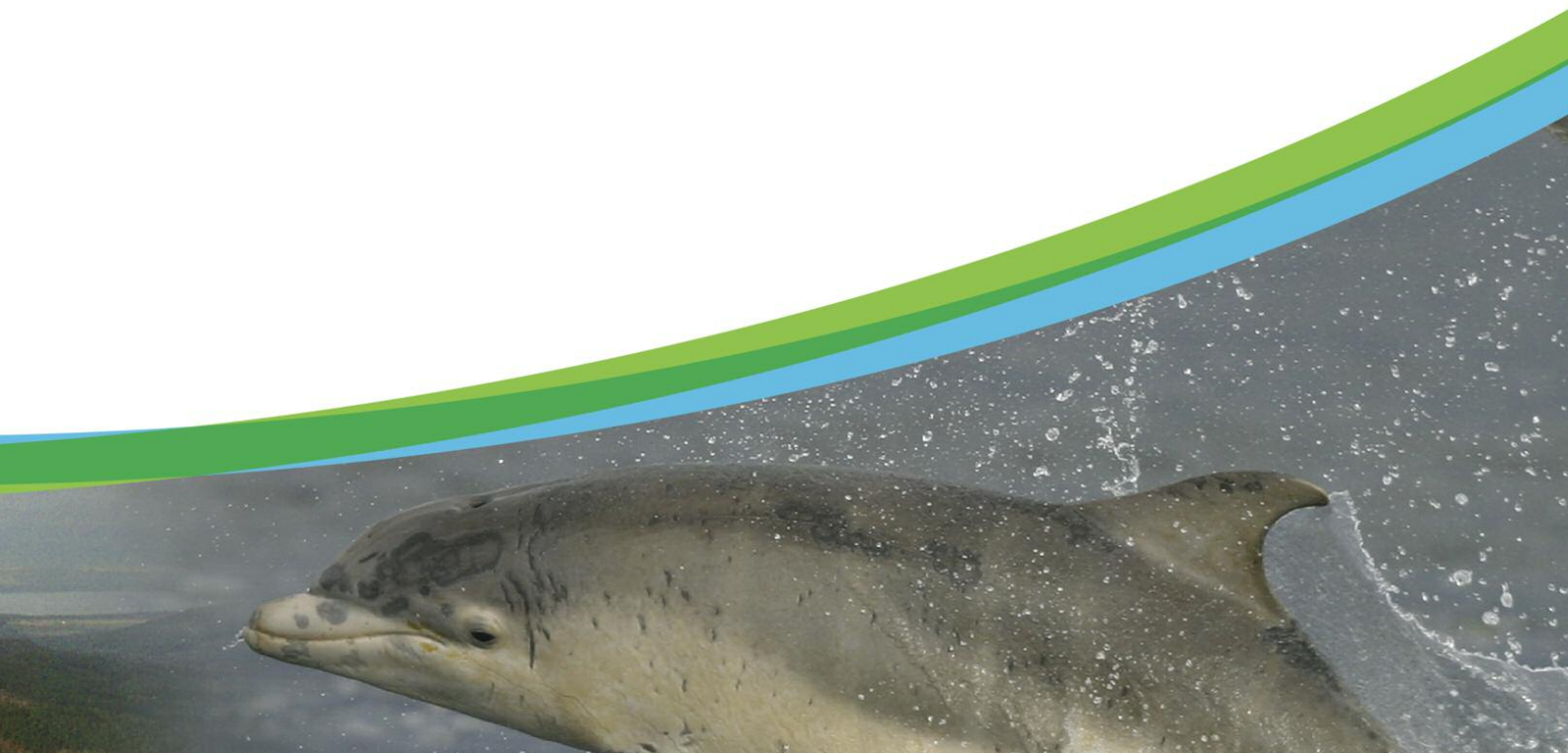
Existing Environmental Conditions

Socio-economics studies investigate the potential effects that projects can have on social and economic indicators, such as the value of goods and services in an area (known as Gross Value Added (GVA)), employment, tourism and recreation.

The export cable comes ashore at Inverboyndie Bay. Along this coastline, there are various towns and villages, including Banff, MacDuff, Whitehills and Buckie, which contribute to the fishing industry in the area. The onshore cable between Inverboyndie and New Deer is routed through the rural countryside which is predominantly used for agriculture. The closest town to the onshore cable route is Turriff, with a number of much smaller villages such as Cuminestown and Aberchirder close by. Banff and the Banffshire coast are designated as a priority regeneration area in the Aberdeenshire Local Development Plan 2012.

The economic conditions of the wider region of Aberdeenshire and the city of Aberdeen are characterised by levels of income and house prices above the Scottish average. In addition, higher proportions of the population are employed in oil and gas-related jobs. Aberdeenshire has a particularly fast rate of population growth. The average income is lower in the Highland and Moray although unemployment rates in Aberdeenshire, the city of Aberdeen, Highland and Moray have been below the Scottish average since 2004.

Recreation and tourism in the area has a strong focus on outdoor pursuits, including walking, sailing, sea kayaking, surfing, dolphin and bird watching.



MORL and its parent companies are committed to exploring ways to increase the positive socioeconomic effects of the development, construction and operation activities associated with the modified project in the Moray Firth area and in Scotland as a whole. The MORL team has recently held supply chain events in Aberdeen, Inverness and Wick with the aim of increasing awareness of the opportunities that an offshore wind project can bring. The events served to identify over 140 Scottish – based companies (many from the area of the modified TI) of varying size and capability with interest in participating in the continuing development of the MORL project. Further events will be held during the summer of 2014 as many of the capabilities to build and operate the modified TI assets can be found in companies local to the Aberdeenshire, Moray and Highland areas.



Left Top: cable duct installation,
Left Bottom: cable pull (cable drum)

Potential Effects

Information on the area was collected from publicly available data sources.

The construction activities associated with the project are expected to have a significant positive effect on local business and employment through the use of local supplier and services to support the construction process. There could be a small, temporary and negative effect on tourism and recreation because of the disruption that the construction works will cause. However, this effect will not be significant.

Once the project is operational, there is predicted to be a small positive effect on local businesses and employment through maintained use of local services and suppliers. There is not expected to be a significant effect on tourism and recreational activities.

When assessing the cumulative effects with other projects, significant positive effects on local businesses and employment during the construction phase are predicted. No significant negative effects on other socio-economic indicators during construction or the operational phases of the project are anticipated.

Traffic and Transport

Existing Environmental Conditions

The main transport system in the area where the modified OnTI corridor is located, is the road network. The main trunk road network located some distance from the modified onshore cable route corridor but there are several distributor roads, i.e. low to moderate capacity roads which connect populated areas. The A98 is the main east to west route in the area but other distributor roads include the A97, A947, A948 and the A981. The distributor roads are all single-carriageway.

There are a number of rural distribution roads, such as the B9105, B9170 and the B9121, all of which are also single-carriageway. There are various minor rural roads (i.e. the C-roads) which provide for local access functions.

It is possible that the construction works will make use of the port facilities at Peterhead but it is unlikely that the rail network will be used as this is primarily for passenger services.

Potential Effects

Traffic surveys using Automatic Traffic Counters (ATC) were undertaken over a full week during May 2014. This month was chosen because it was expected representative traffic flow information could be collected, i.e. that traffic flows would be free of unusual occurrences or patterns. The data collected included vehicle flow, class of vehicle and speed for each direction. The data was used to assess the likely effects of the modified TI works on the following:

- Creating blockages or deviations in traffic routes;
- Causing delays to drivers and pedestrians;
- Pedestrian access;
- Accidents and safety; and
- The creation of dust and dirt.

It is expected that during the construction phases, there could be some limited effects associated with the risks mentioned above. However, the effects will be limited through the use of a Construction Traffic Management Plan which will address these issues and therefore the effects will not be significant. No effects are anticipated associated with the operation of the OnTI.

When considering the modified OnTI with other potential developments in the area, no significant cumulative effects are predicted for traffic and transport.

Other Human Activities

Existing Environmental Conditions

The Moray Firth is an active offshore area used by various industries. Commercial and recreational fishing, shipping and navigation and recreation and tourism have been discussed in the previous sections. Other industries which use or have an interest in the Moray Firth include other renewable energy developers (e.g. offshore wind farms, wave and tidal devices), carbon capture and storage, oil and gas, dredging and sea disposal, subsea cables (including telecommunications), pipelines and aviation. The Moray Firth has and is currently used for military practice exercises. There is also the potential for unexploded ordnance from World War I and II to be present in the area.

Potential Effects

Information on the other users or industries with an interest in the Moray Firth was collected from publicly available sources. Of the interests and users listed above, assessments were done on the potential for effects on other offshore wind farms, the oil and gas industry, military activity, damage to subsea cables and health and safety issues associated with unexploded ordnance.

The assessment concluded that the construction and operation of the modified OfTI would be unlikely to cause interference to the construction or operation of other offshore wind farms in the Moray Firth or military practice exercises. The operational offshore substation platforms will be marked and lit as per standard practice and this will ensure that the infrastructure should not affect military practice exercises. Overall, the effects will not be significant.



The construction of the offshore works is unlikely to have a significant effect on oil and gas activities however the construction works in combination with other developments may cause some disruption to oil and gas activities. This effect will be mitigated through continued consultation with those oil and gas companies working the Moray Firth and through the affected entities adhering to guidance for conflict resolution, should it be needed. Using mitigation, the effects will not be significant.

There is potential for the works to cause damage to subsea cables during both the construction and maintenance works associated with the modified OfTI. There is also the potential for subsea cables to be damaged by other developers working in the Moray Firth. Any potential risk of damage to cables will be minimised through adherence to appropriate guidance on working in the vicinity of subsea cables and any effects will therefore not be significant.

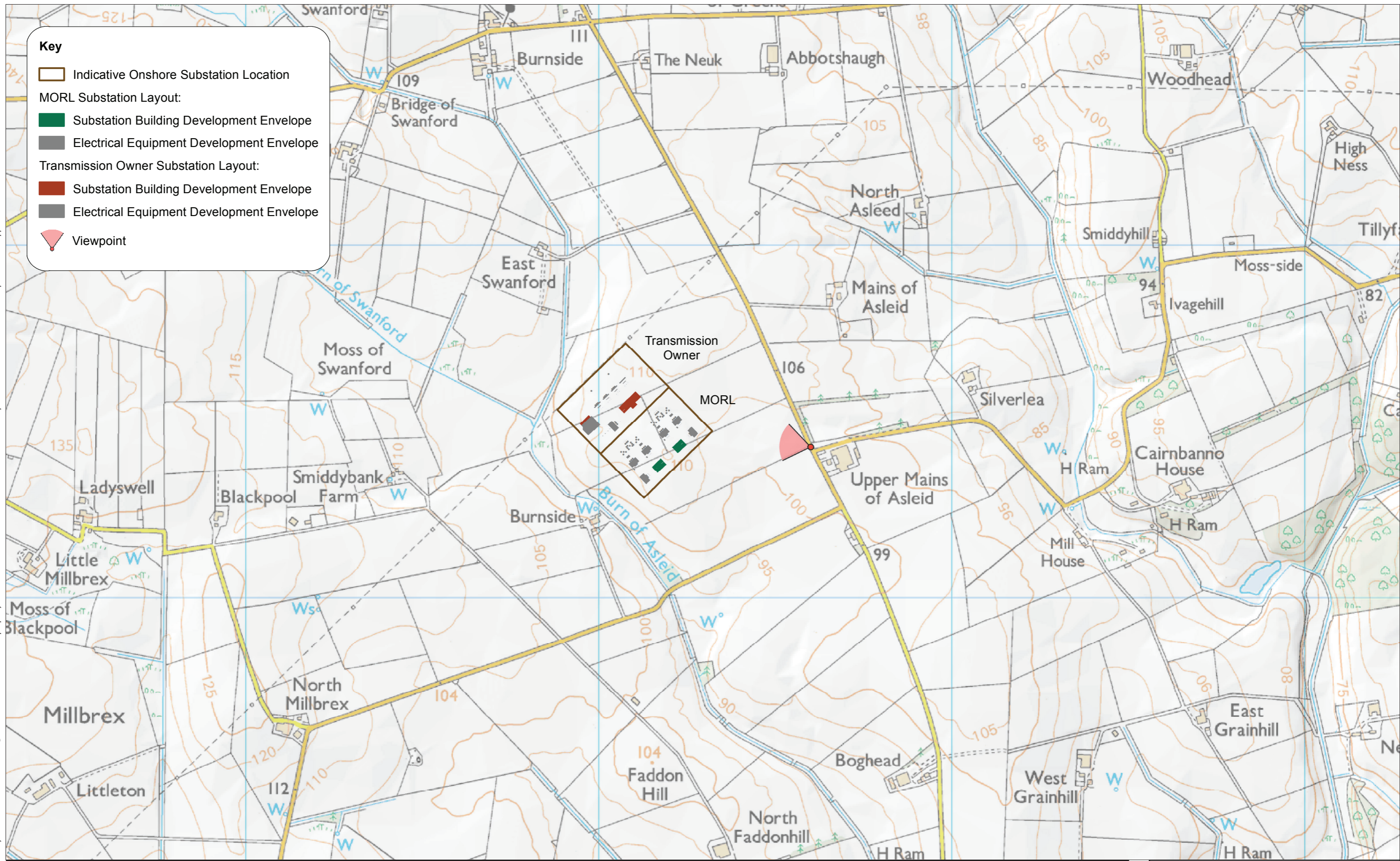
There is expected to be a health and safety risk associated with unexploded ordnance. This risk is expected to be greater during the construction phase compared to the operation and maintenance phase of the works. There is also the potential that other developers could also increase the overall health and safety risk associated with unexploded ordnance in the Moray Firth region. MORL will minimise these risks by using pre-construction surveys specifically designed to identify unexploded ordnance, developing an unexploded ordnance safety plan and by using standard industry practice procedures. The overall effects will therefore not be significant.



Above: Beatrice Demonstration Turbines and Beatrice Oil Field



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Key

- Indicative Onshore Substation Location
- MORL Substation Layout:**
- Substation Building Development Envelope
- Electrical Equipment Development Envelope
- Transmission Owner Substation Layout:**
- Substation Building Development Envelope
- Electrical Equipment Development Envelope
- ◡ Viewpoint

Viewpoint 1: Upper Mains of Asleid

Viewpoint Grid Reference: 383600m E 844428m N (OS BNG)
 View Direction: 282 Degrees from North
 Viewpoint Elevation: 103m AOD
 Horizontal Field of View: 72 Degrees
 Distance to Nearest Onshore Substation: 282m
 Image Viewing Distance: 32cm
 Date & Time of Photo: 04/02/2014, 15:08

Scale in metres: 1: 10,000



Geodetic Parameters: OSGB British National Grid

Produced: LA
 Reviewed: SM
 Approved: LT

Date: 19/06/2014 Revision:
 Ref: 8460001-PSO0021-OPE-MAP-030

Figure 5.3-30

Viewpoint 1: Upper Mains of Asleid

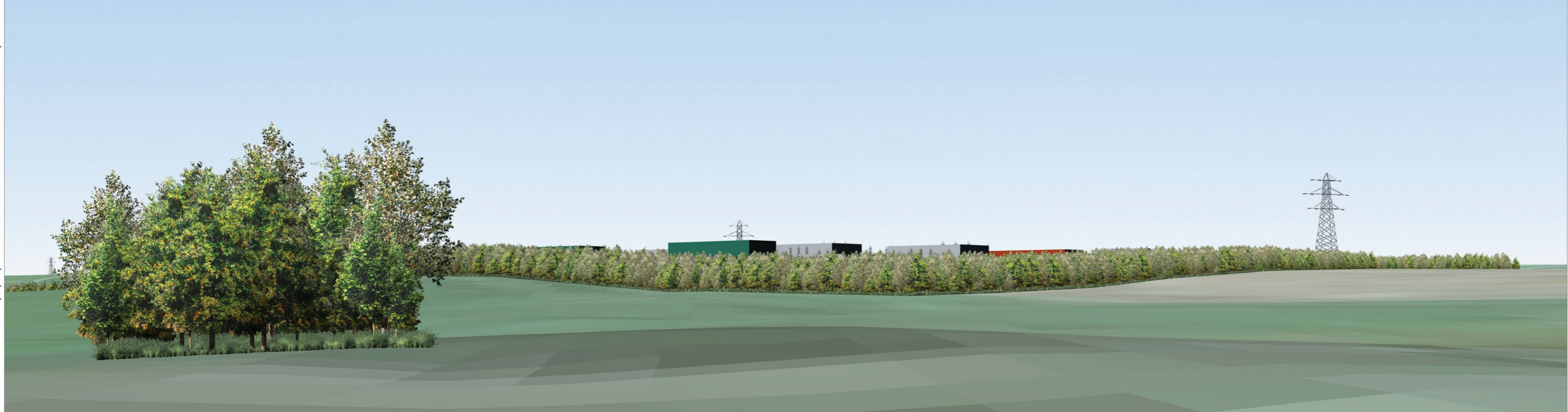


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Photomontage view showing the development envelopes for the proposed onshore substations. Camera: Canon EOS 5D Mark II Focal Length: 50mm Horizontal Field of View: 72 degrees Camera Height: 2m Date: 04/02/14 Time: 15:08



Computer generated model showing the development envelopes for the proposed onshore substations and woodland planting.

The layout of the onshore substations has been modelled using several 'development envelopes' related to the height, width and depth of each part of the onshore substations layout (shown in Figure 5.3.5). The envelopes are modelled at the maximum height of the largest structures or buildings within each area and therefore represent a worse-case scenario, showing the area in which the onshore substations will be built. These envelopes are used as the basis for visual modelling in the photomontages and the assessment of impacts. Colours are used solely to differentiate between the MORL onshore substation and the TO onshore substation and to differentiate between buildings and external electrical equipment. The colours shown are not indicative of the colour of the onshore substation buildings.

Important Viewing Instructions

The photograph is a composite image made up of 5 No 50mm photographs joined together horizontally to form an overall field of view which is wider than that seen in detail by the human eye. For correct perspective viewing, these images must be viewed at a distance of 314 mm. This image should only be assessed in the real landscape from the same viewpoint.

Figure 5.3-30
Viewpoint 1: Upper Mains of Asleid
Photomontage and Visual Representation

The ES will be available to view at the following locations:

- Peterhead Planning Office, Aberdeenshire Council, Arbuthnott House, Peterhead AB42 1DA
- Banff & Buchan Planning Office, Town House, Low Street, Banff AB45 1AY
- Formartine Planning Office, 45 Bridge Street, Ellon AB41 9AA
- The Highland Council, Planning Office, Glenurquart Road, Inverness IV3 5NX
- Caithness Planning Office, Market Square, Wick KW1 4AB
- Moray Council, Planning Office, High Street, Elgin IV30 1BX
- Helmsdale Library and Service Point, Dunrobin Street, Helmsdale KW8 6JX
- Buckie Library, Cluny place, Buckie AB56 1HB
- Golspie Service Point, Olsen House, Main Street, Golspie KW10 6RA
- Brora Library, Gower Street, Brora, Highland KW9 6PD

The ES can also be viewed at the Scottish Government Library at Victoria Quay, Edinburgh EH6 6QQ.

Copies of the ES may be obtained from MORL (Tel: 0131 556 7602, Email: info@morayoffshorerenewables.co.uk) at a charge of £350 or alternatively on CD for £10 (including p & p). Copies of a short Non Technical Summary may be obtained free of charge from MORL.

The ES is also available to download online at www.morayoffshorerenewables.com.



Moray Offshore Renewables
EDPR UK
40 Princes Street
EDINBURGH

EH2 2BY

info@morayoffshorerenewables.co.uk



moray offshore renewables ltd