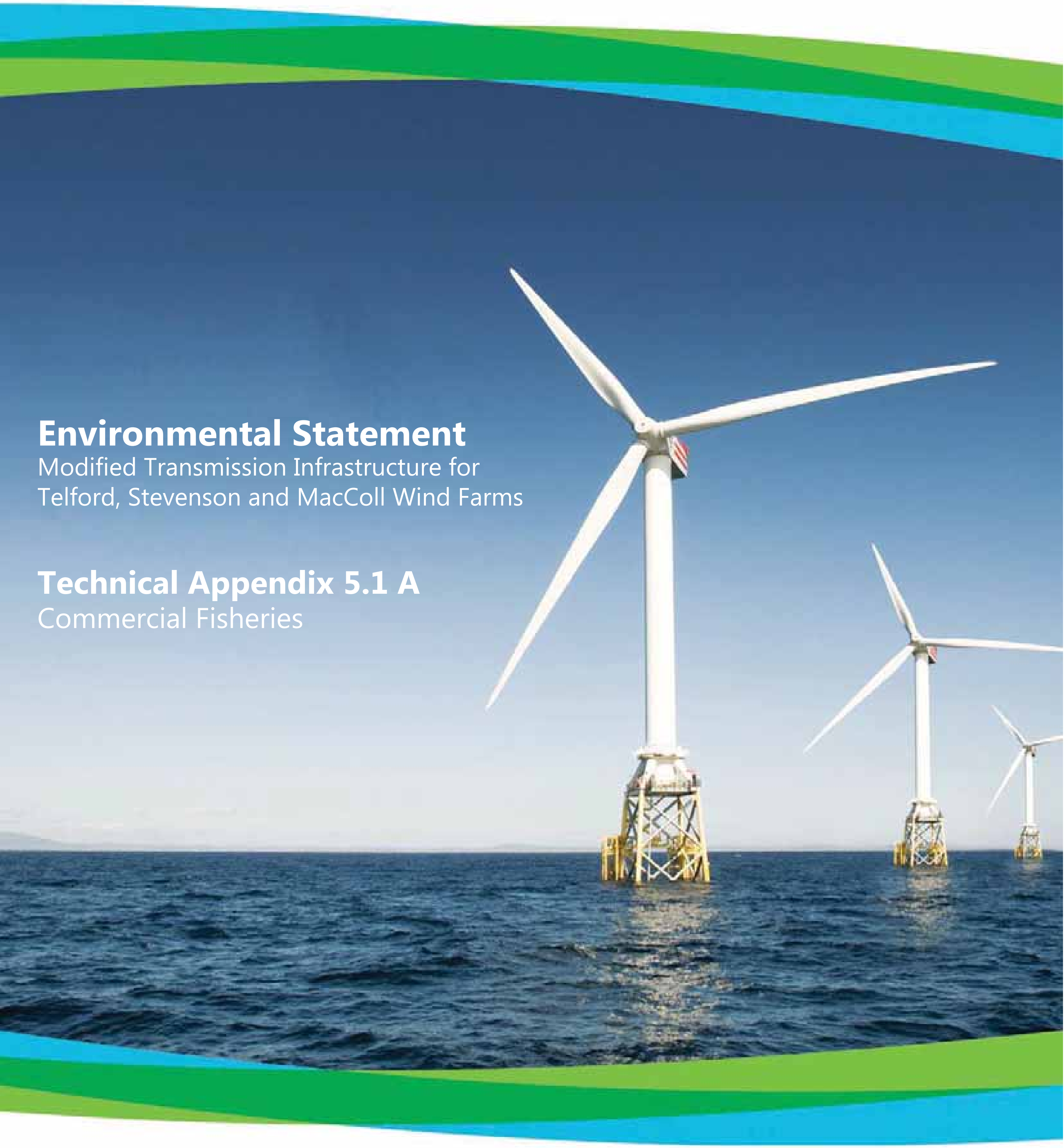
moray offshore renewables ltd

Developing Wind Energy In The Outer Moray Firth



Environmental Statement

Modified Transmission Infrastructure for Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.1 A

Commercial Fisheries

renewables

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Table of Contents

1 List of Abbreviations

BMM	– Brown and May Marine
BWEA	– British Wind Energy Association
Cefas	– Centre for Environment, Fisheries and Aquaculture Science
CFP	– Common Fisheries Policy
CPA	– Coast Protection Act
DEFRA	– Department for Environment, Food and Rural Affairs
EC	– European Commission
EEZ	– Exclusive Economic Zone
EIA	– Environmental Impact Assessment
FEPA	– Food and Environmental Protection Act
FIN	– Fisheries Information Network
ICES	– International Council for the Exploration of the Sea
MFCFWG	– Moray Firth Commercial Fisheries Working Group
MMO	– Marine Management Organisation
MORL	– Moray Offshore Renewables Limited
MS	– Marine Scotland
MSS	– Marine Scotland Science
OfTI	– Offshore Transmission Infrastructure
RSS	– Registry of Shipping and Seamen
SFF	– Scottish Fishermen's Federation
TAC	– Total Allowable Catch
VMS	– Vessel Monitoring System

2 Introduction

This report describes the commercial fishing activities currently being undertaken in the Moray Firth which have the potential to be impacted by the installation, operation and decommissioning of the MORL modified Offshore Transmission Infrastructure (OfTI).

The preparation of this baseline takes into account the requirements of the Food and Environmental Protection Act (FEPA) 1985, Coast Protection Act (CPA) 1949, Department for Environment, Food and Rural Affairs (DEFRA) and Centre for Environment, Fisheries and Aquaculture Science (Cefas) as specified in the 2004 Guidelines (Cefas, 2004) and British Wind Energy Association (BWEA) 2004 Recommendations (BWEA, 2004).

For the purposes of this study, commercial fishing activity is defined as any legal fishing activity undertaken for declared taxable profit. Currently, there is no single data source or recognised model for establishing commercial fishing baselines in discrete sea areas such as export cable routes. The following baseline has therefore been derived using data and information from a number of sources. Further information on these data sources is described in Section 3.

When establishing a commercial fisheries baseline it should be recognised that commercial fishing activities are not constant and fluctuate over time. Variations in landings, changes in legislation and economic constraints (e.g. fuel costs and crew availability) can all impact on fishing activities in any given area and therefore the fishing patterns and practices.

This report is supported by Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012). The full methodology used to establish this baseline can be considered congruent with the methodology described within Appendix 5.1 A however, where necessary, additional information in respect to the methodology is provided below.

2.1 Study Area

The study area for the assessment of commercial fishing activities with regards to the modified OfTI is shown in Figure 2.1. The modified OfTI is located in International Council for the Exploration of the Sea (ICES) rectangles 44E7 and 45E7. The approach has been to assess fishing activities within four ICES rectangles (44E7, 45E7, 44E6 and 45E6) to allow fishing activities within the vicinity of the modified OfTI to be fully described.

ICES rectangles are the smallest spatial unit available for the collation of fisheries statistics. It should be noted that the area of each rectangle in the study area is much larger than the area covered by the modified OfTI. Where possible, fishing activities in the immediate area of the modified OfTI have been described in detail.

3 Data Sources, Limitations and Sensitivities

Establishing a commercial fisheries baseline requires an approach that incorporates a number of different data and information sources. Each data and information source is subject to certain limitations and sensitivities (described in more detail below) and, as a result, these data sources require separate analysis.

The principal sources of data and information used for the collation of the commercial fisheries baseline are:

- ICES;
- Marine Management Organisation (MMO);
- Marine Scotland (MS);
- Marine Scotland Science (MSS);
- District Fishery Offices;
- The Scottish Fishermen's Federation (SFF); and
- Fishermen and their representatives.

3.1 ICES

As previously stated, ICES statistical rectangles are the smallest spatial unit used for the collection and analysis of fisheries statistics by the European Commission (EC) and Member States'. ICES rectangles cover approximately 900 nm^2 and align to 30' latitude by 1° longitude.

Fishing activity within an ICES rectangle is unlikely to be evenly distributed. Analysis of fisheries statistics by ICES rectangle should therefore take into account the small proportion of a statistical area that the modified OfTI covers and the uneven distribution of activity throughout each rectangle.

3.2 Surveillance Sightings Data

As a means of fisheries protection and to ensure the fishing industry complies with UK and EU law, aircraft and surface vessels are used to compile surveillance sightings of fishing vessels in UK waters. The data has been used to give a relative spatial distribution of fishing activity by method and nationality within a given area. It should be noted that, due to the low frequency of flights in an area, which are generally weekly and only occur during daylight hours, the sightings data should not be used to give a quantitative assessment of fishing activity. The MMO has provided sightings of all fishing vessels in UK waters by nationality and method.

3.3 Fisheries Statistics

UK fisheries statistical data for a five year period between 2008 and 2012 has been collected by the MMO by ICES rectangles for all UK and non-UK vessels landing into UK ports. The data includes landings by value and effort (days fished). This data set has been analysed to identify:

- Species targeted;
- Fishing methods used;
- Vessel categories (under-10 m, 10-15 m, over-15 m);
- Annual variations;
- Seasonal variations;
- Landings values;
- Fishing effort; and
- Landings values and effort by port.

The main source of fisheries landing data is the EC daily log sheets that all vessels over-10 m must complete and submit. Fishing vessels under-10 m in length are not required to submit daily log sheets, although skippers can choose to do so.

Dockside inspections are made on the under-10 m fleet by local fisheries officers. The Shellfish Entitlement Scheme (2004) and the 'Registration of Buyers and Sellers of First Sale Fish and Designation Auction Site Scheme' (2005) further facilitate collection of fisheries data from the under-10 m fleet. It should be noted that data collected prior to the introduction of these schemes may underestimate the true levels of activity from the under-10 m fleet. It should also be recognised that under these schemes, fishermen are required only to identify the ICES sub-area within which catch was taken and not the specific ICES rectangle. Catches, effort and values by the under-10 m fleet are allocated to ICES rectangles on the basis of best estimate.

3.4 Satellite Tracking (VMS) Data

3.4.1 MMO

Vessel Monitoring System (VMS) data is the most comprehensive fisheries data set currently available which shows the intensity of over-15 m fishing vessel activity. Since January 2005, all EC vessels over-15 m in length have been fitted with satellite tracking equipment which transmits the vessels' position at a minimum of every two hours to the relevant Member States' fisheries authority. The MMO monitors all UK vessels irrespective of location and all foreign vessels within the UK Exclusive Economic Zone (EEZ). Information regarding non-UK vessels cannot be disclosed by the MMO without prior permission from the vessels national regulating body.

The satellite data has been cross-referenced with landings and effort data to give values in a 0.05° by 0.05° grid for the years 2008 to 2012. The disclosure of independent UK vessels' identities is restricted under the Data Protection Act (1998) and the coordinates of individual vessels are only available at the request of the vessels skipper/owner. Any rectangles that record less than five transmissions are not included in the data set and specific fishing methods have not been identified; instead the type of method (mobile or static) has been defined. All vessels that are stationary in port have not been included in the data set and the VMS data does not differentiate between vessels fishing and steaming. As a result the data has been filtered by speed, with vessels travelling at speeds of between 1-6 knots included (Lee *et al.*, 2010).

Due to VMS only applying to vessels over-15 m in length, activity by vessels under-15 m will not be represented in the analysis. As of 2012, EU legislation will require all Member State vessels over-12 m in length to have VMS installed. Due to the release dates of data however, data from the over-12 m fleet will not be included in this assessment.

3.4.2 Marine Scotland Science

MSS has provided VMS data (2007 to 2011) to Brown and May Marine (BMM) to aid in the establishment of a coherent fisheries baseline. The VMS data was produced by applying VMS records to the Fisheries Information Network (FIN), which is the Scottish Government's sea fisheries database. FIN holds information on voyages (catches, gear and mesh size) and landings (weight, price at sale). Both the VMS records and FIN database use the Registry of Shipping and Seamen (RSS) number, which identifies vessels (this identifier is otherwise protected information) as a common denominator. Logtime (the date and time of each VMS transmission) identifies each vessel's voyage and enables the location of a vessel during each trip to be linked to the gear used and the weight of the landings (Holmes *et al.*, 2011). A collection of weight and value rules separate the data into groups representing key sectors of the UK fishing fleet such as crab, lobster, squid, *Nephrops* (mobile and static), demersal (mobile and static), scallop and pelagic (mackerel and herring) (Kafas *et al.,* 2012).

As with the MMO data set, the data has been filtered by speed with vessels travelling at speeds of between 1 and 6 knots presumed to be fishing (Lee *et al.*, 2010). As previously stated, VMS records do not capture vessels under-15 m and so may not represent the true extent of fishing activities in a given area.

3.5 ScotMap

ScotMap data was collected by MSS and provides spatial information on fishing activity of Scottish registered commercial fishing vessels under-15 m in length. Data was collected through interviews between June 2011 and December 2012 which compiled fisheries information over the past five years (2007 to 2011). The data collected was aggregated and analysed to provide information on the monetary value, number of fishing vessels and crew by fishery.

The data set is based on interviews of 1,090 fishermen, however not all fishermen initially targeted for the ScotMap project were interviewed (72% vessel coverage overall) and not all those interviewed provided earnings information (10% earnings disclosure decline rate overall). Individuals also defined their fishing areas with variable levels of precision.

3.6 Fishermen and Fishermen's Representatives

Consultation on the Telford, Stevenson and MacColl wind farms, in addition to further consultation on the modified TI, has been undertaken with individual skippers and their representatives. Despite extensive consultation through open and advertised fisheries stakeholder meetings and comprehensive field work, it is possible that certain individuals and some unaffiliated stakeholders may not have been included in the assessment.

4 Stakeholder Consultation

4.1 Scoping Responses

The MORL modified Transmission Infrastructure Scoping Report was distributed to commercial fisheries stakeholders in April 2014. A summary of the scoping responses of particular relevance to commercial fisheries is presented in Table 1. This table includes those consultees who raised concerns with respect to the installation, operation and decommissioning of the modified OfTI.

Table 1: Summary of Relevant Scoping Responses

Organisation	Scoping Response	Addressed
MSS	There are substantial locally important shellfish fisheries for brown crab and lobster. These predominantly consist of small vessels (<15 m in length) that do not have VMS aboard. However, ScotMap project should be used as primary source of information on the potential overlap of the spatial distribution of smaller vessels with the proposed site. In general, these vessels work mainly between 0-6 nm from the shore. There is a very active small boat fleet working in the area mainly potting, but also an active summer hand-line fishery for mackerel.	ScotMap data has been used to show the monetary value and number of vessels for creeling, mackerel lining, *Nephrops* trawling and other trawling (i.e. non-*Nephrops*). It should be noted that the scallop data set was analysed, however no values were recorded in the Moray Firth and as such this data set has not been include in the report. Further details on ScotMap can be found in Section 5.5 of this report. In addition to ScotMap, fishing grounds have been collected through consultation and these are detailed in Section 5.6 of this report.
MSS	VMS vessel fishery data indicates the key target species as *Nephrops*, (mainly in the eastern part of the Firth), scallops (both closer to the shore and within the development) and some demersal whitefish species (further offshore). There is an increasing importance of squid in the Moray Firth as there are fewer restrictions on vessels targeting this species. As a result more vessels have been moving to target squid seasonally to alleviate pressure on other stocks and save days at sea for other Total Allowable Catch (TAC) species.	MSS VMS data has analysed by fishery in the Moray Firth and is discussed in Section 5.4 of this report. Consultation has been undertaken with the skippers of vessels who target squid; further details can be found in Section 5.6.3 of this report.

Organisation	Scoping Response	Addressed
MSS	It would be worth ensuring good contact is made and consultation maintained with fisheries representatives in the area. This is especially important for the non-VMS vessels which are not represented by the VMS data plots. Points of contact other than the Scottish Fisherman's Federation (SFF) may include local fishery offices and the inshore fisheries group coordinator for the Moray Firth.	Consultation has been undertaken with fishermen and their representatives in the Moray Firth, including the local fishery offices and inshore fisheries group. A summary of the consultation is provided in Table below.
Scottish Fishermen's Federation	The SFF note that the proposal allows for up to 4 transmission cables. We would expect these to be buried as far as possible at a depth to ensure minimum risk from snagging or changes in seabed as a result of tidal movement. Where this is not technically possible consultation on alternatives and mitigation proposals must be decided and agreed through the Moray Firth Commercial Fisheries Working Group which must include those potentially affected by the cable route.	The potential impacts of the cables to commercial fishing activity along with the appropriate mitigation methods (including cable burial and discussion through the Moray Firth Commercial Fisheries Working Group (MFCFWG)) are assessed in the ES Chapter 5; Section 5.1.2.
Scottish Fishermen's Federation	The SFF are content with the definition given in Chapter 3, page 35 on the cumulative and in combination impacts, and expect to see these clearly illustrated along with any necessary mitigation.	The cumulative and in combination impacts to commercial fishing activity are assessed in this ES Chapter 5; Section 5.1.3.
Scottish Fishermen's Federation	The SFF are content with the baseline fisheries given in Chapter 5.3.2 and vessel activity in 5.3.3. If that knowledge is properly applied to the cable route as far as scallop activity to the North and South, Nephrops & demersal en route, squid and static gear to the South, we are confident that any negative impacts on fishing will become clear and that appropriate mitigation measures will be developed.	The potential impacts of subsea cables to commercial fishing activity along with appropriate mitigation measures are assessed in this ES Chapter 5; Section 5.1.2

4.2 Consultation

Consultation was initially undertaken in 2011 with the organisations listed in Table 2 below. Where applicable, consultees have been approached to provide updated information relevant to the modified OfTI.

Table 2: List of Consultees

Organisation	Consultation Response
Scottish Fishermen's Federation	Inputs into baseline, ongoing consultation.
Scallop Association	Inputs into baseline, ongoing consultation.
Caithness Static Gear Fishermen's Association	Inputs into baseline, ongoing consultation.
Fishermen's Association Limited	Inputs into baseline, ongoing consultation.
North East Inshore Fisheries Group	Inputs into baseline, ongoing consultation.
Marine Scotland	Inputs into baseline, ongoing consultation.
Scrabster Fishery Office	Inputs into baseline, ongoing consultation.
Buckie Fishery Office	Inputs into baseline, ongoing consultation.
Aberdeen Fishery Office	Inputs into baseline, ongoing consultation.
Full-time Creelers from Buckie, Portsoy, Banff, Whitehills and Fraserburgh	Inputs into baseline, ongoing consultation.

5 Baseline Environment

5.1 Fisheries Controls and Legislation

The fisheries controls and legislation are as described in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012). Where necessary, updates to the controls and legislation are provided below.

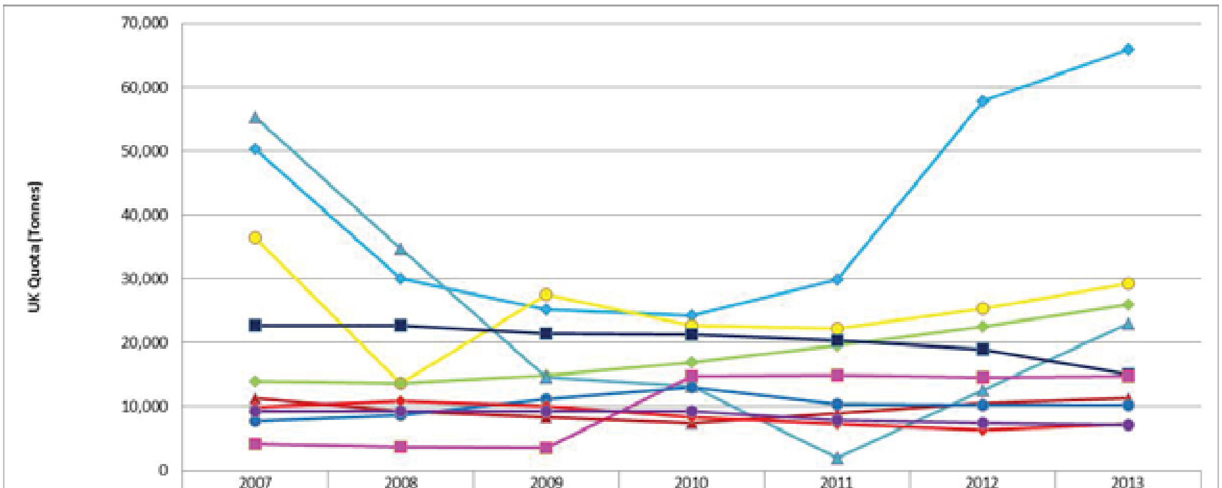
5.1.1 Common Fisheries Policy

As described in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012), the Common Fisheries Policy (CFP) has primarily dictated the structure and capacity of the UK and Scottish fishing fleets. In February 2013, the European Parliament voted for a reform of the CFP, including measures to protect endangered stocks and the ending of discards. The new CFP will begin to come into practice in 2014, with the current policy stipulating that between 2015 and 2020, catch limits should be set that are sustainable and maintain fish stocks in the long term. The new CFP also seeks to make fishing fleets more selective in what they catch and to phase out the practice of discarding unwanted fish. These new measures are likely to impact the fishing patterns and practices of the vessels described in Section 5.6 below.

5.1.2 Quota Restrictions

As discussed in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012), quota for fish stocks in Scottish waters are managed and controlled by the Scottish Executive. Figure 5.1 shows the TAC for the UK in ICES area IV (North Sea). It can be seen that herring currently records the largest TAC and, although there was an initial decline at the beginning of the period, the quota has increased in recent years.

Demersal species such as haddock, plaice, whiting and cod and pelagic species such as blue whiting and horse mackerel constitute a significant proportion of TACs for the UK. *Nephrops* (Norway lobster) is also a species of national importance in the North Sea, although it should be noted that the quota for this species declined in recent years.



	2007	2008	2009	2010	2011	2012	2013
Herring	50,279	30,025	25,275	24,223	29,832	57,836	65,901
Haddock	36,466	13,626	27,507	22,698	22,250	25,386	29,194
Plaice	13,987	13,626	14,975	16,951	19,599	22,542	25,964
Blue Whiting	55,283	34,759	14,670	13,141	1,990	12,563	22,987
Norway Lobster	22,644	22,644	21,513	21,384	20,315	18,994	15,027
Horse Mackerel	4,104	3,721	3,470	14,765	14,850	14,587	14,775
Whiting	11,297	9,336	8,426	7,391	8,933	10,539	11,402
Cod	7,773	8,628	11,216	13,067	10,455	10,311	10,311
Saithe	9,895	10,911	10,110	8,435	7,333	6,318	7,273
Anglerfish	9,233	9,233	9,233	9,233	7,846	7,455	7,082

Year

Figure 5.1: TACs (Top 10 Species) in ICES Area IV (North Sea), UK only, 2007-2013

5.2 Surveillance Sightings

Figure 5.2 gives the positions of vessels identified by fisheries surveillance officers in the study area, by method, between 2008 and 2012. Vessels of all lengths are recorded. Sightings are concentrated in the south and east of the study area and the density of sightings within the vicinity of the modified OfTI are moderate. The majority of vessels sighted in the vicinity of the modified OfTI are demersal trawlers, with seine netters, scallop dredgers and creelers also identified.

5.3 Landings Data

The average landings values (2008 to 2012) of UK vessels in the Moray Firth by species, method and vessel size are shown in Figures 5.3-5.5.

Within the Moray Firth, the main target species are *Nephrops*, squid and scallops; the majority of this activity occurs along the southern Moray coast. The modified OfTI is located in two ICES rectangles, 44E7 and 45E7, and these rectangles record moderate to high landings values.

Rectangle 44E7 records the highest landings values in the study area; the majority of these values are recorded by vessels bottom otter trawling and, to a lesser extent, twin trawling, predominantly for *Nephrops* (46.9%). Squid and haddock (25.6% and 7.7%, respectively) also contribute to the landings values recorded by vessels deploying these methods. Scallops contribute 7.7% of the landings from this rectangle with vessels deploying boat dredges. The majority of vessels operating in this rectangle are over-15 m in length, although over a quarter of vessels are under-15 m in length.

Records show that moderate landings are made within ICES rectangle 45E7, with scallops contributing 50.8% of the landings in this rectangle. Squid, haddock and *Nephrops* (18.7%, 12.9% and 10.3%

respectively) comprise the remainder of the landings values and these are recorded by vessels deploying bottom otter trawls. A high proportion of the vessels operating in this rectangle are over-15 m in length.

In the inner Firth (44E6), the composition of landings is similar to that of 44E7 with *Nephrops* and squid comprising the majority of the landings, albeit recording slightly lower values. In the north-west of the Moray Firth, the majority of activity is recorded by vessels deploying pots (creels), targeting lobster, edible crab and, to a lesser extent, velvet crab. Scallops are also targeted in this rectangle by vessels deploying boat dredges.

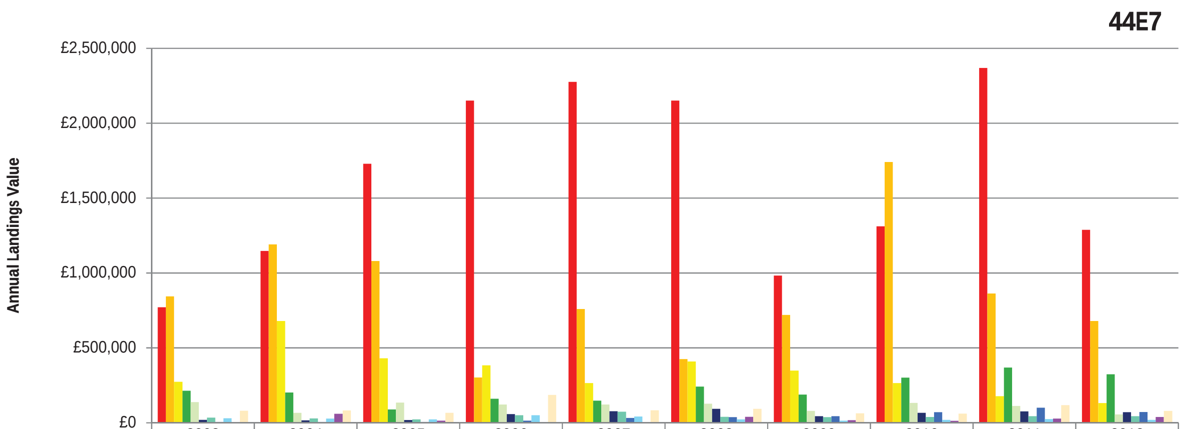
Figure 5.6 shows annual effort by method in the Moray Firth. As can be seen in the figure, the distribution of activity broadly correlates to that of landings, with the exception of 45E7, which records the lowest effort in the area. It should also be noted that vessels creeling record significantly higher levels of effort in rectangles 44E7, 44E6 and 45E6, when compared to landings values. This reflects the higher effort relative to low value fishery.

5.3.1 *Annual and Seasonal Variation*

Figures 5.7 and 5.8 show the annual variations in landings values by species in rectangles 44E7 and 45E7, respectively, between 2003 and 2012.

In rectangle 44E7, the total landings values increased between 2003 and 2008, followed by a sharp decline in 2009. Values since 2009 have, however, shown an increase. The highest values have been recorded by vessels targeting *Nephrops* and squid, with the highest values for these two species recorded in 2011 and 2010, respectively. All others species, with the exception of edible crab, lobster and velvet crab, have shown minor fluctuations over this timeframe. Crab, lobster and velvet crab have shown notable increases in landings values after 2006 due to the changes in fishery management (as discussed in Section 3.3, previously).

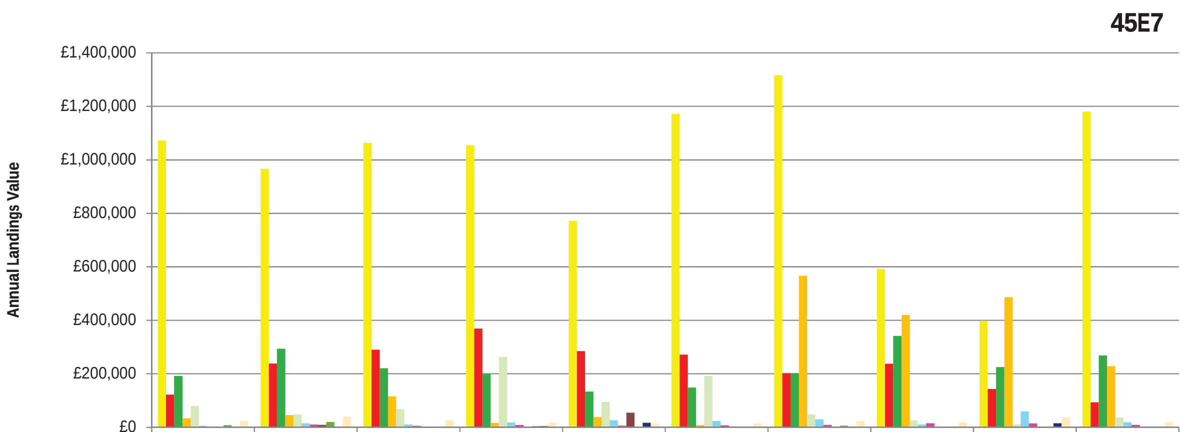
In rectangle 45E7, scallops record the highest landings values and, with the exception of 2010 and 2011, landings for this species have remained stable. The highest landings for scallops were recorded in 2009 followed by 2012. Squid landings values have also fluctuated over the ten year period, with a high of over £500,000 recorded in 2009 and the lowest values (less than £10,000) recorded in 2008. This reflects the unpredictable nature of the fishery which is described in more detail in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012). The landings values of other species recorded in this rectangle have fluctuated slightly over the period, but have generally remained stable. Throughout the ten year period, there have been sporadic landings of herring recorded in this rectangle, with landings in the value of over £50,000 recorded during 2007.



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Nephrops	£771,791	£1,147,176	£1,730,105	£2,152,030	£2,275,944	£2,151,727	£981,965	£1,312,211	£2,368,600	£1,287,429
Squid	£843,239	£1,191,185	£1,079,737	£301,838	£759,672	£425,296	£719,532	£1,741,141	£862,497	£678,642
Scallops	£272,239	£678,358	£430,419	£382,717	£265,119	£409,455	£347,871	£264,575	£177,260	£131,269
Haddock	£212,437	£201,124	£87,933	£160,373	£147,128	£240,579	£187,439	£300,014	£368,383	£322,949
Monks or Anglers	£137,495	£66,003	£134,624	£121,884	£121,773	£126,106	£78,490	£131,759	£111,916	£55,533
Edible Crabs	£19,754	£15,083	£18,464	£57,723	£76,244	£92,854	£43,449	£65,532	£75,093	£69,194
Velvet Crabs	£34,218	£28,700	£21,669	£50,307	£74,239	£39,612	£35,926	£37,472	£43,718	£42,517
Lobsters	£4,985	£5,146	£4,493	£13,409	£30,741	£36,238	£42,659	£69,609	£99,616	£70,765
Cod	£29,240	£26,790	£22,031	£49,925	£41,315	£21,344	£13,331	£19,090	£24,012	£19,434
Mackerel	£1,421	£59,631	£14,572	£2,812	£504	£38,495	£16,960	£12,174	£27,186	£37,434
Other Species	£80,675	£81,669	£65,219	£184,995	£82,949	£92,488	£62,466	£60,693	£116,987	£79,134

Year

Figure 5.7: Annual Variation in Landings Values by Species in ICES Rectangle 44E7 (source: MMO)



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Scallops	£1,072,267	£966,861	£1,062,562	£1,054,831	£771,389	£1,173,196	£1,316,204	£592,166	£398,731	£1,180,638
Nephrops	£122,107	£238,459	£290,249	£368,557	£285,115	£271,758	£202,220	£237,139	£142,847	£93,542
Haddock	£192,109	£293,533	£220,835	£199,359	£133,640	£148,173	£202,623	£341,604	£224,954	£268,585
Squid	£34,105	£45,761	£115,611	£15,750	£38,068	£8,380	£566,765	£419,844	£486,305	£228,534
Monks or Anglers	£80,088	£47,589	£68,023	£263,013	£94,647	£192,126	£48,258	£25,797	£10,672	£36,976
Cod	£5,425	£15,387	£9,785	£18,272	£26,648	£23,041	£30,301	£9,787	£59,097	£18,602
Whiting	£3,558	£10,036	£5,680	£8,900	£6,580	£7,427	£9,000	£15,204	£14,405	£9,639
Herring	£0	£9,594	£0	£0	£54,870	£3,100	£0	£0	£697	£787
Megrim	£8,019	£19,475	£2,119	£4,306	£2,377	£3,113	£6,294	£2,430	£1,049	£3,516
Edible Crabs	£0	£0	£1,291	£4,170	£17,023	£432	£1,612	£0	£15,340	£1,152
Other Species	£23,119	£39,934	£26,617	£17,662	£13,732	£15,097	£22,810	£18,155	£37,746	£19,175

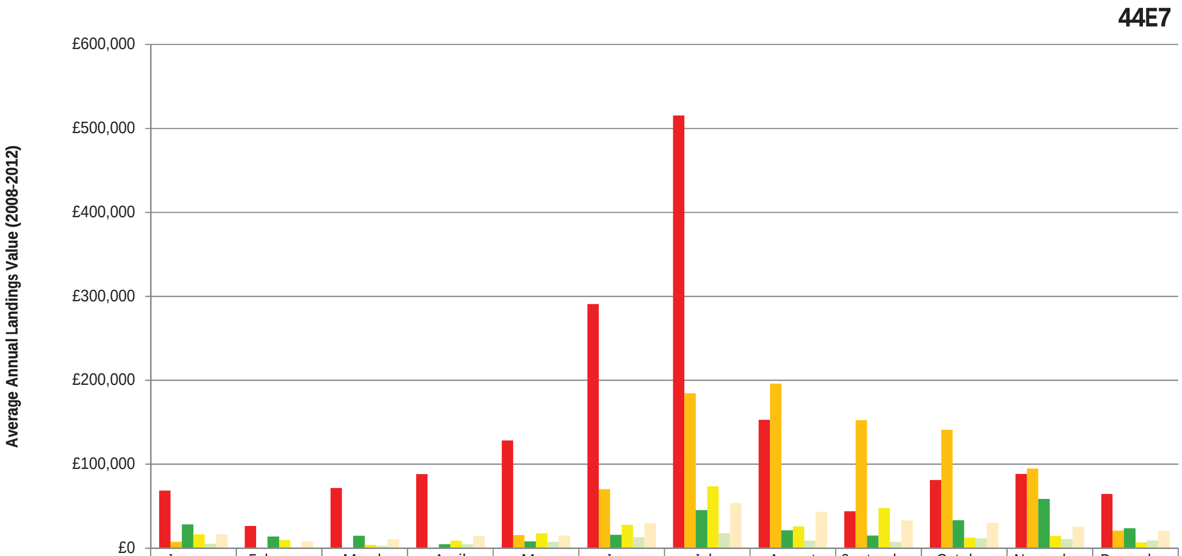
Year

Figure 5.8: Annual Variation in Landings Values by Species in ICES Rectangle 45E7 (source: MMO)

Figures 5.9 and 5.10 show the average landings values (2008 to 2012) by seasonality in rectangles 44E7 and 45E7, respectively.

As can be seen in rectangle 44E7, *Nephrops* are targeted year round with the highest landings recorded in June and July. Squid are predominantly targeted between June and November, with low landings values recorded in the spring and winter months. Landings values recorded by vessels catching haddock remain constant throughout the year with peaks in November and July. Scallops are targeted year round with the highest landings recorded in July and September. The landings of monkfish/anglerfish generally remain constant year round.

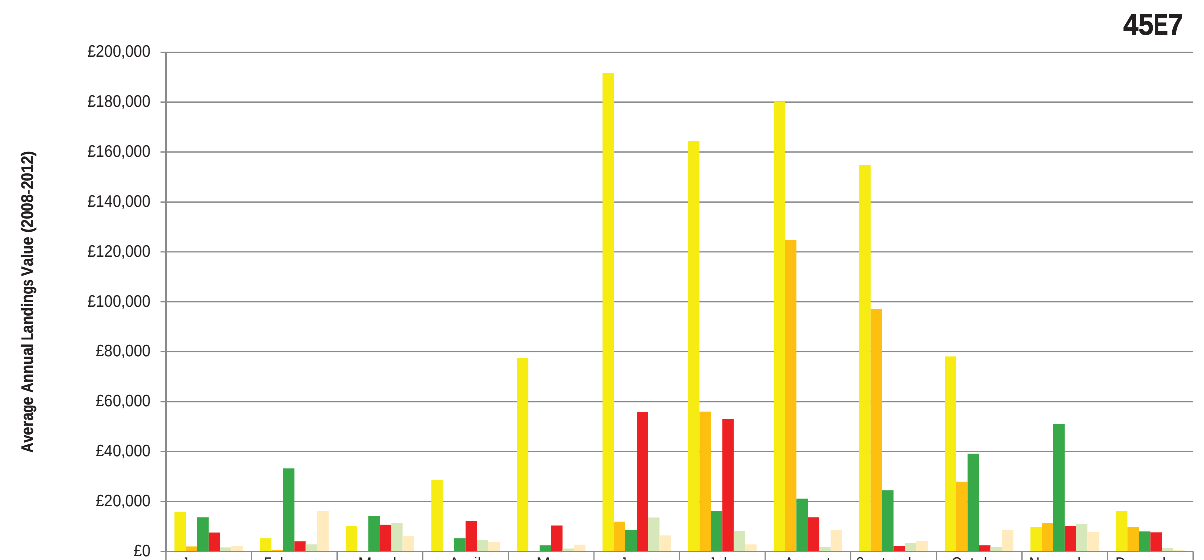
In rectangle 45E7, scallops are caught throughout the year with the majority of landings recorded from late spring to autumn. As with 44E7, squid are targeted between June and November. Haddock are targeted year round with a peak in landings in October and November, although February also records notable landings of haddock. The highest landings of *Nephrops* are recorded in June and July. The landings values of monkfish/anglerfish are sporadic throughout the year with March, June, July and November recording the highest values.



	January	February	March	April	May	June	July	August	September	October	November	December
Nephrops	£68,691	£26,416	£71,728	£88,326	£128,173	£290,646	£515,468	£153,032	£43,903	£81,065	£88,407	£64,531
Squid	£7,615	£544	£468	£924	£15,514	£70,350	£184,702	£196,011	£152,328	£141,069	£94,840	£21,058
Haddock	£28,413	£13,908	£14,860	£4,768	£8,328	£16,074	£45,405	£21,206	£14,999	£33,419	£58,543	£23,950
Scallops	£16,582	£9,516	£3,961	£9,000	£17,747	£27,955	£73,809	£26,057	£47,715	£12,454	£14,516	£6,775
Monks or Anglers	£5,406	£1,196	£2,670	£4,544	£7,409	£13,137	£17,908	£9,150	£7,395	£11,774	£10,723	£9,450
Other Species	£16,478	£7,903	£10,659	£14,701	£15,040	£29,750	£53,691	£43,170	£33,176	£30,012	£25,764	£20,752

Month

Figure 5.9: Average (2008 to 2012) Seasonal Variations in Landings Values by Species in ICES Rectangle 44E7 (source: MMO)



	January	February	March	April	May	June	July	August	September	October	November	December
Scallops	£15,910	£5,207	£10,092	£28,622	£77,420	£191,605	£164,394	£180,269	£154,737	£78,139	£9,727	£16,066
Squid	£1,973	£600	£240	£134	£119	£11,918	£56,022	£124,695	£97,118	£27,895	£11,436	£9,814
Haddock	£13,642	£33,214	£14,074	£5,227	£2,433	£8,548	£16,257	£21,174	£24,499	£39,104	£51,008	£8,009
Nephrops	£7,499	£4,030	£10,721	£12,088	£10,399	£55,853	£52,971	£13,631	£2,178	£2,421	£10,088	£7,622
Monks or Anglers	£1,600	£2,813	£11,462	£4,536	£1,189	£13,566	£8,149	£1,792	£3,402	£1,778	£11,029	£1,450
Other Species	£2,196	£16,069	£6,064	£3,709	£2,715	£6,458	£2,809	£8,640	£4,210	£8,554	£7,786	£590

Month

Figure 5.10: Average (2008 to 2012) Seasonal Variations in Landings Values by Species in ICES Rectangle 45E7 (source: MMO)

5.3.2 Port Data Analysis

The main ports by landings values for rectangles 44E7 and 45E7, and the percentage of each ports total income that this represents are listed in Tables 3 and 4.

In rectangle 44E7, the highest percentage of landings values are recorded into the port at Fraserburgh (65.3%) which represents 5.1% of the ports' total annual average income. The ports of Buckie, Macduff and Banff record lower proportions of the total landings values from 44E7 (21.7%, 7.7% and 0.1%, respectively), however this represents 31.9%, 26.5% and 27.3% of each ports total average annual landings values.

In rectangle 45E7, the highest percentage of landings values are recorded into the port at Fraserburgh (42.8%) which represents 1.8% of the ports' total annual average income. The ports of Buckie and Wick record lower proportions of the total landings values from 45E7 (29.4% and 11.8%, respectively), however this represents 22.9% and 15.9% of each ports total average annual landings values.

Table 3: Top Ports by Landings Value from ICES Rectangle 44E7 (source: MMO)

Port	Average Annual Landings Values (£) in 44E7 (2008-2012)	% of Annual Value in 44E7	Total Average Annual Port Value (2008-2012)	% of Total Annual Port Value that 44E7 Represents
Fraserburgh	£2,258,915	65.3%	£44,550,372	5.1%
Buckie	£750,579	21.7%	£2,350,538	31.9%
Macduff	£266,963	7.7%	£1,007,739	26.5%
Peterhead	£110,254	3.2%	£112,801,781	0.1%
Portknockie	£13,068	0.4%	£15,064	86.8%
Burghead	£8,950	0.3%	£674,097	1.3%
Gardenstown	£7,405	0.2%	£29,747	24.9%
Ullapool	£5,045	0.1%	£10,443,473	0.0%
Scrabster	£4,934	0.1%	£21,940,641	0.0%
Whitehills	£4,797	0.1%	£38,301	12.5%
Aberdeen	£4,604	0.1%	£3,222,380	0.1%
Banff	£3,280	0.1%	£12,030	27.3%
Lossiemouth	£2,575	0.1%	£117,947	2.2%
Wick	£2,464	0.1%	£1,368,682	0.2%
Kinlochbervie	£2,307	0.1%	£11,769,852	0.0%
Lochinver	£2,222	0.1%	£6,209,857	0.0%
Portsoy	£2,070	0.1%	£9,729	21.3%
Mallaig	£1,373	0.0%	£8,995,289	0.0%
Eyemouth	£1,354	0.0%	£2,975,422	0.0%
Rosehearty	£1,150	0.0%	£13,629	8.4%

Table 4: Top Ports by Landings Value from ICES Rectangle 45E7 (source: MMO)

Port	Average Annual Landings Values (£) in 45E7 (2008-2012)	% of Annual Value in 45E7	Total Average Annual Port Value (2008-2012)	% of Total Annual Port Value that 45E7 Represents
Fraserburgh	£784,327	42.8%	£44,550,372	1.8%
Buckie	£538,505	29.4%	£2,350,538	22.9%
Wick	£217,197	11.8%	£1,368,682	15.9%
Peterhead	£139,359	7.6%	£112,801,781	0.1%
Macduff	£87,012	4.7%	£1,007,739	8.6%
Scrabster	£29,361	1.6%	£21,940,641	0.1%
Ullapool	£17,722	1.0%	£10,443,473	0.2%
Mallaig	£4,008	0.2%	£8,995,289	0.0%
Lochinver	£3,737	0.2%	£6,209,857	0.1%
Aberdeen	£3,435	0.2%	£3,222,380	0.1%
Kinlochbervie	£2,302	0.1%	£11,769,852	0.0%
Montrose	£1,349	0.1%	£365,173	0.4%
Burghead	£1,113	0.1%	£674,097	0.2%
Helmsdale	£1,022	0.1%	£234,225	0.4%
Inverness	£921	0.1%	£30,404	3.0%
Stromness	£593	0.0%	£1,983,667	0.0%
Lybster	£570	0.0%	£378,654	0.2%
Brora	£320	0.0%	£100,804	0.3%

Port	Average Annual Landings Values (£) in 45E7 (2008-2012)	% of Annual Value in 45E7	Total Average Annual Port Value (2008-2012)	% of Total Annual Port Value that 45E7 Represents
Lerwick	£215	0.0%	£50,515,944	0.0%
Kirkwall	£129	0.0%	£1,817,081	0.0%

5.4 VMS Data

The VMS density of all UK over-15 m vessels by average landings values (2008 to 2012) and effort (average days fished; 2008 to 2012) is shown in Figure 5.11 and 5.12, respectively.

The highest levels of fishing intensity and effort over the period are located in the south of the Moray Firth, including the area in which the modified OfTI is located.

Figures 5.13 to 5.18 were provided to BMM by MSS to assist in the establishment of a comprehensive commercial fisheries baseline. As with the MMO VMS data, there are limitations associated with the interpretation of the data set; principally that it is only representative of the over-15 m fleet. It should also be noted that dense areas of activity recorded around the ports of Peterhead and Fraserburgh are likely to be vessels steaming into the ports rather than fishing.

Figures 5.13 to 5.18 show the distribution of grounds by relative average value (2007 to 2011) of vessels targeting *Nephrops*, scallops, squid, demersal fish species, herring and pelagic species, respectively.

Figure 5.13 shows *Nephrops* are targeted in the south of the Moray Firth with the modified export cable route passing through moderate to high value grounds. An area of higher value is located to the north-east.

Scallop dredging activity occurs throughout the Moray Firth (Figure 5.14), with areas of high value located in the northern portion of the modified OfTI corridor (the majority of which is located within the three consented wind farm boundaries), and to the east and north of the consented sites. Moderate values are recorded in the southern section of the modified export cable route corridor, along the southern coastline.

Figure 5.15 shows the distribution of squid fishing grounds for the over-15 m fleet. Activity is limited with the highest values recorded to the east of the modified OfTI and very low values recorded within the modified export cable route corridor.

Demersal fishing activity is shown in Figure 5.16. The highest value areas are recorded off the coast at Peterhead and Fraserburgh, although as noted previously, it is likely that this is vessels steaming into port after fishing grounds further offshore. Low to moderate value fishing grounds are located in the northern section of the modified OfTI corridor, with moderate activity recorded to the north of the three consented wind farms.

Figure 5.17 and 5.18 show the landings values of herring and other pelagic species, respectively. Very high value areas are located offshore of the ports of Fraserburgh and Peterhead. As discussed previously, this is likely to be vessels steaming into the ports rather than fishing. Pelagic fishing grounds are often located much further offshore. Some low value herring grounds are located to the north and north-east of the three consented wind farms.

5.5 ScotMap

Figures 5.19 and 5.20 show the relative monetary value of fishing activity and number of vessels operating in the Moray Firth, respectively, for the under-15 m fleet.

The highest landings values of fishing activity by the under-15 m fleet in the Moray Firth occurs in inshore areas, with low landings values recorded in the central portion of the Moray Firth. The landings values in the vicinity of the modified OfTI are moderate compared to those in the south-east and north-west of the Moray Firth.

Moderate to high numbers of under-15 m vessels operate throughout the majority of the Moray Firth, with lower numbers recorded in the outer Moray Firth. The inshore portion of the modified export cable route corridor records high numbers of vessels, with the numbers decreasing further offshore.

Figures 5.21 and 5.22 show landings values and number of over-15 m vessels in the Moray Firth targeting *Nephrops*, respectively. Low to moderate landings values of *Nephrops* are recorded in the Moray Firth and this is reflected in the number of vessels fishing in the area. The majority of these landings and vessels are recorded in the inner Moray Firth, with low landing values and number of vessels recorded within the modified export cable route corridor.

The landings values and number of trawlers (targeting species other than *Nephrops*) are shown in Figures 5.23 and 5.24, respectively. It should be noted that these figures contain information relating to vessels targeting squid and whitefish. As can be seen in the figures, the highest landings values and number of vessels are recorded along the southern Moray Firth coast. Records show moderate landings values and vessel numbers for the area of the modified OfTI.

Figures 5.25 and 5.26 show the landings values and number of vessels creeling in the Moray Firth, respectively. Moderate to high landings values are recorded along the north and south Moray Firth coastlines, with no landings recorded in offshore areas. Despite moderate to high landings values being recorded in the area, low numbers of vessels are recorded as deploying creels. Records show low to moderate landings values and low numbers of vessels in the area of the modified export cable route corridor.

The landings values of the mackerel fishery and number of vessels targeting mackerel in the Moray Firth is shown in Figures 5.27 and 5.28, respectively. As can be seen in the figures, mackerel is targeted off the north-east Aberdeenshire coast between Gardenstown and Peterhead. Moderate to high landings values and number of vessels are recorded in this area. Within the vicinity of the modified export cable route corridor, low to moderate landings values and number of vessels are recorded.

5.6 Fishing Vessels, Patterns and Practices

Commercial fisheries in the Moray Firth are targeted by both local and visiting vessels. For the purposes of this report, local vessels are considered to be those based at home ports within the Moray Firth, which are often under-15 m in length and as a result are limited in their operational range. Visiting vessels are generally considered to target grounds elsewhere but will be seasonally present in the Moray Firth. Although not exclusively so, these vessels are generally over-15 m in length.

The modified OfTI is located in the vicinity of grounds targeted by vessels described below; it should however be noted that the modified OfTI constitutes only a small percentage of the total area fished by these vessels and even less in the case of visiting vessels.

A description of each gear type can be found in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012).

5.6.1 Nephrops

The majority of vessels targeting *Nephrops* in the Moray Firth have home ports in the area, although it is possible that visiting vessels may occasionally target the fishery. Vessels reported to target *Nephrops* in the Moray Firth are listed in Table 5 below. All of the vessels below are also able to reconfigure their gear to target the squid fishery.

The specifications and operating practices of a sample of these vessels can be found in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012).

Table 5: Vessels reported to target *Nephrops* in the Moray Firth

Vessel Name	Reg. No.	Home Port	Length
Boy Bryan	B 756	Burghead	11.35 m
Carona	WY 786	Buckie	9.80 m
Charisma	BF 296	Macduff	14.10 m
Freeward	IH 264	Burghead	9.95 m
Incentive	BCK 41	Buckie	8.10 m
Jenna Maree	BCK 621	Burghead	9.90 m
Just Reward	BF 64	Macduff	13.90 m

Figure 5.29 shows the location of *Nephrops* grounds targeted by the under-15 m fleet, identified by a sample of *Nephrops* fishermen, relative to the modified OfTI. It can be seen that grounds are, for the most part, located in the southern Moray Firth particularly in areas in the inner Firth. One of the vessels sampled has identified *Nephrops* fishing grounds through which the modified export cable route corridor passes, with another fishing ground within the MacColl consented wind farm boundary.

Consultation with the SFF confirmed that over-15 m vessels will fish grounds through which the modified export cable route corridor passes. Under-15 m vessels will also fish these grounds in favourable weather conditions (Marine Scotland VMS); however the majority of their grounds are located within the inner Firth (ScotMap).

5.6.2 Scallops

Vessels targeting scallops in the Moray Firth fall into two categories: smaller vessels with home ports based within the Moray Firth and larger, nomadic vessels which will variously target scallop grounds around the UK. Table 6 lists scallop dredge vessels reported to fish grounds in the Moray Firth.

The specifications and operating practices of a sample of these vessels can be found in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012).

Table 6: Vessels Reported to Target Scallops in the Moray Firth

Vessel Name	Reg. No.	Home Port	Length	Grounds Targeted
Academus	BA 817	Kirkcudbright	16.11 m	Around the UK
Albion	DS10	Kirkcudbright	34.90 m	Around the UK
Aquinis	BA 500	Kirkcudbright	18.27 m	Around the UK
Argonaut	BA 858	Kirkcudbright	23.96 m	Around the UK
Argosy	BA 804	Kirkcudbright	18.25 m	Around the UK
Atlantic Belle	N 80	Kirkcudbright	18.27 m	Around the UK

Vessel Name	Reg. No.	Home Port	Length	Grounds Targeted
Aztec	BA 224	Kirkcudbright	16.15 m	Around the UK
Azula	BA 70	Kirkcudbright	17.13 m	Around the UK
Clasina	DS 15	Kirkcudbright	28.04 m	Around the UK
Charity & Liberty	DS 4	Kirkcudbright	14.95 m	Around the UK
Cordelia K	INS 151	Avoch	40.27 m	Around the UK
Cornelis Gert Jan	GY 98	Kirkcudbright	12.00 m	Around the UK
Crimson Arrow	OB 128	Oban	16.96 m	Around the UK
Crystal Dawn	CN 20	Islay	14.95 m	Around the UK
Emerald Dawn	BCK 303	Islay	23.00 m	Around the UK
Evening Star	PD 1022	Peterhead	21.00 m	Scottish east coast
Fredwood	BA 338	Annan	19.35 m	Around the UK
Geertruida	OB 99	Oban	18.99 m	Around the UK
George Lou-n	TN 38	Kirkcudbright	25.50 m	Around the UK
Georgelou-N	TN 38	Annan	25.50 m	Around the UK
Georgia Dawn	INS 140	Avoch	18.00 m	Around the UK
Honeybourne	PD 905	Kirkcudbright	29.16 m	Around the UK
Isla S	DS 1	Kirkcudbright	40.11 m	Around the UK
Jann Denise	FR 80	Oban	16.51 m	Around the UK
Kayleigh M	K 970	Islay	13.10 m	Around the UK
Kelly	BCK 625	Buckie	18.17 m	Around the UK
Kestrel	BCK 81	Buckie	30.20 m	Around the UK
Kilwarlin	B 910	Burntisland	20.29 m	Scottish east coast
King Challenger	BA 87	Kirkcudbright	21.30 m	Around the UK
King Explorer	BA 829	Kirkcudbright	23.66 m	Around the UK
Kingfisher	BA 810	Kirkcudbright	22.94 m	Around the UK
Maggie Ann	FR 110	Fraserburgh	26.60 m	Around the UK
Mary Manson	OB 19	Oban	17.80 m	Around the UK
Mattanja	TN 36	Annan	32.50 m	Around the UK
Natalie B	H 1074	Fleetwood	26.36 m	Around the UK
Noordzee	TN 30	Annan	31.10 m	Around the UK
Olivia Jean	TN 35	Annan	33.86 m	Around the UK
Our Heritage	FR 237	Fleetwood	16.89 m	Around the UK
Philomena	TN 37	Annan	30.57 m	Around the UK
Queensberry	BA 156	Annan	15.90 m	Around the UK
Rois Mhalri	OB 45	Oban	18.90 m	Around the UK
Sardonyx II	WK 350	Wick	11.45 m	Moray Firth
Saturnus	KY 43	Kirkcudbright	24.00 m	Around the UK
Sea Lady	TN 20	Annan	32.80 m	Around the UK
Silvia Bowers	DS 8	Kirkcudbright	36.75 m	Around the UK
Southards	WK 913	Wick	16.40 m	Around the UK
St Amant	BA 101	Kirkcudbright	17.83 m	Around the UK
St Apollo	BA 359	Girvan	18.00 m	Around the UK
Star of Annan	OB 50	Oban	18.29 m	Around the UK

Vessel Name	Reg. No.	Home Port	Length	Grounds Targeted
Star of Jura	OB 278	Oban	19.00 m	Around the UK
Susan Bird	FD 357	Kirkcudbright	24.80 m	Around the UK
Tjeerd Jacoba	BS 186	Kirkcudbright	25.30 m	Around the UK
Torbach-N	TN 2	Annan	23.07 m	Around the UK
Vertrouwen	DS 11	Kirkcudbright	26.24 m	Around the UK

Figure 5.30 shows the location of scallop grounds relative to the modified OfTI, identified by a sample of fishermen. Scallop grounds have been identified in areas throughout the three consented wind farm boundaries, with the modified export cable route corridor passing through grounds identified by one vessel along the southern coast.

5.6.3 Squid

A number of demersal trawl vessels will reconfigure gear to target squid on a seasonal basis in the Moray Firth. Depending upon the productivity of the fishery and the availability of other, restricted stocks, the fishery may be the focus of a number of visiting vessels, some of which are of the larger category of vessel, up to 26 m in length. Table 7 lists vessels which are reported to target squid in the Moray Firth.

The specifications and operating practices of a sample of these vessels can be found in the Technical Appendix 5.1 A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012).

Table 7: Vessels reported to target Squid in the Moray Firth

Vessel Name	Reg. No.	Home Port	Length	Target Species	Local or Visiting Vessel
Boy Bryan	B 756	Burghead	11.35 m	Nephrops	Local
Boy Paul	BM 477	Peterhead	9.70 m	Whitefish	Visiting Vessel
Carona	WY 786	Buckie	9.80 m	Nephrops	Local
Charisma	BF 296	Macduff	14.10 m	Nephrops	Local
Deeside	BCK 595	Buckie	24.00 m	Whitefish	Local
Freeward	IH 264	Burghead	9.95 m	Nephrops	Local
Incentive	BCK 41	Buckie	8.10 m	Nephrops	Local
Jenna Maree	BCK 621	Burghead	9.90 m	Nephrops	Local
Just Reward	BF 64	Macduff	13.90 m	Nephrops	Local
Norlantean II	K 508	Kirkwall	27.80 m	Whitefish	Visiting Vessel
Ocean Venture	PD 340	Peterhead	30.50 m	Whitefish	Visiting Vessel
Prospect	BF 573	Macduff	20.60 m	Whitefish	Local
Shalimar	BCK 598	Buckie	21.72 m	Whitefish	Local

As has been previously stated, squid fishing grounds are reported to vary each year. Figure 5.31 illustrates the squid fishing grounds in the Moray Firth, identified by a sample of squid fishermen. Squid fishing grounds are located throughout the Firth, in both inshore and offshore areas.

5.6.4 Whitefish

There are five vessels reported to target whitefish in the vicinity of the Moray Firth, as well as in other areas around the UK (Table 8). It should be noted that whitefish activity in the vicinity of the modified OfTI is very low relative to fishing grounds elsewhere.

Table 8: Vessels reported to target Whitefish in the Moray Firth

Vessel Name	Reg. No.	Home Port	Length
Boy Andrew	WK 170	Wick	26.00 m
Deeside	BCK 595	Buckie	24.00 m
Opportune	WK 171	Wick	25.90 m
Prospect	BF 573	Macduff	20.60 m
Shalimar	BCK 598	Buckie	21.72 m

Figure 5.32 shows whitefish fishing grounds. Grounds are located to the north of the Moray Firth and in coastal areas to the south-east. None of the vessels sampled have identified whitefish fishing grounds through which the modified export cable route corridor passes.

5.6.5 Crab and Lobster

Crab and lobster fishing grounds are in the main located in inshore areas in the Moray Firth. There are seven full time creel vessels reported to target crab and lobsters in the area around the modified export cable route landfall (Table 9). The vessel specifications and fishing practices of two local creel vessels are given in Table 10. There are also a number of part time vessels who will set a small number of creels in inshore areas during the summer months.

Table 9: Vessels reported to target Crab and Lobster Grounds in the vicinity of the Modified Export Cable Route Corridor

Vessel	Reg. No.	Vessel Length
Helena	BF 2	7.90 m
Halcyon II	BF 500	7.32 m
Sea Shell	BF 23	6.92 m
Confidence	BF 600	5.96 m

Table 10: Vessel Specifications and Fishing Practices of two Local Creel Vessels

Vessel	Halcyon II	Helena
Reg. No	BF 500	BF 2
Home Port	Whitehills	Whitehills
Principal fishing method	Creels	Creels
Other fishing methods	Hand lining	N/A
Fishing Association	Moray Firth Inshore	Moray Firth Inshore
Length (m)	7.32	7.90
Beam (m)	2.9	3.2
Draft (m)	0.9	0.6
Main engine (HP)	60	212
Gear box reduction	3:1	2:1
Average days fishing/yr	300	200+
Typical fishing trip duration (days)	1	0.4
Typical distance steamed/trip (n.miles)	10	N/A
Avg steaming speed (knots)	7	N/A
Seasonality of fishing methods (months)	Creels - 10 months, hand lines - 3 months	N/A
Main species targeted	Brown crab, lobster, velvet crab, mackerel	Brown crab, lobster, velvet crab

Vessel	**Halcyon II**	**Helena**
Seasonality of fisheries (months)	Creels - 10 month, mackerel - 3 months	N/A
Pot/creel type	Parlour and D-type	Steel and wood

Figure5.33 shows the creel fishing grounds in the Moray Firth, identified by a sample of creel fishermen. The insert shows the fishing grounds identified by local fishermen fishing grounds in the vicinity of the modified export cable route landfall. Two fishermen have been identified as fishing a larger area, with the remaining five fishermen fishing the smaller area. It was noted during consultation, however, that at least one fisherman will be upgrading his vessel and fishing a wider area later in the year (2014).

It should be noted some of the creel vessels identified as operating in the area of the modified export cable route landfall, will also seasonally hand-line for mackerel in the same area.

5.7 Future Fisheries

A short summary of potential changes to the current fishing baseline identified above that may occur in the future is provided below.

5.7.1 Nephrops Fishery

Nephrops stocks in the Moray Firth are currently considered to be sustainably exploited (Keltz & Bailey, 2010). It is however considered that active vessels may in the future diversify into alternative fisheries with fewer restrictions, such as squid and crustaceans. Impending changes in fisheries management policies will potentially see further changes to the fleet.

5.7.2 Scallop Fishery

The Moray Firth scallop fishery is reported to be fished at lower levels than grounds elsewhere, such as the English Channel. The number of vessels in the national scallop fleet has however increased over the last ten years. Although scallop landings values are currently considered to be stable in the Moray Firth, this does not necessarily indicate durable stock levels and may instead indicate an overall decline in population levels (Beukers-Stewart & Beukers-Stewart, 2009).

The scallop fishery could face stricter management in the future with MSS(2010) advising that restrictions are placed on the number of vessels entering the scallop fleet and increases in landing size are recommended for future management of the fishery (Keltz & Bailey, 2010). In addition, it is possible that restrictions may be imposed in the future as a result of conservation management measures, such as the closures enforced in Cardigan Bay and the Isle of Man. Environmental conditions have also affected scallop landings, with the warmer sea temperatures altering the distribution of scallop species (Shephard *et al*., 2010).

5.7.3 Whitefish and Flatfish Fishery

A number of fish species in the Moray Firth have been commercially targeted in the past. These included a flatfish fishery for plaice and sole, a whitefish fishery for species including cod and haddock and a pelagic fishery for herring, mackerel and bass. Recent years have seen a return of the haddock and mackerel fisheries to the area (pers. comm., retired whitefish fisherman, December 2010) and therefore it is possible that other whitefish or flatfish species could once again become commercially targeted species if stocks were to return to sustainable levels. Ability to target the species would however depend upon available quota, which is currently only allocated on the basis of recorded landings and hence would not be available to fishermen with no track record.

5.7.4 Squid Fishery
Restrictions on other fisheries have increased fishing effort on the squid fishery, both for local and visiting vessels. The fishery is currently unregulated and it is possible that more fishermen will rely on this fishery to supplement their income.

Squid are seemingly resistant to fishing pressure due to their short lifespan; however squid stocks can be erratic and are sensitive to both environmental and human pressures. There are concerns over the resistance of squid stocks due to increases in fishing pressure and expansion of the fishing season. Increases in sea temperature could lead to the squid population moving north (Hastie *et al*., 2009).

As the Moray Firth is a potential spawning area (squid move to inshore, coastal areas to spawn and squid eggs have been found on creels in the area), it is considered that these grounds need to be identified and effectively managed in order to protect future stocks (Young *et al*., 2006). A number of inshore squid fishermen would also like to see measures implemented in the future to effectively manage the fishery and protect it from overfishing (pers. comm. squid fisherman, December 2010), which could limit activity by larger category, visiting vessels.

5.7.5 Crab and Losbter Fisheries
Crab and lobster are not currently quota or effort restricted, unlike the whitefish and *Nephrops* fisheries, being regulated in the main by licensing and minimum landing sizes. The number of vessels targeting the fishery has broadly increased in recent years and furthermore, vessels configured to target other species are additionally employing gear to seasonally target crustaceans. It is possible that the number of creel vessels will increase in the future, particularly in light of increasing restrictions upon other fisheries, unless additional management measures are implemented which will prevent this.

5.7.6 Bivalve Fishery
Within the Moray Firth, there are fisheries for razor clams on the Navity Bank (The Moray Firth Partnership, 2007), mussels in the Dornoch Firth (The Moray Firth Partnership, 2003) and cockles in Inver Bay in the Dornoch Firth and in Culbin Sands in the Inner Moray Firth (The Moray Firth Partnership, 2006). All of the bivalve fisheries are currently targeted at low levels, in inshore areas away from the modified export cable route corridor although there is considered to be scope for expansion in the future (see the Technical Appendix 5.1A (Commercial Fisheries Technical Report) of the MORL ES (MORL, 2012) for further information).

5.7.7 Sandeel Fishery
There is currently no fishing for sandeels in the Moray Firth, although there has historically been a fishery, concentrated on the Smith Bank and targeted predominantly by the Danish fleet. The North Sea sandeel fishery was closed in 2000 as a result of concerns about marine top predators, particularly seabirds. The fishery was reopened in 2009 with a quota of 200,000 tonnes (MMO statistics), although there still remains a moratorium on the fishery along the Scottish east coast and grounds such as the Dogger Bank are targeted.

It has been reported that recent years have seen an increase in sandeel populations in harbours and bays of the Moray Firth and subsequently an increase in the number of species that prey on sandeels (in particular herring and mackerel; pers. comm. retired whitefish fisherman, December 2010). Furthermore, sandeel populations on the Smith Bank are reported to support a number of top predators, including birds, marine mammals and other fish species. It is possible that a fishery may recommence in the future, although it should be noted that the Danish fleet (to whom the vast majority of quota is allocated) only have access to grounds outside of 12 nm and possible activity in the area of the modified OfTI will be limited.

6 References

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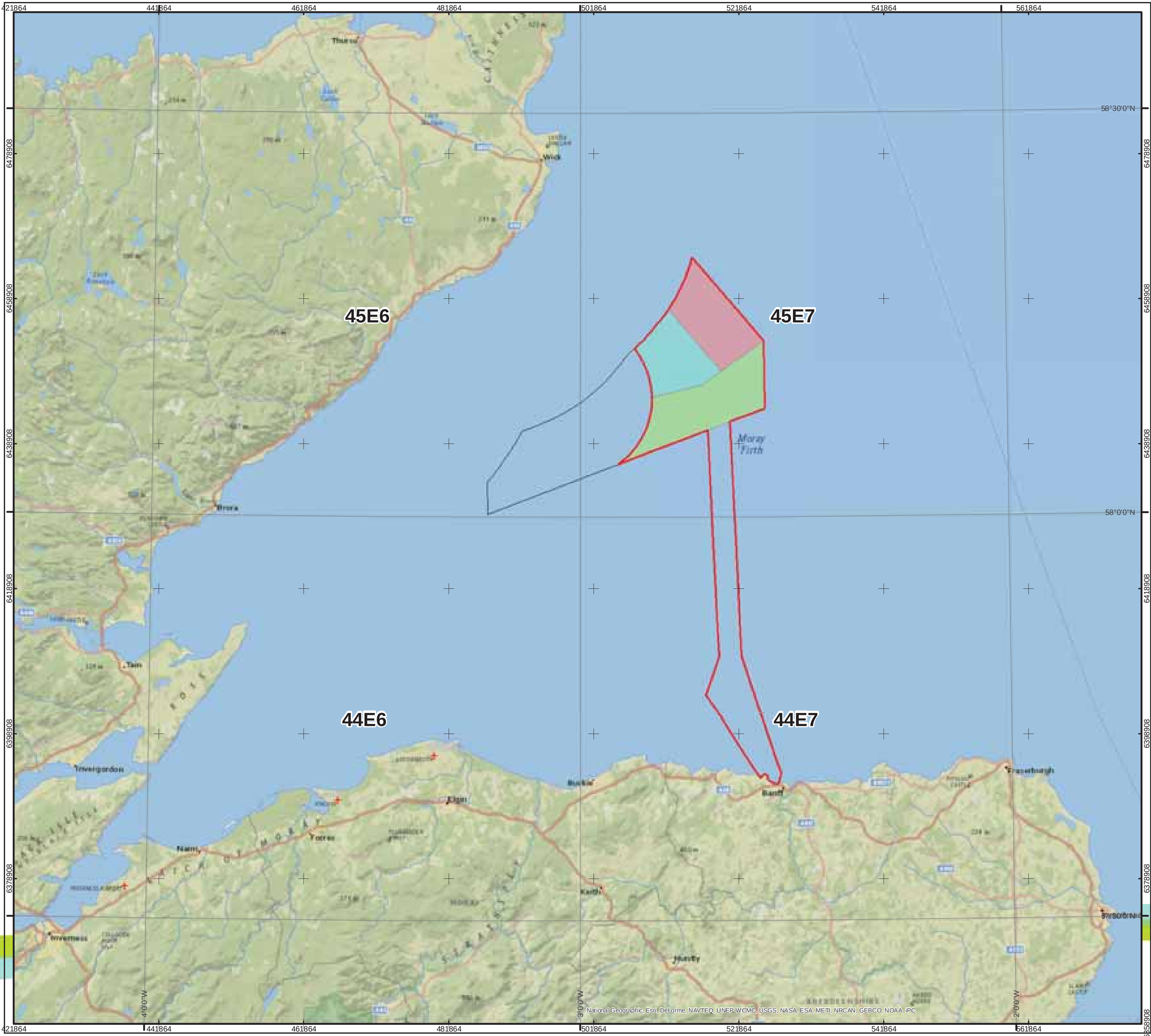


edp renewables

REPSOL

Moray Offshore Renewables Ltd

KEY

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

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

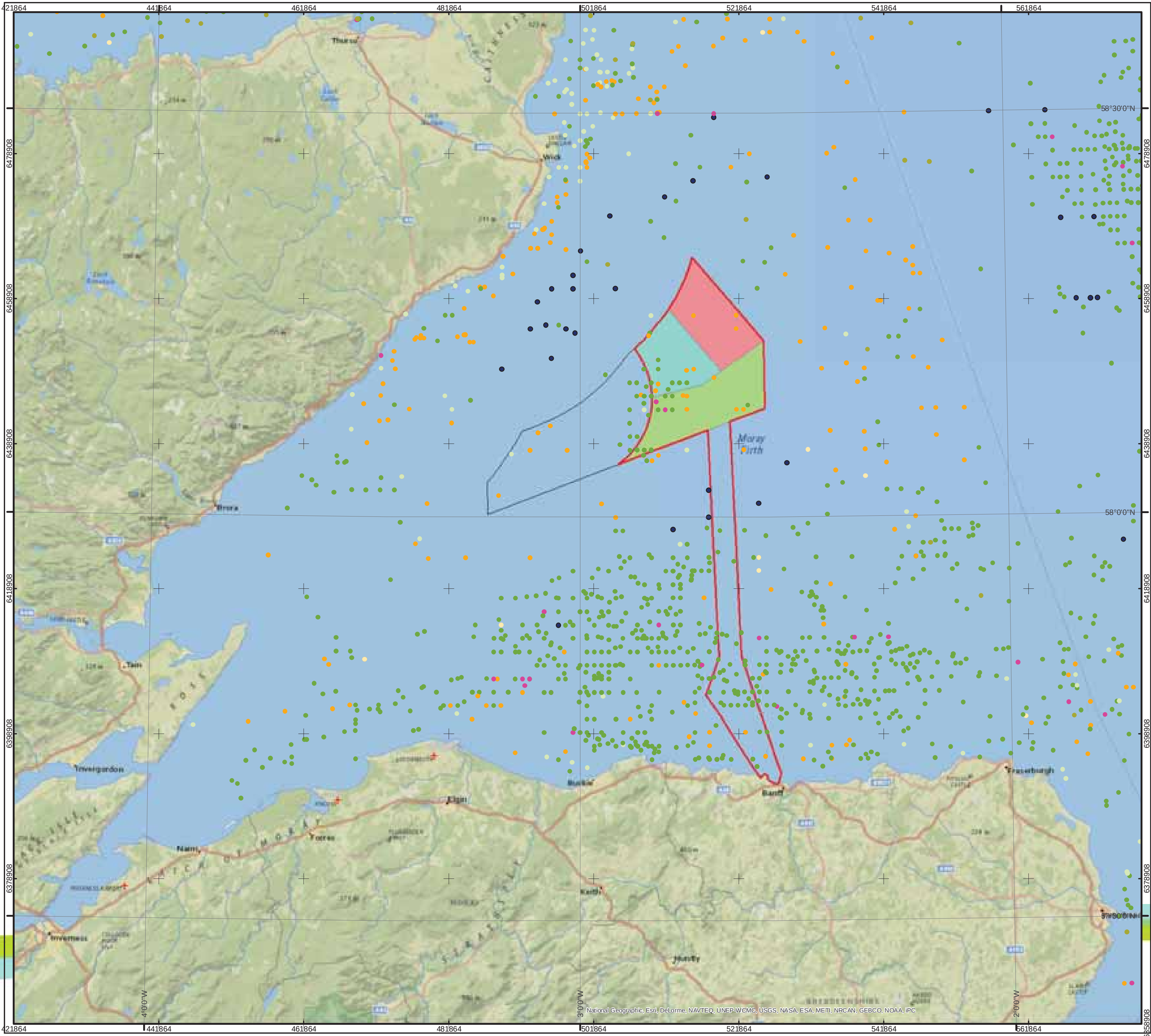
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-001

Figure 2.1
Study Area

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

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

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

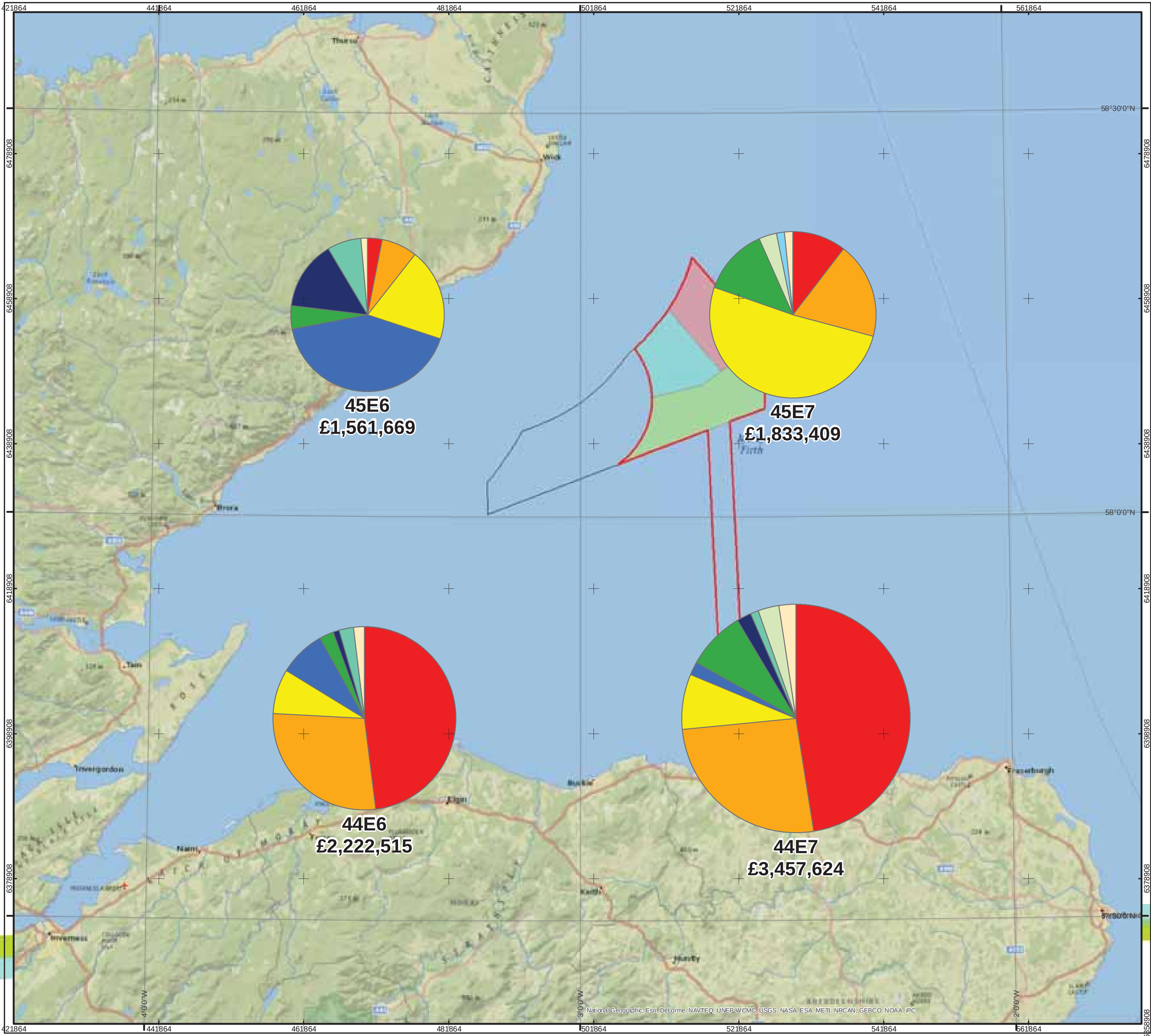
Produced: RP
Reviewed: ES
Approved: PM

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



Moray Offshore Renewables Ltd

KEY

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

Species

- Nephrops
- Squid
- Scallops
- Lobsters
- Haddock
- Edible Crabs
- Velvet Crabs
- Monks or Anglers
- Cod
- Mackerel
- Other Species

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

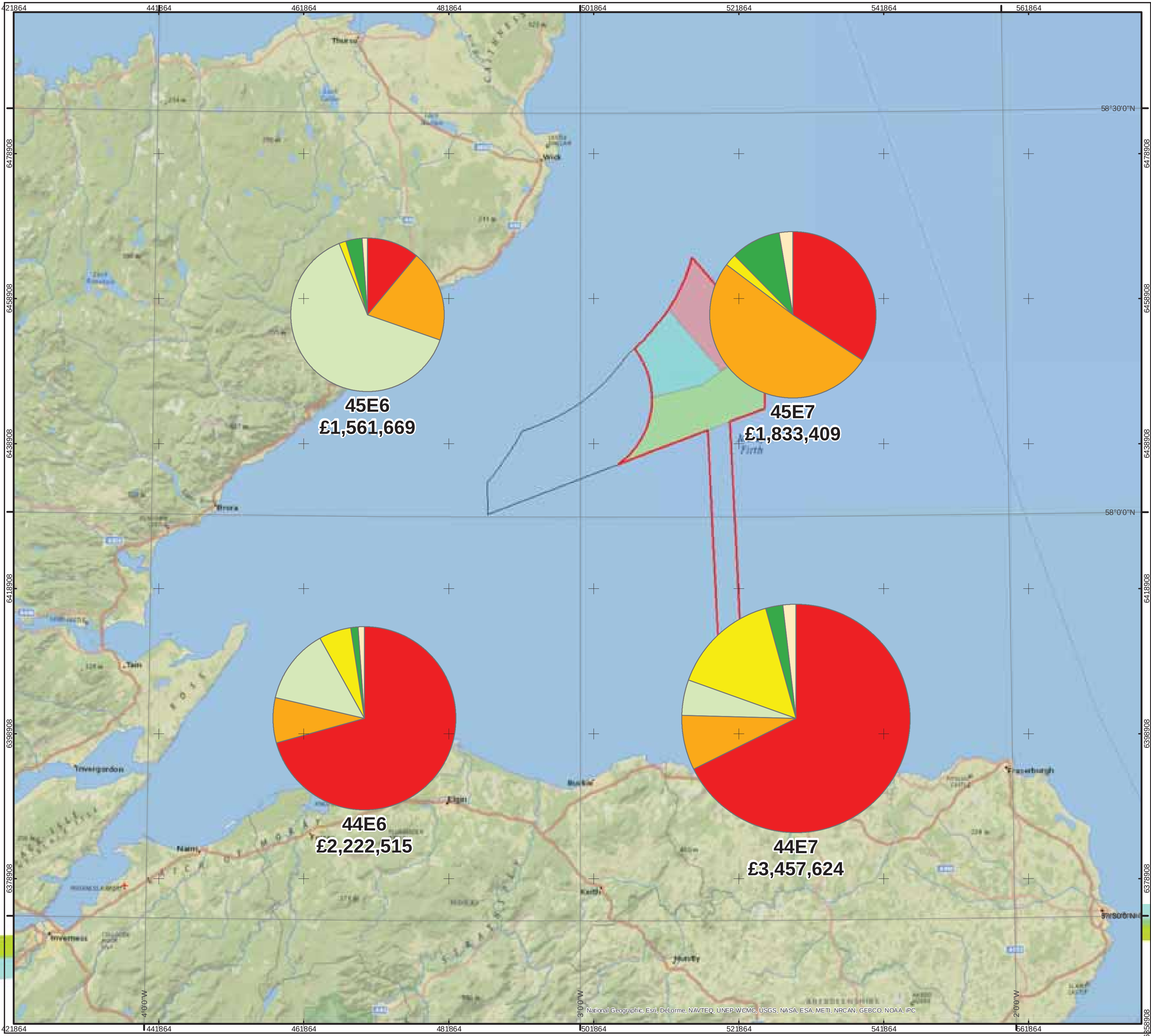
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-003

Figure 5.3
Value by Species, UK Only
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Method

- Bottom otter trawls
- Boat dredges
- Pots
- Otter twin trawls
- Scottish seines
- Other Method

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

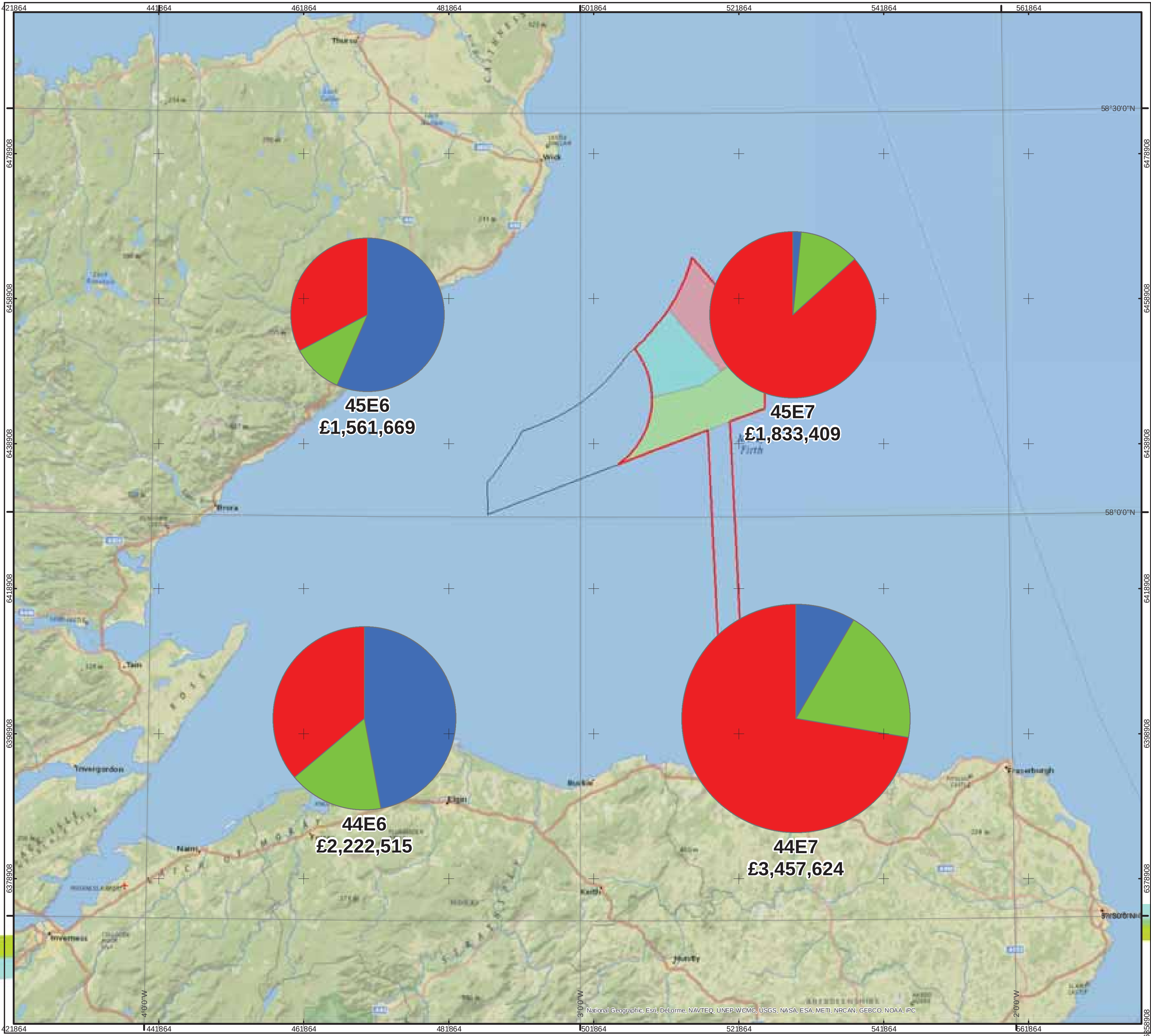
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-004

Figure 5.4
Value by Method, UK Only
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Vessel Size

- Under-10m
- 10m to 15m
- Over-15m

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

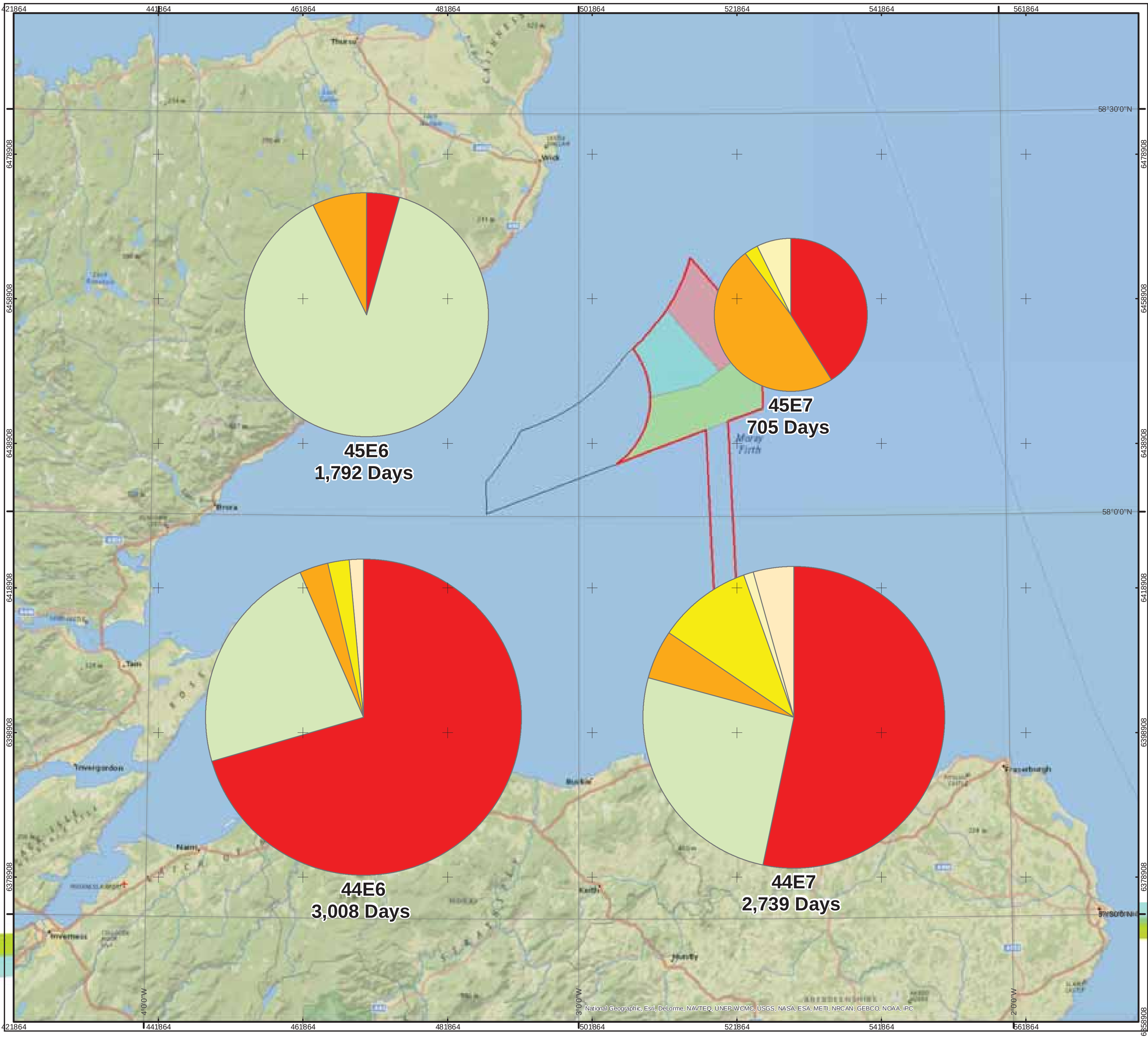
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-005

Figure 5.5
Value by Vessel Size, UK Only
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Method

- Bottom otter trawls
- Boat dredges
- Pots
- Otter twin trawls
- Scottish seines
- Other Method

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

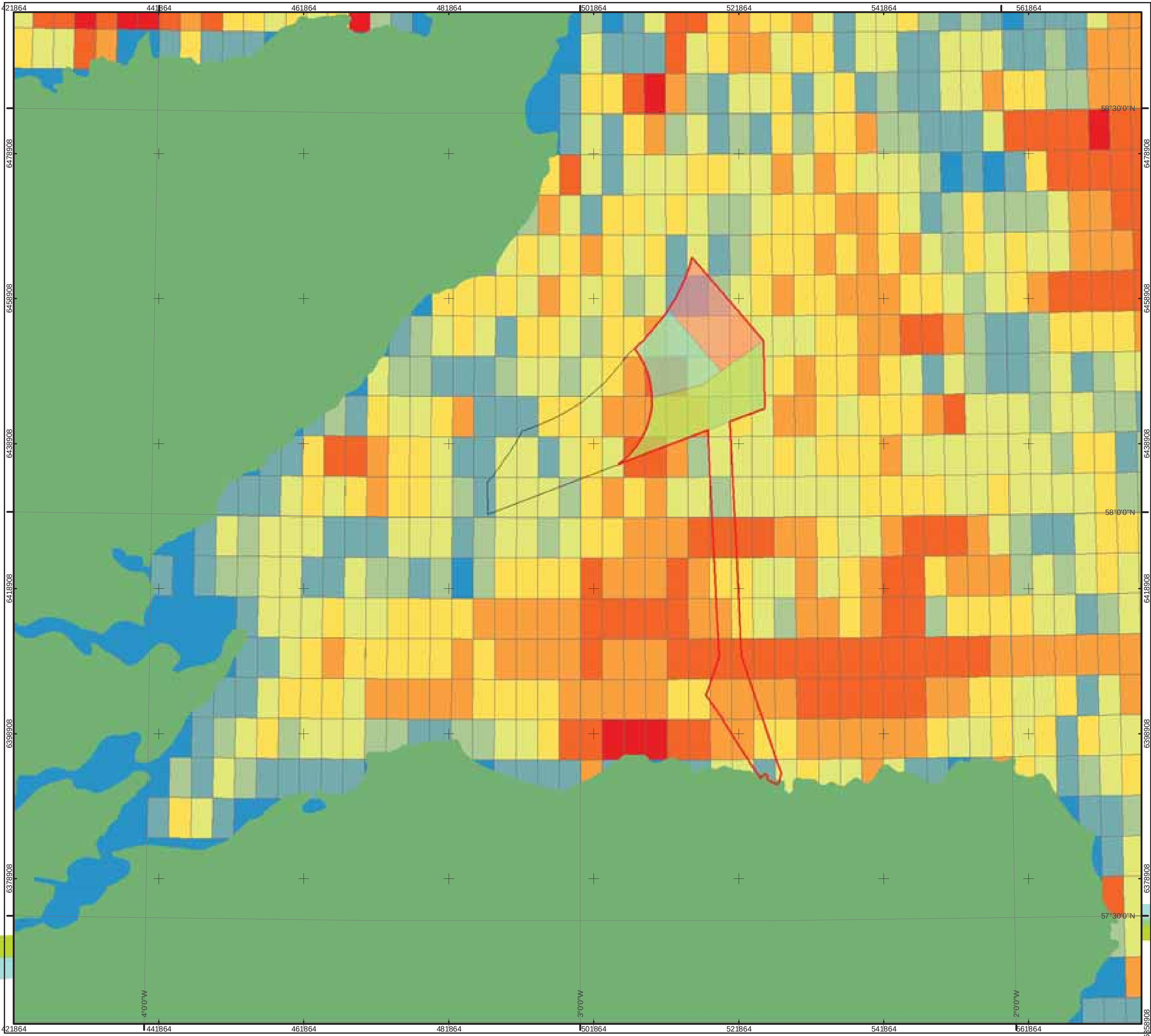
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-006

Figure 5.6
Effort by Method, UK Only
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Average Value 2008 - 2012

- No Value
- Less than £1,000
- £1,000 to £2,000
- £2,000 to £5,000
- £5,000 to £10,000
- £10,000 to £20,000
- £20,000 to £50,000
- Over £50,000

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

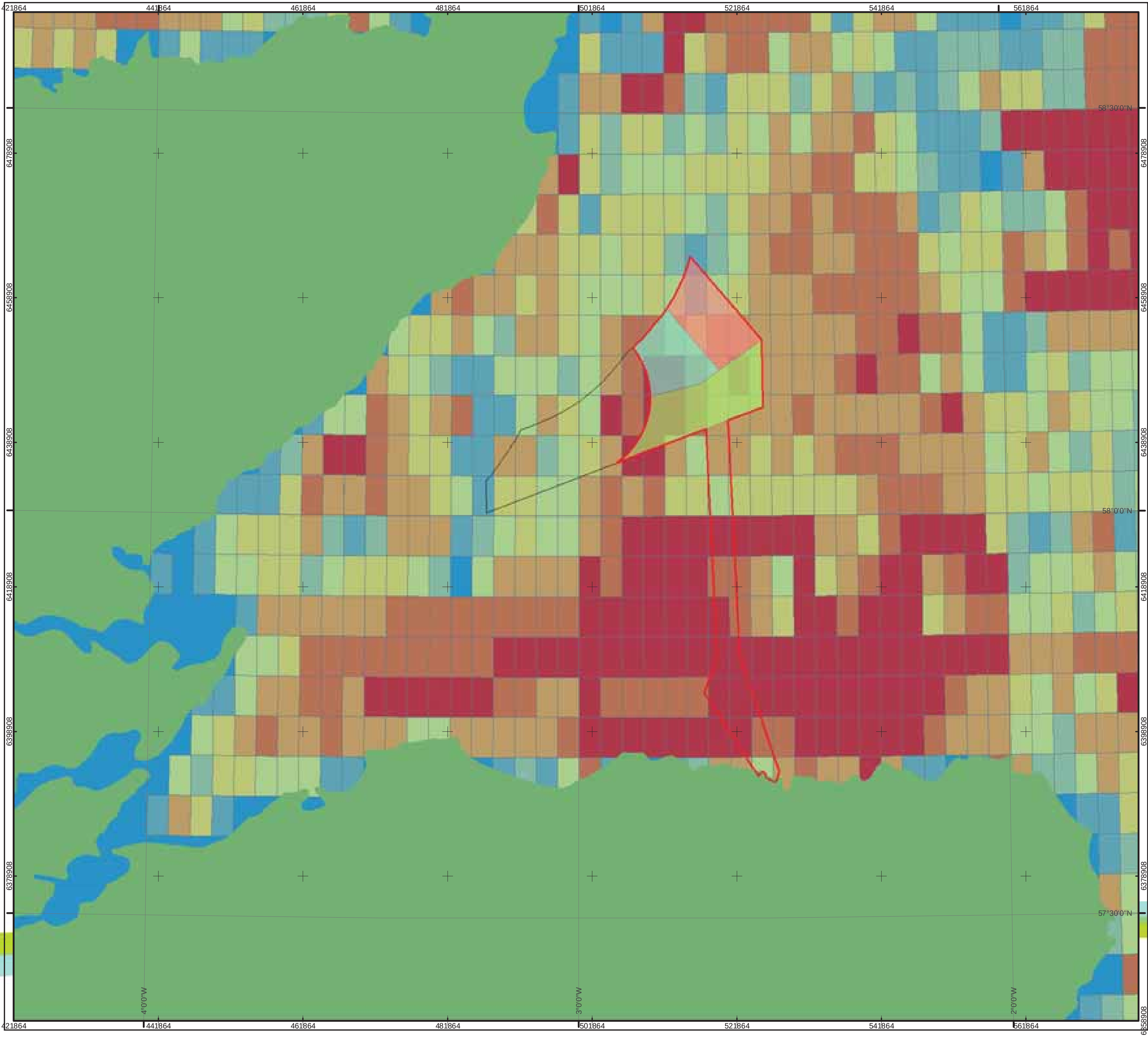
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-007

Figure 5.11
VMS Density by Value
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Average Effort 2008 - 2012

- No Value
- Less than 100 hours
- 100 to 250 hours
- 250 to 500 hours
- 500 to 1,000 hours
- 1,000 to 2,500 hours
- 2,500 to 5,000 hours
- More than 5,000 hours

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

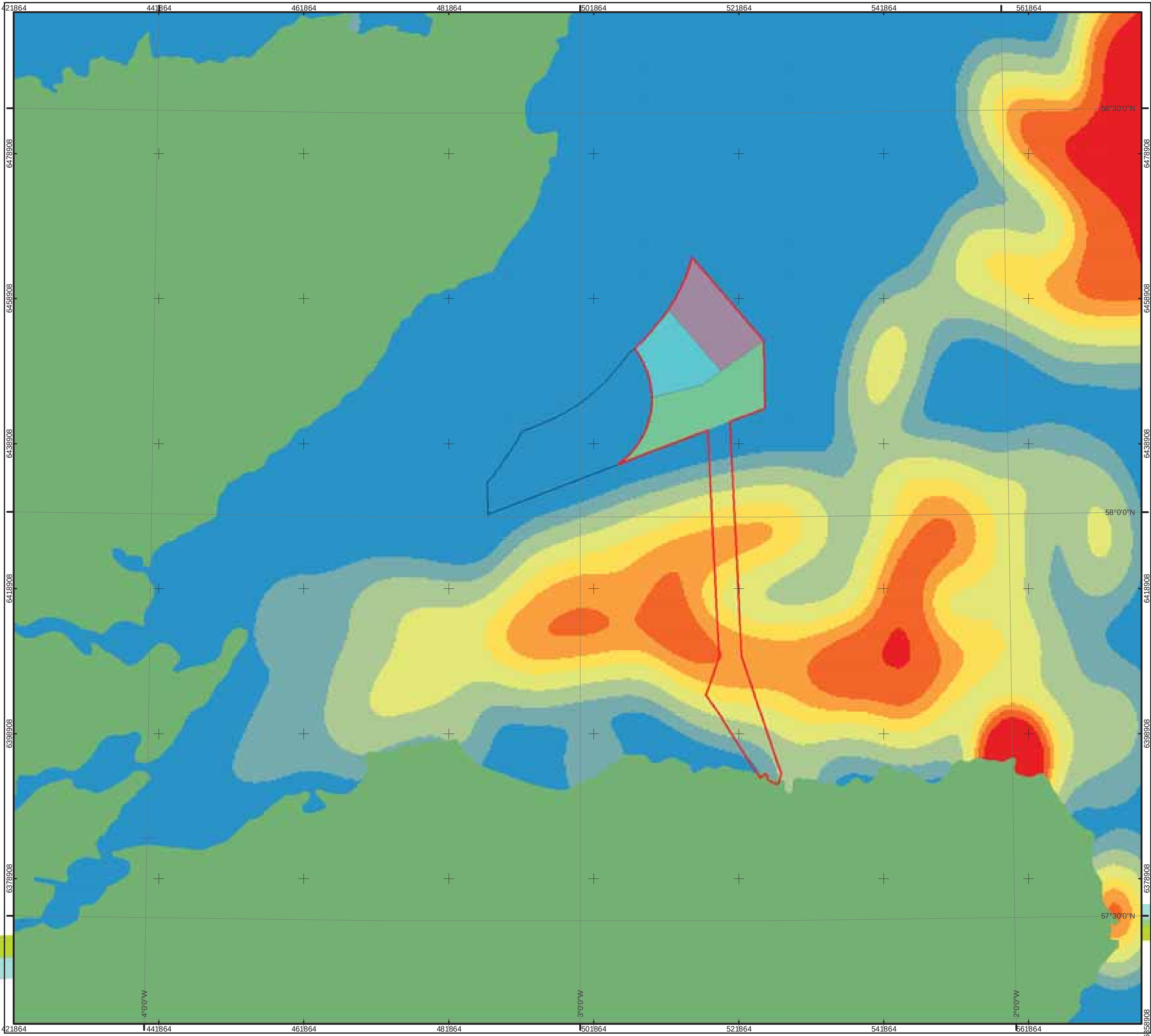
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-008

Figure 5.12
VMS Density by Effort
(Average 2008 - 2012)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Nephrops Relative Value

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-009

Figure 5.13 Commercial Fisheries Distribution by Value, Nephrops, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd

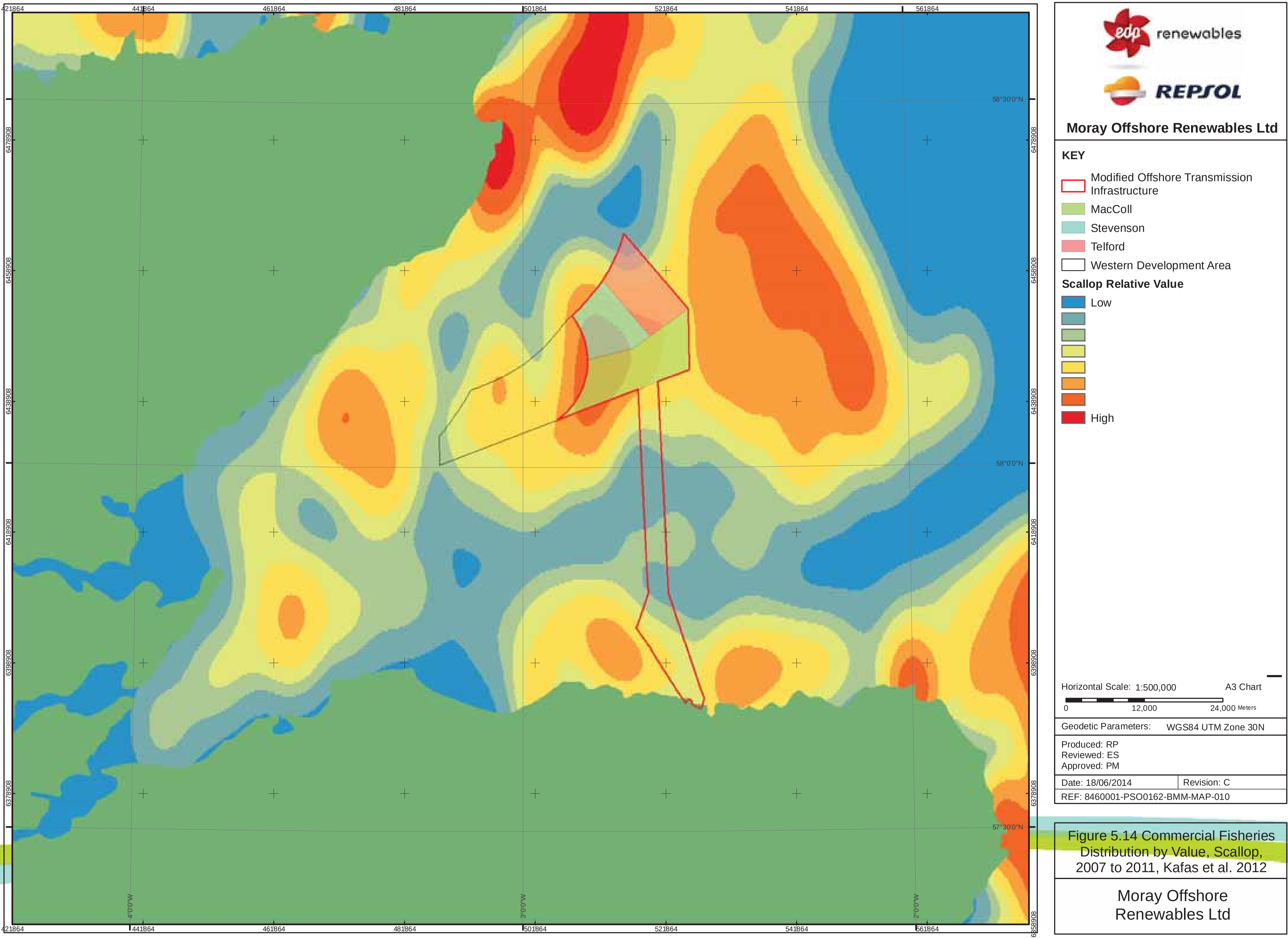
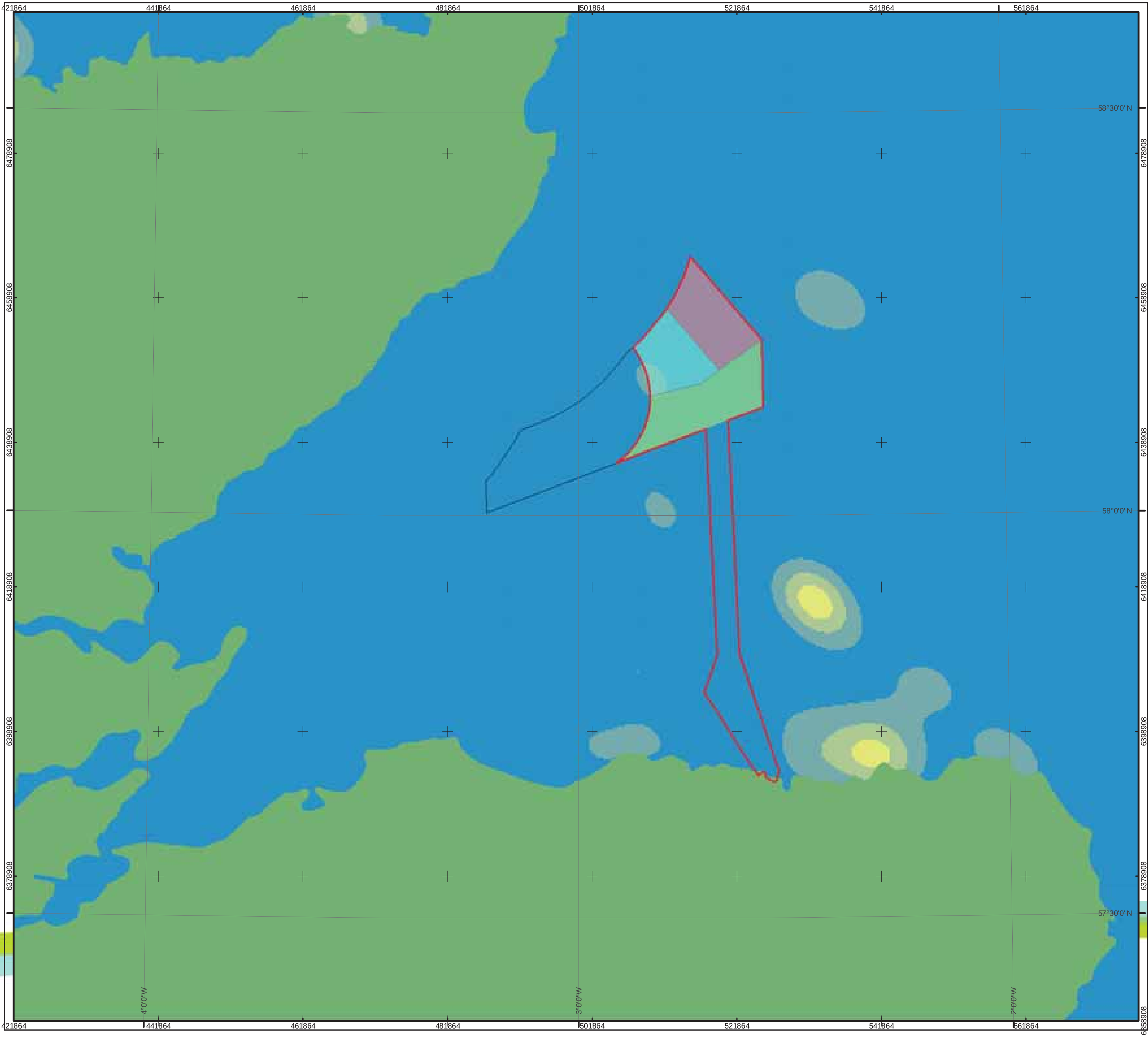


Figure 5.14 Commercial Fisheries Distribution by Value, Scallop, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Squid Relative Value

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

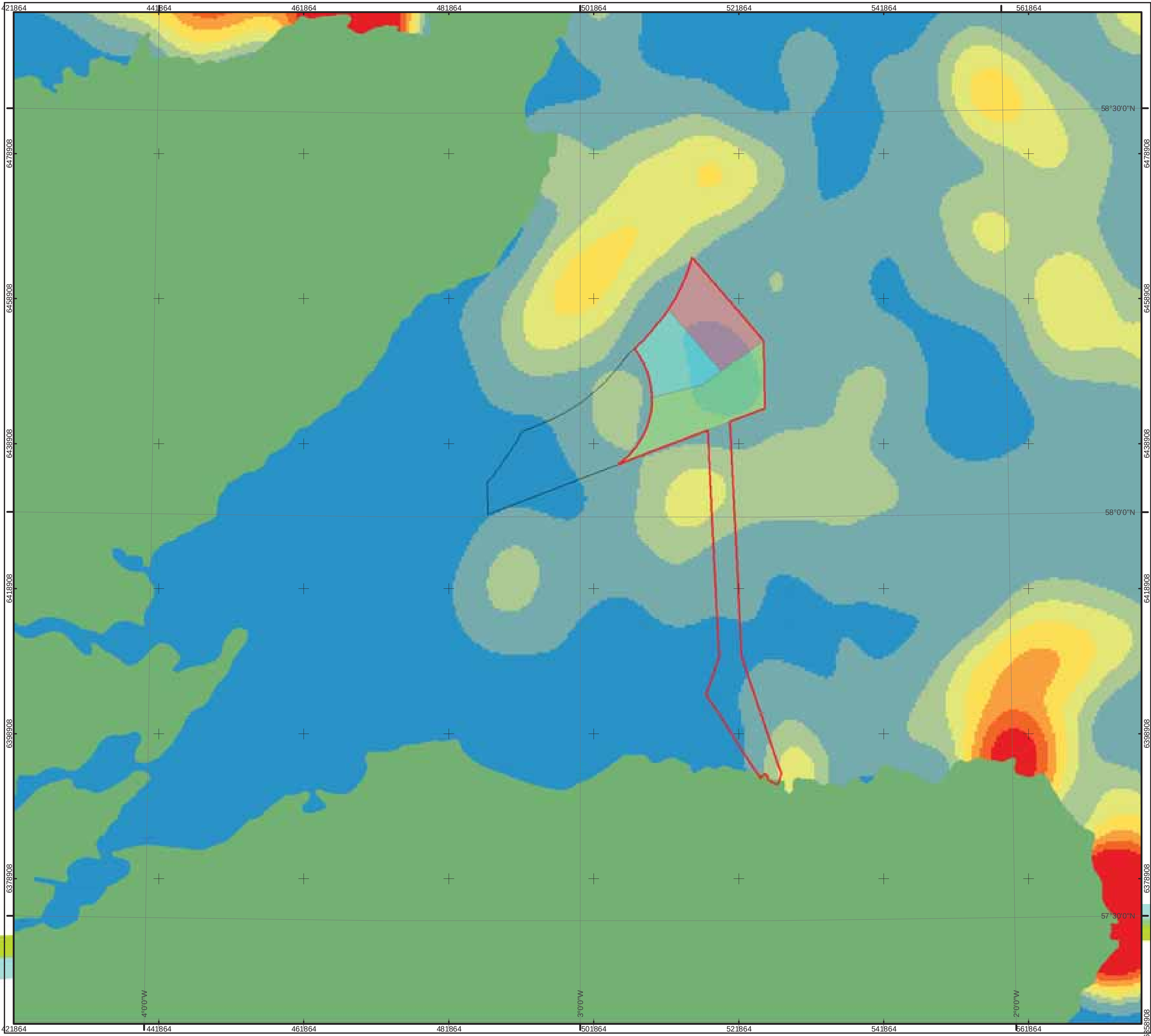
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014	Revision: C

REF: 8460001-PSO0162-BMM-MAP-011

Figure 5.15 Commercial Fisheries Distribution by Value, Squid, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Demersal Relative Value

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

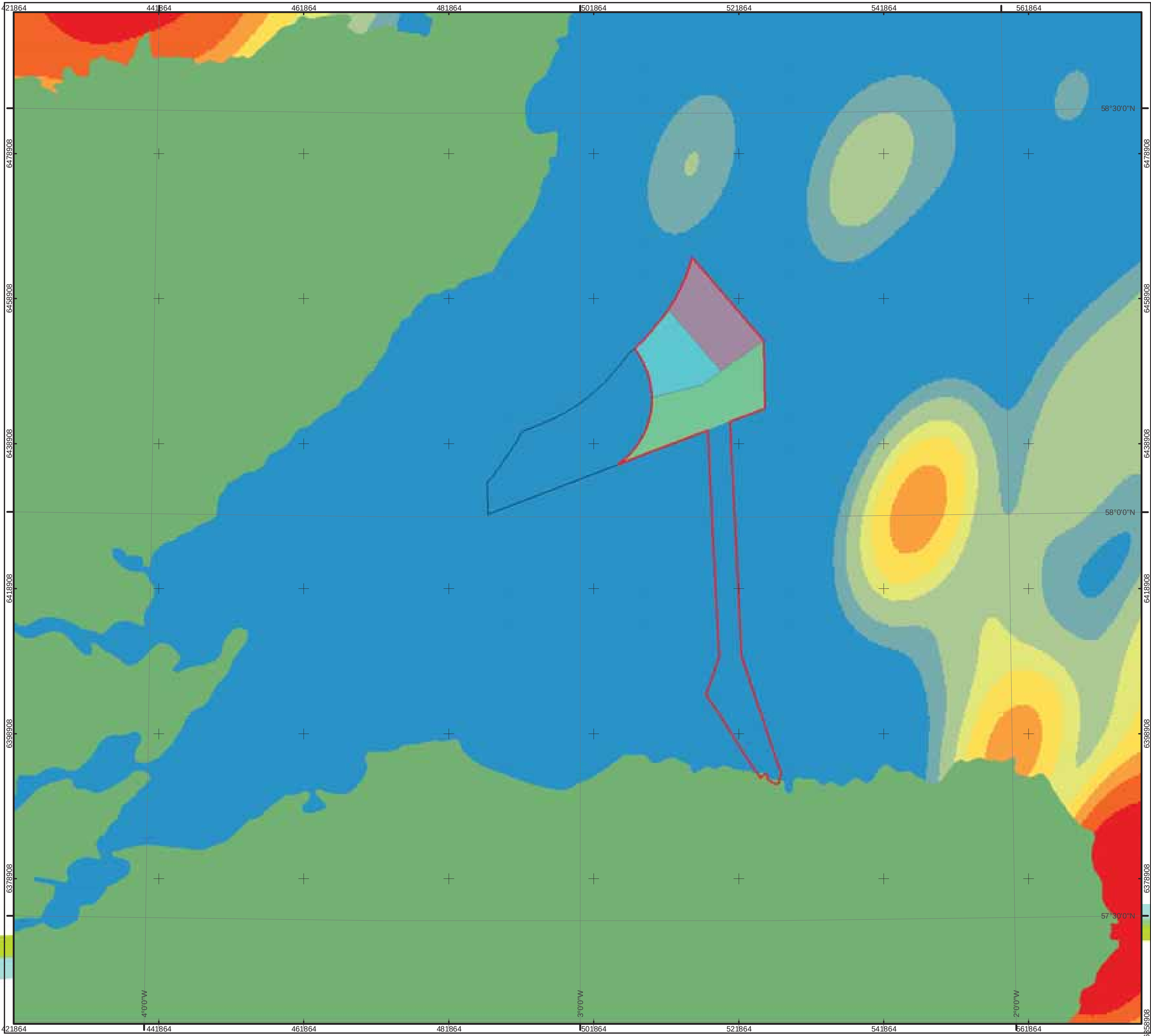
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-012

Figure 5.16 Commercial Fisheries Distribution by Value, Demersal, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Herring Relative Value

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

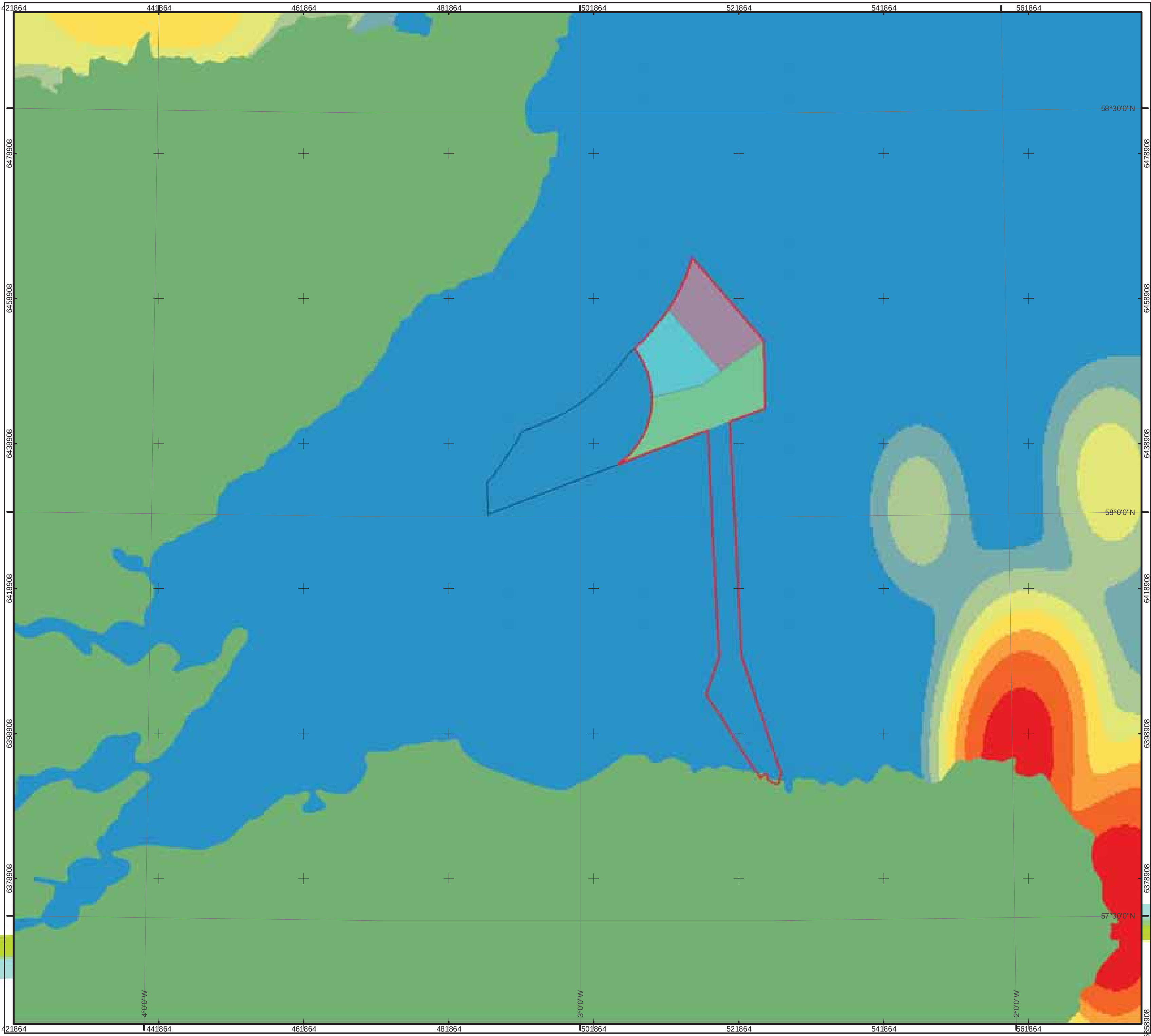
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-013

Figure 5.17 Commercial Fisheries Distribution by Value, Herring, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Pelagic Relative Value

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

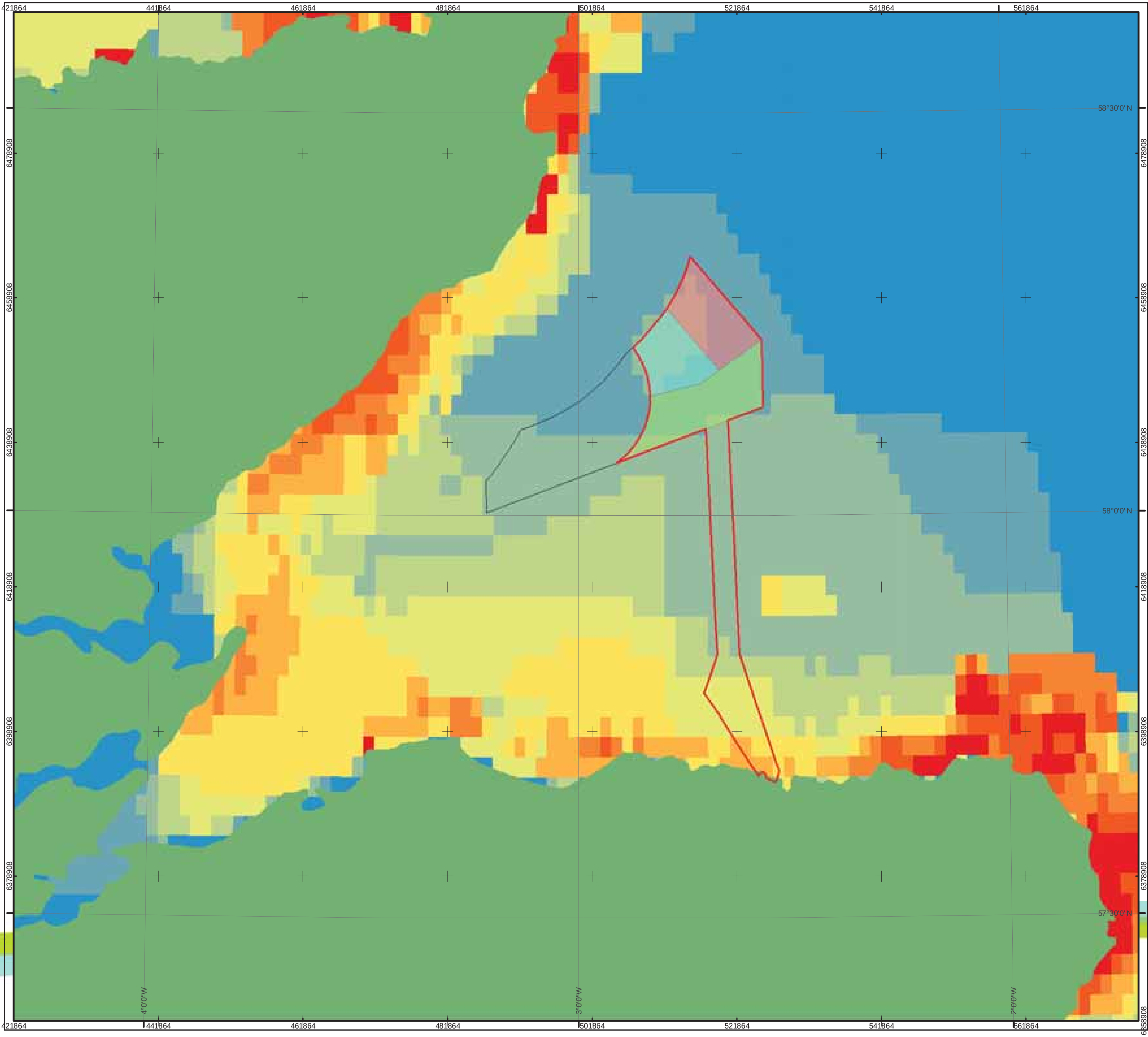
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-014

Figure 5.18 Commercial Fisheries Distribution by Value, Pelagic, 2007 to 2011, Kafas et al. 2012

Moray Offshore Renewables Ltd



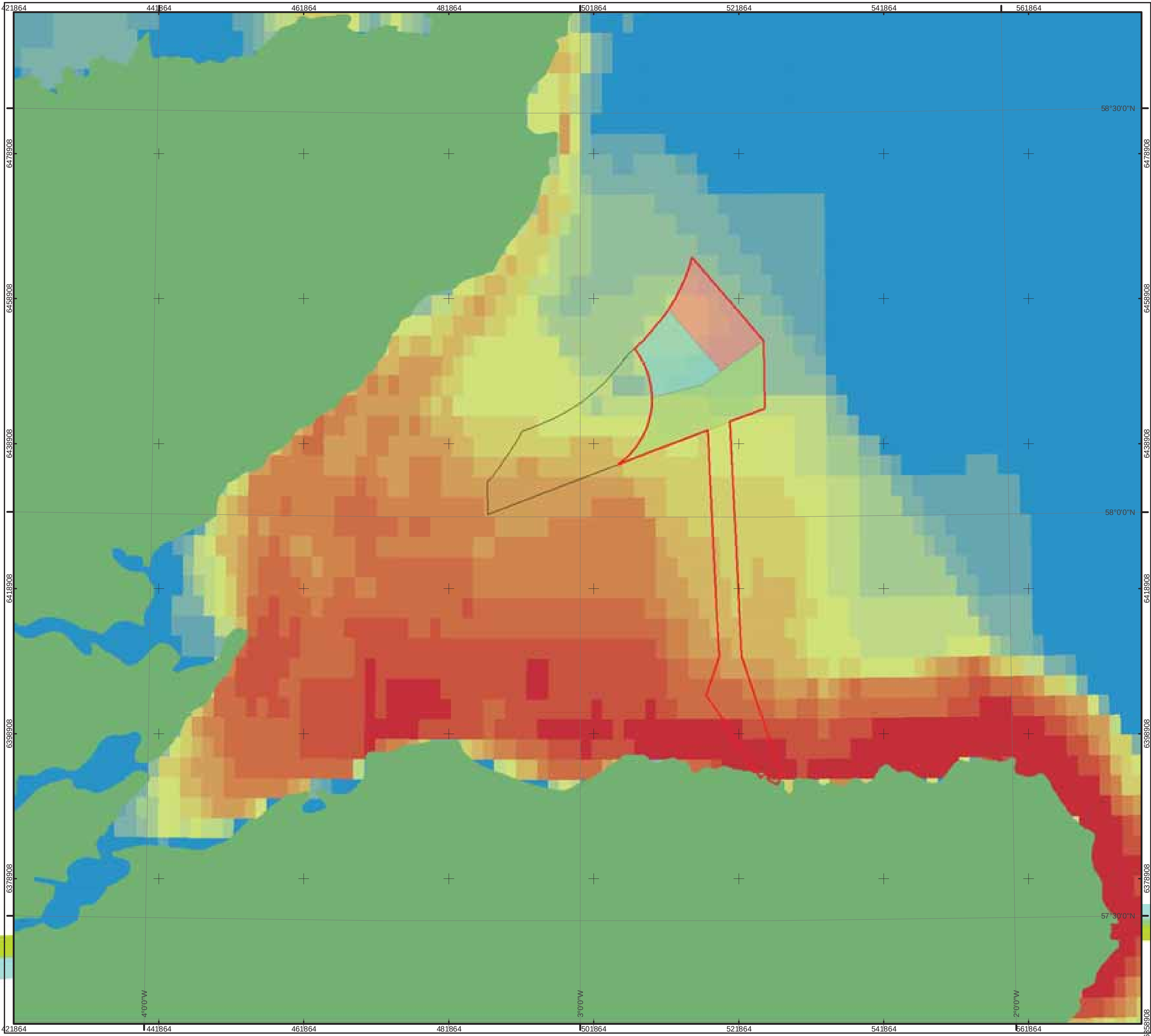
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-015

Figure 5.19
ScotMap - Monetary Value
(2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Number of Vessels

- 3
- 4
- 5
- 6 - 7
- 8
- 9
- 10 - 11
- 12 - 13
- 14 - 15
- 16 - 17
- 18 - 20
- 21 - 23
- 24 - 28
- 29 - 34
- 35 - 94

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

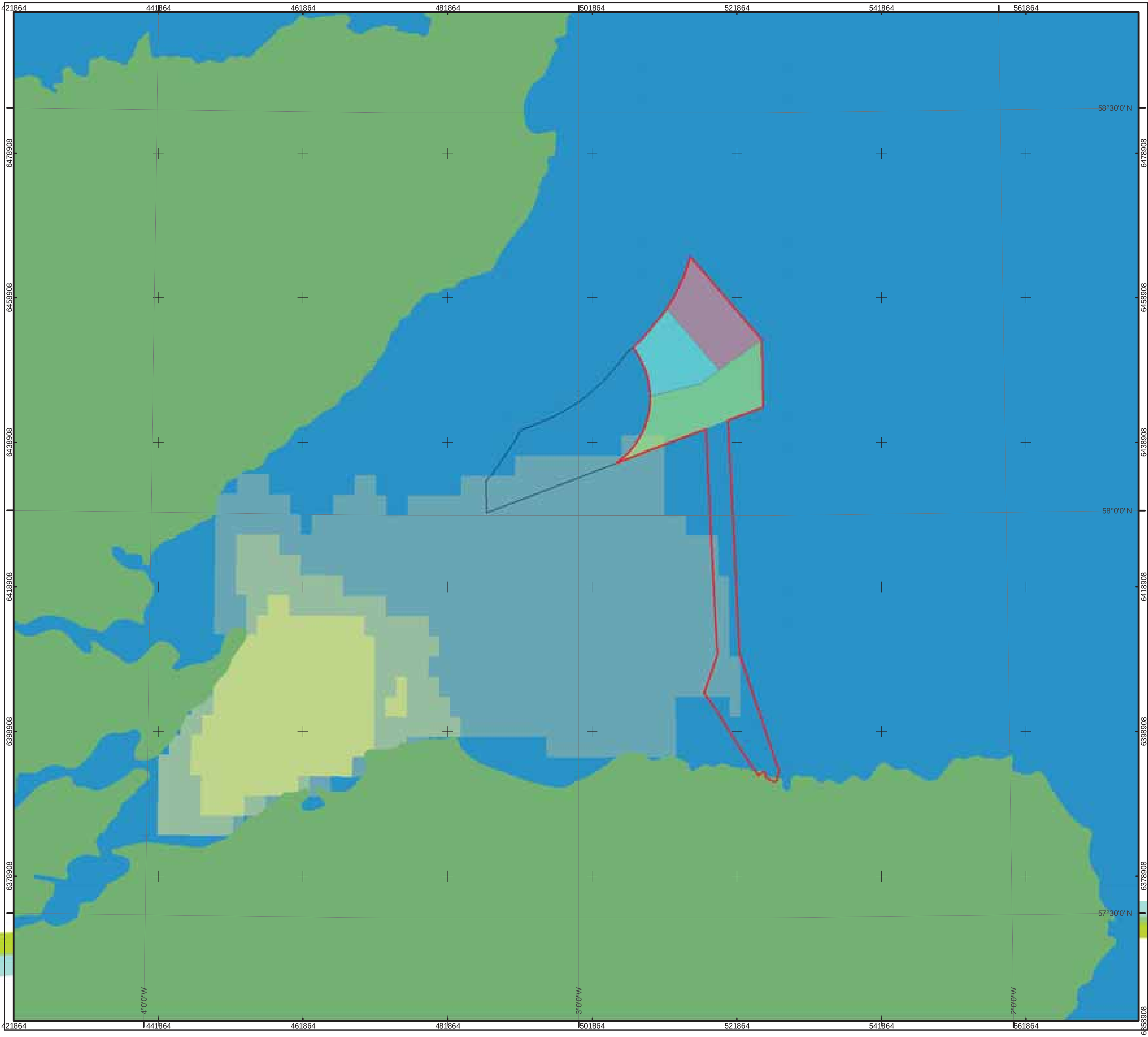
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-016

Figure 5.20
ScotMap - Number of Vessels
(2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Monetary Value (£)

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

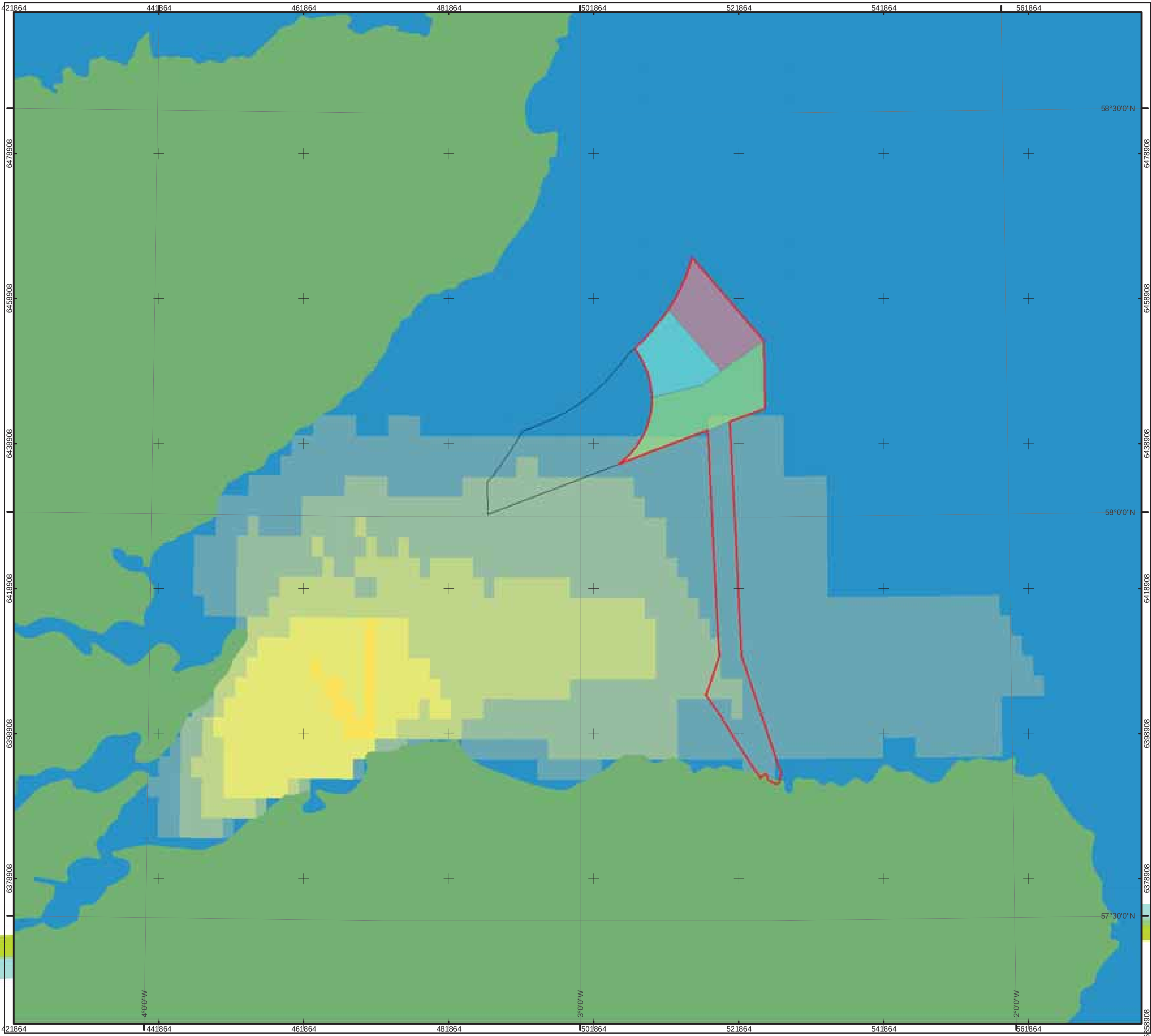
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-017

Figure 5.21
ScotMap - Nephrops, Monetary Value

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Number of Vessels

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

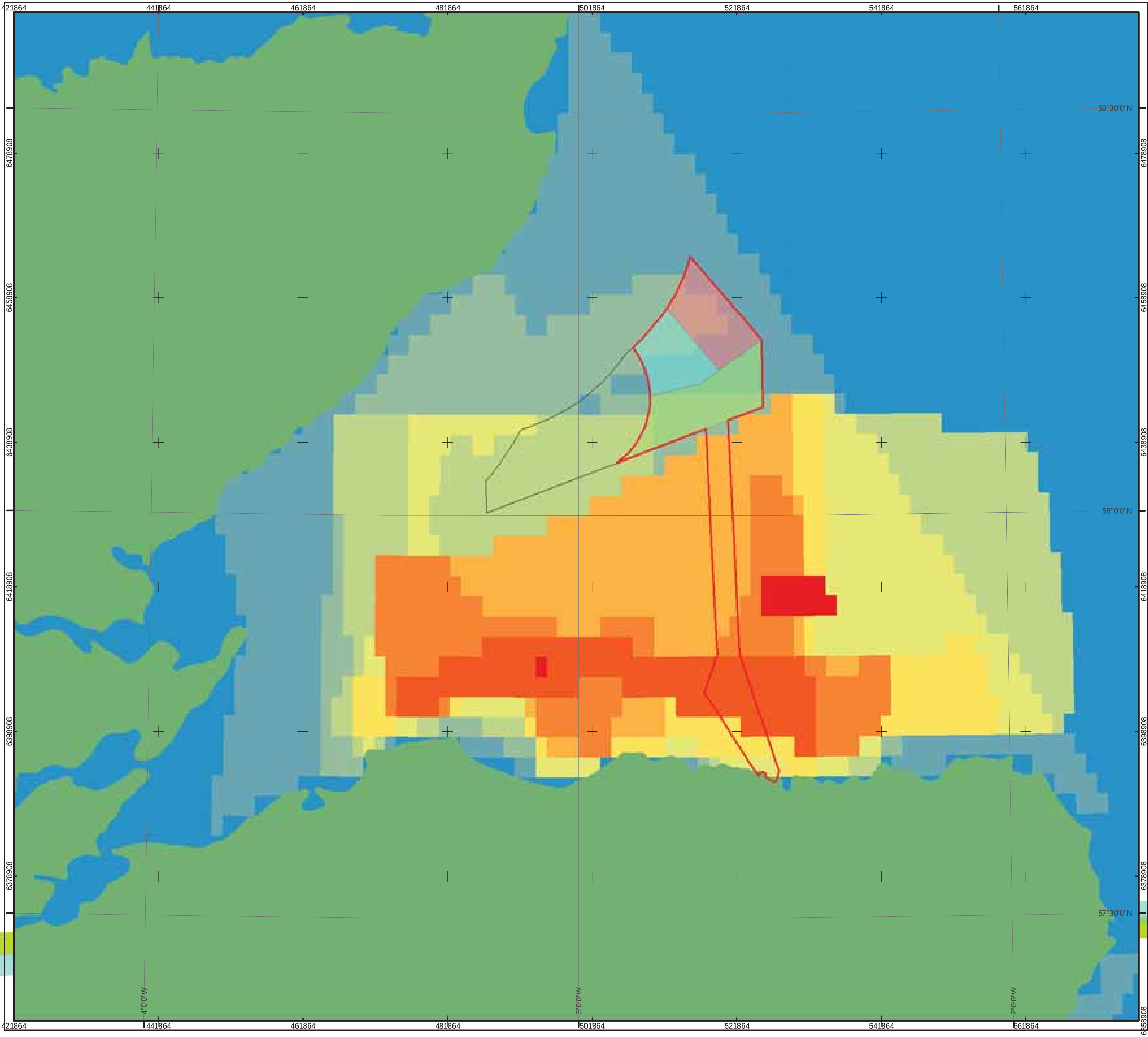
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-018

Figure 5.22
ScotMap - Nephrops Trawls, Number of Vessels (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Monetary Value (£)

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

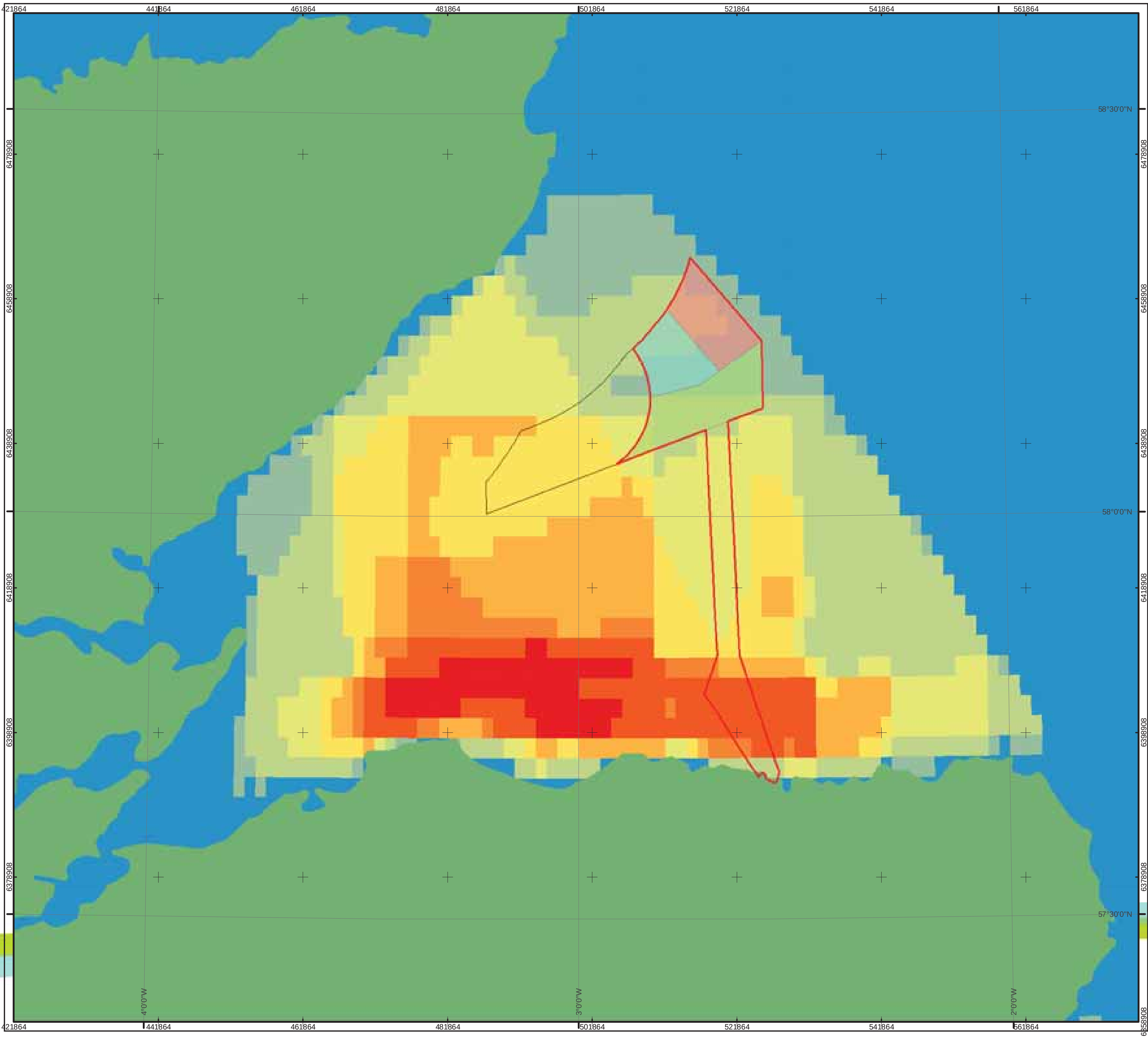
Produced: RP
Reviewed: ES
Approved: PM

Date: 09/06/2014 Revision: B

REF: 8460001-PSO0162-BMM-MAP-019

Figure 5.23 - ScotMap Trawls (Squid and Whitefish), Monetary Value (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Number of Vessels

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

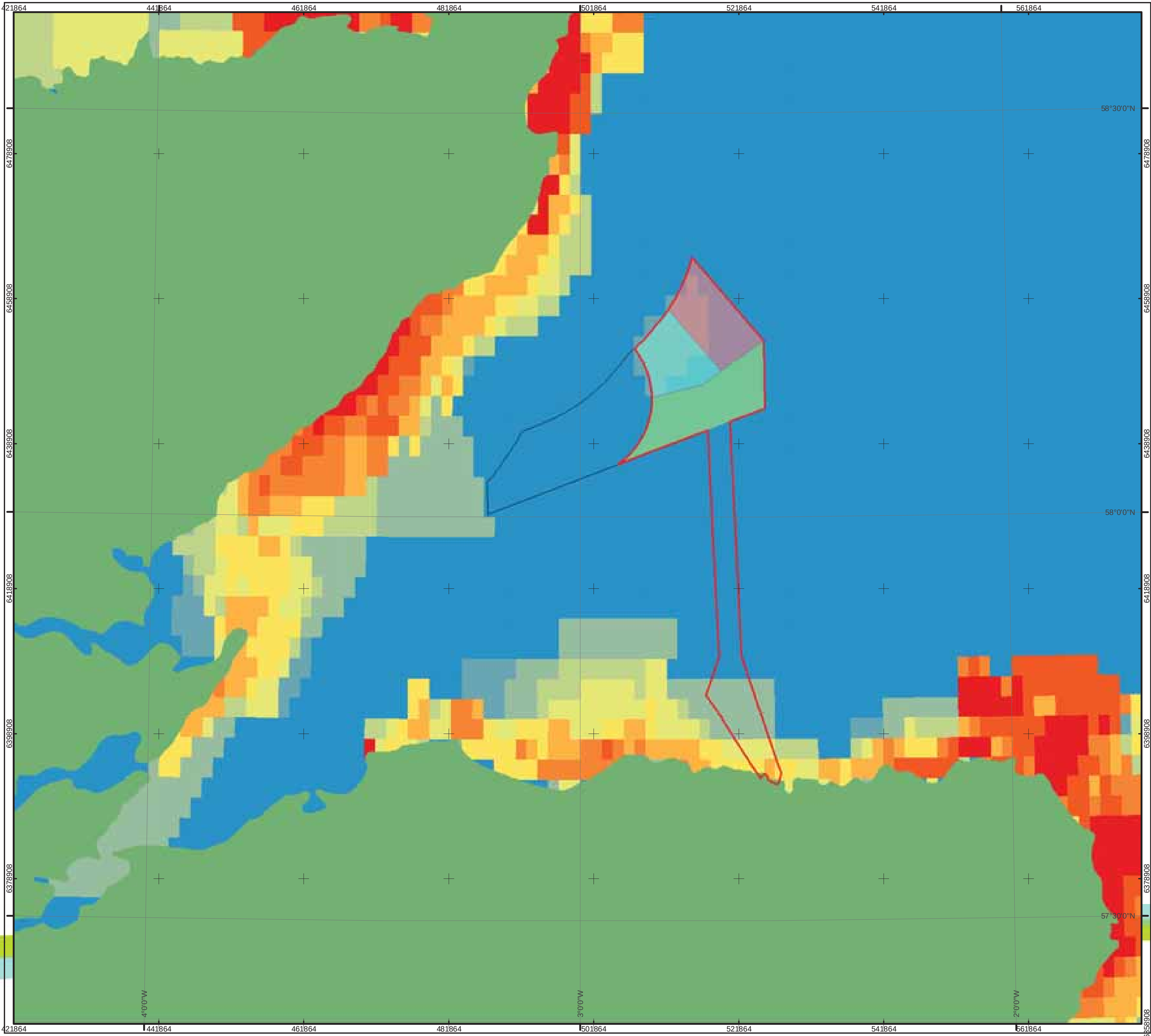
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-020

Figure 5.24 ScotMap - Trawls (Squid and Whitefish), Number of Vessels (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Monetary Value (£)

Low

High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

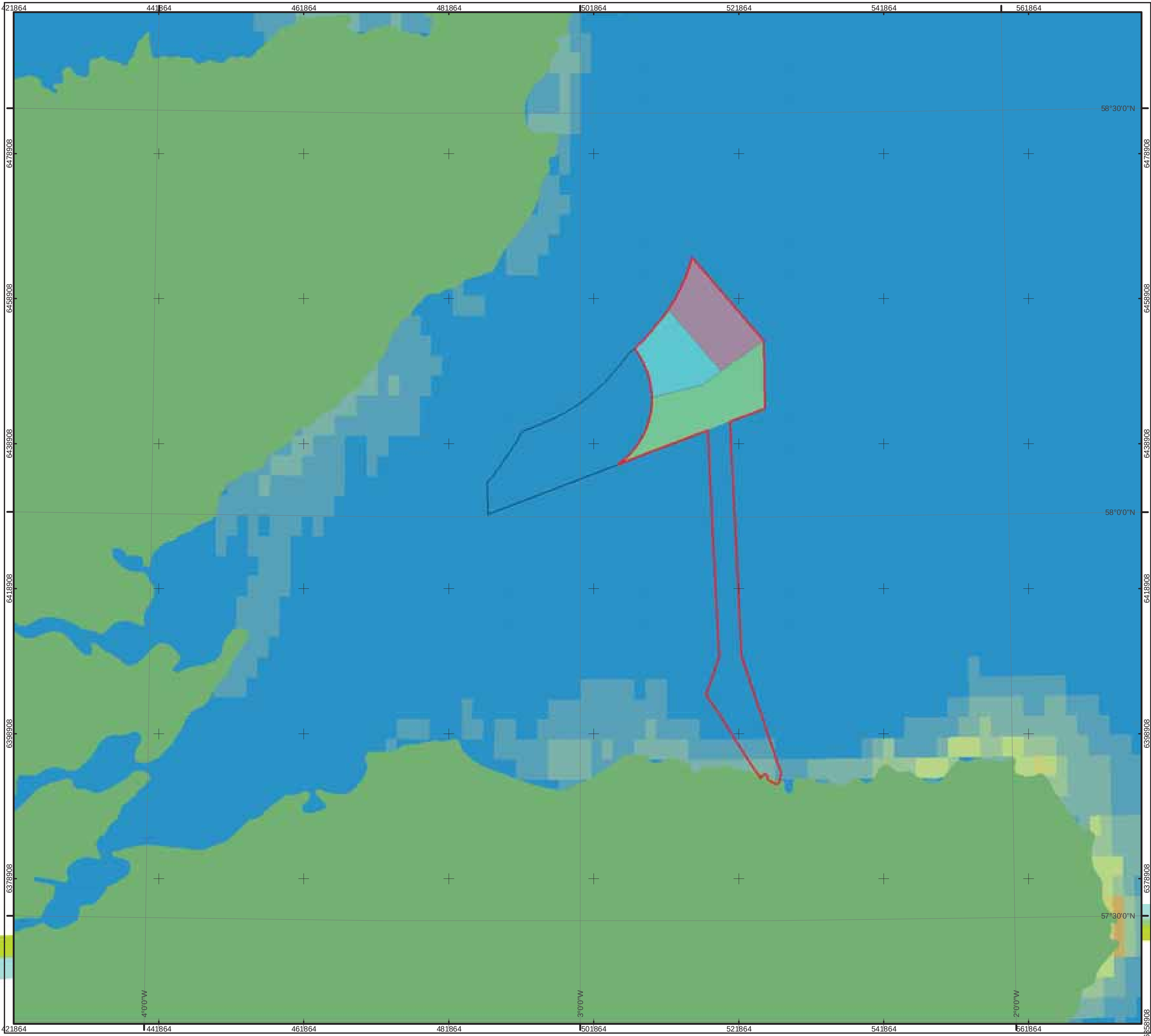
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-021

Figure 5.25
ScotMap - Creels, Monetary Value (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Number of Vessels

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

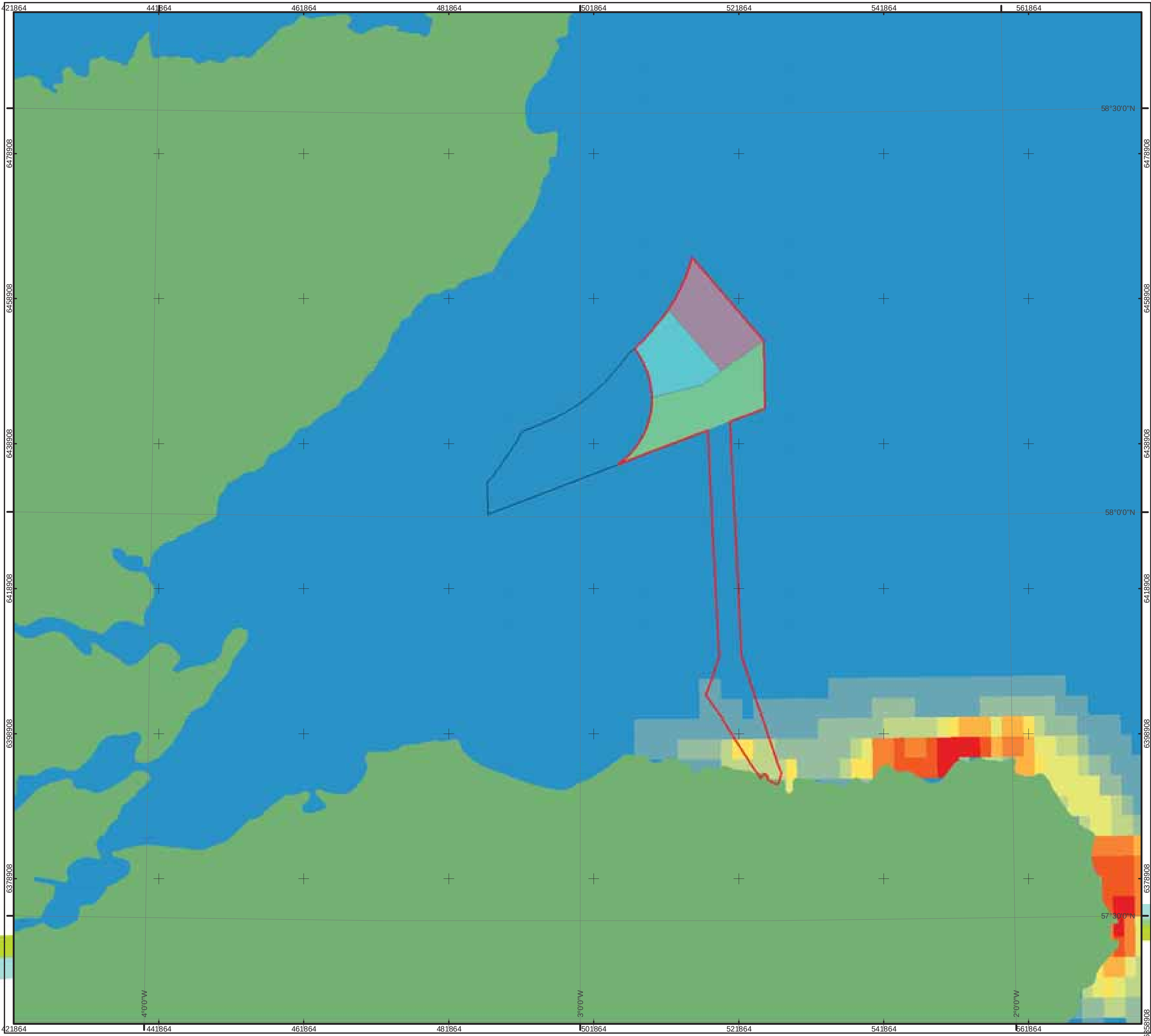
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-022

Figure 5.26
ScotMap - Creels,
Number of Vessels (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Modified Offshore Transmission Infrastructure
MacColl
Stevenson
Telford
Western Development Area

Monentary Value (£)

Low
High

Horizontal Scale: 1:500,000 A3 Chart
0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

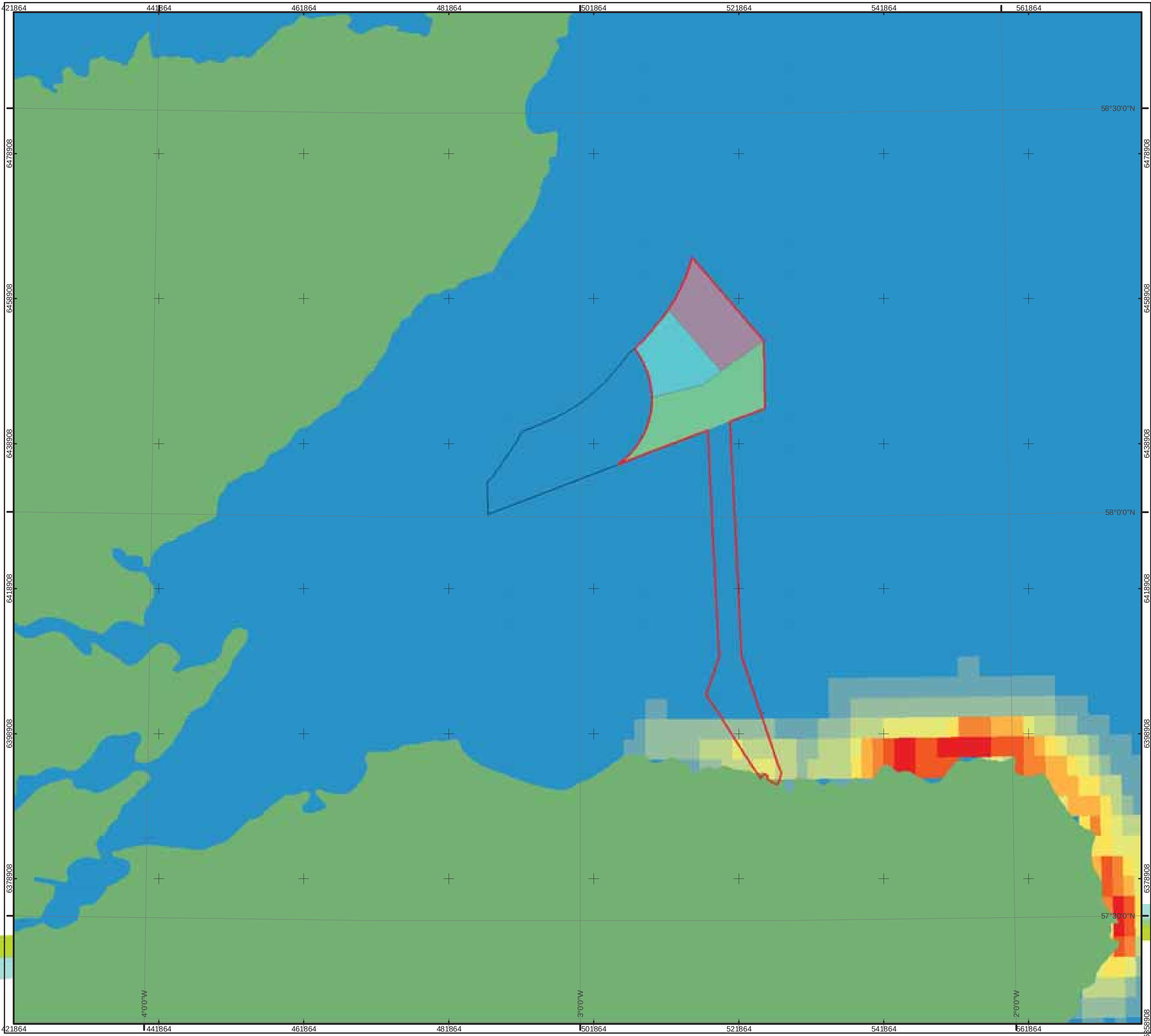
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-023

Figure 5.27
ScotMap - Mackerel Lines, Monetary Value (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Number of Vessels

- Low
- High

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

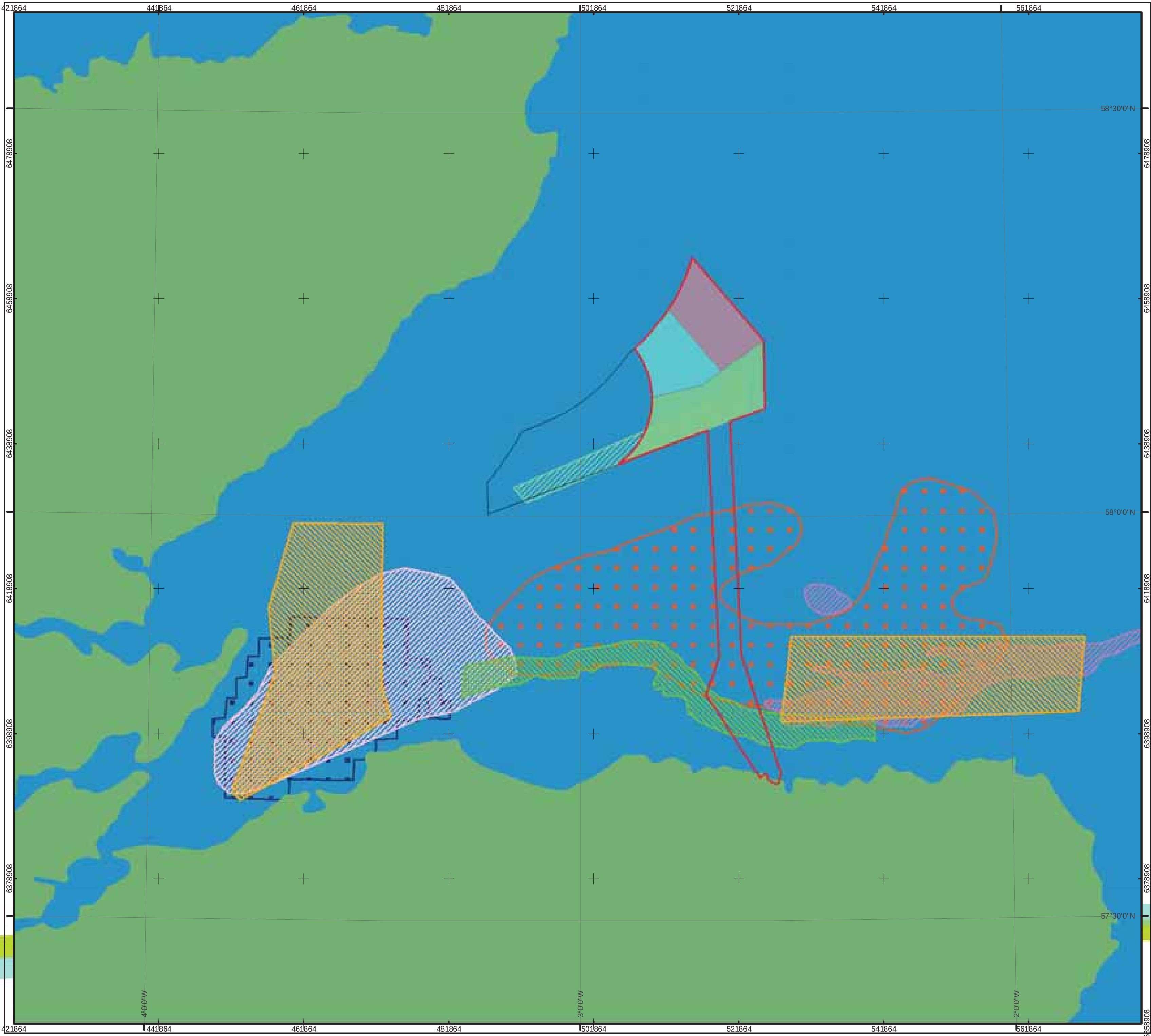
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-024

Figure 5.28
ScotMap - Mackerel Lines, Number of Vessels (2007 - 2011)

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

- Modified Offshore Transmission Infrastructure
- MacColl
- Stevenson
- Telford
- Western Development Area
- Predominantly Over-15m Scallop Grounds (Note 1)
- Predominantly Under-15m Scallop Grounds (Note 2)

Previously Collected Nephrops Grounds (2011)

- Vessel 1
- Vessel 2
- Vessel 3
- Vessel 4
- Vessel 5

Note 1 - Data collected from MSS VMS of Nephrops grounds
Note 2 - Data collected from MSS ScotMap of Nephrops vessels
Both data sources have been discussed and approved by the SFF during consultation

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

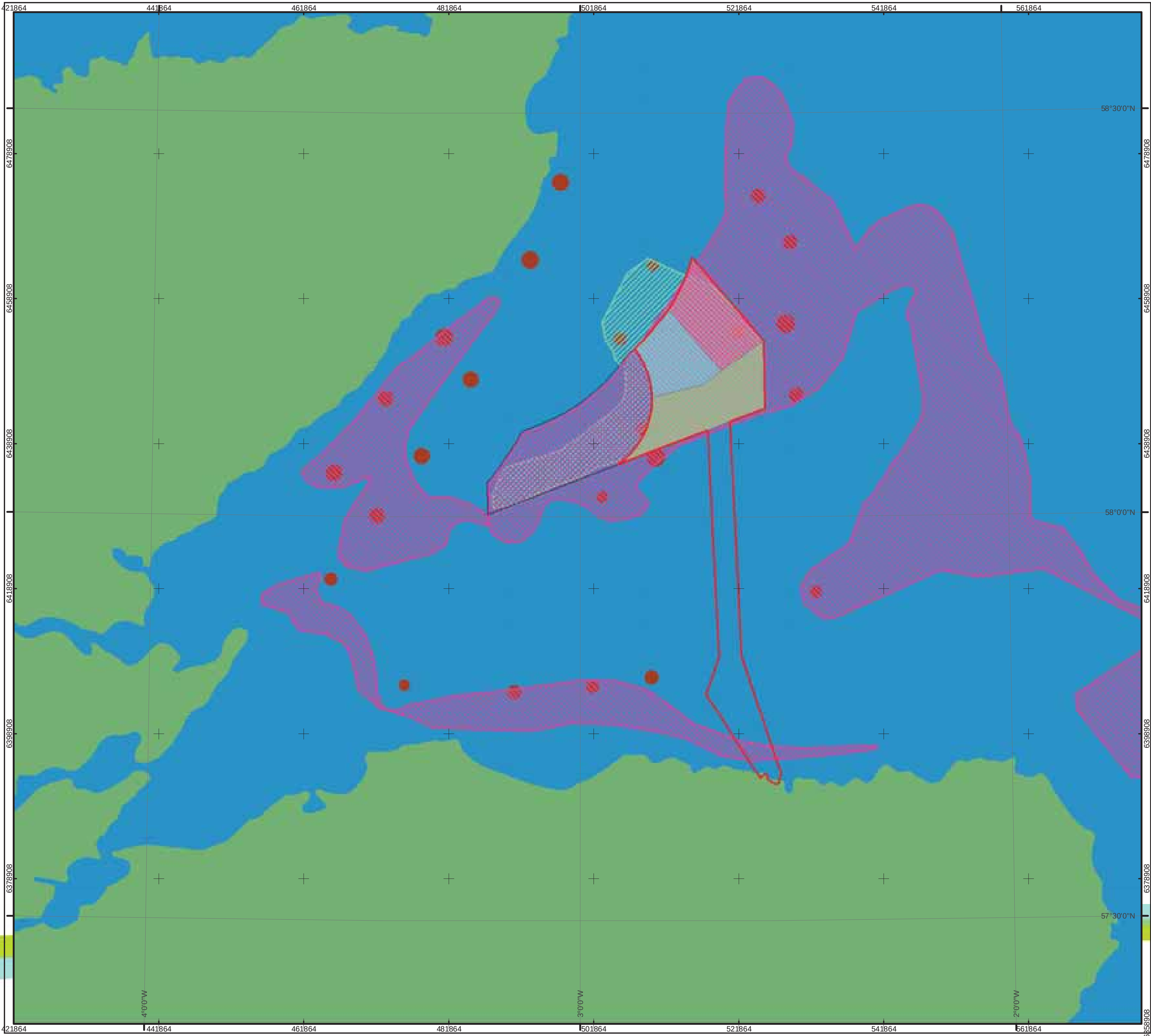
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-025

Figure 5.29
Nephrops Fishing Grounds

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Previously Collected Scallop Grounds (2011)

- Vessel 1
- Vessel 2
- Vessel 3

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

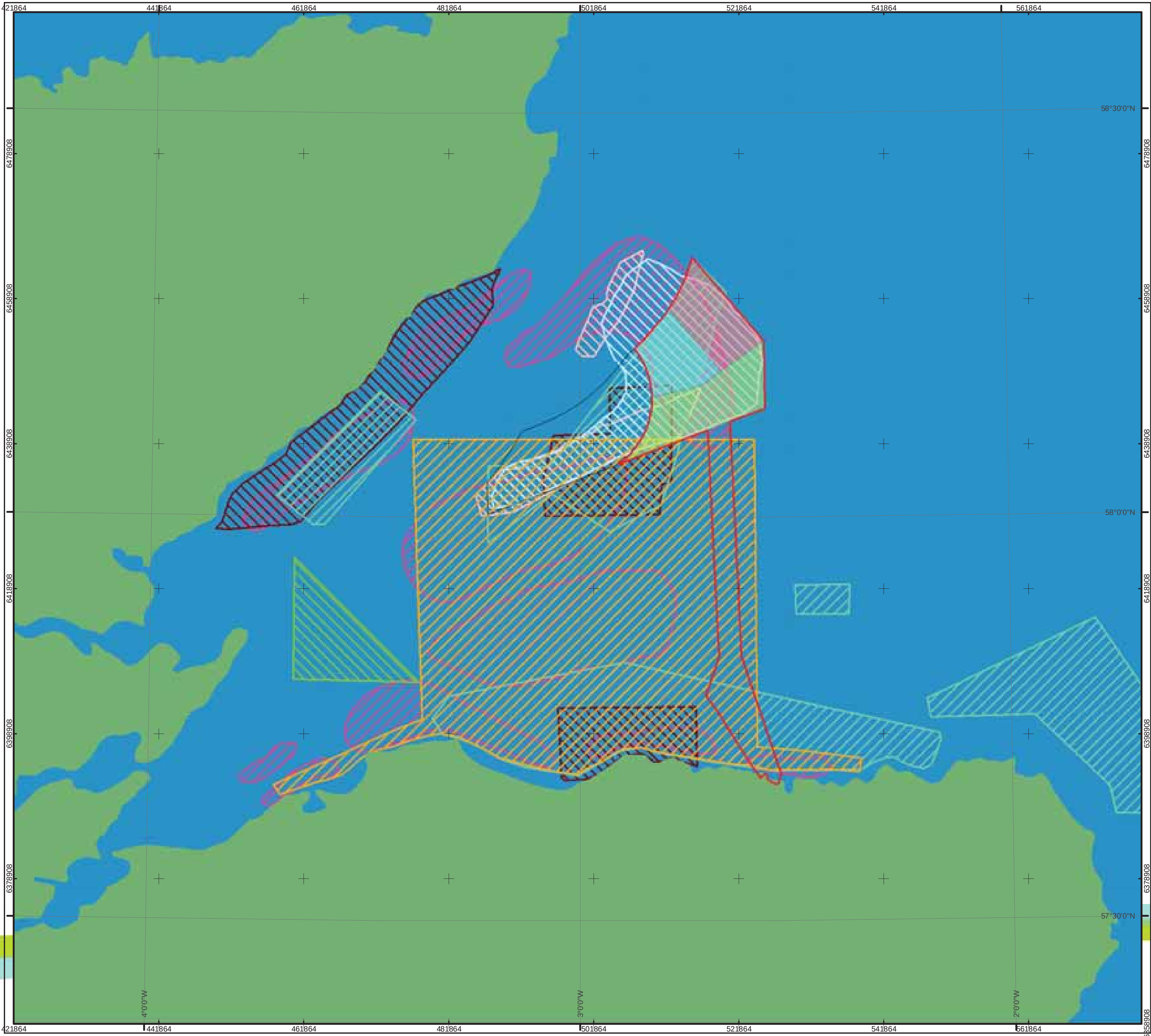
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-026

Figure 5.30
Scallop Fishing Grounds

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Previously Collected Squid Grounds (2011)

- Vessel 1
- Vessel 2
- Vessel 3
- Vessel 4
- Vessel 5
- Vessel 6
- Vessel 7

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

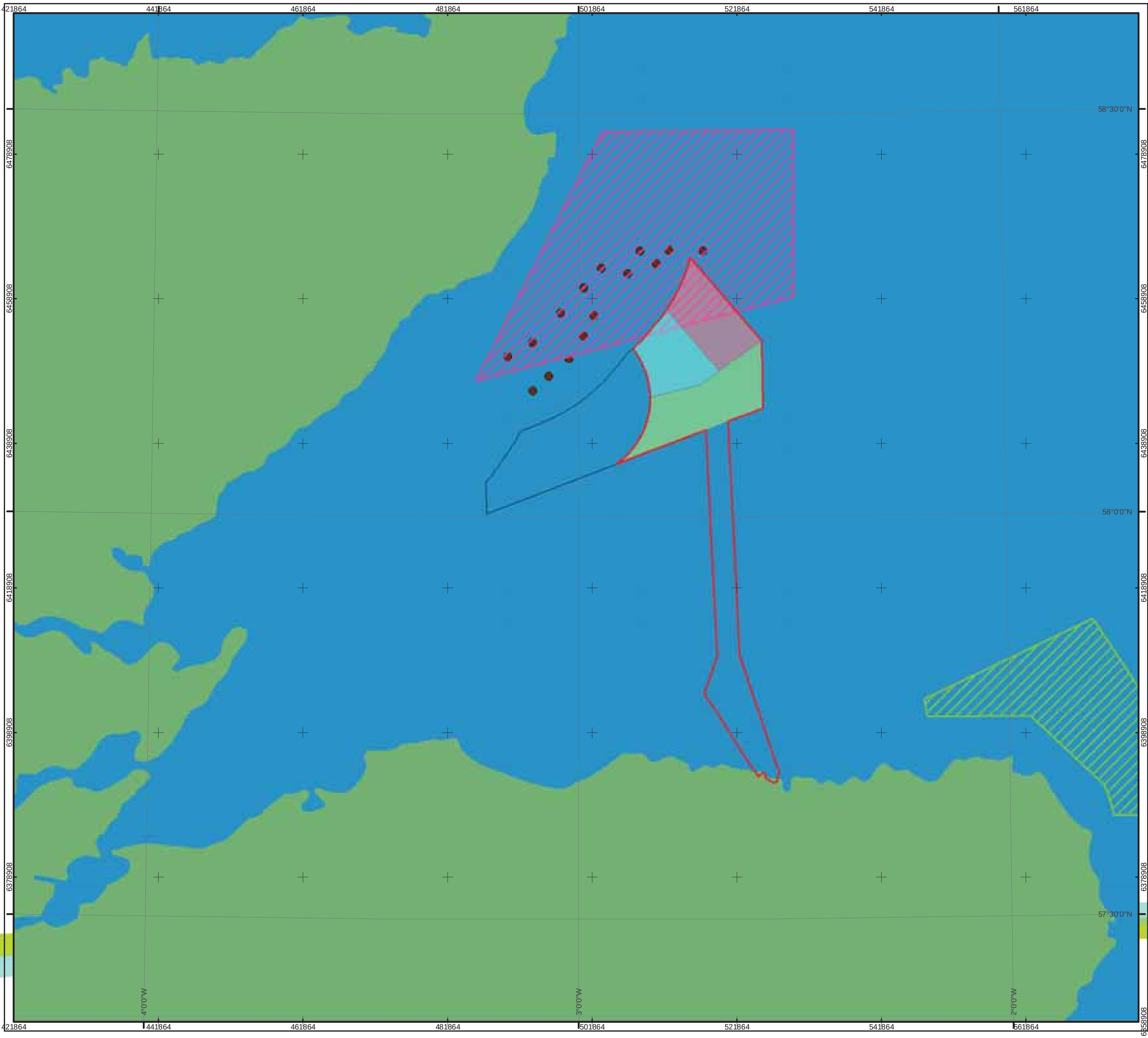
Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-027

Figure 5.31
Squid Fishing Grounds

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

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

Previously Collected Whitefish Grounds (2011)

- Vessel 1
- Vessel 2
- Vessel 3

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 Revision: C

REF: 8460001-PSO0162-BMM-MAP-028

Figure 5.32
Whitefish Fishing Grounds

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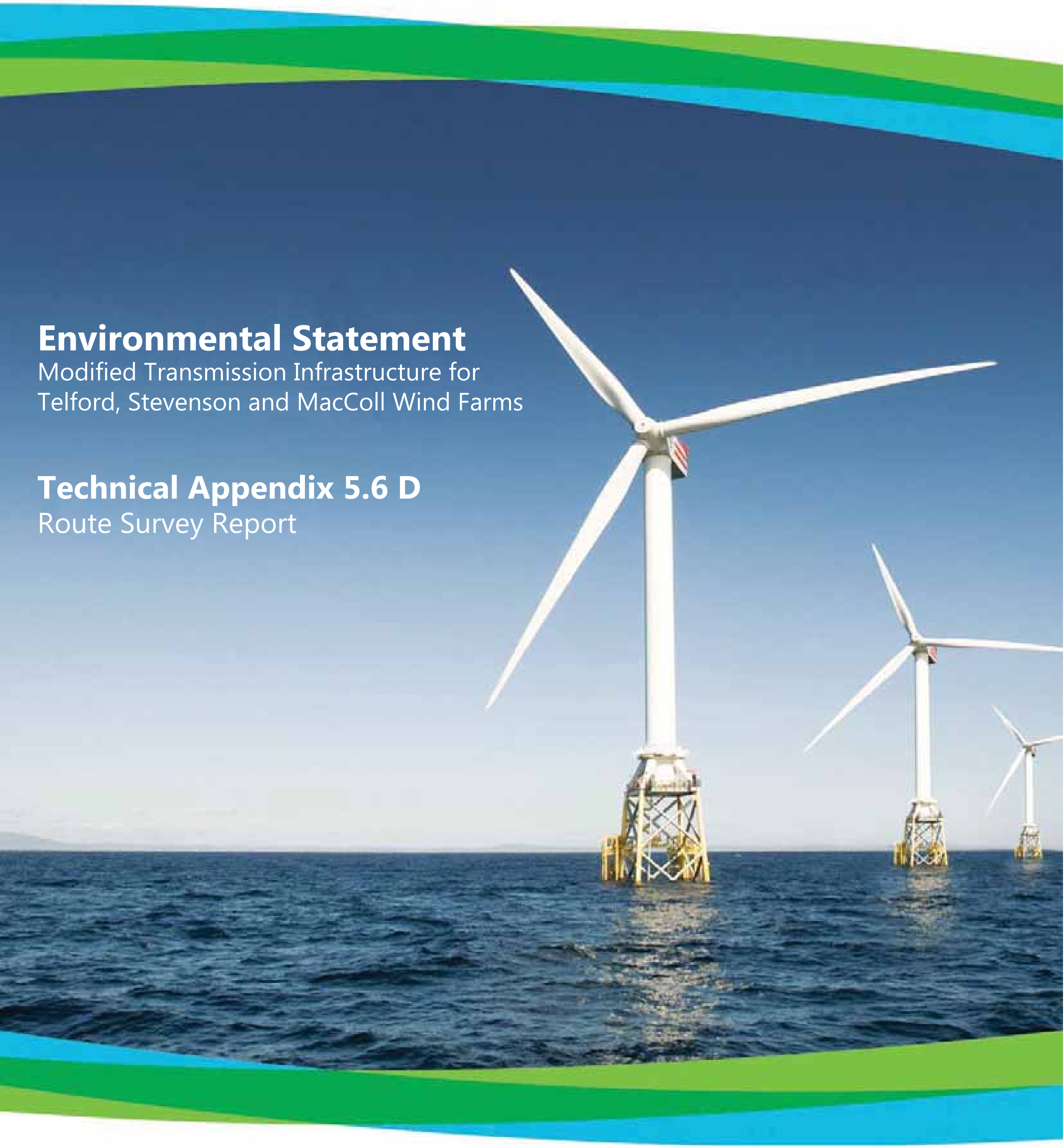
Developing Wind Energy In The Outer Moray Firth



Environmental Statement

Modified Transmission Infrastructure for Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.6 D

Route Survey Report

edp renewables

This document was produced by WYG on behalf of Moray Offshore Renewables Ltd

Document Owner		**Craig Jolly**			
Document Status		**Final**			
File Name		**2014-06-10 RSR draft.docx**			
Revision	**Date**	**Description**	**Originated By**	**Checked By**	**Approved By**
A1	19 June 2014	Final	Craig Jolly	Gordon Buchan	Gordon Buchan

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Table of Contents

1 Introduction

1.1 Background

WYG has been commissioned by Moray Offshore Renewables Ltd (MORL) to produce a route feasibility study for a planning in principle application for the installation of the modified Transmission Infrastructure (TI). This study will focus on the onshore transmission infrastructure (OnTI) which includes the onshore aspects of the export cable and two substations to the south west of New Deer.

This study examines the transport and access issues relating to the movement of abnormal loads required to construct the proposed substations.

This report has been prepared in accordance with instructions from MORL on the above modified TI details. No liability is accepted for the use of all or part of this report by third parties.

WYG has been commissioned to prepare this route feasibility study as a source of guidance. The report identifies the key points and issues associated with the route that may require remedial works to accommodate the predicted loads. The detailed designs of these remedial works, however, are beyond the agreed scope of works. It is the responsibility of the substation equipment suppliers (depending on contractual arrangements) to ensure that the access route from the POE to the site is fit for purpose and that appropriate consideration for all road users has been made in accordance with the relevant health and safety legislation and ruling transport requirements

1.2 Report Structure

Following this introductory chapter the report is structured as follows:

- **Chapter Two** describes the location of the modified OnTI;
- **Chapter Three** outlines the route option reviewed on the site visit along with areas of potentially significant constraints;
- **Chapter Four** details a framework for the Abnormal Load Traffic Management Plan; and
- **Chapter Five** provides a summary of the report and an outline of suggested further works, actions and recommendations for consideration by MORL.

2 Proposed Development

2.1 Site Description and Location

The site is located approximately 5.5 km south west of New Deer, shown on Plate 2.1. It is bounded by the C29S to the east, an unclassified road to the south, and agricultural boundaries to the north and west.

The location of the proposed substations is illustrated in Plate 2.1

Plate 2.1: Proposed Location of Substations

2.2 Proposed Substation Equipment

MORL have yet to confirm the model of substation equipment, however it is understood that the worst case option is likely to be a 108 tonne equipment at a length of 7.8 m and a width of 3.75 m. With a load weight of approximately 108 tonnes, the delivery vehicle trailer will have ten axles to ensure that the maximum axle weight is limited to 11 tonnes. This component is classified as an Abnormal Indivisible Load (AIL) due to its weight, length, height and width when loaded. MORL have advised that all substation AIL components will fit within the envelope assessed.

WYG has assumed that the loads will generally follow the transport guidelines published by the equipment manufacturer.

3 Access Route Review

3.1 Introduction

A route review was undertaken by video survey in June 2014 from the port of Peterhead to the proposed substation site access via the identified route along the A950. An alternative route via the A90 southbound and Oldmeldrum was considered and, following discussions with Aberdeenshire Council, discounted due to the presence of a weak bridge located to the east of North Millbrex.

3.2 Route Description

It is proposed that the loads will depart the port at Peterhead and approach the site from the A90 and A950, and then access the site via a new access junction on the unclassified road that runs south from Maryhill Farm.

The proposed access route from Peterhead to the site of the substations is as follows:

- Depart the port onto Bath Street;
- Turn left (west) at the junction with Kirk Street;
- Turn left (south) at the Kirk Street / South Road Roundabout and continue south on South Road;
- Turn right (west) at the A90 / A982 roundabout and continue west on the A90;
- Turn left (west) at the A90 / A950 roundabout and continue west on the A950;
- Turn left (southwest) at the A950 / A981 Lake House junction and continue southwest on the A981;
- Continue south on the B9028 from the A981 / B9029 / B9028 junction;
- Turn right (northwest) onto the A948, then continue west onto the B9170 from the A948 / A981 / B9170 junction;
- Turn left (southwest) onto the unclassified road at the junction with the B9170 at Hillhead Auchreddie; and
- Turn left (south) onto the unclassified road that lies south of Maryhill Farm and continue to the site access.

The access route is illustrated in Plate 3.1 overleaf.

Plate 3.1: Proposed AIL Route

3.3 Public Highway Constraints

An indicative risk review has been provided using a traffic light system. Red highlights a high risk, whilst green highlights a minor risk.

Table 3.1: Horizontal Constraints Summary

Identified	Yes ☒		No ☐
Severity of Risk	Minimal ☒	Medium ☐	High ☐
Description	Subject to swept path assessments, loads are likely to encounter issues at a single location: • POI 19: Unclassified Road Junction South of Maryhill Farm Each site is described below in greater detail in the following sections and is illustrated by a photo where appropriate. The locations of the identified Points of Interest (POIs) can be found in Appendix A.		

Table 3.2: Route Option Constraint Points

POI No: 1	**Peterhead Port Exit** 
Details	The loads will exit from Peterhead Port and turn left (north) to join Bath Street, then continue west on Bath Street. An over-sail area is required on the inside footway as the load exits the port. No physical mitigation measures are required to faciliate this. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA001).
POI No: 2	**Charlotte Street / Kirk Street Junction** 
Details	The loads would turn left and continue west along Kirk Street. No mitigation measures are required. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA002).

POI No: 3		**Kirk Street / A982 South Road Roundabout** 
Details	The loads would turn left at the roundabout. No mitigation measures are required. Escorts to ensure that no other vehicles are allowed to impede the convoy. A swept path assessment drawing can be found in Appendix B (SPA003).	
POI No: 4		**A982 / A90 Roundabout** 
Details	The loads would turn right at the roundabout. No mitigation measures are required. Escorts to ensure that no other vehicles are allowed to impede the convoy. A swept path assessment drawing can be found in Appendix B (SPA004).	

POI No: 5		**A90 / A950 Roundabout** 
Details	The loads would turn left at the roundabout. No mitigation measures are required. Escorts to ensure that no other vehicles are allowed to impede the convoy. A swept path assessment drawing can be found in Appendix B (SPA005).	
POI No: 6		**A950 Series of Bends in Longside** 
Details	The loads would continue west through Longside, travelling through a set of bends within the village. No mitigation measures are required. Escorts to ensure that no other vehicles are allowed to impede the convoy. A swept path assessment drawing can be found in Appendix B (SPA006).	

<table>
<tr><td>POI No: 7</td><td></td><td>A950 / A952 Roundabout
</td></tr>
<tr><td>Details</td><td colspan="2">The loads would proceed straight across the roundabout, located in the centre of Mintlaw.
No mitigation measures are required.
A swept path assessment drawing can be found in Appendix B (SPA007).</td></tr>
<tr><td>POI No: 8</td><td></td><td>A950 West of Mintlaw
</td></tr>
<tr><td>Details</td><td colspan="2">The loads would continue west on the A950.
The tree canopy needs to be trimmed to provide a clear 5 m head height and the side vegetation cut back to improve forward visibility.
The head height clearance is a responsibility of Aberdeenshire Council through the Roads (Scotland) Act and early engagement with the council to ensure that all the necessary licenses for trimming are in place.</td></tr>
</table>

POI No: 9		**A950 / A981 Junction** 
Details	The loads would turn left and continue west on the A981. An over-run area is required on the offside verge on the A981, where a load bearing surface should be laid. One road sign should be relocated outwith the over-run area. In addition, an over-sail area is required on the verge on the south side of the junction bellmouth. No physical mitigation works are required to facilitate this. Both mitigation elements are within the adopted road boundary. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA008).	
POI No: 10		**A981** 
Details	The loads continue west on the A981. The tree canopy needs to be trimmed to provide a clear 5 m head height and the side vegetation cut back to improve forward visibility. The head height clearance is a responsibility of Aberdeenshire Council through the Roads (Scotland) Act and early engagement with the council to ensure that all the necessary licenses for trimming are in place.	

<table>
<tr><td>POI No: 11</td><td></td><td>A981 Left / Right Bends North of Brucklay
</td></tr>
<tr><td>Details</td><td colspan="2">The loads would continue west on the A981, passing through a series of bends.

No mitigation measures are required.

A swept path assessment drawing can be found in Appendix B (SPA009).</td></tr>
<tr><td>POI No: 12</td><td></td><td>A981
</td></tr>
<tr><td>Details</td><td colspan="2">The loads continue west on the A981.

The tree canopy needs to be trimmed to provide a clear 5 m head height and the side vegetation cut back to improve forward visibility.

The head height clearance is a responsibility of Aberdeenshire Council through the Roads (Scotland) Act and early engagement with the council to ensure that all the necessary licenses for trimming are in place.</td></tr>
</table>

POI No: 13	A981 / B9029 Junction 
Details	The loads continue south onto the B9029. The loads should undertake a contraflow manoeuvre of the splitter island on the northern approach of the A981 to avoid the need to remove any street furniture on the island. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA010).
POI No: 14	**B9028 / A948 Junction** 
Details	The loads would turn right and continue north on the A948. No mitigation measures are required. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA011).

POI No: 15		**B9170 / C121B Junction at Hillhead of Auchreddie** 
Details	The loads would turn left and continue west on the C121B. No mitigation measures are required. The width of the unclassified road between this junction and the junction at POI 19 generally varies between 4 m and 5 m, therefore traffic management will be required to hold oncoming between POI 15 and POI 19 to prevent it from impeding the convoy along the unclassified road. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. A swept path assessment drawing can be found in Appendix B (SPA012).	
POI No: 16		**C121B Road Right / Left Bends at Grainhow** 
Details	The loads would continue west on the C121B through the set of bends. No mitigation measures are required. A swept path assessment drawing can be found in Appendix B (SPA013).	

POI No: 17		**C121B Road Bridge** 
Details	The loads would continue west on the C121B. A structural assessment of the bridge is required at the detailed design stage, once the exact weights of the proposed loads are confirmed through the detailed design phase.	
POI No: 18		**C121B Right Bend at Mill of Greens** 
Details	The loads would continue west on the C121B. An over-run area is required in the verge to the north of the road, where a load bearing surface should be laid. One road sign should be relocated outwith the over-run area. A swept path assessment drawing can be found in Appendix B (SPA014).	

POI No: 19	**C121B / C29S Junction South of Maryhill Farm** 
Details	The loads would turn left and continue south on the C29S. An over-run area is required on the north eastern verge and south eastern verge crossroads junction, as well as the field beyond the south eastern verge. An area of over-sail is also required in the same field. A load bearing surface should be laid in both of the over-run areas. Vegetation and tree foliage should be cut back on the north eastern verge. The wood and wire fence that bounds the field to the south east should be set back outwith the over-run and over-sail areas, which will require third party land. In addition, vegetation should be cleared from this area. Escorts to hold back all oncoming traffic to allow the loads to safely complete the manoeuvre. Traffic management is also required during the deliveries at this location to prevent oncoming traffic from impeding the convoy along the unclassified road between POI 19 and the site access junction (POI 20). A swept path assessment drawing can be found in Appendix B (SPA015).

POI No: 20		Site Access Junction 
Details	The loads would turn right into the site. An over-run area is required on the northern edge of the junction bellmouth, where a load bearing surface should be laid. Vegetation and tree foliage should be cut back on the north eastern verge. The wood and wire fence and stone wall that run along the field boundary should be removed for the creation of the site access and over-run area. In addition, vegetation should be cleared from this area. A swept path assessment drawing can be found in Appendix B (SPA016). Visibility splay drawings for the site access also be found in Appendix B (SPA017).	

4 Abnormal Load Management Plan

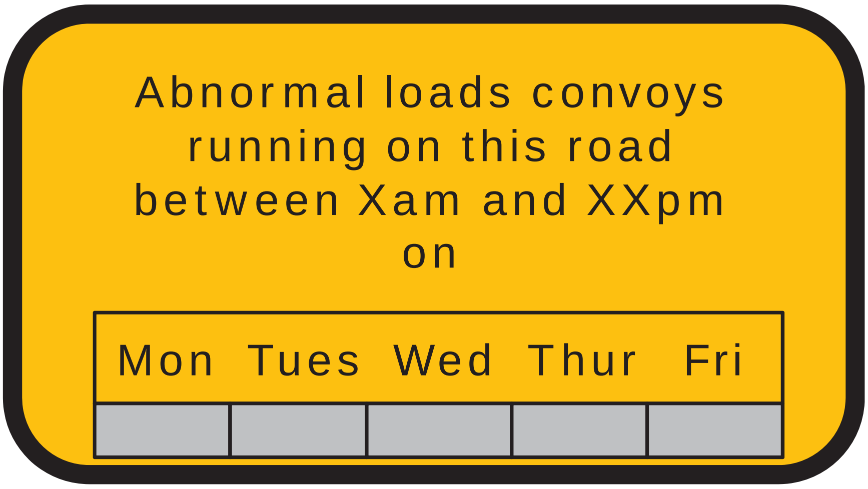
4.1 Proposed Management Measures

This chapter introduces a number of traffic management measures that could help reduce the impact of the AIL convoys. These measures are currently presented as indicative to be confirmed with the various roads agencies and police closer to the construction date.

4.2 Advance Warning Signage

Advance warning signs would be installed on the approaches to the affected roads network. Temporary signage advising drivers that abnormal loads will be operating could be erected along the B9170 and C class roads leading to the site. Signs such as the example shown in Plate 4.1 could be installed to help assist drivers.

Plate 4.1: Indicative Sign



The purpose of this type of signage is to help improve driver information and allow drivers of oncoming traffic to consider proceeding to the nearest convenient passing bay, or breaking their journey until the convoy has moved on.

4.3 Public Information

Information on the movement of abnormal load convoys would be provided to local media outlets to help assist the public. Information could be provided to local newspapers and radio stations that related to expected vehicle movements in the vicinity of New Deer. It is hoped that this level of information will make residents aware of convoy movements and help reduce any potential conflicts.

WYG also suggest that the developer may wish to consider producing a local newsletter for distribution to properties along the most affected sections of the proposed access routes, advising of convoy movements and the measures put in place to ensure the safe and efficient operation of the road network.

4.4 Convoy System

A police escort will be required to facilitate the delivery of the predicted loads. The police escort would be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advanced escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible.

The abnormal load convoys should be no more than three HGVs long, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so.

The times at which the convoys would travel will need to be agreed with Police Scotland. Typical delivery times for similar projects has seen the early morning periods used in constrained sections, as traffic levels are generally lighter than those found in the afternoon.

A full convoy operation plan will be developed in consultation with Aberdeenshire Council, Transport Scotland and Police Scotland representatives along the route and agreed before deliveries commence to the site.

The majority of potential conflicts between construction traffic and other road users will occur with AIL traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more used to them.

5 Summary

WYG has been commissioned by MORL to undertake a route feasibility investigation for the delivery of abnormal loads associated with the OnTI.

The route review has been undertaken from Peterhead port, via the A90, A950, A981, B9028, A948, B9170 and unclassified roads leading to the site access south of Maryhill Farm.

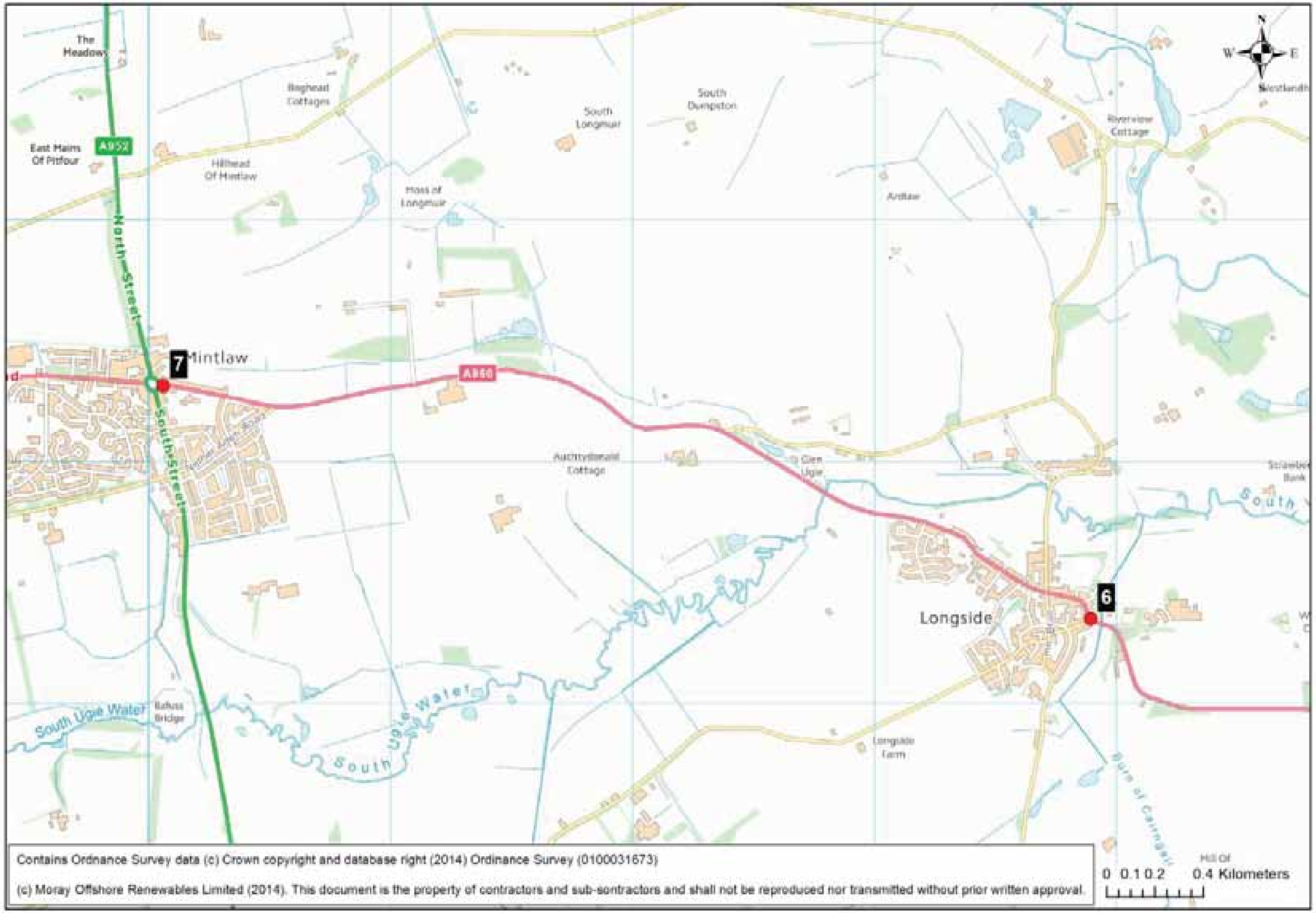
Access from Peterhead to the development has been assessed based on a 108 tonne substation equipment unit.

5.1 Conclusions

Swept path assessments have been completed outlining any mitigation measures that are required to allow the proposed loads to transit safely to site. WYG advise that subject to the mitigation works outlined being instigated and the results of land searches, the route from Peterhead port is deemed suitable for the delivery of the proposed components

Appendix 1 – Points of Interest


PETERHEAD
Peterhead Bay
South Harbour
West Road
South Road
Balmoor Terrace
A950
A982
A90
1
2
3
4
5
Buchanhaven
Blackhouse
Coplandhill
Roanheads
Green Hill
Keith Inch
Kirktown
Grange Gardens
Middle Grange
Clerkhill
Meethill
Whitehill
Invernettie
Ellen Skellyis
Wester Clerkhill
Windy Ridge
Richmondhill Cottage
Wood End House
Berryhill
Wellington
Auchtygall
Westerton Of Auchtygall
Cowsnewe Bungalow
South Breakwater
0 0.1 0.2 0.4 Kilometers
N
S
E
W



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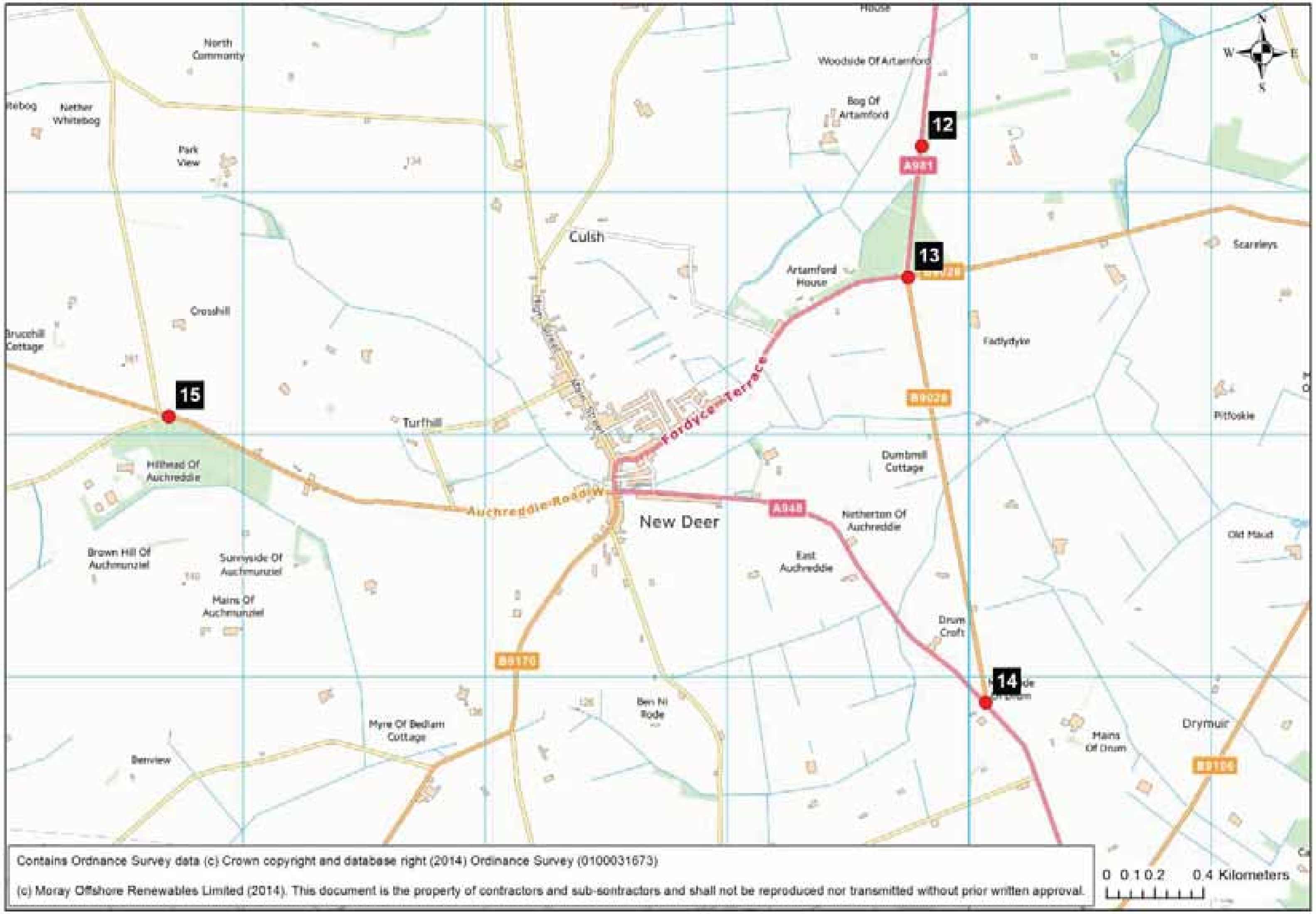
Mains Of Whitehill
Little Whitehill
Katie's Neuk
Willanslea Cottage
Grassiehill
Hope Cottage
Milton Of Auchorthie
Auchorthie
Camichal
Newlandhill
Meikle Auchedch
Sawmill Cottage
Weetingshill Cottage
Water of Pedderate
North Lodge
Castle Park House
Quintos Dos Amigos
North Atherb
Cryla
Knapper
Woodside
A981
Aulton Of Atherb
Hillhead Of Bruxie
Brownhill
Bridge Of Tillepestle
Brownhill Cottage
Shevado Home Farm Cottage
The Linties
dderate
8
9
10
11
N
S
W
E
0 0.1 0.2 0.4 Kilometers


North Community
Nether Whitebog
Park View
Crosshill
15
Hillhead Of Auchreddie
Brown Hill Of Auchmunziel
Sunnyside Of Auchmunziel
Mains Of Auchmunziel
Benview
Myre Of Bedlam Cottage
Turfhill
Culsh
High Street
Main Street
Auchreddie Road W
Fordyce Terrace
New Deer
B9170
Ben Ni Rode
Woodside Of Artamford
Bog Of Artamford
12
A981
13
Artamford House
B9028
Dumbmill Cottage
A948
Netherton Of Auchreddie
East Auchreddie
Drum Croft
14
Fadlydyke
Scareleys
Pitfoskie
Old Maud
Mains Of Drum
Drymuir
B9106
N
W
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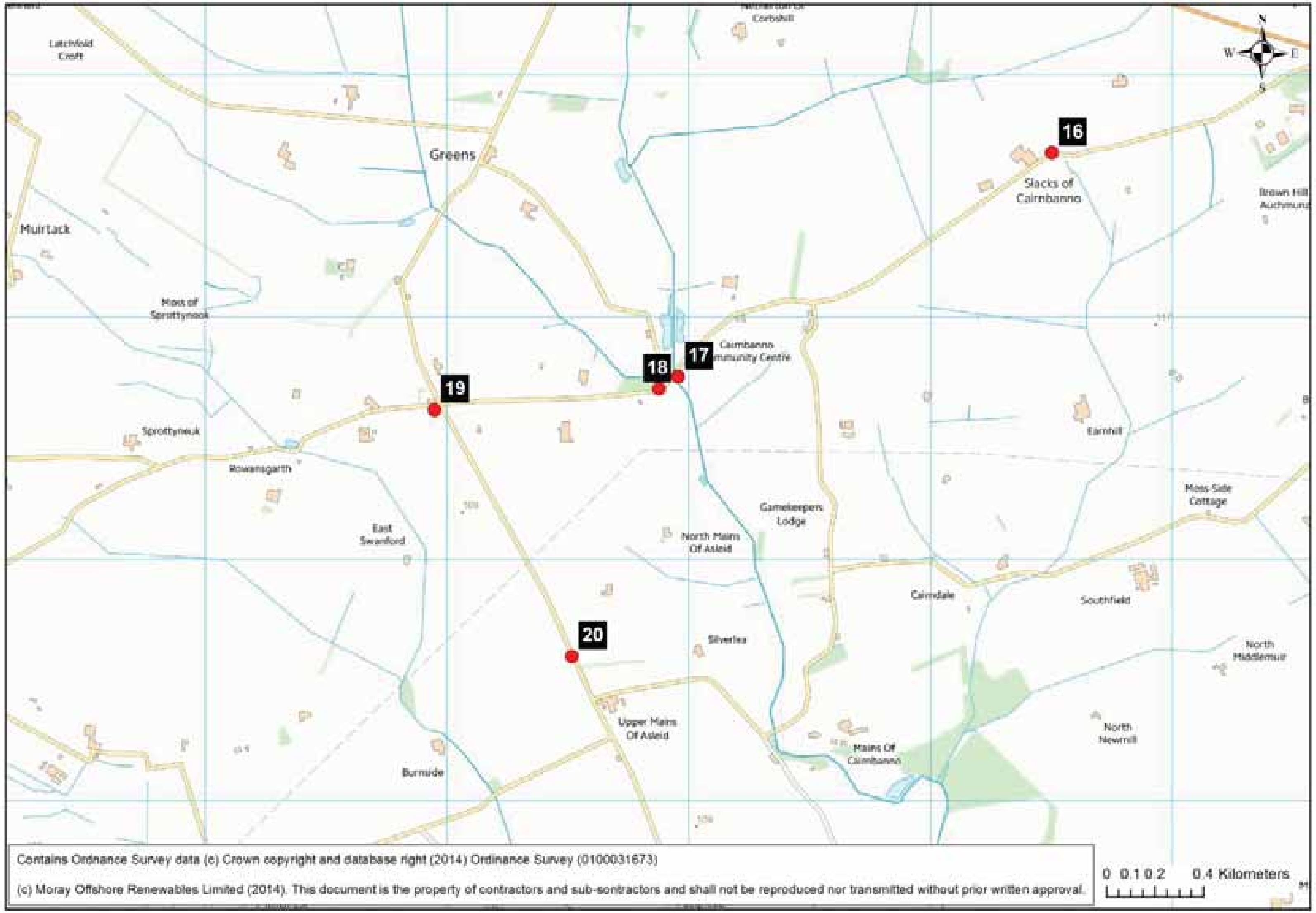
S
0 0.1 0.2 0.4 Kilometers


Latchfold Croft
Greens
Muirtack
Moss of Sprottynook
Sprottyneuk
Rowansgarth
East Swanford
Burnside
19
18
17
Cairnbanno Community Centre
16
Slacks of Cairnbanno
Brown Hill Auchmunz
Earnhill
Moss-Side Cottage
Gamekeepers Lodge
North Mains Of Asleid
Cairndale
Southfield
North Middlemuir
Silverlea
20
Upper Mains Of Asleid
Mains Of Cairnbanno
North Newmill
N
S
E
W
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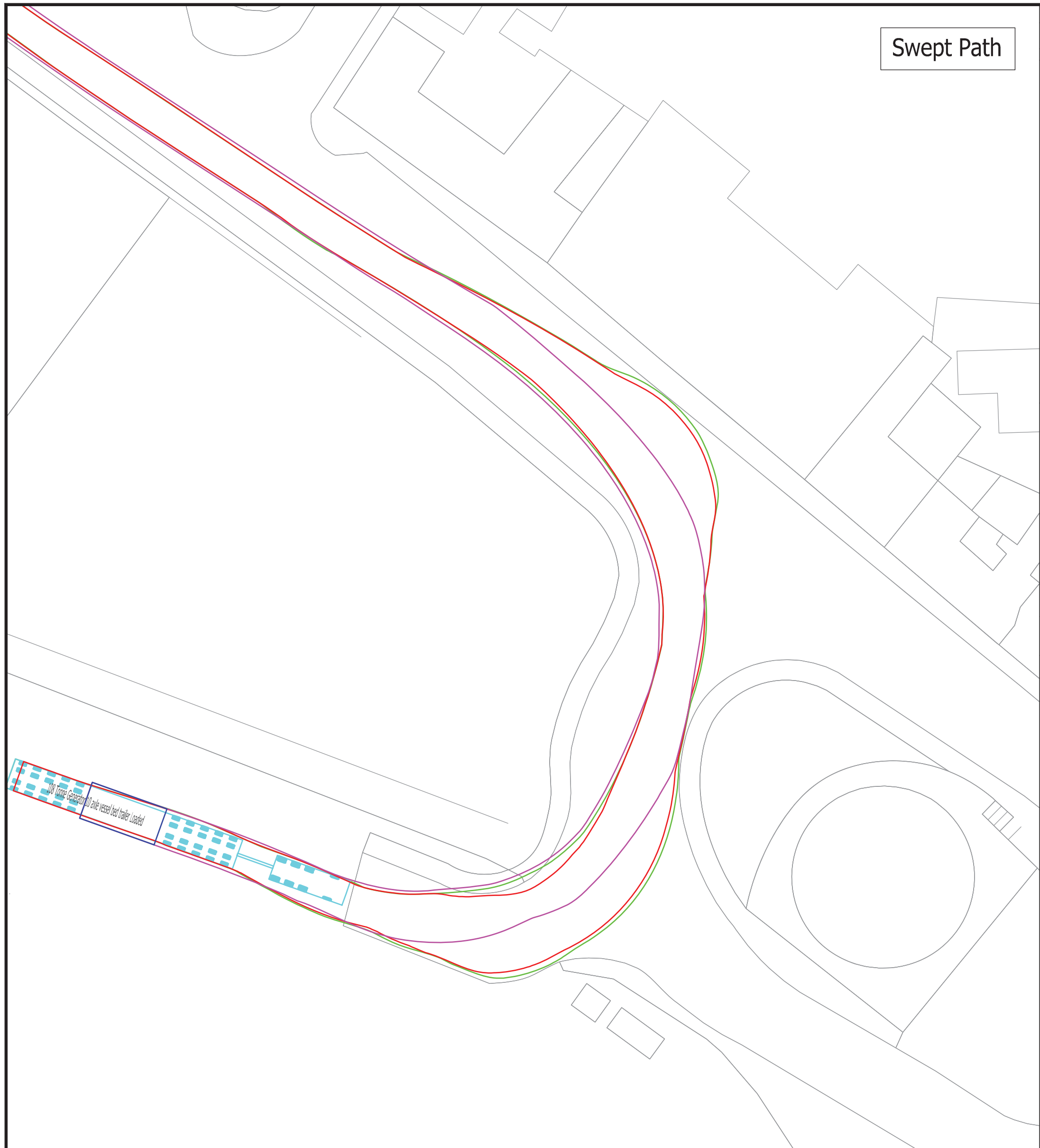
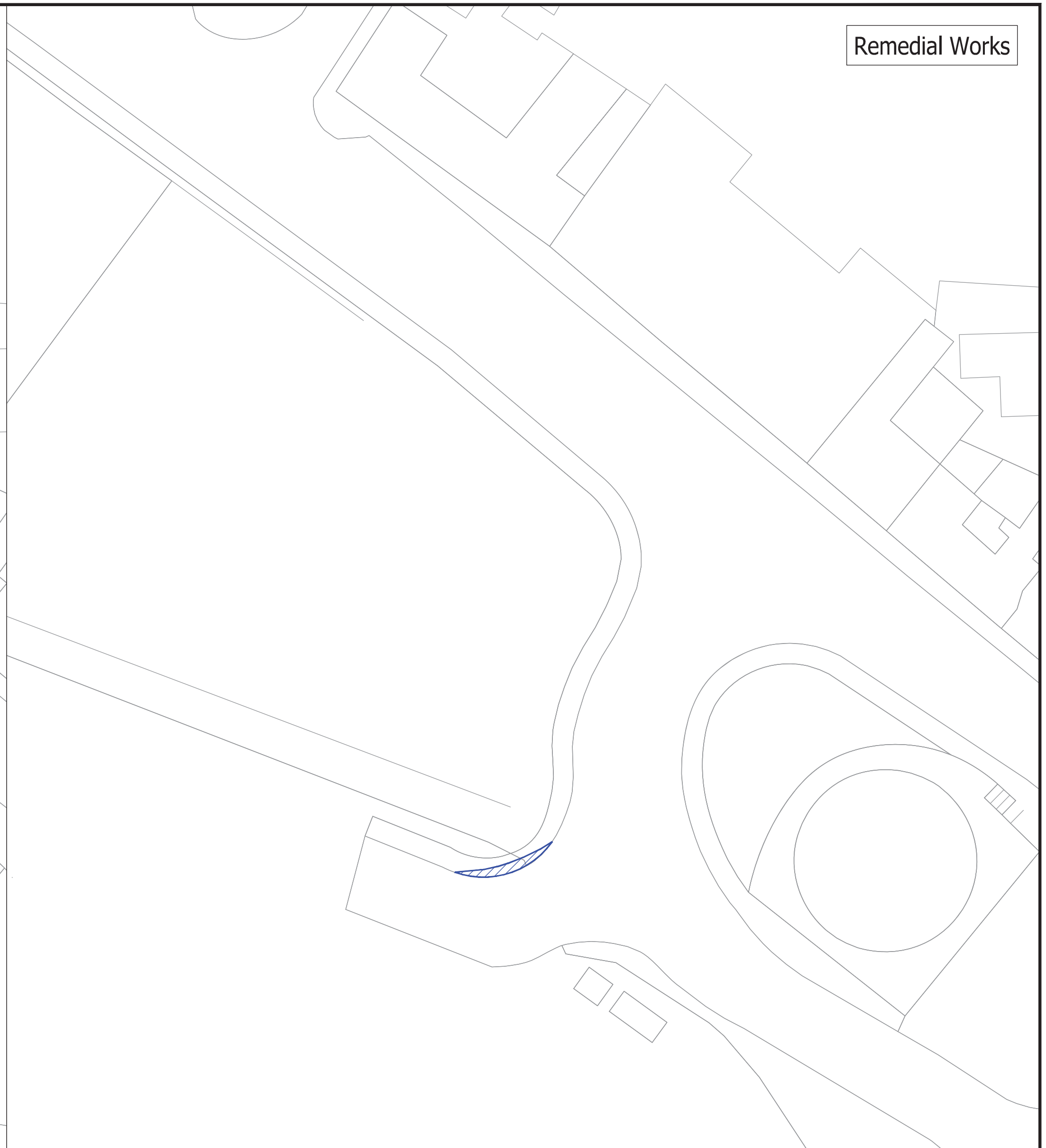
0 0.1 0.2 0.4 Kilometers

Appendix 2 – Swept Path Assessment





Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: Peterhead Port Exit	POI: 1
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
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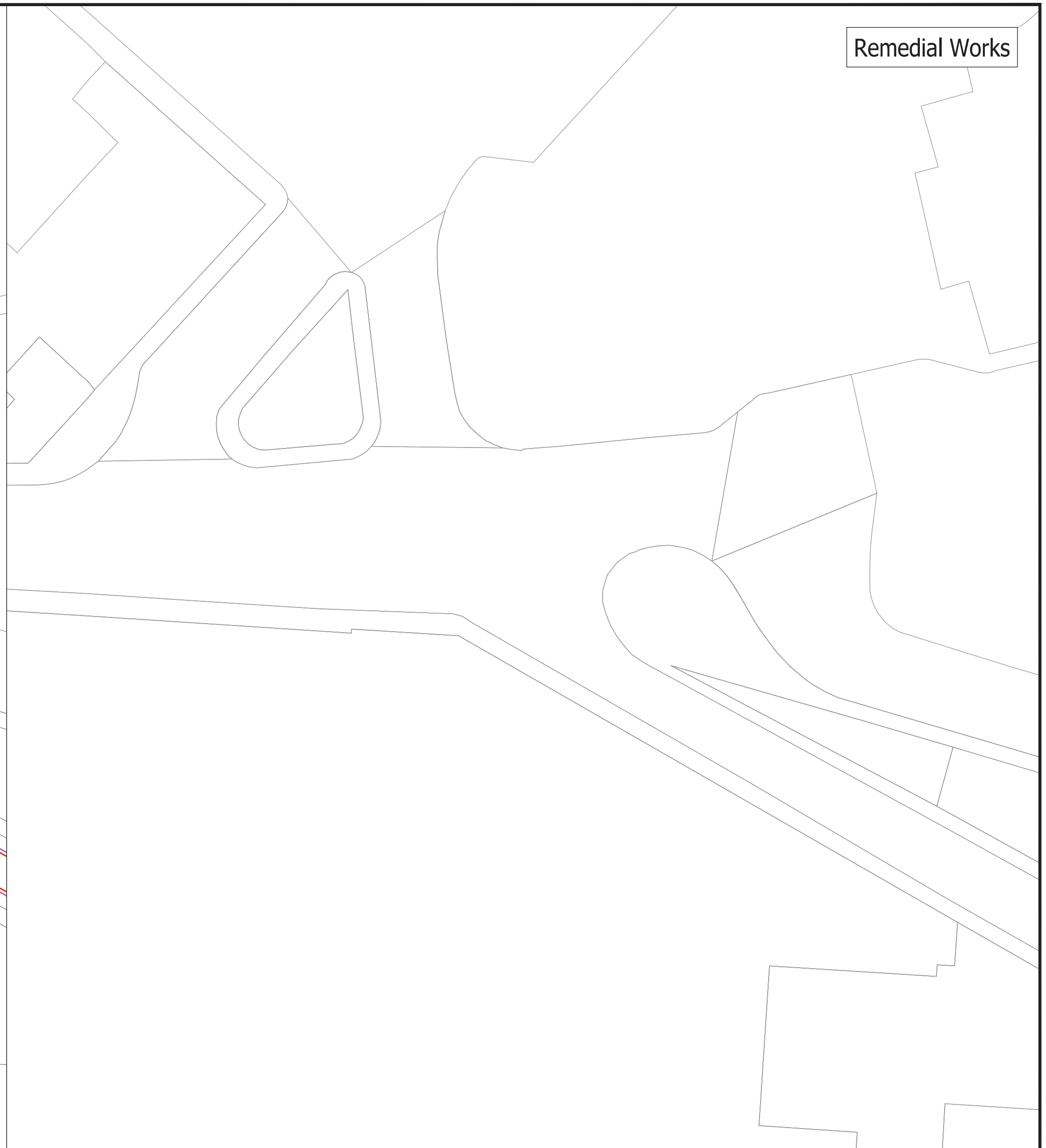
DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
CJ	GB	June 2014	1:500 @ A3	A087928	SPA001	-



Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
Charlotte Street / Kirk Street Junction	2

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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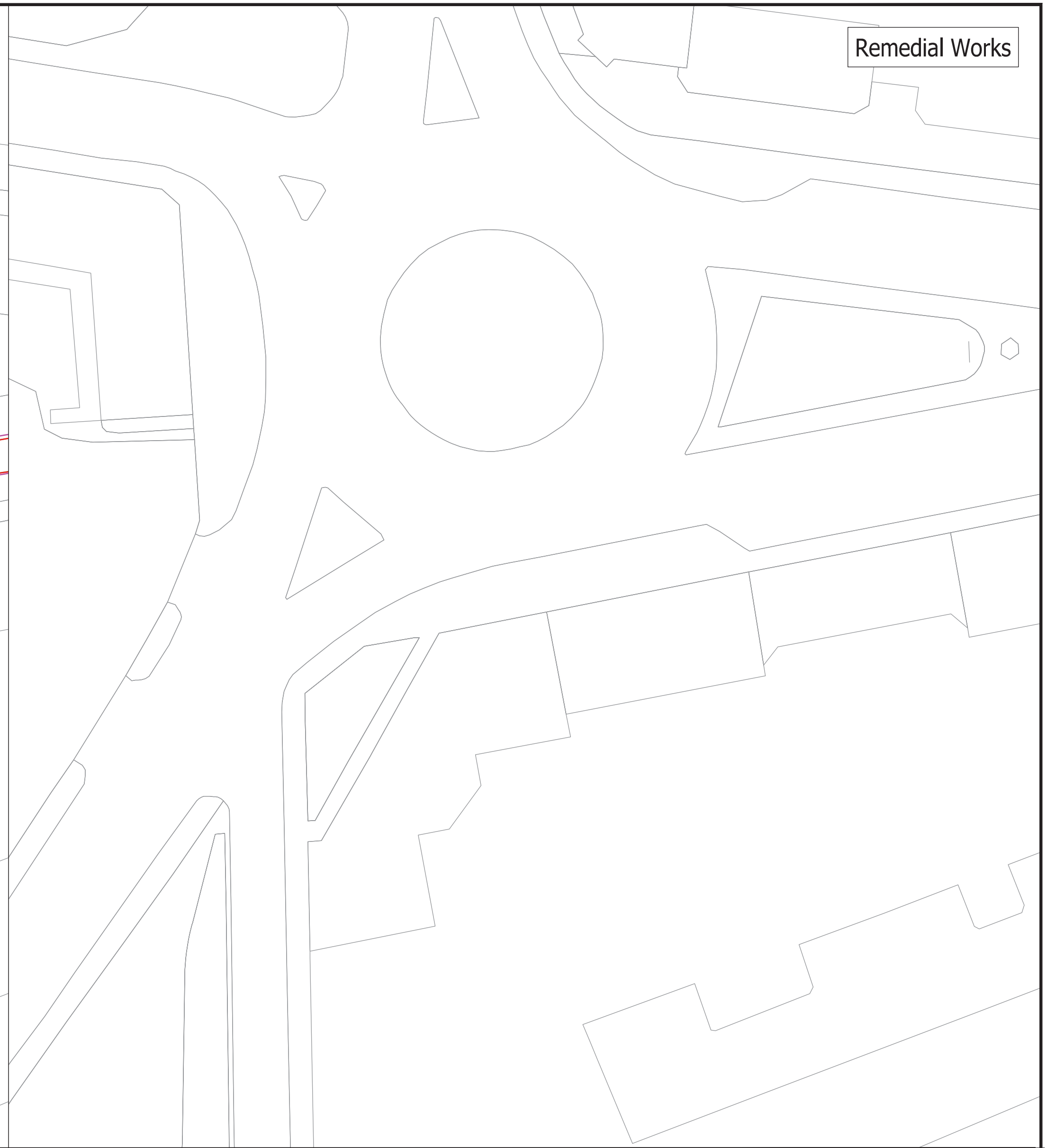

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
Kirk Street / A982 South Road Roundabout	3

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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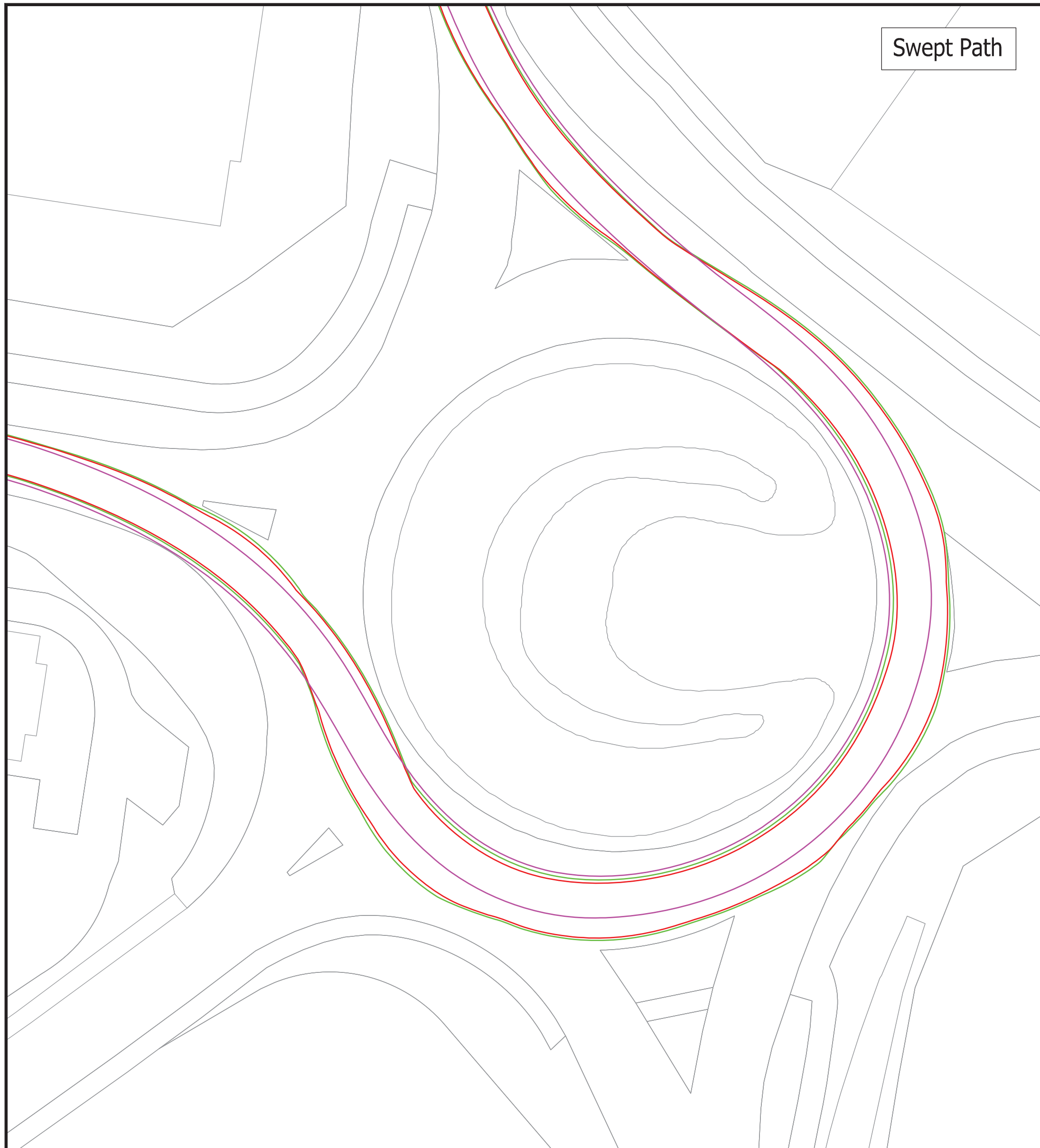

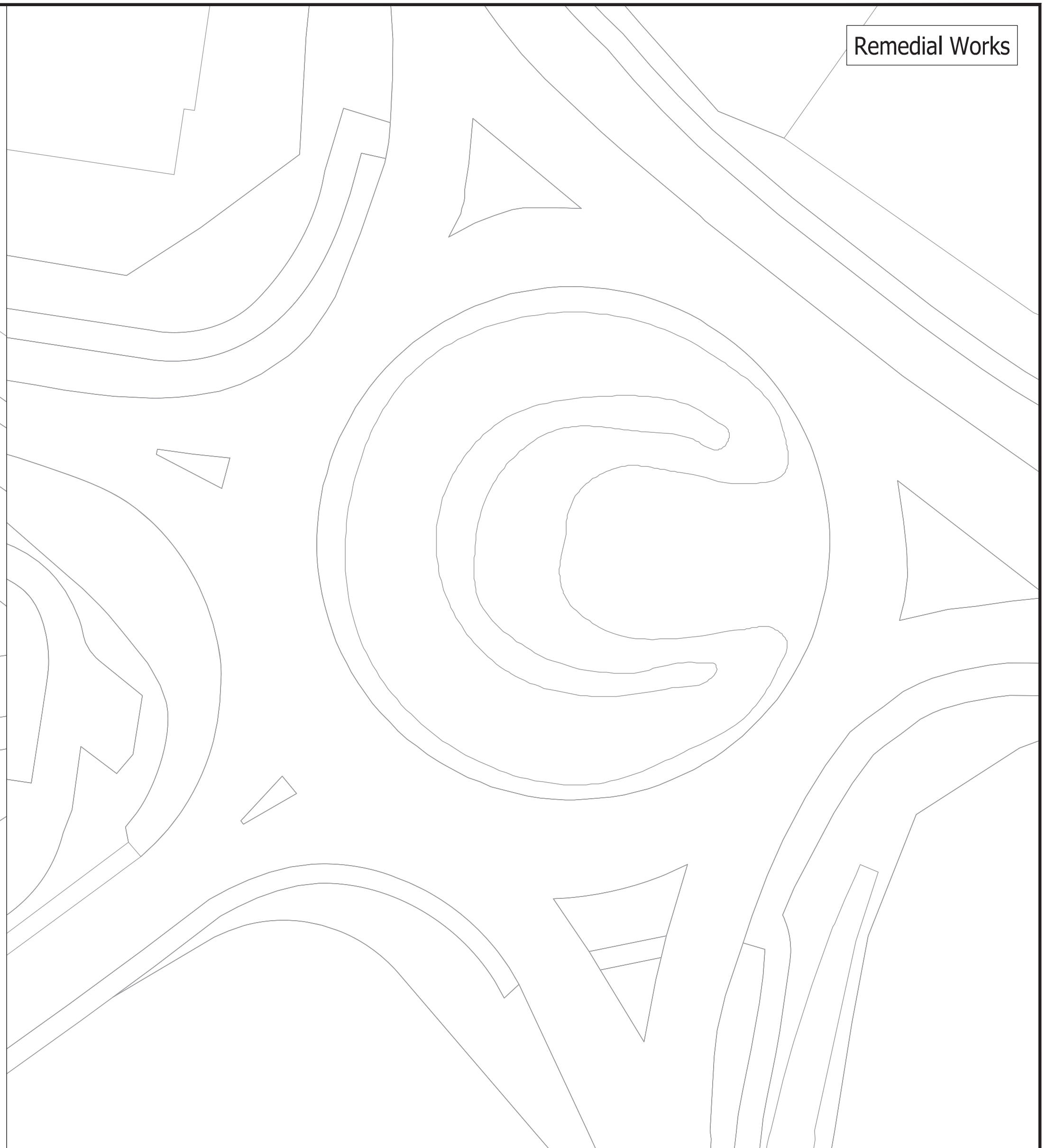

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

N

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: A982 / A90 Roundabout

POI: 4

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning

part of the WYG group

39 George Street Edinburgh EH2 2HN

t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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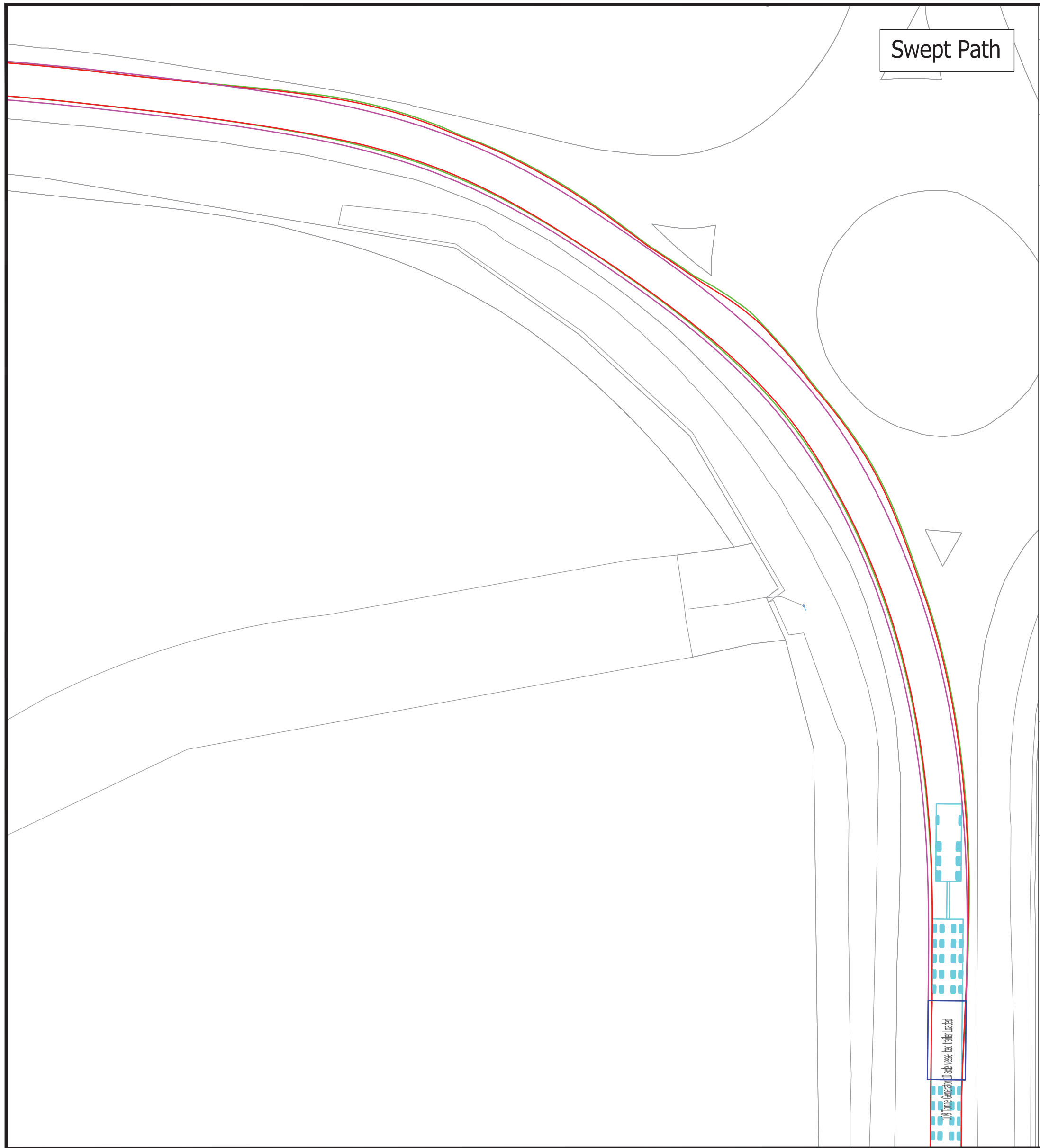

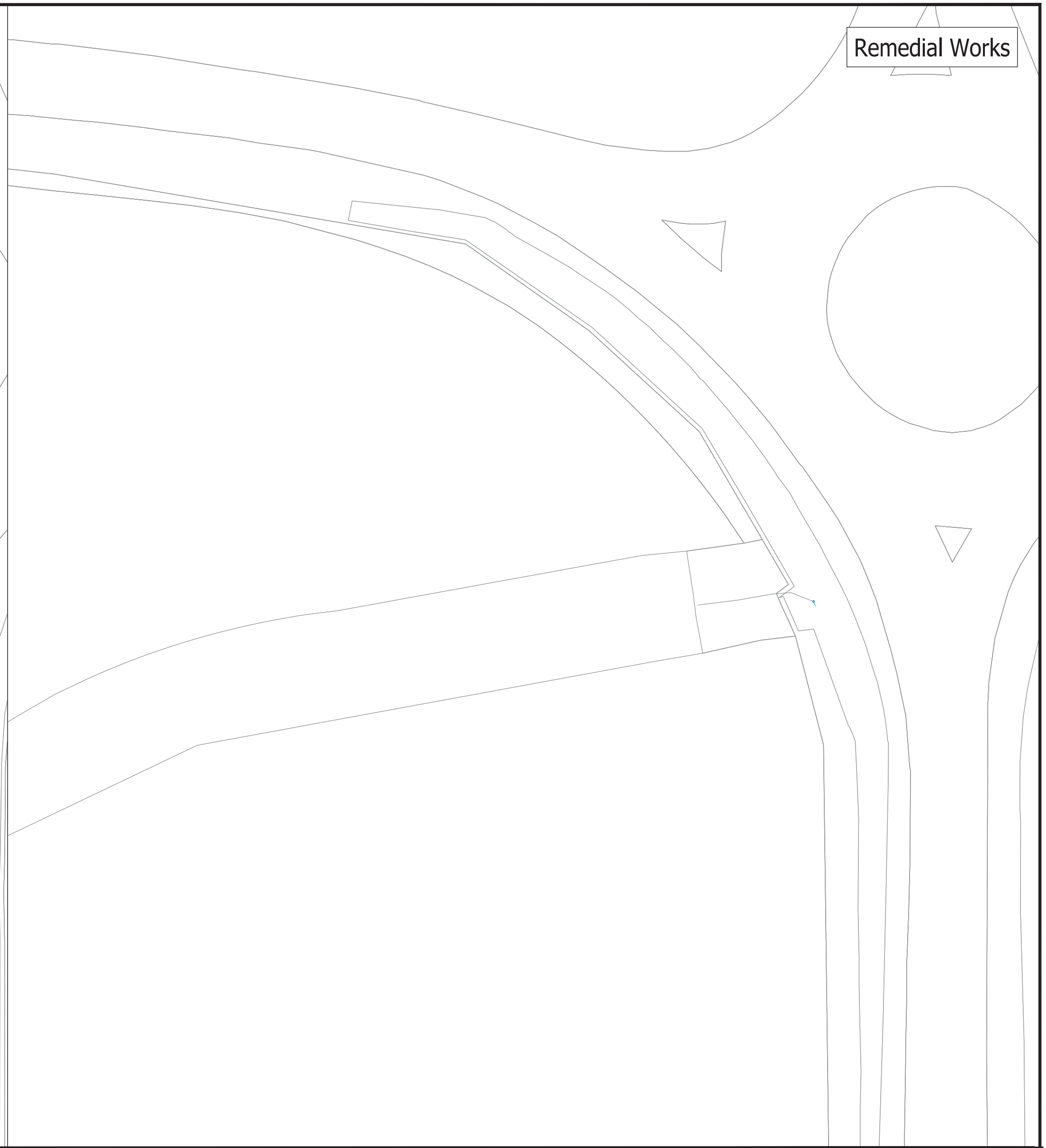

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: A90 / A950 Roundabout	POI: 5
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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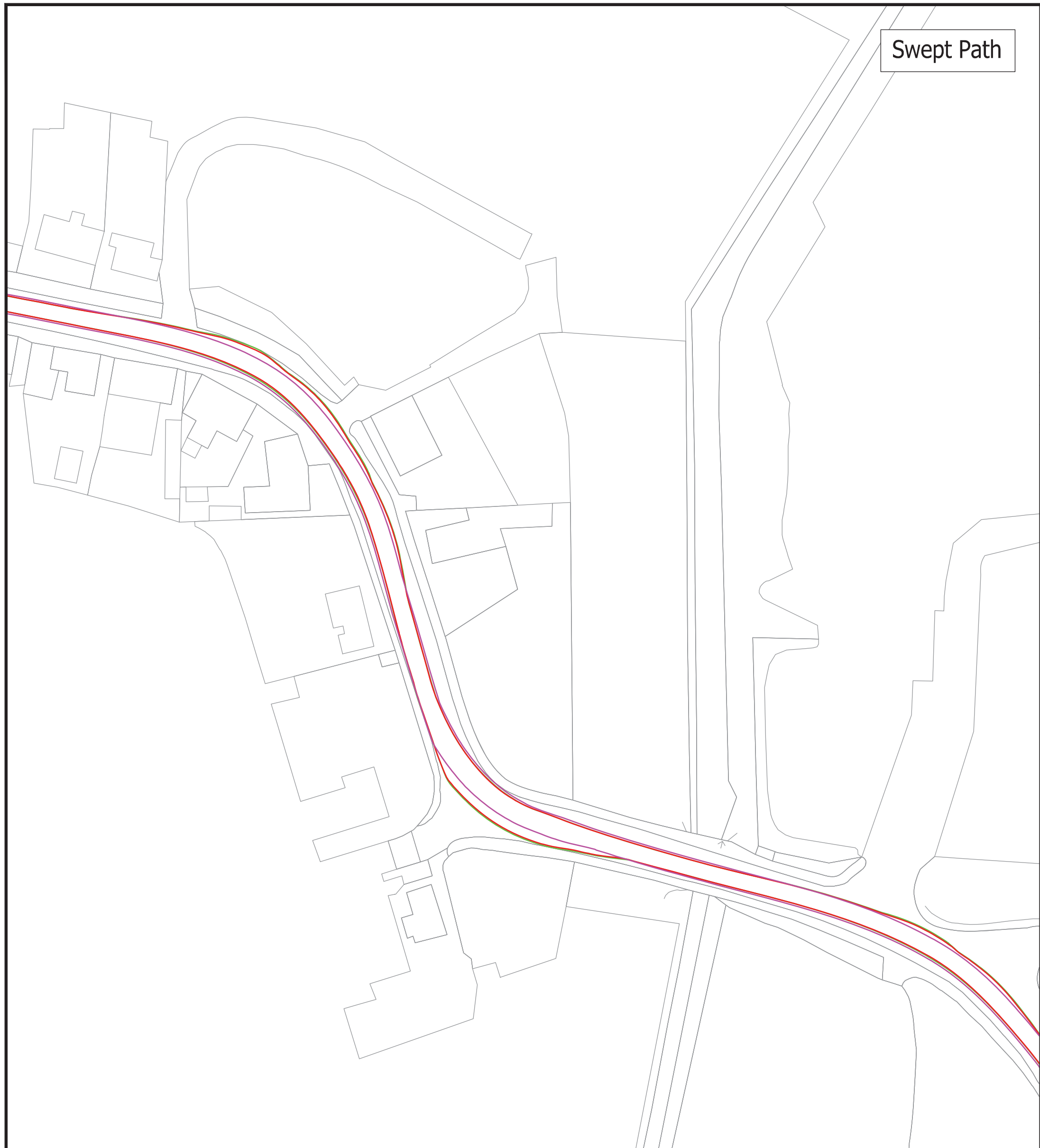

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: A950 Series of Bends in Longside	POI: 6
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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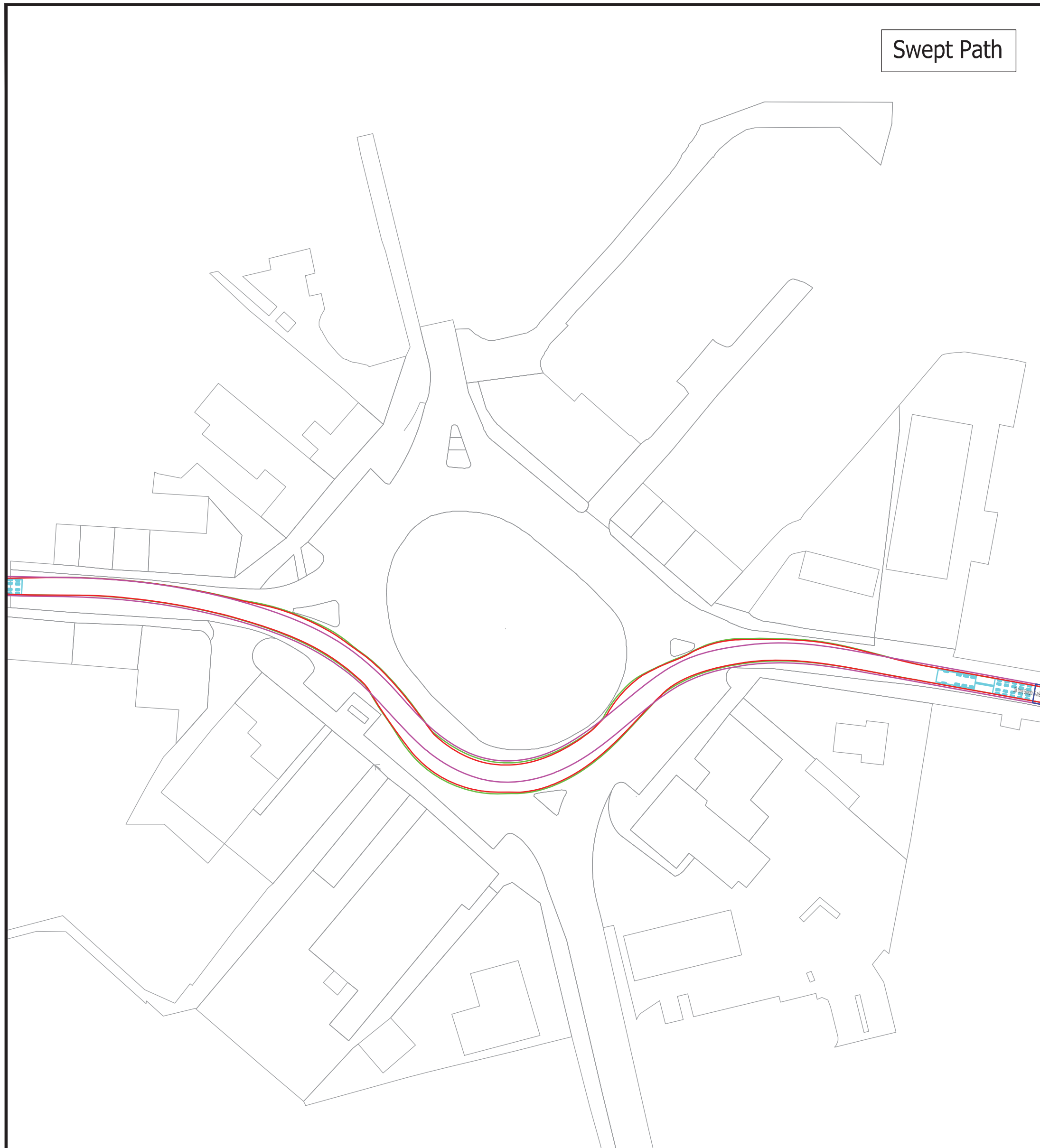

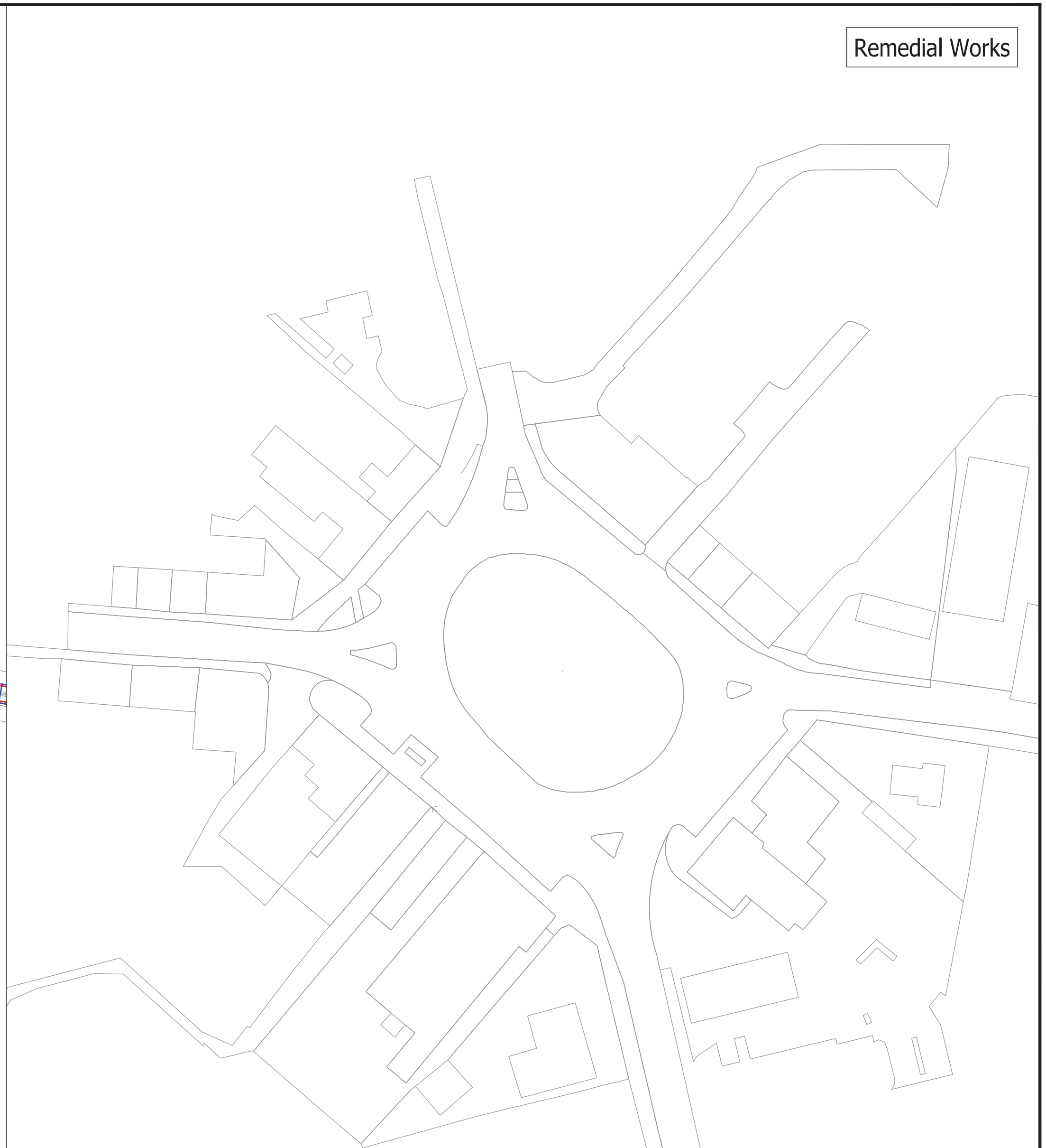

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
A950 / A952 Roundabout	7

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning

part of the WYG group

39 George Street Edinburgh EH2 2HN

t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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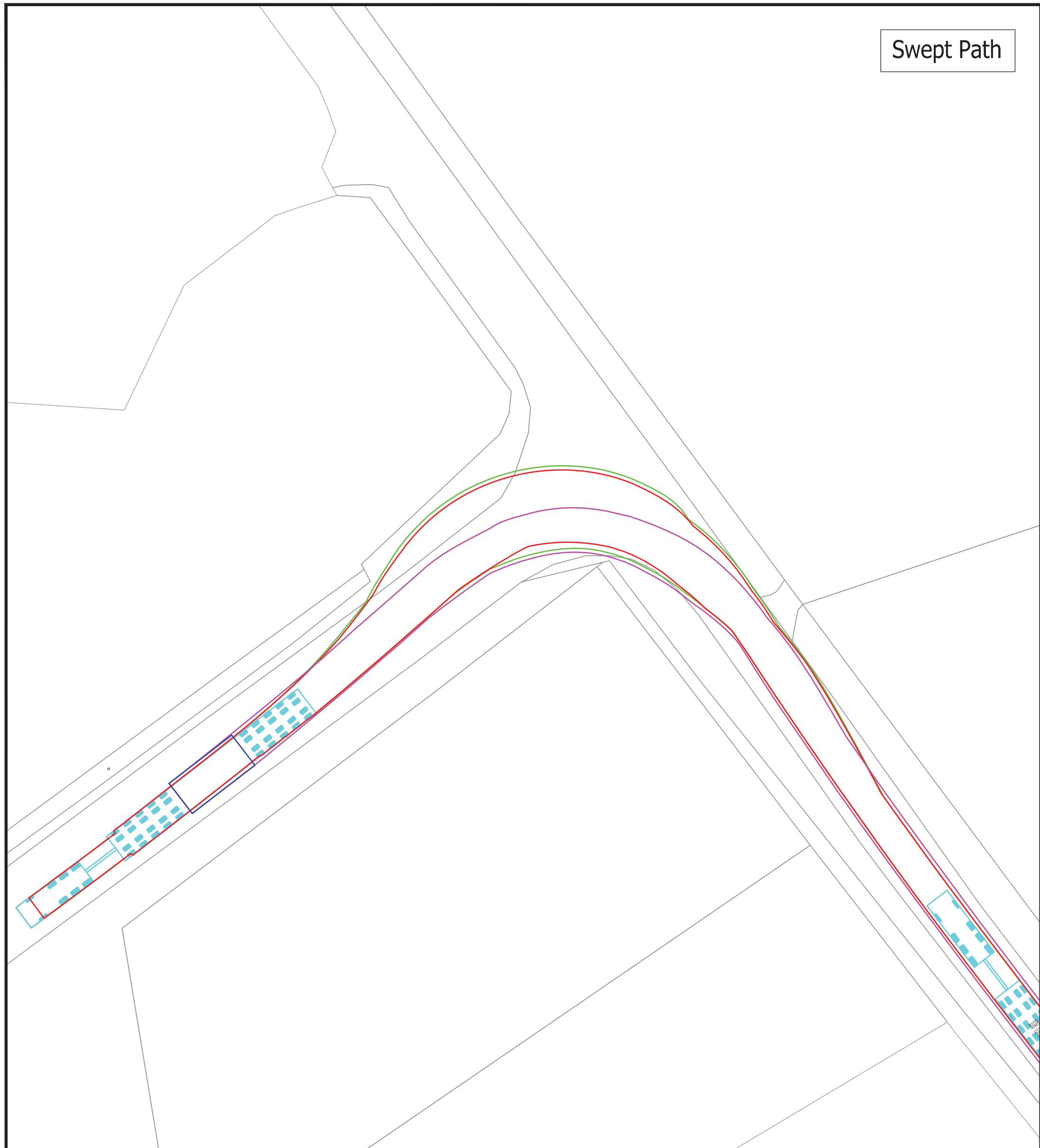

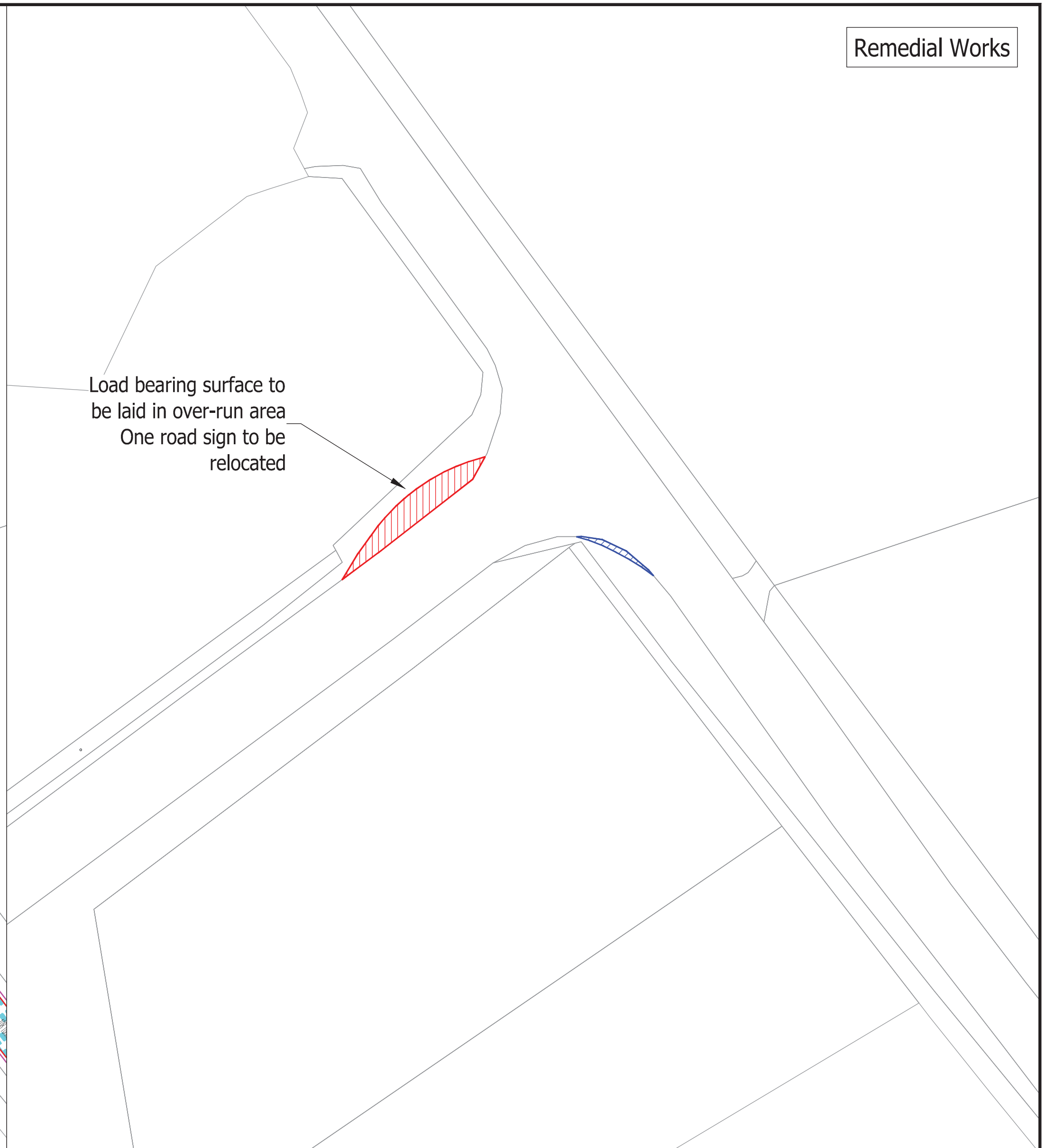

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: A950 / A981 Junction

POI: 9

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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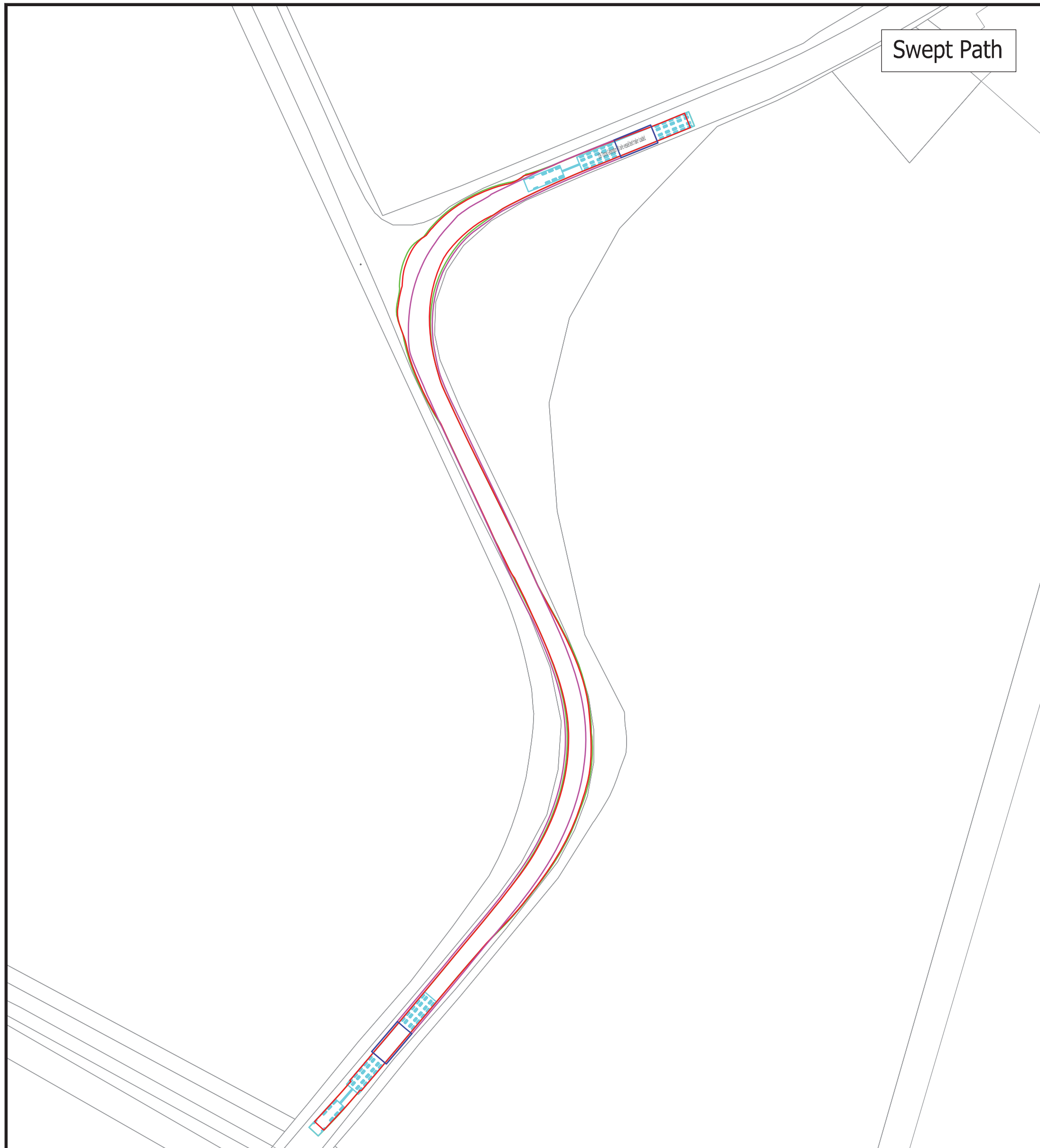

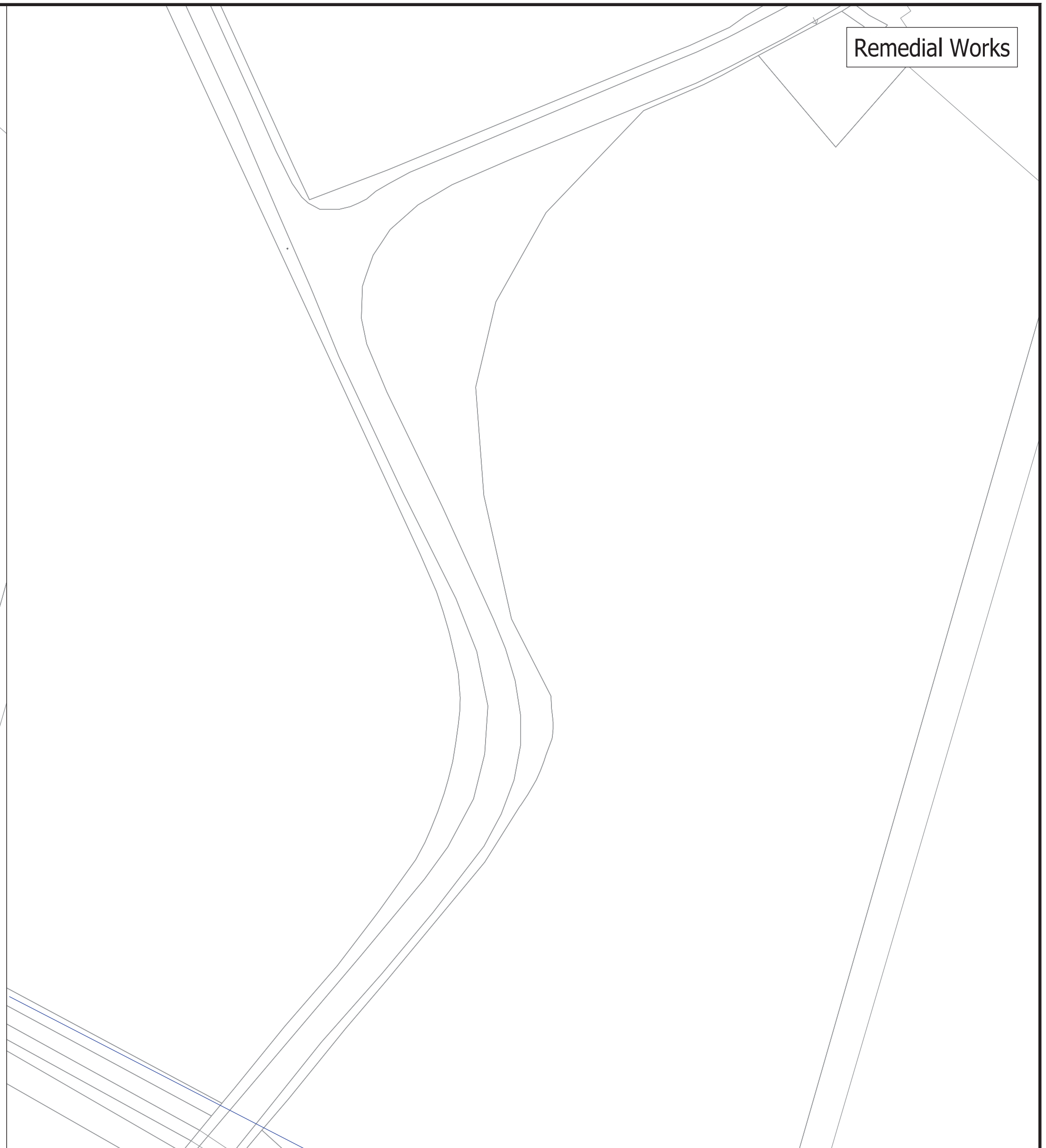

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

N

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: A981 Left / Right Bends North of Brucklay	POI: 11
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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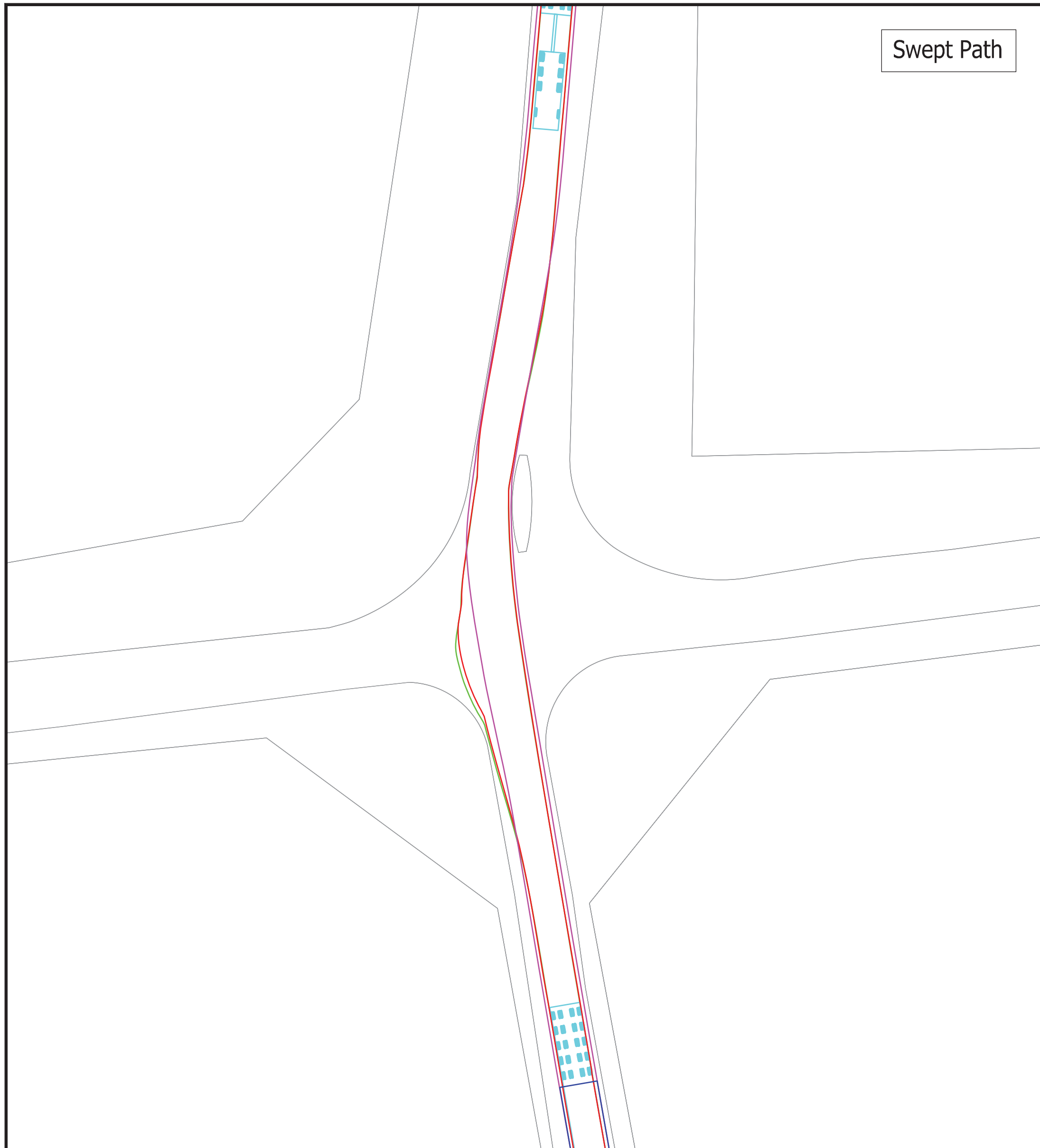

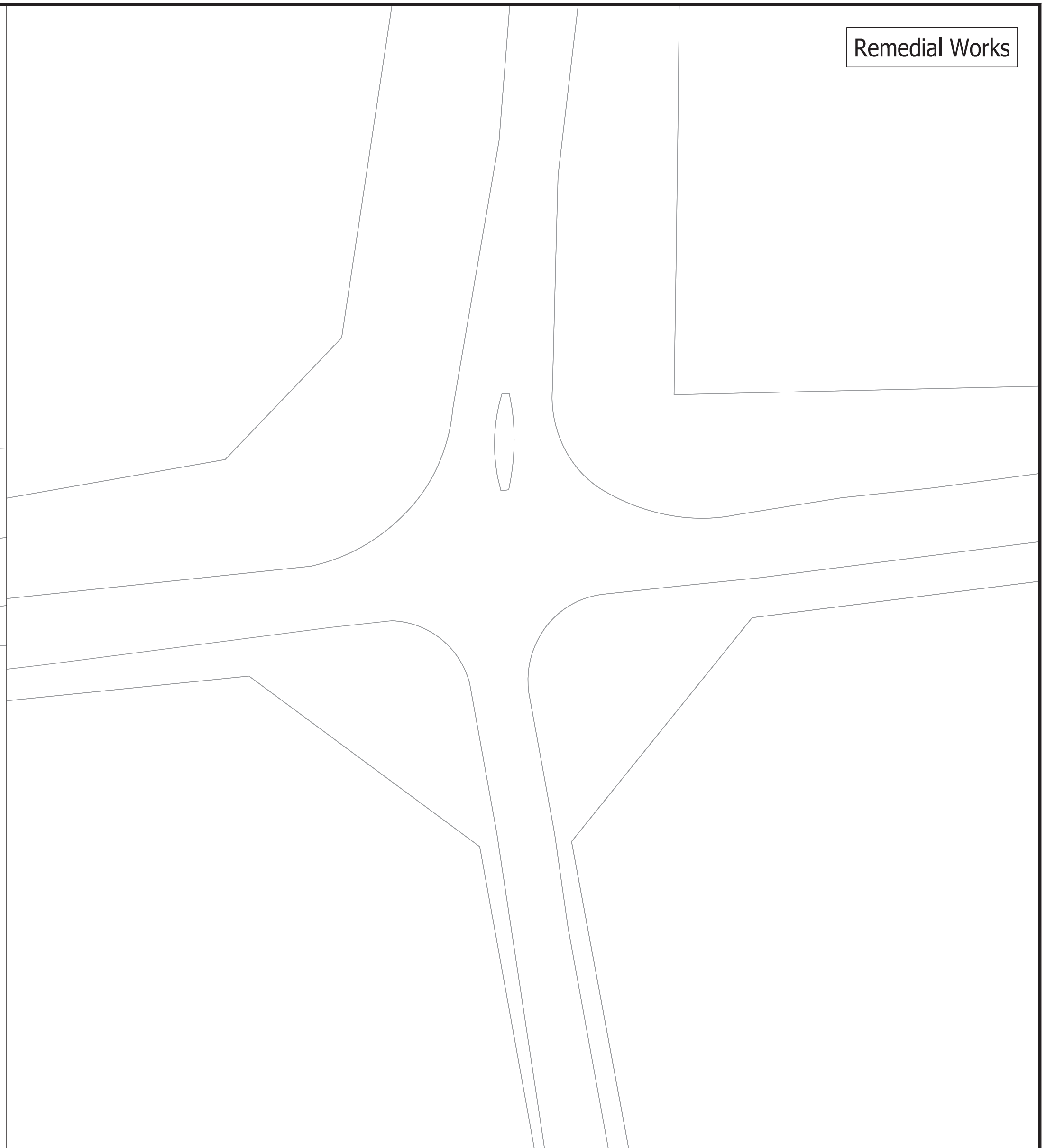

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
A981 / B9029	13

COMPONENTS:
Substation Generator Unit

DRAWING TYPE:
Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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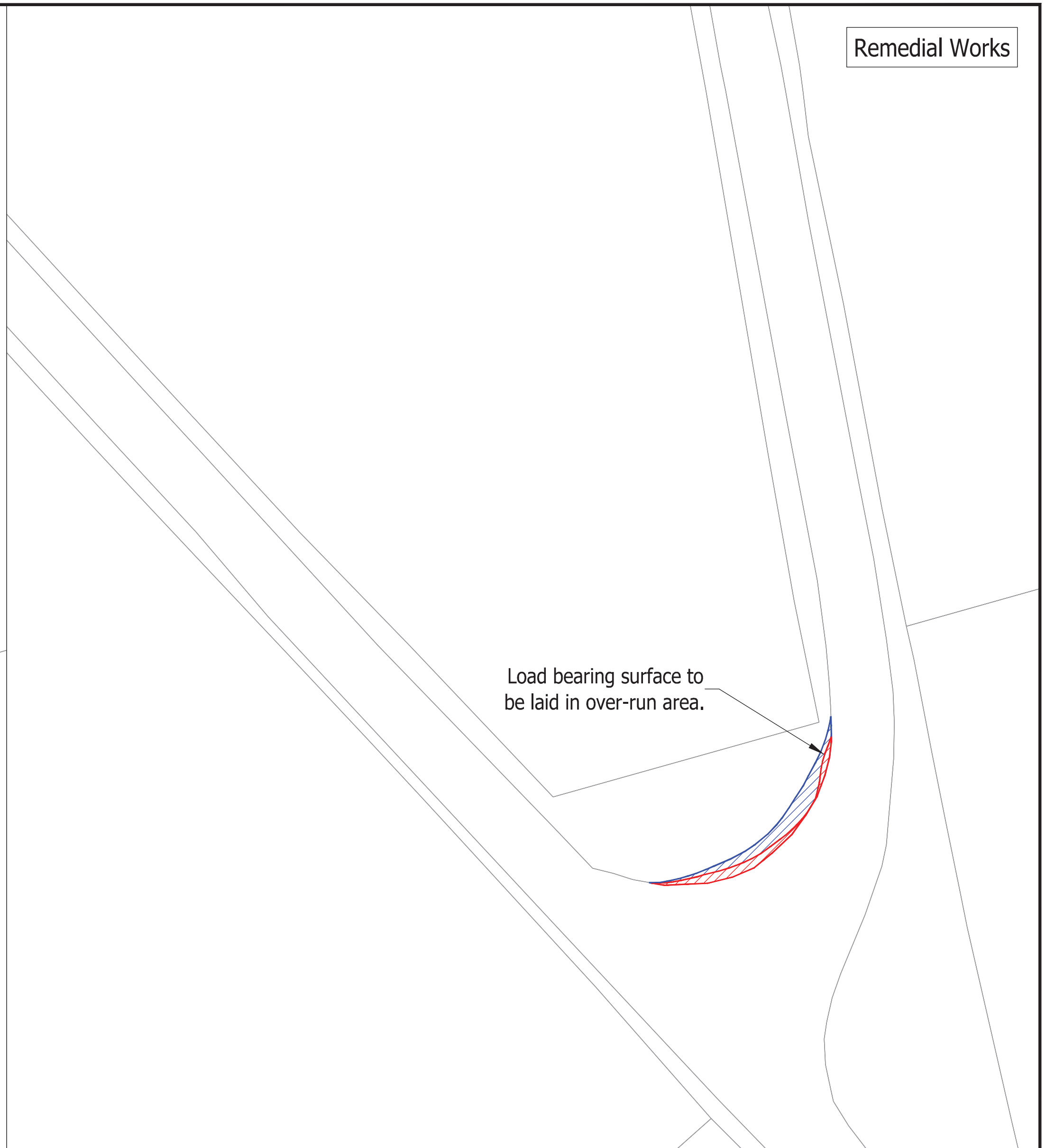

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: B9028 / A948 Junction

POI: 14

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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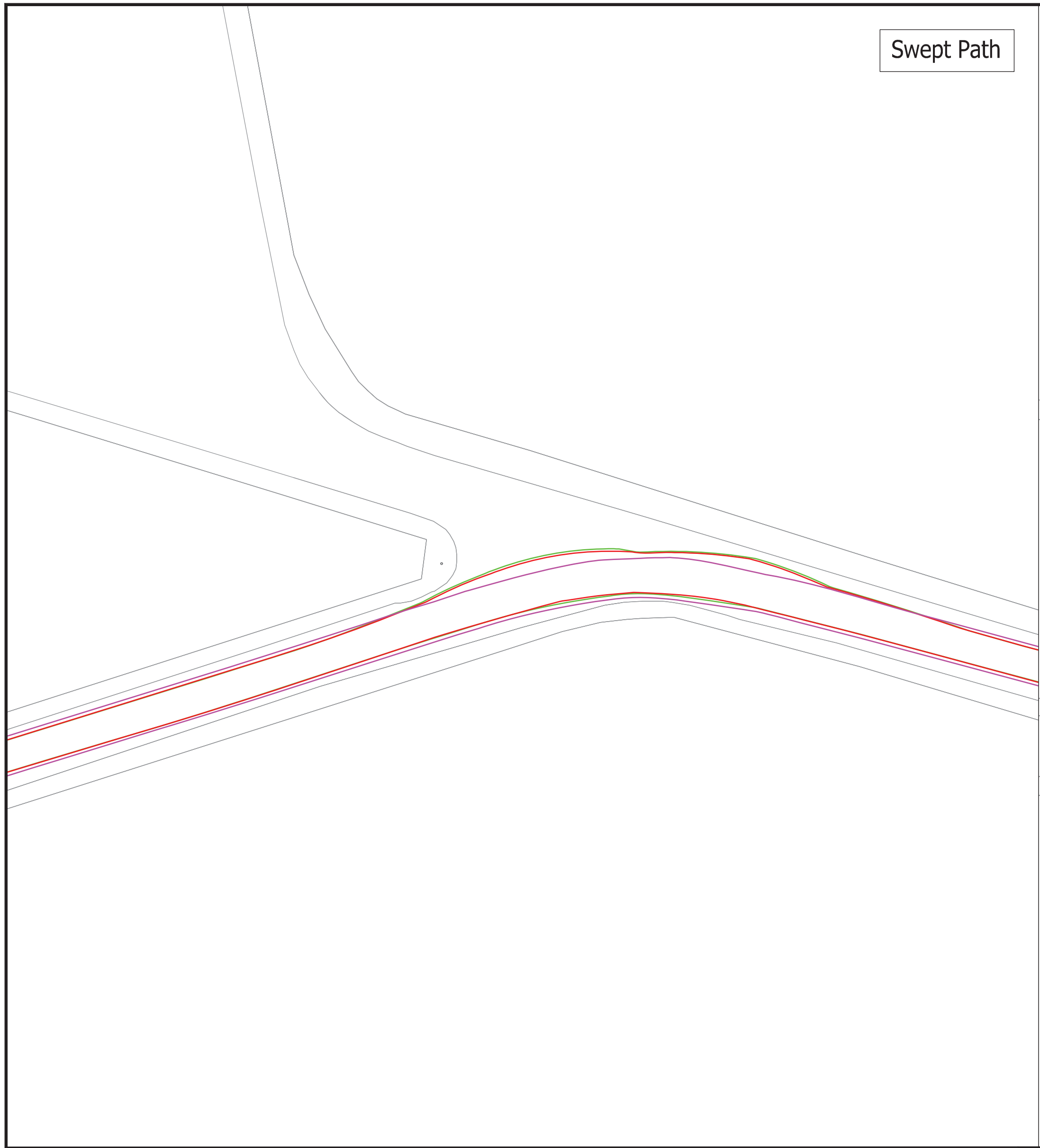
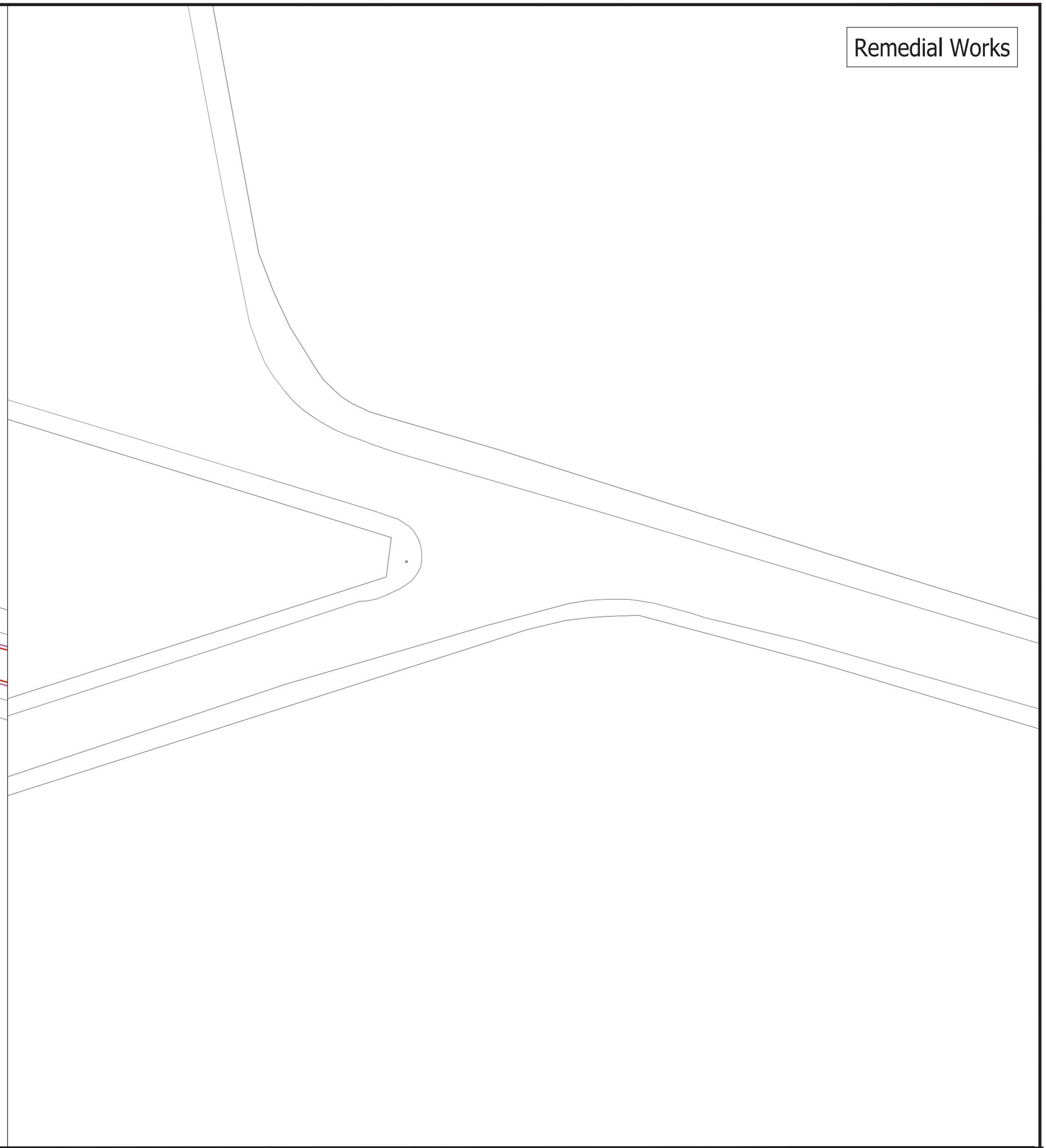
Swept Path



Remedial Works



Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: B9170 / C121B Junction at Hillhead of Auchreddie

POI: 15

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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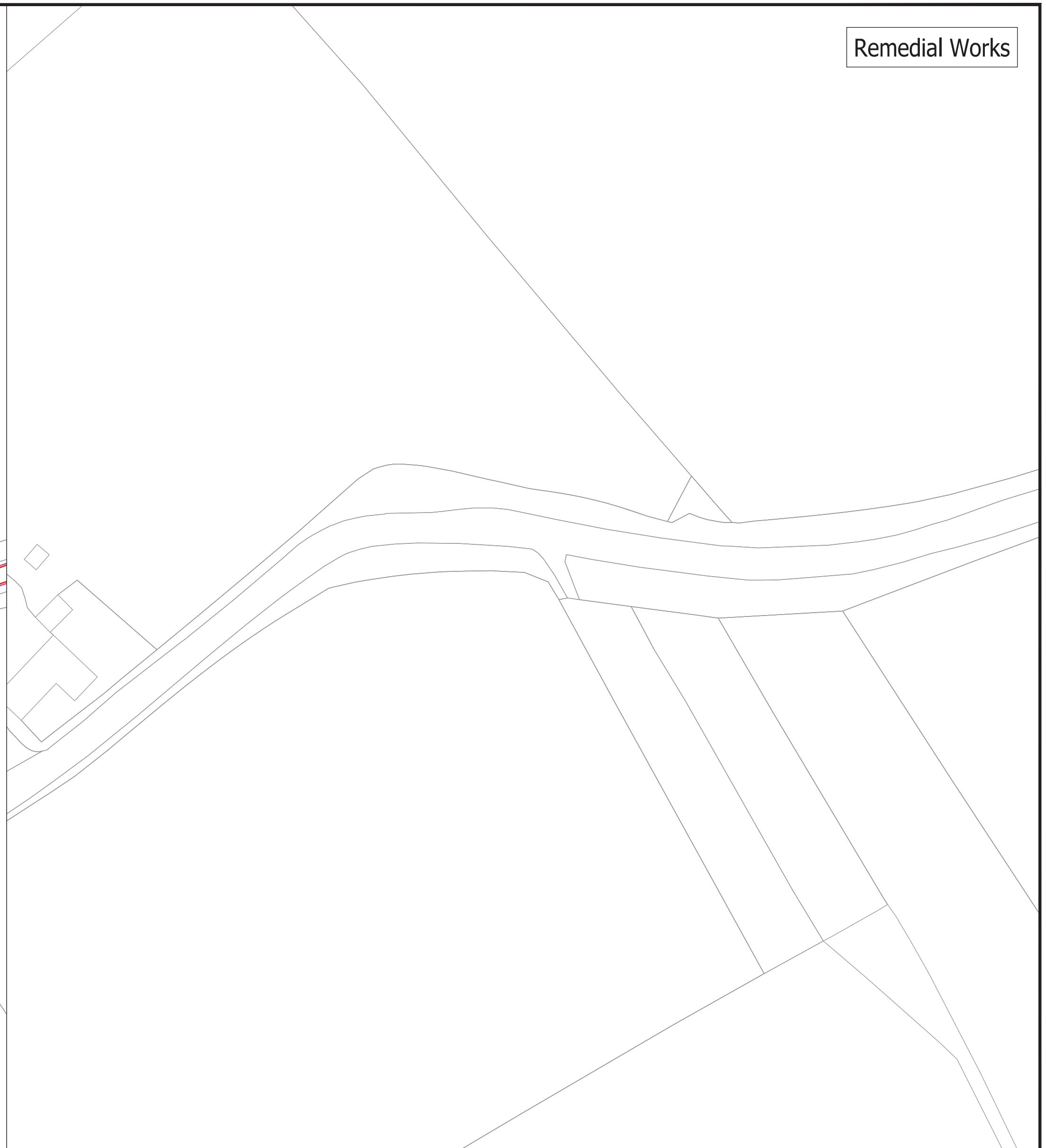

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

N

NO MITIGATION REQUIRED

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
C121B Right / Left Bends at Grainhow	16

COMPONENTS:
Substation Generator Unit

DRAWING TYPE:
Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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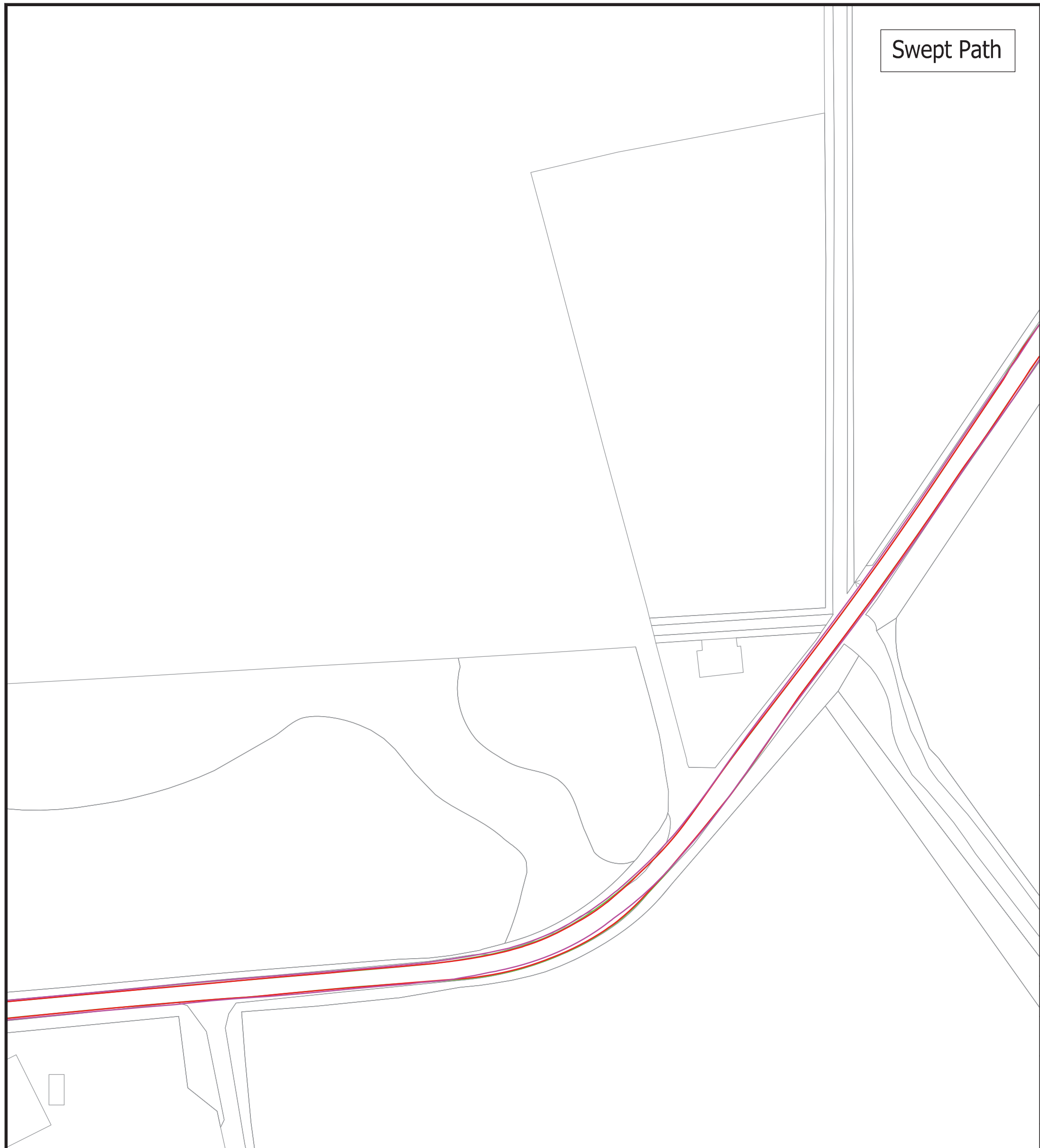

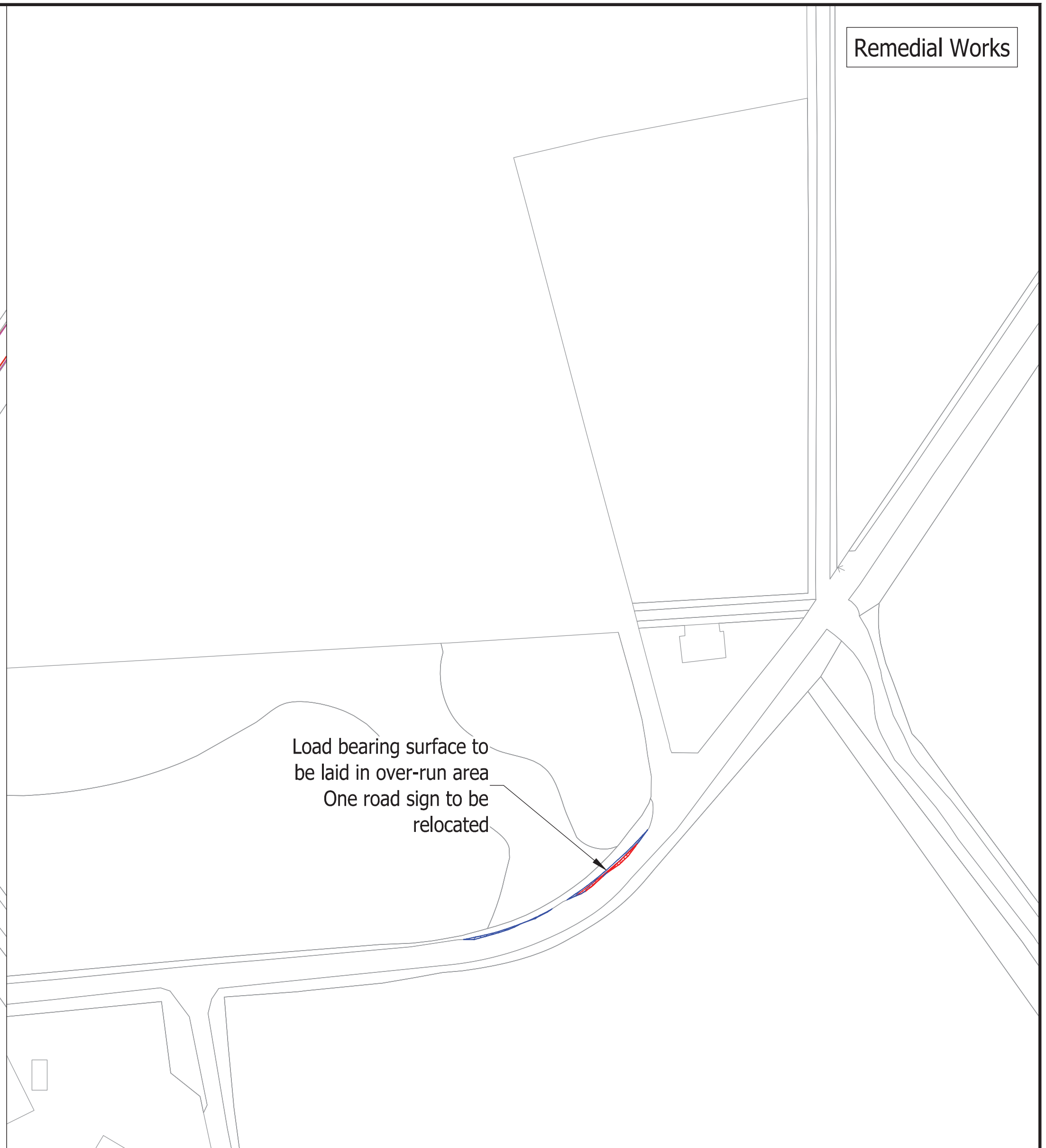

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Over-sail Required
- Over-run Required

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION:	POI:
C121B Right Bend at Mill of Greens	18

COMPONENTS:
Substation Generator Unit

DRAWING TYPE:
Swept Path Assessment & Required Remedial Works

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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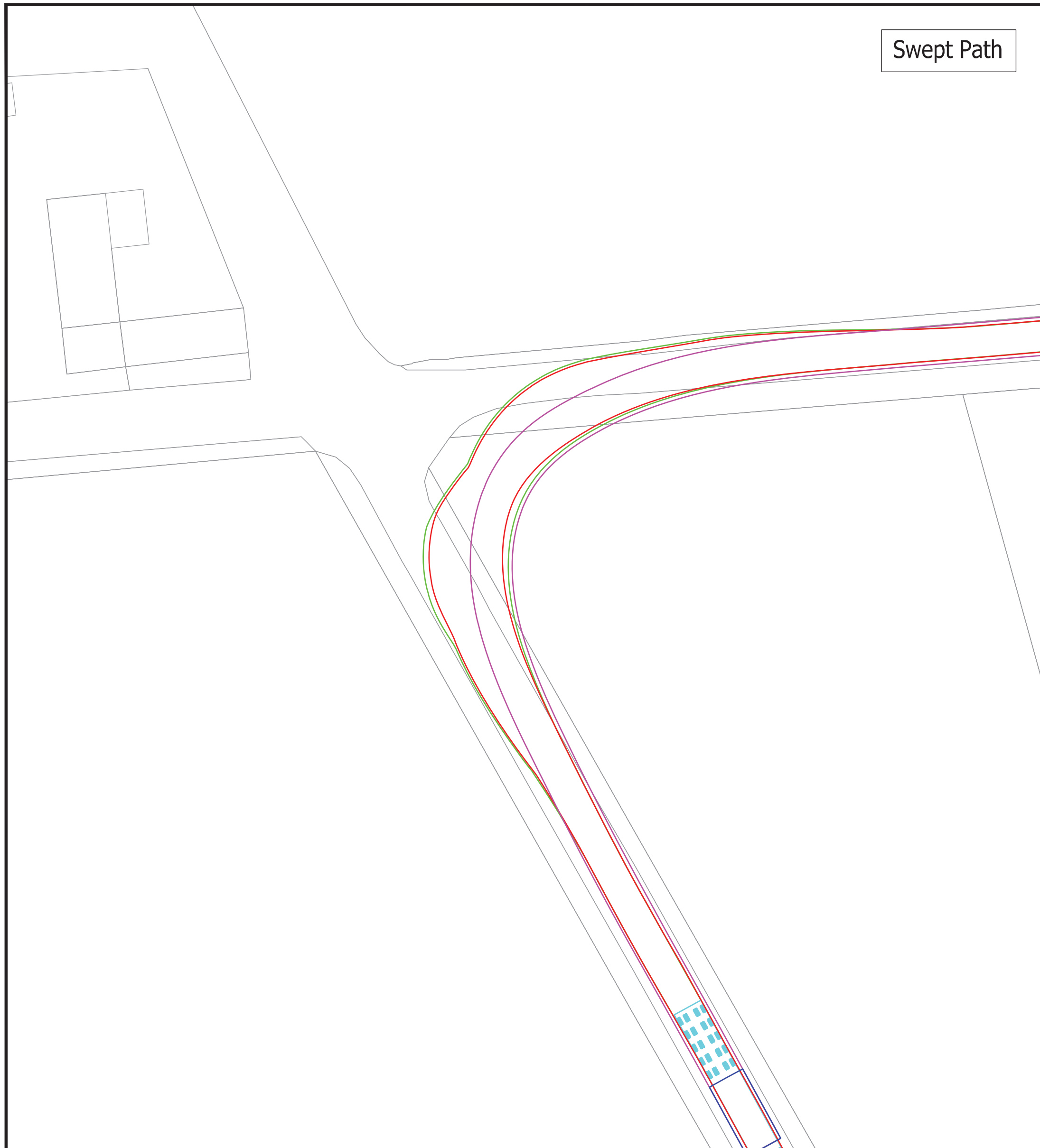

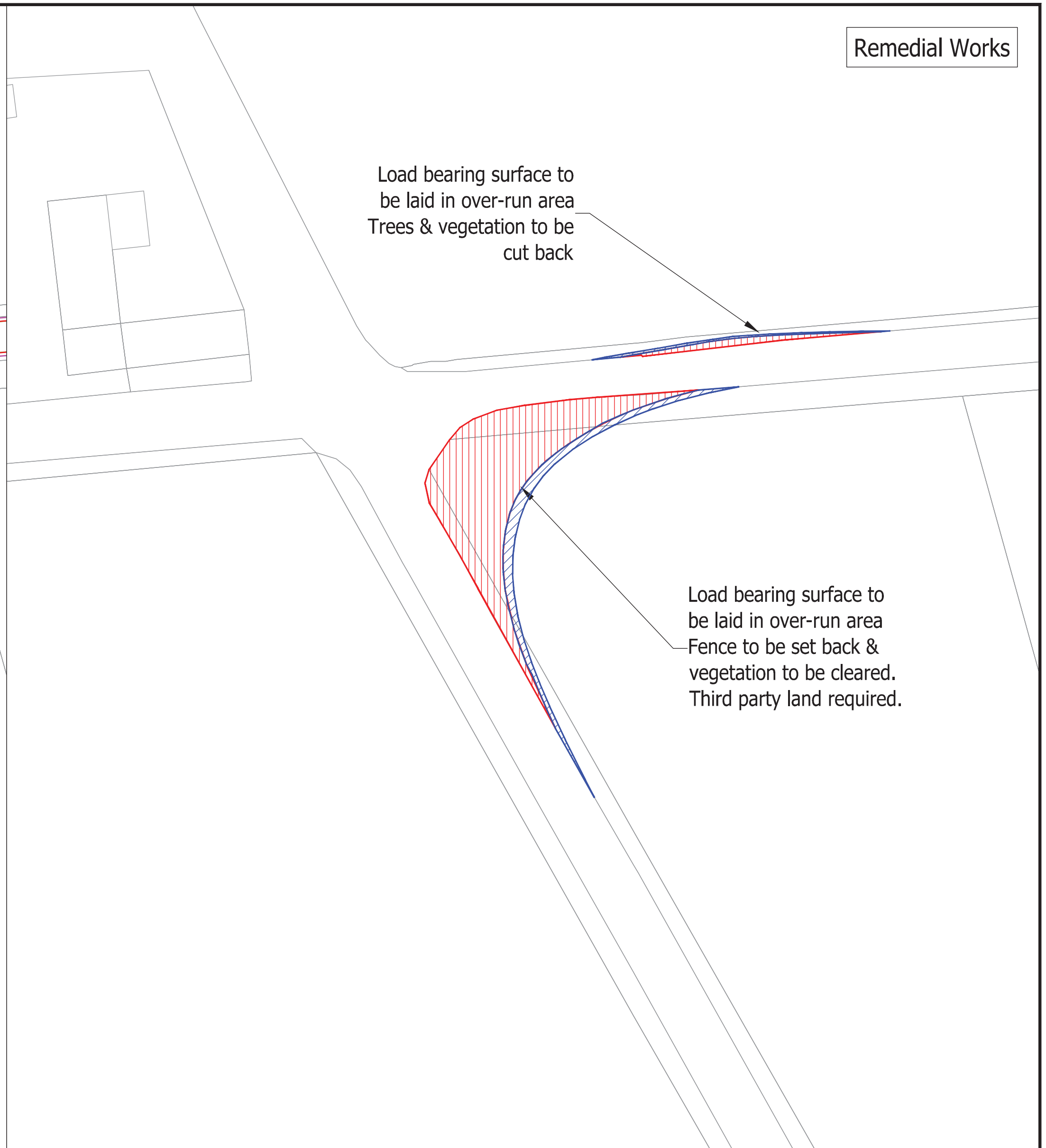

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

MORL Modified Onshore Transmission Infrastructure	moray offshore renewables ltd
LOCATION: C121B / C29S Junction South of Maryhill Farm	POI: 19
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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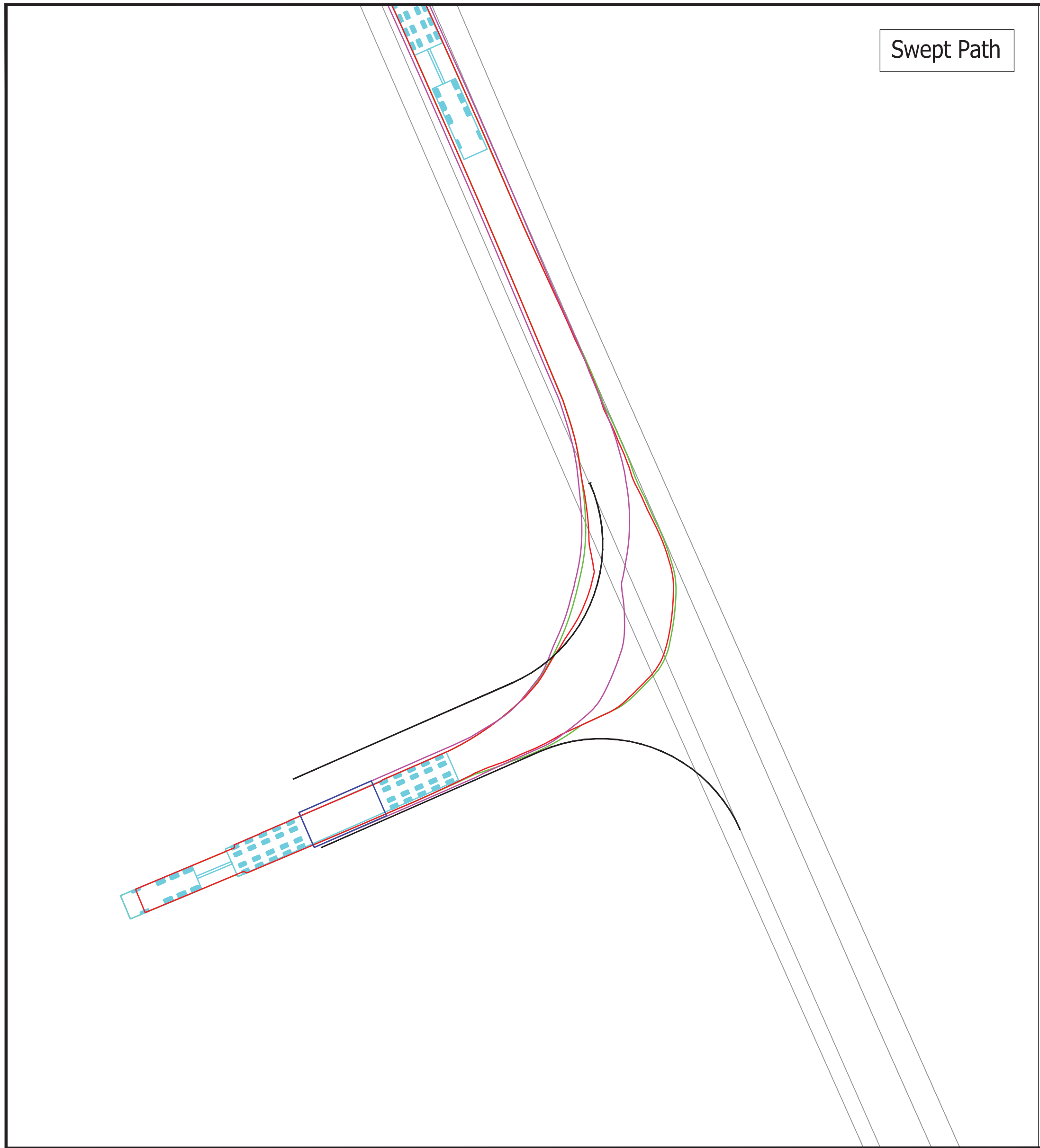

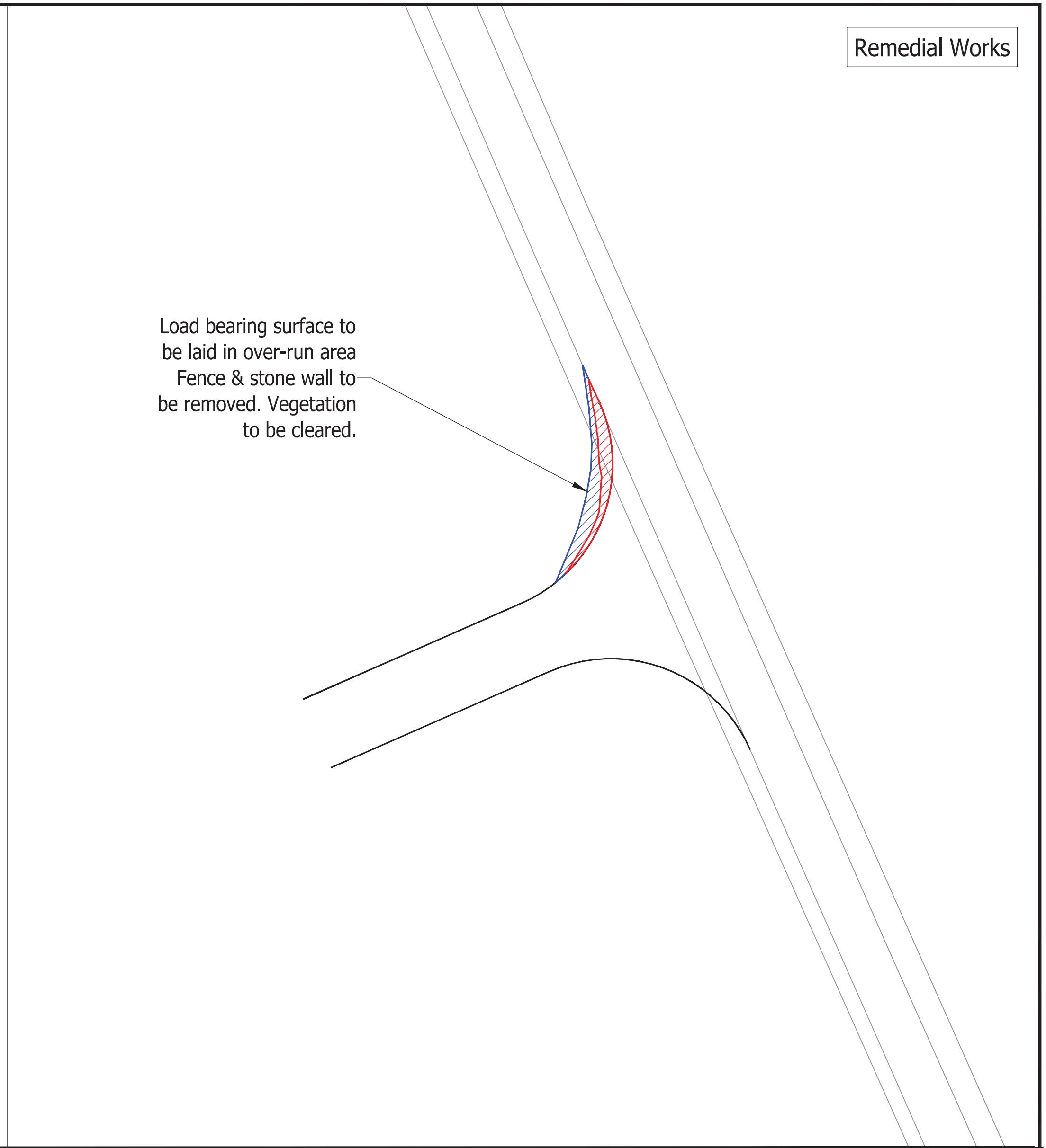

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Vehicle Swept Path
- Wheel Swept Path
- Load Swept Path
- Ordnance Survey Mapping
- Site Access Junction
- Over-sail Required
- Over-run Required

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: Site Access Junction	POI: 20
COMPONENTS: Substation Generator Unit	
DRAWING TYPE: Swept Path Assessment & Required Remedial Works	

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

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Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.

Key:

- Ordnance Survey Mapping
- Site Access Junction
- 2.4m x 60m Visibility Splays

N

MORL Modified Onshore Transmission Infrastructure

moray offshore renewables ltd

LOCATION: Site Access Junction

POI: 20

COMPONENTS: Substation Generator Unit

DRAWING TYPE: Indicative 2.4m x 60m Visibility Splays

WYG Transport Planning

part of the WYG group

39 George Street Edinburgh EH2 2HN

t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
CJ	GB	June 2014	1:500 @ A3	A087928	SPA017	-

moray offshore renewables ltd

Developing Wind Energy In The Outer Moray Firth

Environmental Statement

Modified Transmission Infrastructure for Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.6 C

Construction Traffic Management Plan

edp renewables

This document was produced by [WYG] on behalf of Moray Offshore Renewables Ltd

Document Owner	**Timothy Lockett**
Document Status	**Final**
File Name	**Technical Report – Traffic Management Plan**

Revision	**Date**	**Description**	**Originated By**	**Checked By**	**Approved By**
A1	19/06/2014	Final	Timothy Lockett	Gordon Buchan	Gordon Buchan

`

moray offshore renewables limited

4th Floor
40 Princes Street
Edinburgh
EH2 2BY

Tel: +44 (0)131 556 7602

Table of Contents

1 Introduction

1.1 Background

WYG has been commissioned by Moray Offshore Renewables Ltd (MORL) to produce a Construction Traffic Management Plan (CTMP) relating to the planning in principle application for the installation of the modified transmission infrastructure (TI). This study will focus on the onshore transmission infrastructure (OnTI) which includes the onshore aspects of the export cable and two substations to the south west of New Deer.

This report has been prepared in accordance with instructions from MORL on the above project details. No liability is accepted for the use of all or part of this report by third parties. This report is © Copyright of WYG and MORL. No section of this report may be reproduced without prior written approval.

It is the responsibility of the substation component supplier (depending upon contract) through CDM regulations to ensure that the finalised access route from the Port of Entry (POE) to the site is fit for purpose and that appropriate consideration for all road users has been made in accordance with the relevant health and safety legislation and ruling transport requirements.

Where references are made to work by third parties, WYG does not accept any liabilities for these items or issues based upon them.

1.2 Report Structure

Following this introductory chapter the report is structured as follows:

- **Chapter Two** describes the proposed development and delivery route;
- **Chapter Three** outlines the legislative background and details the construction vehicles and associated traffic flows;
- **Chapter Four** reviews the physical and operational access constraints;
- **Chapter Five** describes the physical and operational measures;
- **Chapter Six** describes the on-site traffic management measures;
- **Chapter Seven** outlines the management measure for the abnormal load delivery convoys; and
- **Chapter Eight** summarises this report.

2 Proposed Development

2.1 Site Details

The TI will consist of both offshore and onshore infrastructure. This will consist of a maximum of two OSPs, offshore and onshore export cable and two onshore substations. The offshore export cable from the three consented wind farms will come onshore at Inverboyndie. The onshore cabling will then run underground south-east to connect with two substations, which are to be provided to connect the cabling to the National Electricity Transmission System (NETS). The substation site is located approximately 5.5 km south-west of New Deer, which in turn lies 28 km west of Peterhead in Aberdeenshire.

2.2 Modified Onshore Export Cable

The modified onshore export cable spans a distance of approximately 33 km from the landfall to the proposed substations. A series of access junctions are proposed at 2 km intervals along the length of the modified export cable route, and will be located on A, B, C and unclassified roads. These access junctions would be based on one of a series of standard layouts produced in line with Aberdeenshire Council standards for various road types.

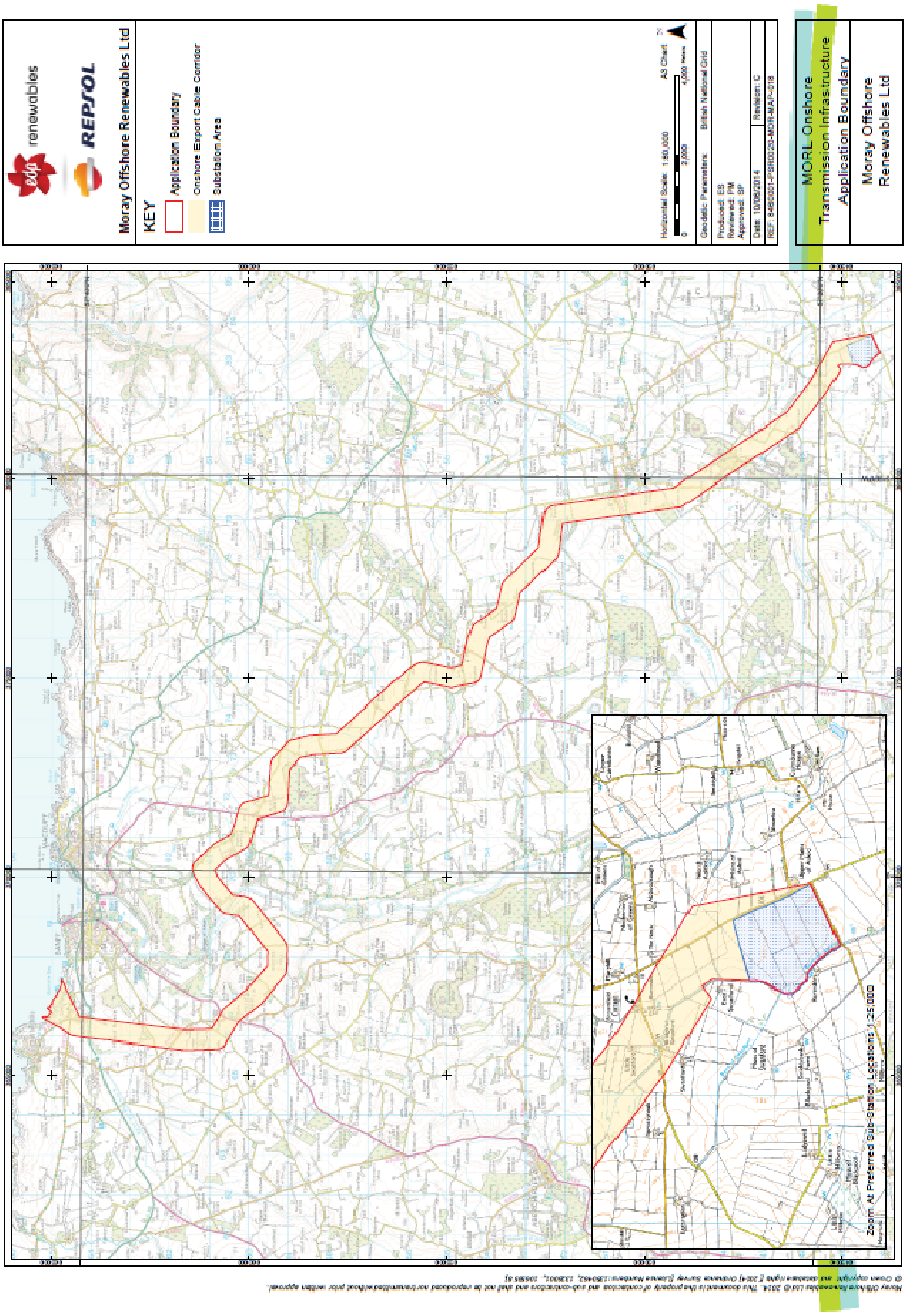
An overview of the modified export cable route along with the location of the proposed access junctions is provided in Plate 2.1.

For ease of reference, the route has been split into three sections, namely:

- Section 1: Substation to Fintry;
- Section 2: Fintry to the East Bank of the River Deveron; and
- Section 3: West Bank of the River Deveron to the Landfall Point.

Subdivision of the route is only a reference guide for the planning documents. The cable run will be one continuous line when constructed.

Plate 2-1: Modified Onshore Export Cable Route



2.3 Onshore Substations

The location of the onshore substations is to be accessed via a new junction on the west side of the unclassified road that runs north to south through Maryhill. The junction is to be located approximately 300 m south of Maryhill Farm.

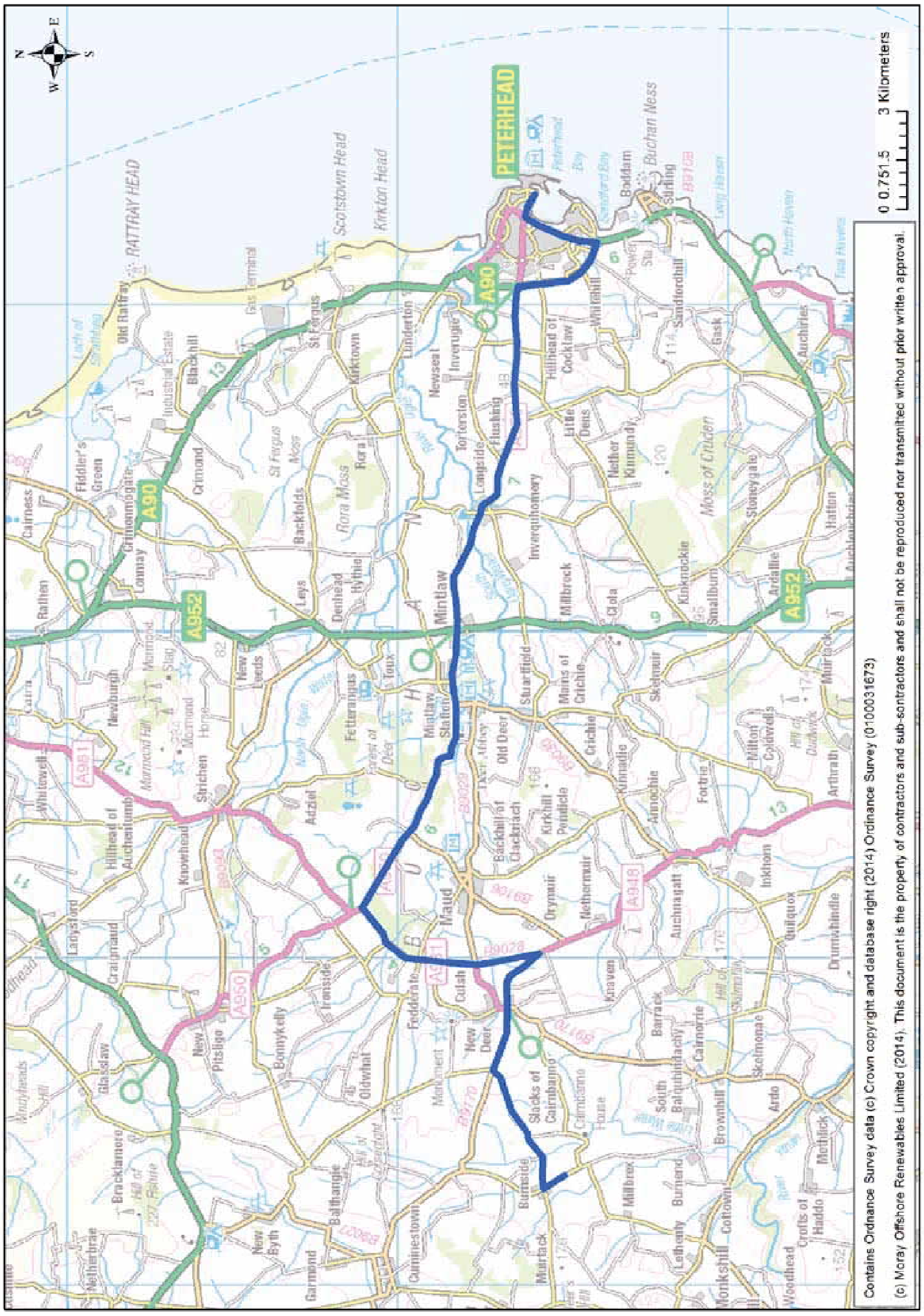
A route feasibility study from the nearest suitable Port of Entry (Peterhead) to the site was undertaken by WYG as part of the application for planning permission in principle to determine its feasibility for the movement of Abnormal Indivisible Loads (AIL). The report, contained in Technical Appendix 5.6C,concluded that this route is considered feasible.

The delivery route from the port at Peterhead is as follows:

- Depart the port onto Bath Street;
- Turn left (west) at the junction with Kirk Street;
- Turn left (south) at the Kirk Street / South Road Roundabout and continue south on South Road;
- Turn right (west) at the A90 / A982 roundabout and continue west on the A90;
- Turn left (west) at the A90 / A950 roundabout and continue west on the A950;
- Turn left (southwest) at the A950 / A981 Lake House junction and continue southwest on the A981;
- Continue south on the B9028 from the A981 / B9029 / B9028 junction;
- Turn right (northwest) onto the A948, then continue west onto the B9170 from the A948 / A981 / B9170 junction;
- Turn left (southwest) onto the unclassified road at the junction with the B9170 at Hillhead Auchreddie; and
- Turn left (south) onto the unclassified road that lies south of Maryhill Farm and continue to the site access.

The access route is illustrated in Plate 2.3 overleaf.

Plate 2-2: Proposed AIL Route



Works to construct the OnTI will include the creation of a landing point, site access junctions, improvements to existing access tracks, the creation of new access tracks, casting foundations, creating electrical connection trenches, erecting a control building, two substations and 33 km of transmission line.

2.4 Intended Delivery Routes

2.4.1 Landfall Point

It is likely that quarry sourced construction materials will approach by way of the B9139 or the A98 through Banff. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96 split evenly between the A98 and the A947. Construction staff will approach by way of the A98 from the east.

All construction traffic will access the landing area by way of an access junction on the B9038 north of Inverboyndie.

2.4.2 Modified Onshore Export Cable Route

In order to distribute traffic associated with the 33 km long cable route the route has been split into three distinct sections as follows:

- Section 1: Substation to Fintry;
- Section 2: Fintry to the East Bank of the River Deveron; and
- Section 3: West Bank of the River Deveron to the Landing Point.

2.4.2.1 Cable Section 1

It is likely that quarry sourced materials will approach by way of the A98/B9027/B9170 or A947/B9170 depending upon the distances to from the entry point to the nearest quarry location. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96/A947/B9170/B9105 or the A90/A948/B9170, depending upon the access junction to the cable that is being used. Construction staff will approach by way of the A947/B9170/B9105 or the A948/B9170.

Cable section 1 is likely to have four main access points along this section of the route as follows:

- C121B west of the C295;
- C29S south of Cuminestown;
- B9170 west of Cuminestown; and
- B9105 south of Fintry.

The access points are illustrated in the accompanying Construction Traffic Method Statement, contained in Technical Appendix 5.6D.

2.4.2.2 Cable Section 2

It is likely that quarry sourced materials will approach by way of the A947 or A98/B9105, depending upon the location of the quarry to the site access points. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96/A98/A947 or A947. Construction staff will approach by way of the A947.

Cable section 2 is likely to have three main access points along this section of the route as follows:

- B9105 south of Fintry.
- C7S west of Gorrachie; and
- A947 north of Keilhill.

The access points are illustrated in the accompanying Construction Traffic Method Statement, contained in Technical Appendix 5.6D.

2.4.2.3 Cable Section 3

It is assumed that quarry sourced materials will approach from the north by way of the B9139/B9121 or the A98 through Banff. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96. Construction staff will approach by way of the A98 from the east.

Cable section 3 is likely to have three main access points along this section of the route as follows:

- A97 south of Tipperty;
- B9121 north of Tipperty ; and
- A98 west of Inverboyndie.

The access points are illustrated in the accompanying Construction Traffic Method Statement, contained in Technical Appendix 5.6D.

2.4.3 Onshore substations

It is likely that quarry sourced materials will approach by way of the A98/B9027/B9170/C295. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A90 split evenly between the A981 and A948 and then following the B9170/C121B/C295 to site. Construction staff will approach by way of the A948/B9170/ C121B/C295.

3 Construction Traffic

3.1 Traffic Categories

Traffic to the site during construction will fall into two categories, namely:

- General construction traffic; and
- AIL traffic – vehicles for the transport of the transformers and reactors along with the required crane and associated support vehicle movements.

The components are classified as AIL due to their weight, length, width and/or height when loaded

3.2 Legislative Background

General construction traffic is covered by the Construction and Use Regulations, while AIL traffic is covered under the Road Vehicles (Authorisation of Special Types)(General) Order 2003 which defines an Abnormal Indivisible Load as;

"...a load that cannot, without undue expense or risk of damage, be divided into two or more loads for the purpose of being carried on a road and that:

- On account of its length or width, cannot be carried on a motor vehicle of category N3 or a trailer of category O4 (or by a combination of such vehicles) that complies in all respects with Part 2 of The Construction and Use Regulations; or
- On account of its weight, cannot be carried on a motor vehicle of category N3 or a trailer of category O4 (or by a combination of such vehicles) that complies in all respects with–
- Authorised Weight Regulations (or, if those Regulations do not apply, the equivalent provisions in Part 4 of the Construction and Use Regulations); and
- Part 2 of the Construction and Use Regulations."

There are four main pieces of legislation that cover AIL movements:

- The Road Vehicles (Construction & Use) Regulation 1986: This covers all aspects of the vehicles setup from the weights and dimensions through to the braking system and environmental standards.
- The Road Vehicles (Authorised Weight) Regulations 1998: This regulation sets the limited maximum weight of the vehicle and axle loading of different vehicle categories.
- The Road Vehicles (Authorisation of Special Types)(General) Order 2003: The STGO is for vehicles not covered by either of the above Regulations and covers component delivery vehicles which are categorised as N3 for the tractor units and O4 for the specifically designed trailers. It states that the Police, the relevant road and bridge authorities or the Secretary of State may need to be notified of vehicle movement, dependent on the size of the load. Notifications can be made online or in paper form using the BE16 form for Special Orders.
- The Road Vehicles Lighting Regulation 1989 (Authorisation of Special Types)(General) Order 2003: This regulation defines whether front, side and rear lamps and reflectors are mandatory and which ones are permitted and which are not permitted.

Applications for a 'Vehicle Special Order' (VSO) will be made to the Vehicle Certification Agency (VCA) by the haulier at least ten weeks prior to planned vehicle movements.

3.3 General Construction Traffic

With the exception of the transformers, reactors and crane elements, the vast majority of traffic is normal construction plant, rather than AIL, and will include grading tractors, excavators, HIAB cranes, forklifts and dumper trucks. Most earthmoving plant will arrive on site on low loader transporters.

Traffic generation has been estimated using information from manufacturers and contractors with experience of substation construction as well as from MORL. Trips within the application site are not included as they do not pose a direct effect on the public highway network.

Construction personnel will generally travel to site in private vehicles and minibuses and these will be parked locally within the site or at a specific designated construction compound. The indicative construction programme is estimated to be a minimum of thirty seven months long and the anticipated normal hours of construction activity will generally be between 07:00-19:00 on Monday to Friday and 07:00-12:00 Saturday inclusive.

A typical trip generation has been developed by WYG on behalf of MORL and includes for each element an activity in terms of personnel and material deliveries. The predicted construction programme and associated activity traffic generation is included in Appendix A of this report.

The highest flow of traffic will occur in month 22 and will correspond with the excavation of cable trenches, delivery of cabling sand, import of rock and the delivery of the cables. This equates to approximately 8,547 movements (i.e. 4,274 inbound and 4,274 outbound trips) during the month, giving an average of 356 movements per day across the entire 33 km long study area, distributed to ten principal access points.

As described in ES Chapter 5.6 (Traffic and Transport) (Technical Appendix 5.6A) the maximum level of traffic at any one access point at the peak of construction would be 93 vehicle movements (46 inbound and 45 outbound).

The potential effect of this low level of construction traffic on the network is not considered significant when considering the link capacities of the surrounding road network and as such no link or junction capacity assessments are considered necessary.

3.4 AIL Traffic

The main elements of the predicted loads of this project are summarised in Table 3-1.

Table 3-1: Abnormal Indivisible Loads

Component	Number of Components
Transformers	4
Reactors	2
Crane and Associated Support Vehicles	12

The cable drums required for the project can be delivered using standard low loader Heavy Goods Vehicles (HGV) and these loads are not considered abnormal.

The AIL components can be delivered on a variety of specialist transport platforms. It is proposed that all components will be delivered under full police and civilian escort. With the convoy escorts included, it is estimated that there will be 132 movements (66 inbound and 66 outbound) in total associated with the delivery of AIL loads.

All the trailers used in the transport process are specifically designed for the transport of the associated components or feature custom modifications to suit loads. All feature rear wheel steering. When not transporting components, the trailers are shortened so that they do not exceed normal HGV dimensions.

The trailers are built to a high standard and the tractor units are designed for heavy haulage. Regular checks are undertaken on the vehicles on a daily basis. As such, the mechanical state of vehicles is kept at a very high level and breakdowns or malfunctions are very rare.

Delivery of transformer and reactor components is the responsibility of the manufacturer under the sales contracts. The manufacturer selects specialised hauliers for the transport of these loads and all drivers are reviewed and carry full AIL licences. The component manufacturer will appoint specialist hauliers for this element of the project.

Given that loads could be transported in convoys of up to three components, it is possible that up to six individual convoys would be present on the network at any one time. This however would be at the discretion of the police and as such it is safer to assume that the substation components would be delivered individually, resulting in a total of up to six days where AIL deliveries would be operating on the road network.

In addition to the transformer and reactor deliveries, a large erection crane will be needed to offload a number of components. The crane will be a high capacity mobile crane that is delivered in sections to keep the weights to a minimum on the public highway. The crane segments will consist of separate loads including the self propelled chassis, boom carrier and ballast trucks. A smaller erector crane will also be present to allow the assembly of the main crane and to ease overall load movements.

4 Route Traffic Management Considerations

4.1 AIL Route Conflict Areas

Potential conflicts between construction traffic and other road users can occur with AIL traffic due to the width of loads or the need to hold traffic back from constrained areas. General construction traffic does not have the same level of conflict with other road users as the vehicles are smaller and road users are generally more used to them.

Potential conflicts between AILs and other road users can occur at a variety of locations and circumstances. The main potential conflicts are likely to occur:

- In rural areas where the loads may straddle the centre line, where fast moving oncoming traffic may be encountered, etc.;
- Where traffic turns at a road junction, requiring other traffic to be restrained on other approach arms; and
- In locations where high speeds of general traffic are predicted.

Urban areas along a route pose different challenges for the abnormal loads. Whilst vehicle speeds would be less than those in the rural or motorway sections of a route, there are more potential conflicts with other road users to be aware of. These include:

- Pedestrians and cyclists;
- Local vehicular traffic;
- Parked vehicles;
- Side junctions; and
- Street furniture.

In this instance, straddling will be required along sections of the rural route and loads will be required to negotiate road junctions and general traffic travelling at high speed.

4.2 General Traffic Management Controls

The project will adopt a 'Considerate Contractor' approach to the development of the site.

The following measures will be implemented to aid site operation and maintenance during the construction phase;

- All materials delivery lorries loaded with dry and dusty materials will be sheeted to reduce dust and stop spillage on public roads;
- Main bulk delivery access points will be tarred to adoptable standards for a distance of 15 m from the Give Way line and all on site tracks will be of stone construction to reduce debris from being brought onto the carriageway;
- A road sweeper will be available to the site to deal with the unlikely instance of debris being placed on the public highway;
- All vehicles will be liveried or have identifying marks to enable recognition by the general public in case of issues;
- All construction traffic will be routed on agreed construction traffic routes to reduce the impact of traffic on sensitive areas such as villages, schools, shopping areas, etc;
- Construction traffic routes will be sign posted and warning signs will be placed in the vicinity of site access junctions to provide advance warning to other road users;
- A public awareness campaign of construction routes and likely movements will be published by the developer and distributed to local residents and to the local media; and
- Specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway.

A Construction Phase Environmental Management Plan (CEMP) will set out measures to be put in place to reduce the impact of noise, dust and excessive speed. The CEMP will also include a requirement to maintain access to existing paths within or affected by the development or to make alternative provision to avoid severance.

Vehicles will be fitted with identification numbers to allow the public to identify any vehicles that may be speeding or causing specific issues and drivers will be required to pass through sensitive areas at low speed.

The site induction process will also enforce the need to take care along the route and to reduce speeds in sensitive areas. The site induction process is a legal requirement under the Construction Design and Management CDM Regulations 2007 and will be mandatory for all persons working on the development.

Advanced warning signs are recommended to be installed on the approaches to the affected road network. Temporary signage advising drivers that AILs will be operating is recommended along the route.

Signage such as this would help improve driver information and alert drivers of oncoming traffic, thereby allowing them to consider whether proceeding to the nearest convenient passing bay, or breaking their journey until the convoy has moved on, would be appropriate.

4.3 General Abnormal Load Convoy Composition

A police escort will be required to facilitate the delivery of the predicted loads. The police escort will be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advanced escort would warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy would remain in radio contact at all times where possible. An example of escorts protecting a convoy is provided in Plate 4.1 from a recent wind farm delivery.

The AIL convoys should be no longer than three HGVs long, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so. It is likely that the police will only allow one substation component to be transported at any one time however this will be confirmed with the police at the detailed AIL licensing stage, post consent.

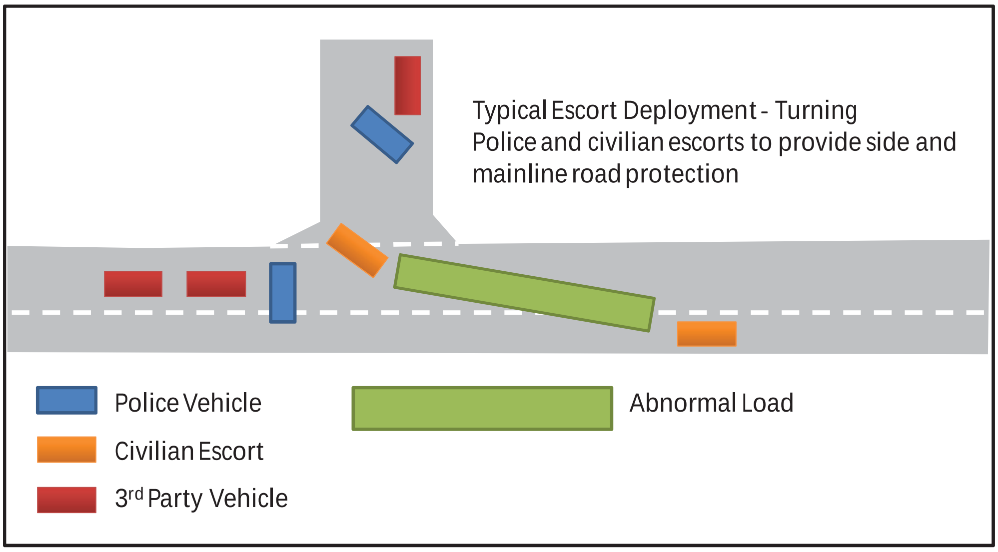
The times at which the convoys would travel will be agreed with Police Scotland. Typical delivery times for similar projects has seen the very early morning periods used in constrained sections, as traffic levels are generally lighter than those found in the afternoon and disruption is minimised.

A full convoy operation plan will be developed in consultation with Aberdeenshire Council, Transport Scotland and Police Scotland representatives along the route and agreed before deliveries commence to the site.

Plate 4.1: Escort Example

Within the route there are locations where general traffic flows will need to be stopped, such as junctions and crossings to allow safe manoeuvre of the loads. In these circumstances the advance police escorts will ensure that the traffic is stopped before the convoys enter the affected section. The advance police escorts will confirm through radio contact that the area is clear and safe for transit. Should general traffic fail to observe the request to stop, the advance police escort will advise the convoy to immediately halt, and then proceed to remove the rogue traffic. The convoy must not start without approval from the advance police escort. Plate 4.2 illustrates an indicative layout of the convoy and escorts for information.

Plate 4.2: Convoy Layout for Turning Traffic



Similar deployment will be undertaken at roundabouts, where the police escorts will hold back traffic on the entry arms and circulating carriageway.

In areas where the load is likely to, or is close to, straddling the centre line or road lanes the advance escort should be positioned to give advance warning and protection to the convoy such that any necessary evasive action can be taken. This is most prevalent at the final section of the route to the west of New Deer, when loads will depart from the B9170.

On the final access section, it is suggested that the advance police escorts hold traffic at either side road junctions or at new lay-by locations on the unclassified road.

5 Mitigation Measures

5.1 Physical AIL Mitigation Measures

A review of the AIL access route has been undertaken, focussing on the principle junctions along the access route. Where constraints have been identified, these have been reviewed through swept path assessments for the transformer as the worst case loads.

Swept path drawings are provided within the Route Survey Report (Technical Appendix 5.6C). The swept path assessments identified the following constraints:

- Peterhead Port Exit: the AIL convoy will be required to oversail the inside footway on exit from the port but no physical works will be required;
- A950 / A981 Junction: the AIL convoy will be required to overrun the offside verge on the A981 where a load bearing surface should be laid and one road sign should be relocated. An area of oversail will be required in the verge on the south side of the junction bellmouth but no physical works will be required;
- A981 / B9029 Junction: the AIL convoy will be required to undertake a contra flow manoeuvre of the splitter island on the northern approach of the A981 to avoid the requirement to remove street furniture from the island;
- B9170 / C121B Junction: the AIL convoy will be required to straddle the centre line of the road from this point to the C121b / C29S junction. Escorts should hold all traffic beyond these points to allow loads to utilise the entire carriageway width;
- C121B Right Bend at Mill of Greens: the AIL convoy will be required to overrun the verge to the north of the road where a load bearing surface should be laid. One road sign should be relocated;
- C121B / C29S Junction: the AIL convoy will be required to overrun the north eastern verge and south eastern verge crossroads junction as well as the field beyond the south eastern verge. A load bearing surface should be laid in these areas. The wood and wire fence that bounds the field to the south east should be set back outwith the over-run and over-sail areas, which will require third party land. In addition, vegetation should be cleared from this area; and
- Site Access Junction: the AIL convoy will be required to overrun the northern edge of the junction bellmouth where a load bearing surface should be laid.

The only major element of new construction associated with the above constraints is the site access junction which is designed to accommodate the proposed loads. This junction will be subject to a Road Opening Permit application following detailed design with Aberdeenshire Council and generally conforms to their access standards.

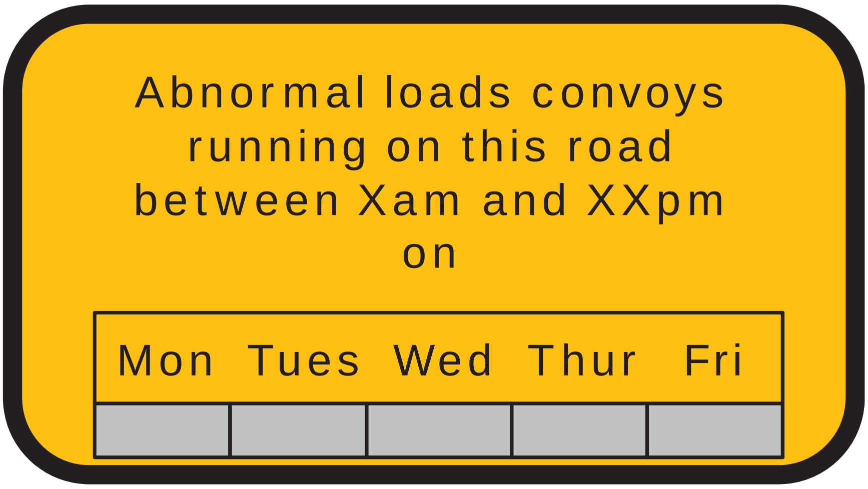
The access road leading into the site will feature an Industrial Access Road type pavement for 20 m back from the highway kerb line and an access gate will be set back 20 m during the construction phase. This could be moved to a 12.5 m set back during the operational phase of the junction if required by the Council.

A full services review will be undertaken at the detailed design stage and minor vegetation trimming is proposed to achieve the visibility splay requirements.

5.2 AIL Advance Warning Signage

Advance warning signs would be installed along the access route for AIL traffic from the A90 at Peterhead through to the site access junction. Temporary signage advising drivers that abnormal loads will be operating such as the example shown in Plate 5.1 could be installed to help assist drivers. Flip up panels (shown in grey) can be used to mask over days where convoys would not be operating

Plate 5.1: Indicative Information Sign



To further improve driver information, it is suggested that any Variable Message Signs (VMS), operated by Transport Scotland on the Trunk Road network, are used to warn drivers of abnormal loads operating on the trunk road sections of the route. This would display information warning of possible delays and would allow drivers to consider alternative routes if possible.

5.3 Construction Traffic Mitigation and Signage

New access junctions to enable access for material and construction plant deliveries will be required along the cable route and at the landing point and substation location. Where possible, existing field access points will be used.

At principal access junctions, the junctions will be formalised, featuring a metalled surface to reduce the movement of debris and mud onto the public road. Full details of the proposed junction forms are provided in the accompanying Construction Traffic Method Statement (Technical Appendix 5.6D). With the exception of the substation access junction, all other construction access junctions will be temporary in nature and will be removed following completion of the full cable installation.

Where access routes are located on roads of less than 5.5 m in width, passing places will be provided within the adopted boundary to ease access for all road users. The location and frequency of these passing places will be detailed at the detailed planning application stage.

Advance warning signs will be provided in advance of all construction access points. Where crossroads crossings are proposed, "Heavy Plant Crossing" signs would be provided on the public road arms. All access junctions would feature "Caution Site Entrance" signs as illustrated below in Plate 5.2.

Plate 5.2: Indicative Warning Signs

All traffic management measures associated with the new junctions will be designed to Chapter 8 of the Traffic Signs Manual and will be installed and maintained by a specialised Traffic Management Contractor who would be required to review the signs on a regular basis.

To improve sign visibility, it is proposed that all signs be made out of 3M Diamond Grade (or similar) retro-reflective signage material which provides excellent visibility is all lighting conditions.

5.4 Public Information

Information on the movement of abnormal load convoys and general construction traffic activity will be provided to local media outlets to help assist the public. Information could be provided to local newspapers and radio stations that relate to the expected vehicle movements along the proposed route. It is intended that this level of information will make residents aware of convoy movements and help reduce any potential conflicts

6 Site Traffic Management

6.1 Internal Roads Management

All construction vehicles operating on the site must be fitted with a CB radio and all operatives inducted at the site compounds before being allowed to work on site.

The maximum speed limit for all traffic in on-site roads will be 10 mph and advance warning signs will be installed on all construction tracks leading up to junctions with the public road network.

Passing places will be provided on the internal tracks for ease of access. Site rules will be established to ensure that no vehicles reverse out of the site on the public road network.

All vehicles operating on the site must have headlights and warning lights operating at all times when under way.

During AIL deliveries at the substations, on-site traffic will be advised to clear the track by radio when an abnormal load is approaching. The site manager must ensure that the access track is clear for use and all remedial works are in place and that in steep sections, the track has been swept. Once the abnormal load is at its designated destination, other traffic may resume.

Once the abnormal load has been offloaded, the HGV will advise the site manager that the vehicle is ready to depart. All other traffic is to be removed from the track, to allow the HGV to depart the site. Empty HGVs will depart the site and regroup if necessary at the haulier identified lay-over areas. Where loads pass under energised electricity services on site, warning gates will be provided

7 General Abnormal Load Convoy Management

7.1 Journey Timings

The timing of deliveries is a key consideration and greatly influences the potential effects of the convoys on the road network.

The police have ultimate authority and control of convoy movement timings. From previous experience of similar movements throughout the UK, it is usually preferable to undertake convoy movements outwith peak traffic flows to limit the effect that they have on network traffic

7.2 Initial Checks

Before the convoys depart the POE, the lead convoy driver will check weather and traffic conditions, and advise colleagues through a "Tool Box Talk". The following websites provide relevant weather and traffic updates:

Traffic updates	Weather conditions
www.theaa.com/traffic-news/index	www.metoffice.gov.uk
www.bbc.co.uk/travelnews	www.bbc.co.uk/weather
ww.transportdirect.com	www.uk.weather.com
www.rac.co.uk	www.weatheronline.co.uk

7.3 Daily Management Updates

Daily updates to the general convoy management will be provided at the daily Tool Box Talks, where drivers and escorts will be fully briefed on the specific requirements of the convoys on that day. During these sessions, the following checks will be made by abnormal load staff:

- That staff are aware of the CTMP and have a copy of the latest version of the Driver Information Pack (a condensed version of the CTMP) in the cab;
- That all staff have the appropriate licences, safety equipment and clothing;
- That all radios and mobile telephones are provided, charged and that the correct channels are known;
- That the convoy is aware of its legal responsibilities for the country of operation;
- That drivers are briefed on welfare issues, including provisions for sleep and/or rest during the day if applicable;
- That the convoy is aware of client, haulier and component supplier health and safety requirements and method statements; and
- That all persons are inducted on site rules, the induction is undertaken immediately upon arrival and prior to persons undertaking any site works. Details of the induction process are to be provided by the relevant Principal Contractor.

7.4 Communications Strategy

In order to ensure effective communications during transit, all vehicles within the convoy will be fitted with Citizens Band (CB) radio equipment. The CB units on the transporters will be hard-wired to reduce the risk of power failure during transit. All escort vehicles will be fitted with hand held battery powered CB radio sets. Spare sets should only be carried to allow communications with the police during transit, if the police request it. In addition to the CB sets, all vehicles will be fitted with hands free mobile phones, to allow contact with third parties without CB devices and that would also act as an alternative form of communication in an emergency. Mobile phones could only be used when stationery.

A communication protocol would also be established with the emergency services so that, in the case of a blue light emergency, the convoys would be diverted to the nearest lay-by / hold point area.
In the case of emergency vehicles that need to pass the convoy en-route to a third party emergency, the escorting police will be informed by radio of the incident and the requirement for vehicles to pass unhindered. At that time, a police escort vehicle, which is likely to comprise a motorbike, will travel ahead of the convoy to the next convenient holding point(s) at which the convoy could be manoeuvred such that clear passage can be afforded to the emergency vehicle. In the unlikely event that such an area is a considerable distance away, the emergency services will be informed of this and a decision taken concerning the necessity to reroute the emergency vehicle(s). Alternatively, once the wide area has been reached, the police escort will marshal the AIL convoy such that safe and speedy passage is afforded to the emergency vehicle.

This entire process will be controlled by the escorting police officers, in contact with the emergency services control centre

7.5 Contingency and Incident Plans

Contingency details for incidents such as tyre punctures, breakdowns and accidents are described below and should be observed. In all situations the safety of personnel and the public is paramount and reasonable steps to ensure safety at a site will be undertaken. In the event of an incident, it will be reported to the appropriate person immediately.

In the event of vehicle breakdown or incident the following details from The Highway Code must be observed:

- Try to remove the vehicles off the road if possible;
- If available, try to stop near to an emergency telephone;
- When stopped, close the convoy up to reduce the length where possible;
- Warn other traffic by using hazard warning lights if the vehicles are causing an obstruction;
- Drivers should depart using the left hand side door. Unless staff are threatened by their situation, all staff should depart the vehicles;
- Use PPE at all times when outside the vehicle;
- Place a warning triangle on the road at least 100 metres behind the last convoy vehicle on the same side of the road. Use the warning cones and flares carried in the escorts to protect the end of the convoy by creating a diagonal around the back of the last vehicle. Always take great care when placing or retrieving them. The Highway Code indicates that warning triangle should not be used on motorways;
- Consult with the Police escorts to identify what additional warning devices should be deployed;
- Keep sidelights and beacons on;

- No staff should stand between the convoy vehicles and oncoming traffic. Staff should not stand between vehicles in the convoy. Staff should be located at locations where all road users can see them;
- Staff should wait on the verge and where barriers are provided, stay behind them;
- In the event of injuries, do not move injured people unless they are in immediate danger from fire or explosion. Staff must not remove a motorcyclist's helmet unless it is essential to do so and should be prepared to give first aid if appropriately trained;
- In the case of injuries, all staff must stay at the scene until the emergency services arrive;
- In the event if a collision which causes damage or injury to any other person, vehicle, animal or property, the convoy must stop, provide contact details and addresses, provide vehicle registration details to third parties. The police escort should be informed and the incident reported within 24 hours to the local police station;
- In the event of a collision, all staff should obey directions from the escort Police Officers or attending officers;
- In the event of a breakdown, the nature of the breakdown should be reported to the indicated assistance provider. Obtain advice from the haulier Project Manager; and
- In the event of a burst tyre the appropriate repair provider should be contacted to come and replace the damaged item. Staff should not attempt to replace any HGV tyres themselves.

Should the convoy be able to restart following an incident, it should only enter when a safe gap in the traffic occurs.

To ensure the minimum delay and inconvenience, the haulier will have recovery agreements set up with suitable contractors along the route

7.6 Equipment Requirements

Each of the convoy vehicles must be suitably equipped with hazard warning devices to warn all other road users. All the tractor, trailer and escort vehicles operating on the project must have the following:

- Tractor units to have beacon bars on the roof and 3M reflective markings on both sides;
- Trailer units to have amber beacons on the rear with 3M reflective markings on both sides;
- All escort vehicles will have beacon bars on the roof, with 360 degree motion for all round visibility, and 3M reflective markings;
- Certified cargo lashing straps are to be used at all times. Certification must be carried and made available for inspection, kept within the cab.

All of the hazard warning equipment must be checked and cleaned at the start of each day. Additional cleaning of the warning equipment may be required throughout the day and must be undertaken when required.

All escort vehicles will carry the following equipment:

- 8x Reflective Road Cones;
- 8x Flare Alert Beacons;
- 2 x Warning Triangles;
- 1 x Spill Kit;
- 1 x Emergency Hammer;
- 1 x Flash Light;
- 1 x Auxiliary Rechargeable CB Radio;
- 1 x Fire Extinguisher (dry powder);
- 1 x Van/Truck First Aid Kit;
- 1 x Roll of Barrier Tape;
- 1 x Spare High-Vis Waistcoat;
- 1 x Spare Hard Hat;
- 1 x pack of disposable dust masks; and
- 1 x safety spectacles.

All relevant personnel must have the appropriate Personal Protective Equipment (PPE). All PPE clothing must be 'CE' marked to show it meets the European standards and should be appropriate for use in Motorway situations (i.e. must be full coats with reflective bands on the arms). Drivers must be issued with:

- Hard hat (within certification date);
- High-Vis (jacket / coat);
- Lace up steel toe capped safety boots; and
- Gloves

7.7 Third Party Accident / Breakdown on Route

In the event of a third party accident or breakdown on the delivery route, ahead of the AIL convoy, it may be necessary for the convoy to be slowed or temporarily halted until safe passage can be assured. The police escort would take control of the convoy and monitor manoeuvring of the convoy into a safe location, which would generally be a suitable holding point identified nearby. The convoy would be held at this location until the highway ahead is judged by the police to be sufficiently clear to enable safe passage of the convoy.

Should it be required for the loads to be temporarily halted, traffic in the vicinity of the convoy would be marshalled by a combination of the police and civilian escorts.

It is assumed for the purpose of this CTMP that any road closure is likely to be only temporary. However, in the case of a catastrophic failure of the road, for example a collapsed culvert, which would lead to longer term closures, alternative nearby routes would be identified as emergency diversions. These would be agreed with appropriate highway authority officers and marshalled by the attending police escort. It is not possible to plan in advance for the implications of such catastrophic failures.

8 Summary

WYG has been commissioned by Moray Offshore Renewables Ltd (MORL) to produce a Construction Traffic Management Plan (CTMP) relating to the planning in principle application for the installation of the modified transmission infrastructure (TI). This study will focus on the onshore transmission infrastructure (OnTI) which includes the onshore aspects of the export cable and two substations to the south west of New Deer.

A route access review has been undertaken from the Port of Entry at Peterhead through to the site access junction. The route is suitable for the movement of the anticipated loads subject to implementation of the required mitigation measures, although careful manoeuvring will be required into the site access.

A series of operational measures have also been detailed to further aid the delivery of equipment and to minimise the impact of convoys on the network. These include the provision of warning signs and incident contingency plans.

Appendix A – Construction Traffic Generation

Transport Indicative Construction Programme

Vehcile Classes

	May 2016	June	July	August	September	October	November	December	January 2017	February	March	April	May	June	July	August	September	October	November	December
Landing Point																				
Set Up																				
Excavation																				
Piling																				
Construction Works																				
Cable Instalation																				
Remediation																				
General Supplies																				
Staff																				
Cable Run																				
Set Up																				
Excavation																				
Laying																				
Jointing																				
Backfil																				
Remediation																				
General Supplies																				
Staff																				
Substation																				
Set Up				204																
Site Preparation					43	43	43													
Foundations							251	251	251	251	251									
Buildings											60	60	60	60	60					
AIL deliveries																44	44	44		
Installations																			150	150
Commissioning																				
Remediation																				
General Supplies				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Staff				396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
Total Per Month	0	0	0	640	479	479	730	687	687	687	747	496	496	496	496	480	480	480	586	586
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	0	0	0	27	20	20	30	29	29	29	31	21	21	21	21	20	20	20	24	24

	January 2018	February	March	April	May	June	July	August	September	October	November	December
Landing Point												
Set Up			116									
Excavation			34	34								
Piling				34								
Construction Works				16	16							
Cable Instalation					32							
Remediation					58							
General Supplies			16	16	16							
Staff			240	240	240							
Cable Run												
Set Up		160										
Excavation			6074	6074	6074	6074						
Laying				631	631	631	631					
Jointing					76	76	76					
Backfil					17	17	17					
Remediation							87	87				
General Supplies		44	44	44	44	44	44	44				
Staff		864	864	864	864	864	864	864				
Substation												
Set Up												
Site Preparation												
Foundations												
Buildings												
AIL deliveries												
Installations	150	150										
Commissioning			64	64								
Remediation					43	43	43					
General Supplies	40	40	40	40	40	40	40					
Staff	396	396	396	396	396	396	396					
Total Per Month	586	1654	7888	8453	8547	8186	2198	995	0	0	0	0
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	24	69	329	352	356	341	92	41	0	0	0	0

	January 2019	February	March	April	May	June	July	August	September	October	November	December	January 2020	Total	Cars & Lights	HGV
Landing Point																
Set Up														116		116
Excavation														68		68
Piling														34		34
Construction Works														31		31
Cable Instalation														32		32
Remediation														58		58
General Supplies														48	48	
Staff														720	720	
Cable Run																
Set Up		160												320		320
Excavation			1949	1949	1949	1949								32093		32093
Laying				631	631	631	631							5051		5051
Jointing					76	76	76							456		456
Backfil					17	17	17							104		104
Remediation							3163	3163						6501		6501
General Supplies			44	44	44	44	44	44						572	572	
Staff			864	864	864	864	864	864						11232	11232	
Substation																
Set Up														204		204
Site Preparation														128		128
Foundations														1256		1256
Buildings														300		300
AIL deliveries														132	96	36
Installations														600		600
Commissioning														128		128
Remediation														128		128
General Supplies														960	960	
Staff														9504	9504	
Total Per Month	0	160	2857	3488	3582	3582	4796	4071	0	0	0	0	0	70776	23132	47644
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24			
Total Per Day	0	7	119	145	149	149	200	170	0	0	0	0	0		33%	67%

moray offshore renewables ltd

Developing Wind Energy In The Outer Moray Firth

Environmental Statement

Modified Transmission Infrastructure for
Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.6 B

Construction Traffic Method Statement

renewables

This document was produced by WYG on behalf of Moray Offshore Renewables Ltd

Document Owner		**Craig Jolly**			
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A1	19/06/14	Final	Craig Jolly	Gordon Buchan	Gordon Buchan

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Table of Contents

1 Introduction

1.1 Background

WYG has been commissioned by Moray Offshore Renewables Ltd (MORL) to produce a Construction Traffic Method Statement as part of a Transport Assessment for a planning in principle application for the installation of modified Transmission Infrastructure (modified TI) to connect the three consented wind farms (Telford, Stevenson and MacColl offshore wind farms) to the grid. This study focuses on the modified onshore transmission infrastructure (OnTI) which includes the onshore aspects of the export cable and two substations to the south west of New Deer.

This report has been prepared in accordance with instructions from MORL on the above project details. No liability is accepted for the use of all or part of this report by third parties.

WYG has been commissioned to prepare this construction access study as a source of guidance. The report reviews the key access issues associated with the construction of the OnTI as advised by MORL.

1.2 Report Structure

Following this introductory chapter the report is structured as follows:

- **Chapter Two** outlines the assumptions for the construction access study;
- **Chapter Three** outlines the standard layouts for the construction accesses and passing places;
- **Chapter Four** summarises the potential locations for the access points and passing places; and
- **Chapter Five** provides a summary of the report and an outline of suggested further works, actions and recommendations for consideration by MORL.

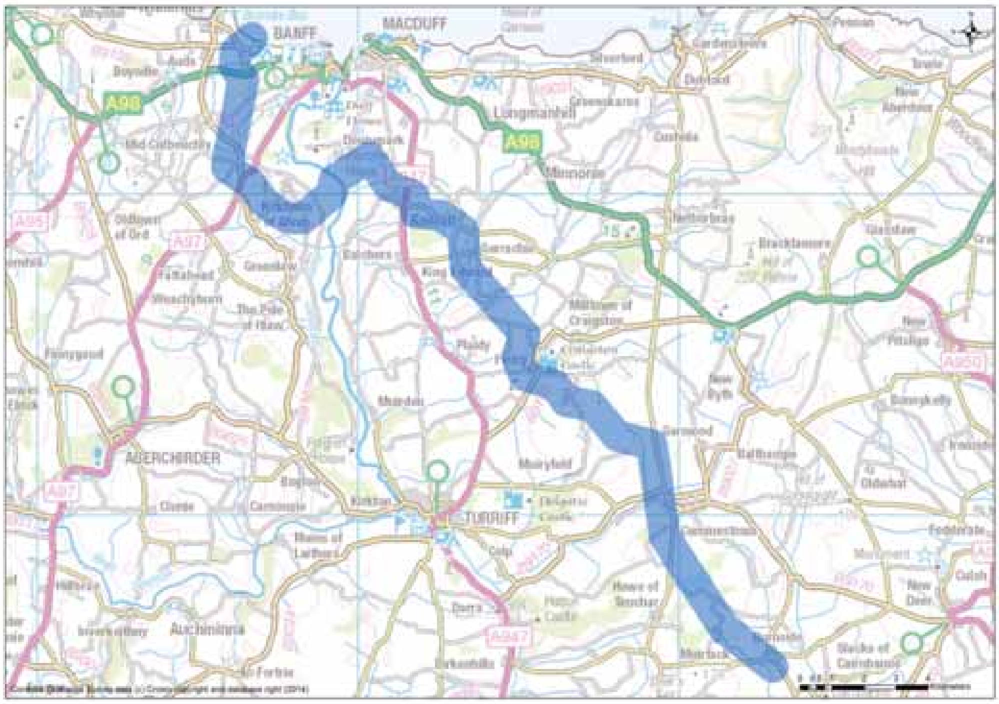
2 Construction Traffic Background

2.1 Project Description and Location

The modified export cable landfall is to be located at Inverboyndie bay to the west of Banff on the northern coast of Aberdeenshire, and will run in a generally south easterly direction to the substation site situated approximately 5.5 km south west of New Deer.

The location of the modified export cable corridor is illustrated in Plate 2.1

Plate 2.1: Modified Export Cable Corridor



2.2 Construction Methodology

The modified OnTI falls into three distinct construction elements, namely:

- Landfall Point;
- Modified Export Cable Route; and
- Substations.

WYG has liaised with the developer and Balfour Beatty, MORL's advisors in relation to the onshore electrical infrastructure, to develop a suitable indicative construction methodology at this relatively early stage of the project to determine the number of construction traffic vehicles on the network. The following sections describe the assumptions made in order to develop traffic flows for the construction phase. It is worth noting however that these assumptions are indicative at present and exact methodologies will be determined at the detailed application stage.

2.3 Landfall Point Construction Assumptions

The landfall point may be part constructed from land, with a coffer dam structure potentially being constructed to tie into the underwater cable.

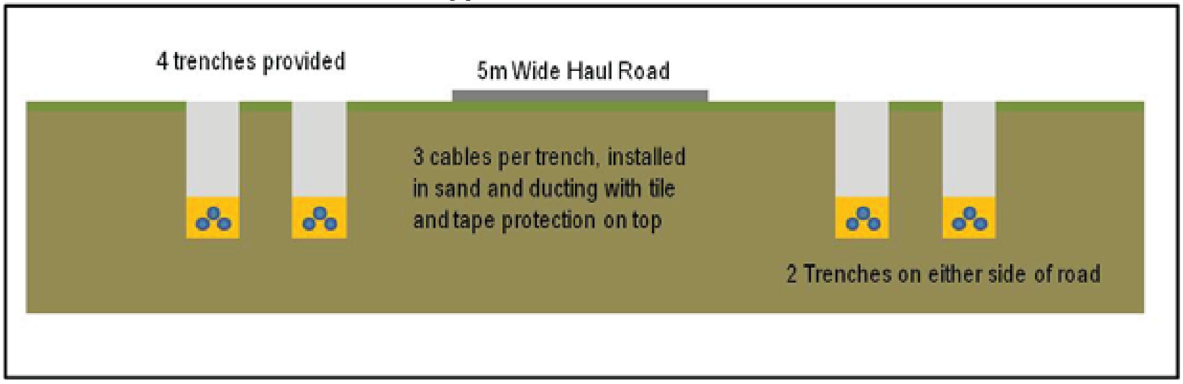
The coffer dam will be constructed from sheet piles and will be imported along with concrete blocks, concrete, cabling sand and construction plant.

Construction at the landfall point is predicted to take up to three months.

2.4 Export Cable Construction Assumptions

The cable route is 33 km in length and will be constructed in two phases. A typical cross section is provided below in Plate 2.2.

Plate 2.2: Typical Cable Route Cross Section



In the initial cabling phase, up to two trenches are to be installed along with the access road. It is likely that all road and river crossings for all four trenches would be installed in this first phase to reduce disruption. The remaining one or two trenches would be installed in the final cabling phase.

A 5 m wide access track with passing places would be installed alongside the cable trenches to allow the installation of the cables and the movement of plant, material and staff.

Up to four trenches, each containing three cables in a trefoil arrangement will be installed in total. All cables will be sheathed in ducting and surrounded in cabling sand. Cable tiles and warning tape would be installed on the top of the cabling sand and the trench backfilled.

Excavated material would be used for the backfilling process and excess material could be used in the site restoration process. However, to provide a robust assessment, WYG has assumed that all excess material would be removed.

Construction of the cable route involves the import of cables, ducting, cable tiles, rock (to construct the access track), cabling sand and fencing materials. Plant and staff access will be required, as will concrete to form the buried cable joint boxes. Exported material will include excess excavated material and recovered road way material (recovered at the restoration phase at the end of the second cable phase).

The cable drums required for the supply of cabling are not considered as Abnormal Indivisible Loads (AIL) loads and would be transported on standard low loader trailers.

To supply the cable route, access junctions will be provided at suitable points where the route crosses (or is in close proximity) to the existing public road network. Crossing accesses of the existing public road are also required to allow the movement of staff along a route, although is it proposed that Horizontal Directional Drilling (HDD) will be used to enable the cable to cross roads and major waterways. This methodology reduces pollution risks and will reduce the effect on traffic and road damage.

For the purposes of construction, it is assumed that three construction teams will be engaged in developing the route in three distinct sections.

The construction process is estimated to last 6 months for each phase.

2.5 Substation Construction Assumptions

The substations feature the development of buildings, hard standings, access roads and concrete pad foundations to accommodate the various electrical switchgear and transformers.

Concrete, cabling stand, rock (for the hard standings), prefabricated building sections and general construction supplies will be required to construct the MORL and Transmission Owner (TO) substation facilities. A small number of AIL will be required to transport the transformers and reactors to the site as well as the heavy lift cranes (and supporting vehicles) required to discharge the AILs and position the equipment within the site.

TO and MORL substation facilities will require 24 months to completely develop and commission the substation facilities.

2.6 Construction Programme

The material required to construct each of the construction elements has been estimated and applied to an indicative construction programme, commencing in 2016, assuming a successful consenting outcome.

The indicative construction programme is provided in Appendix A to this report and includes two way flows (inbound + outbound traffic flows) for each element and for each major task.

The peak of construction occurs in May 2018 and the figures associated with this peak period have been used as the worst case scenario for the surrounding road network. The effects of these traffic flows on the road network are presented in the accompanying Transport Assessment in Technical Appendix 5.6A.

2.7 Abnormal Indivisible Loads (AIL) Access

AIL traffic is excluded from this report and is described in detail in the accompanying AIL Route Survey Report in Technical Appendix 5.6C.

3 Access Junction Strategy

3.1 Introduction

Access junctions will be required to enable construction of all three elements of the development. Single points of construction access will be required for the landing point and substations, whilst 28 points of access will be required along the 33 km cable route.

Wherever possible, access junctions will be created at existing field accesses to minimise the effect on hedgerows and other environmental features and to minimise disruption to agricultural activities.

None of the affected road network in the vicinity of the development is located on or near the Trunk Road network, with all neighbouring links being the responsibility of Aberdeenshire Council (AC). The AC Roads Standards (Standards for Road Construction Consent and Adoption) have been used to develop access solutions that are considered appropriate for construction use.

Given that the detailed design of the landfall point and substations have not yet been undertaken and that the cable route sits within a 500 m buffer, it is not feasible at this stage to develop individual access junction proposals to suit each location. To overcome this issue, WYG has instead developed standard junction types that are appropriate to certain road types and conditions and these are described in further detail in the following sections.

3.2 Standard Junction Types

The standard junction types are illustrated in Appendix B to this report in drawing SK001. Two types of junction are proposed, namely:

- Type 1: Suitable for A / B Class Roads and Busy C Class Roads; and
- Type 2: Suitable for C Class and Unclassified Minor Roads.

The landfall point and substations will feature Type 1 junctions given the volume of traffic accessing them. The cable route will feature both junction types.

Common to both standard junctions are 15 m radii entrance curves to suit HGV traffic (the substations will feature slightly wider radii curves to the north to accommodate AIL traffic). The entry roads will be 7.3 m in width at the junction to allow HGV traffic to pass with ease and removes the potential for loads “hooking” into each other in the access junction causing accidents, or for loads to project back on the public road causing third party road safety issues.

Busy and high speed roads will feature junctions with a metalled road surface to reduce the possibility of the migration of site debris onto the public road. Further measures such as road sweepers and wheel washes will also be used.

All junctions will be designed in detail as part of the detailed design application and a full Section 56 application for works in the adopted road will be made at the appropriate stage, should the development be consented.

It is suggested that Industrial standard access road pavement formation is used for the metalled surface in accordance with the AC's design standards.

Visibility splays at each location will vary depending upon the location and design speeds of the various links that the cable junctions access onto. Using AC standards, three visibility splay options have been adopted and are illustrated in drawing SK002 in Appendix B.

The proposed visibility splays are minimum splays and are as follows:

- Type A: 4.5 x 120 m for high speed and high capacity roads;
- Type B: 4.5 x 90 m for medium speed and low – medium capacity roads; and
- Type C: 2.4 x 59 m for low speed and low capacity roads.

The junction type and visibility splays can be combined to provide a suitable access solution at each of the access locations.

The detailed design stage would also feature Road User Safety Audits (RUSA) reviews for the development as a whole to ensure the highest standards of road safety.

3.3 Crossing Types

At various points, the export cable will cross roads and it will be necessary for a road access to be provided to allow the transport of staff from one side of the road to the other. Two types of standardised crossing are provided and are provided in indicative form on drawing SK003 in Appendix B of this report.

It is not MORL's intention to dig trenches through the public road and it is likely that crossing works would be undertaken by HDD to minimise disruption. The crossing points would only be used to move staff and plant as the cable run develops.

Bulk material deliveries will be concentrated to the principal access junctions and not focussed on crossing points. Turning facilities and passing places will be provided on site to accommodate this requirement.

All crossing points would be signposted and would feature appropriate traffic management measures. Access across them would be regulated by the site agents to an absolute minimum.

3.4 Passing Place Provision

Due to the rural nature of sections of the OnTI there are sections where construction traffic may route along narrow rural unclassified roads that are less than 5.5 m in width. In these sections, it is proposed that a network of passing places are developed to allow the passing of HGV traffic with agricultural traffic.

An indicative proposal for such passing facilities is illustrated in Appendix B of this report in drawing SK004. The exact design and location of these passing places would be set at the detailed design stage in close consultation with AC. It is possible that the passing places are formalised post construction as an enhancement to the public road.

3.5 Permanence of Road Infrastructure

The access junction for the substations will be made permanent. All other junctions and crossing points would be removed following the completion of construction works and the land would be restored as appropriate.

3.6 Roads (Scotland) Act

Once the confirmed delivery routes have been established at the detailed design stage, MORL will enter into a Section 96 agreement with AC to ensure that any damage on the more rural road network is monitored and repaired as appropriate.

Section 56 permissions will be sought for all access and enabling works located within the adopted road area.

4 Potential Locations for Accessibility Works

4.1 Location Criteria

The type of junction will be set by the type of road that it will access onto, the use of the access junction, if it is a crossing point or principal access and the speed of the road.

WYG have undertaken a speed survey during the traffic count exercise (see Transport Assessment). Automatic Traffic Counters (ATC) collected vehicle speed data as well as vehicle classes. Analysis of the 85^{th} percentile vehicle speeds over the 7 day period has been undertaken to develop a view on the speed of current traffic.

4.2 Principal Access Points

Bulk material deliveries would be focussed on principal access points to ensure that HGV traffic is focussed on roads that are suited to construction traffic flows. As a result, 10 principal access points have been identified for the modified export cable route, namely:

- A98 west of Inverboyndie;
- B9121 north of Tipperrty;
- A97 south of the B9121 Fintry;
- A947 north of Keilhill;
- C7S west of Gorrachie;
- B9105 south of Fintry;
- B9105 south of Fintry;
- B9170 west of Cuminestown;
- C29S south of Cuminestown; and
- C121B west of the C295.

These access points would handle the bulk of cable route deliveries, with other accesses, being reserved for crossing points only.

4.3 Suggested Access Locations

There are up to 28 possible crossing points of the public road network on the modified export cable route. These are shown in indicative form in drawings SK05 and SK06 in Appendix C of this report.

Table 4.1 illustrates the proposed junction types, visibility splays, recorded 85^{th} percentile speeds and crossing points suggested for the proposed cable route. The final location will be dependant upon the detailed design of the modified export cable route and detailed application stage discussions with AC.

Table 4.1: Proposed Access Point Description

Access Point	Major Road Class	85th Percentile Speed (MPH)	Principal Junction	Junction Type	Visibility Type
1	B	53	Crossing	Staggered	A
2	B	44	Crossing	Staggered	B
3	A	53	Principal	1	A
4	C	44	Crossing	Straight	B
5	B	44	Principal	1	A
6	C	46	Crossing	Straight	C
7	A	61	Principal	1	A
8	C	46	Crossing	Straight	B
9	C	46	Crossing	Straight	B
10	C	46	Crossing	Straight	B
11	C	56	Crossing	Straight	A
12	A	67	Principal	1	A
13	C	56	Crossing	Staggered	A
14	C	56	Crossing	Straight	A
15	C	58	Principal	1	A
16	C	56	Crossing	Straight	A
17	C	46	Crossing	Straight	C
18	C	56	Crossing	Straight	A
19	C	46	Principal	2	A
20	B	46	Principal	1	A
21	C	45	Crossing	Straight	C
22	C	55	Crossing	Staggered	A
23	B	55	Principal	1	A
24	C	45	Crossing	Straight	C
25	C	56	Principal	2	A
26	C	45	Crossing	Straight	C
27	C	45	Crossing	Straight	C
28	C	45	Principal	1	A

5 Summary

WYG has been commissioned by Moray Offshore Renewable Limited to undertake a Construction Traffic Method Statement to review the construction access issues associated with the proposed export cable development.

The review has focussed on the non-AIL transport elements of the project and illustrates the assumptions developed in terms of estimating the traffic generation of the construction proposals.

At present it is not possible to provide detailed design of all the access junctions and crossing points associated with the export cable proposals. To provide a high level review of potential arrangements, WYG has prepared a set of indicative access junction types for use along the route of the project. These standard types have been applied to the various access points to inform the likely form of access.

The exact access design will need to be established at the detailed design stage and fully worked up detailed access drawings will be provided with Stage 1 RUSA reviews at that stage.

Appendix A – Indicative Construction Programme

Transport Indicative Construction Programme

Vehicle Classes

2016–2017

	May 2016	June	July	August	September	October	November	December	January 2017	February	March	April	May	June	July	August	September	October	November	December
Landing Point																				
Set Up																				
Excavation																				
Piling																				
Construction Works																				
Cable Instalation																				
Remediation																				
General Supplies																				
Staff																				
Cable Run																				
Set Up																				
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Jointing																				
Backfil																				
Remediation																				
General Supplies																				
Staff																				
Substation																				
Set Up				204																
Site Preparation					43	43	43													
Foundations							251	251	251	251	251									
Buildings											60	60	60	60	60					
AIL deliveries																44	44	44		
Installations																			150	150
Commissioning																				
Remediation																				
General Supplies				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Staff				396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
Total Per Month	0	0	0	640	479	479	730	687	687	687	747	496	496	496	496	480	480	480	586	586
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	0	0	0	27	20	20	30	29	29	29	31	21	21	21	21	20	20	20	24	24

2018

	January 2018	February	March	April	May	June	July	August	September	October	November	December
Landing Point												
Set Up			116									
Excavation			34	34								
Piling				34								
Construction Works				16	16							
Cable Instalation					32							
Remediation					58							
General Supplies			16	16	16							
Staff			240	240	240							
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Set Up		160										
Excavation			6074	6074	6074	6074						
Laying				631	631	631	631					
Jointing					76	76	76					
Backfil					17	17	17					
Remediation							87	87				
General Supplies		44	44	44	44	44	44	44				
Staff		864	864	864	864	864	864	864				
Substation												
Set Up												
Site Preparation												
Foundations												
Buildings												
AIL deliveries												
Installations	150	150										
Commissioning			64	64								
Remediation					43	43	43					
General Supplies	40	40	40	40	40	40	40					
Staff	396	396	396	396	396	396	396					
Total Per Month	586	1654	7888	8453	8547	8186	2198	995	0	0	0	0
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	24	69	329	352	356	341	92	41	0	0	0	0

2019–2020 and totals

	January 2019	February	March	April	May	June	July	August	September	October	November	December	January 2020	Total	Cars & Lights	HGV
Landing Point																
Set Up														116		116
Excavation														68		68
Piling														34		34
Construction Works														31		31
Cable Instalation														32		32
Remediation														58		58
General Supplies														48	48	
Staff														720	720	
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Staff			864	864	864	864	864	864						11232	11232	
Substation																
Set Up														204		204
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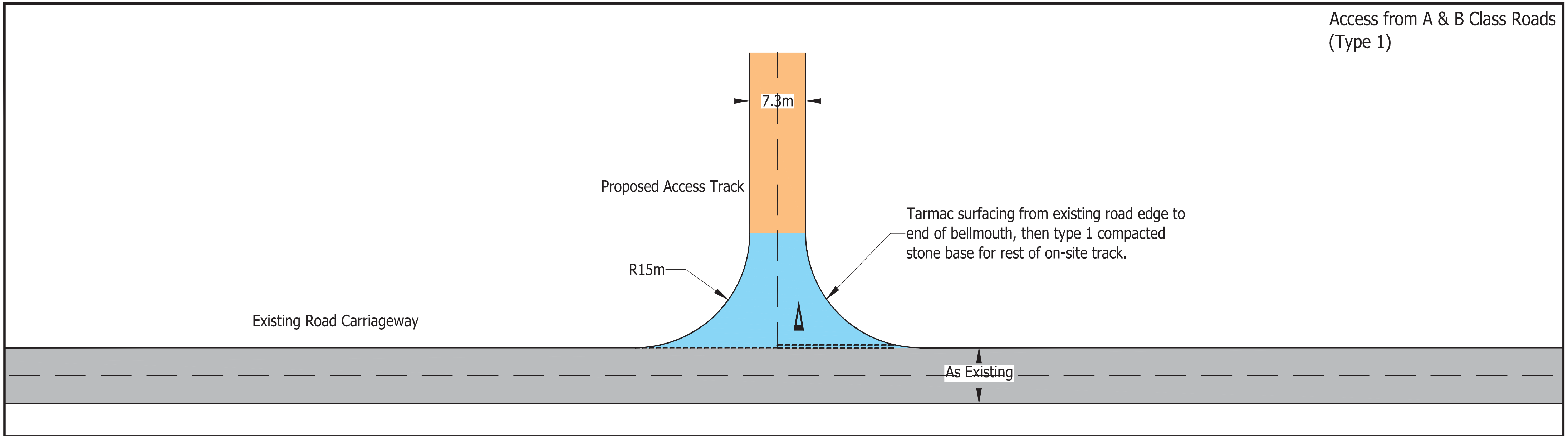
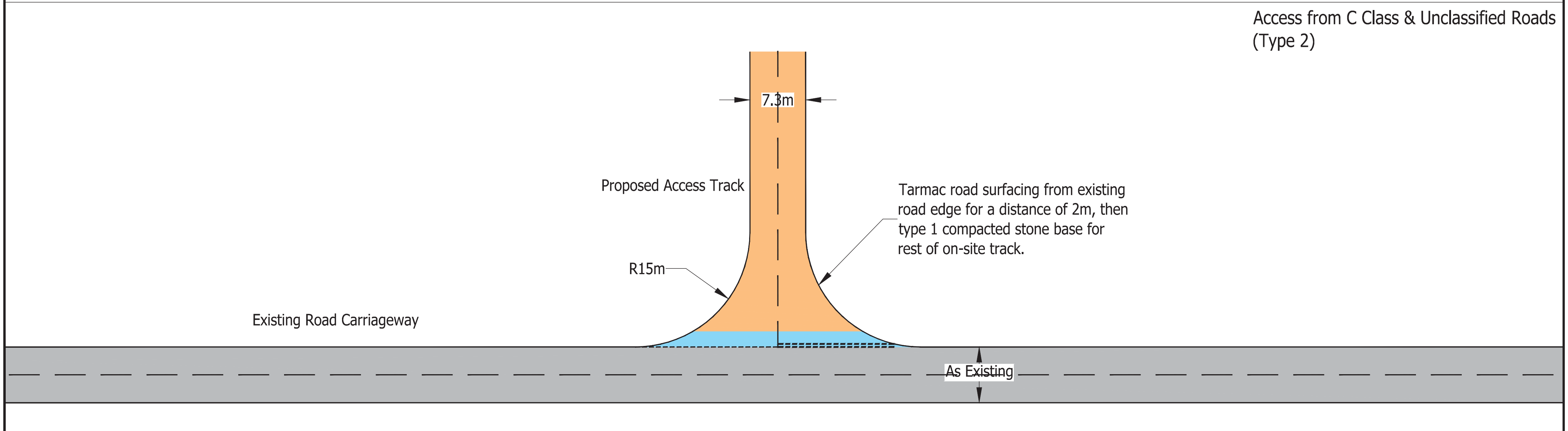
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24			
Total Per Day	0	7	119	145	149	149	200	170	0	0	0	0	0		33%	67%

Appendix B – Standard Access & Passing Place Layouts





Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.
3. Junction standards are based on Aberdeenshire Council's standards for Industrial Access Roads.
4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Indicative Kerbline / White Lining
- Existing Road Surface
- Proposed Tarmac Surface
- Proposed Compacted Stone Surface

MORL Modified Onshore Transmission Infrastructure

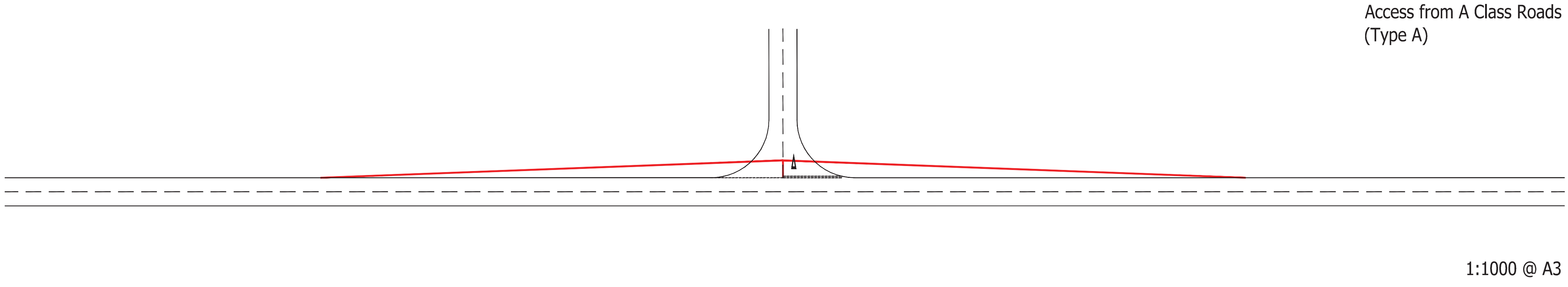
Moray Offshore Renewables Ltd

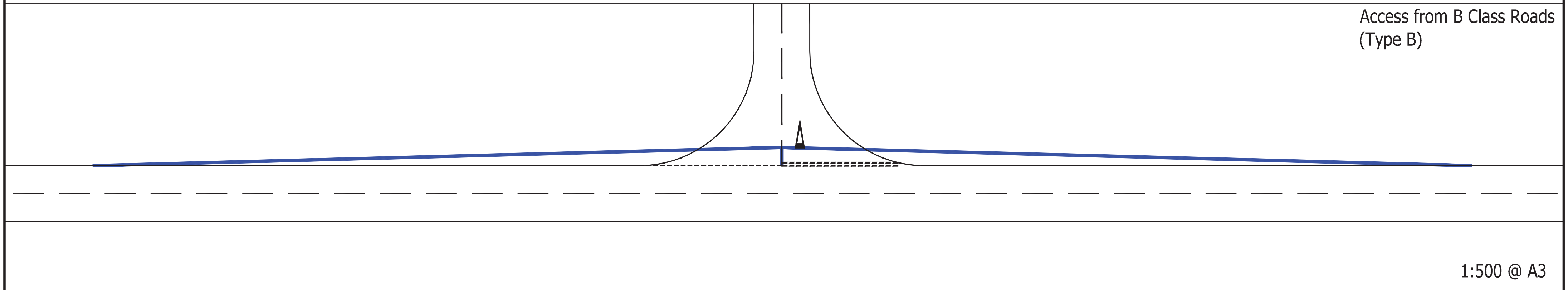
LOCATION:
Indicative Access Junction Layouts

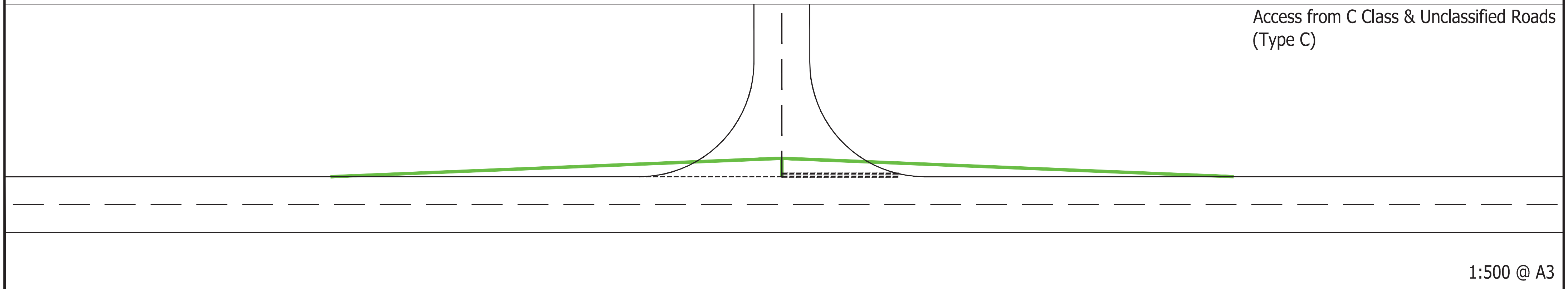
DRAWING TYPE:
Indicative Dimensions & Surfacing

WYG Transport Planning
part of the WYG group
39 George Street Edinburgh EH2 2HN
t: +44 (0)131 247 5780 f: +44 (0)131 247 5799 e: edinburgh@wyg.com

DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
CJ	GB	June 2014	1:500 @ A3	A087928	SK001	-







Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.
3. Junction standards are based on Aberdeenshire Council's standards for Industrial Access Roads.
4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Indicative Kerbline / White Lining
- Indicative 4.5m x 120m Visibility Splay
- Indicative 4.5m x 90m Visibility Splay
- Indicative 2.4m x 59m Visibility Splay

MORL Modified Onshore Transmission Infrastructure

Moray Offshore Renewables Ltd

LOCATION:
Indicative Access Junction Layouts

DRAWING TYPE:
Indicative Visibility Splay Requirements

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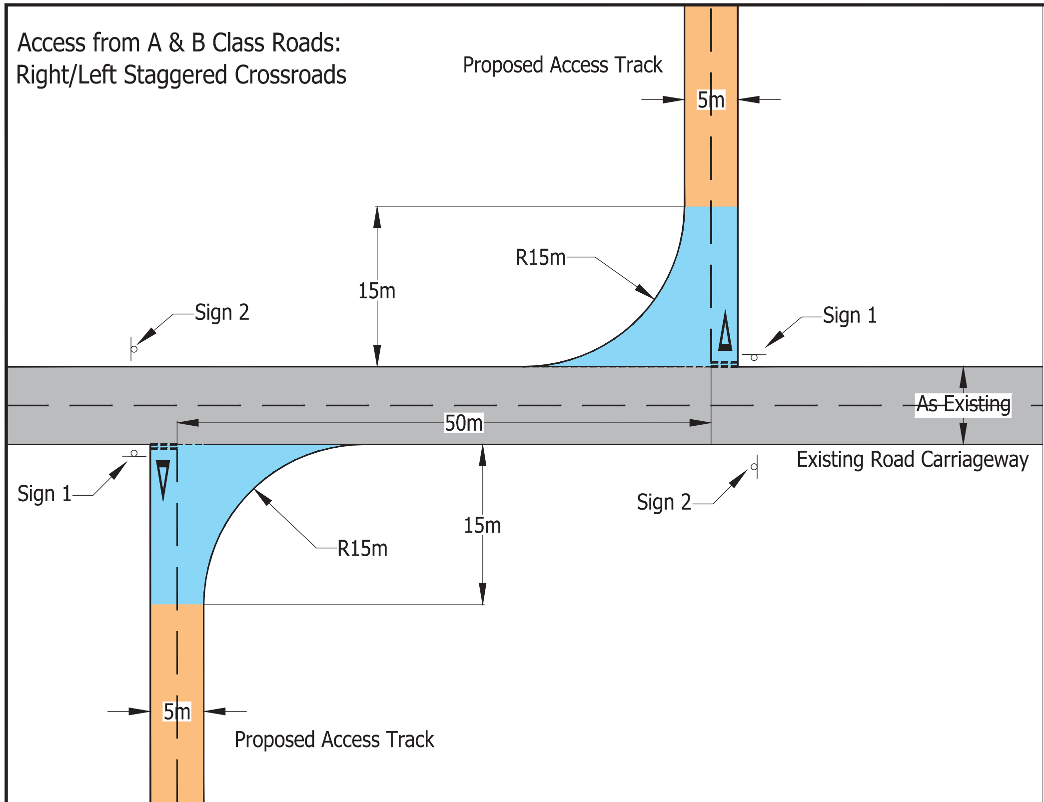

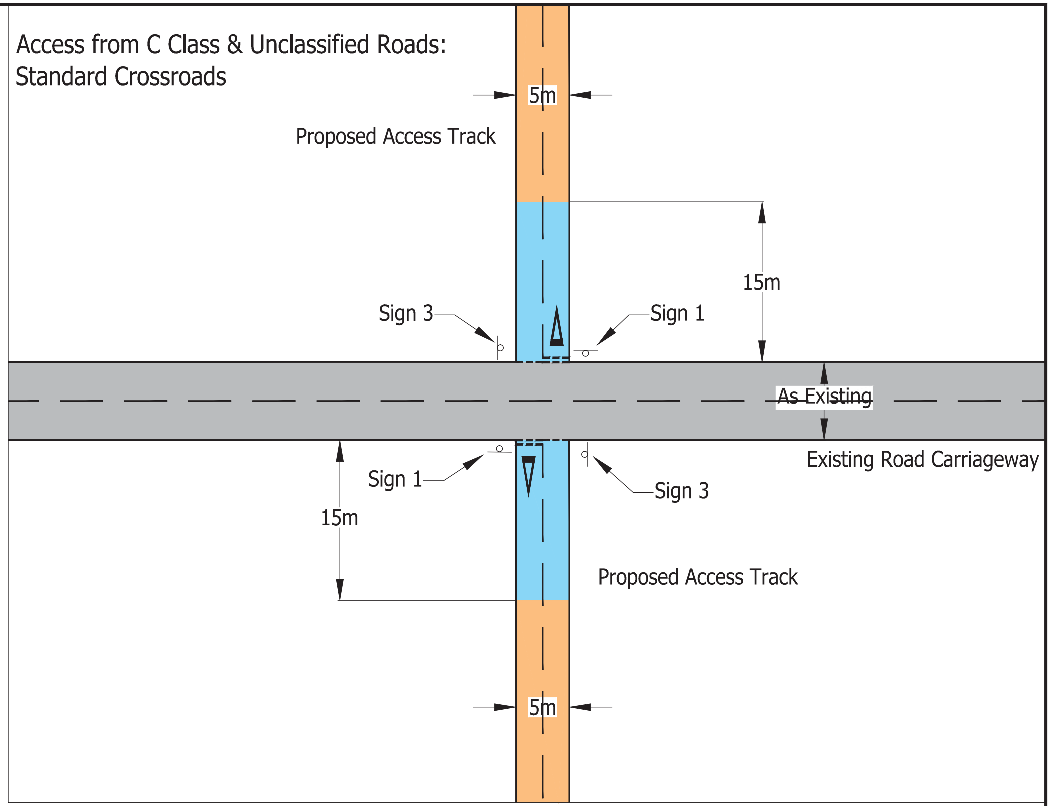

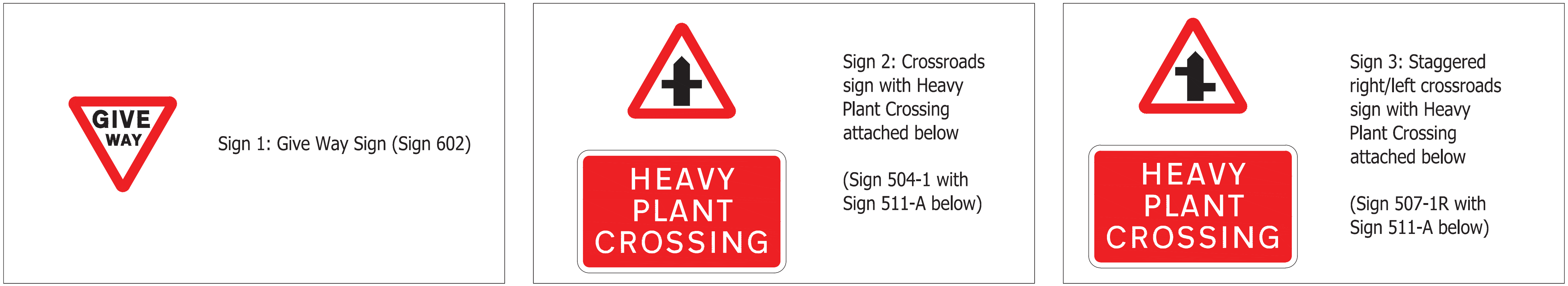

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.
3. Junction standards are based on Aberdeenshire Council's standards for Industrial Access Roads & DMRB TD 42/95
4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Indicative Kerbline / White Lining
- Existing Road Surface
- Proposed Tarmac Surface
- Proposed Compacted Stone Surface
- Road Sign Location

MORL Modified Onshore Transmission Infrastructure

Moray Offshore Renewables Ltd

LOCATION:
Indicative Construction Crossing Junction Layouts

DRAWING TYPE:
Indicative Dimensions & Surfacing

WYG Transport Planning
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DRAWN:	CHECKED:	DATE:	SCALES:	PROJECT NUMBER:	DRAWING NUMBER:	REVISION:
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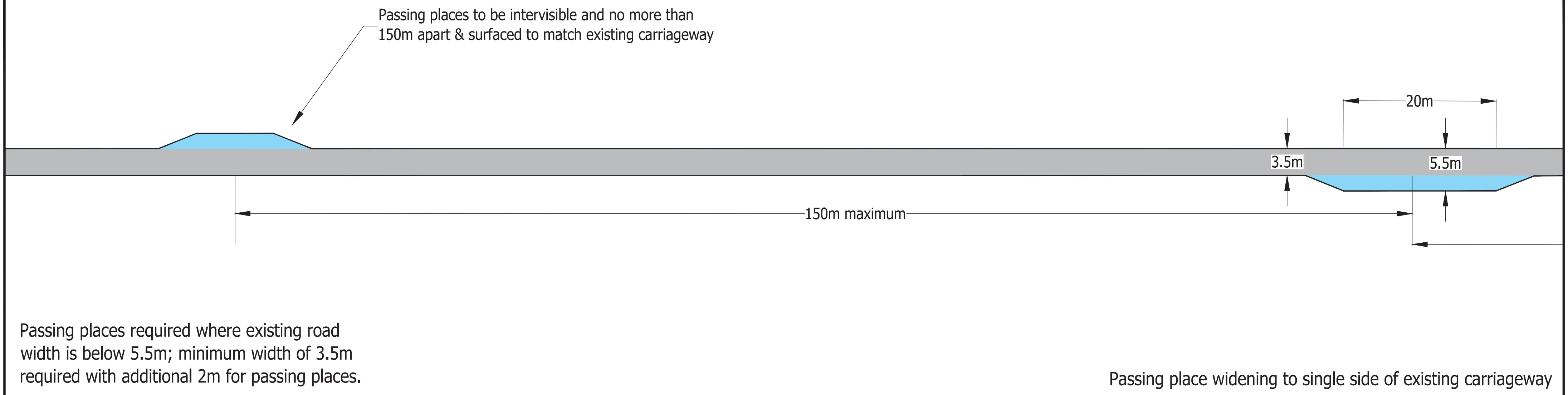

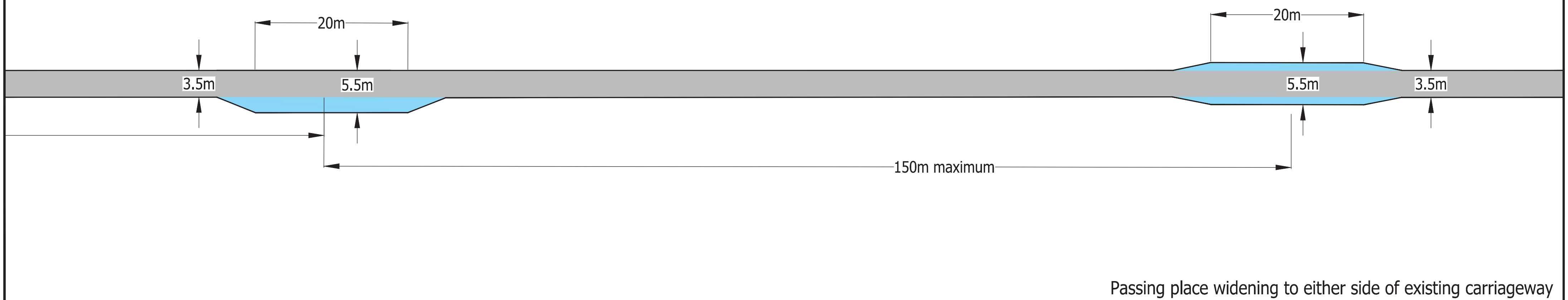

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.
3. Junction standards are based on Aberdeenshire Council's standards for Rural Passing Places.
4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Indicative Kerbline / White Lining
- Existing Road Surface
- Proposed Passing Place

MORL Modified Onshore Transmission Infrastructure

Moray Offshore Renewables Ltd

LOCATION:
Indicative Passing Place Layouts & Positioning

DRAWING TYPE:
Indicative Dimensions & Surfacing

WYG Transport Planning
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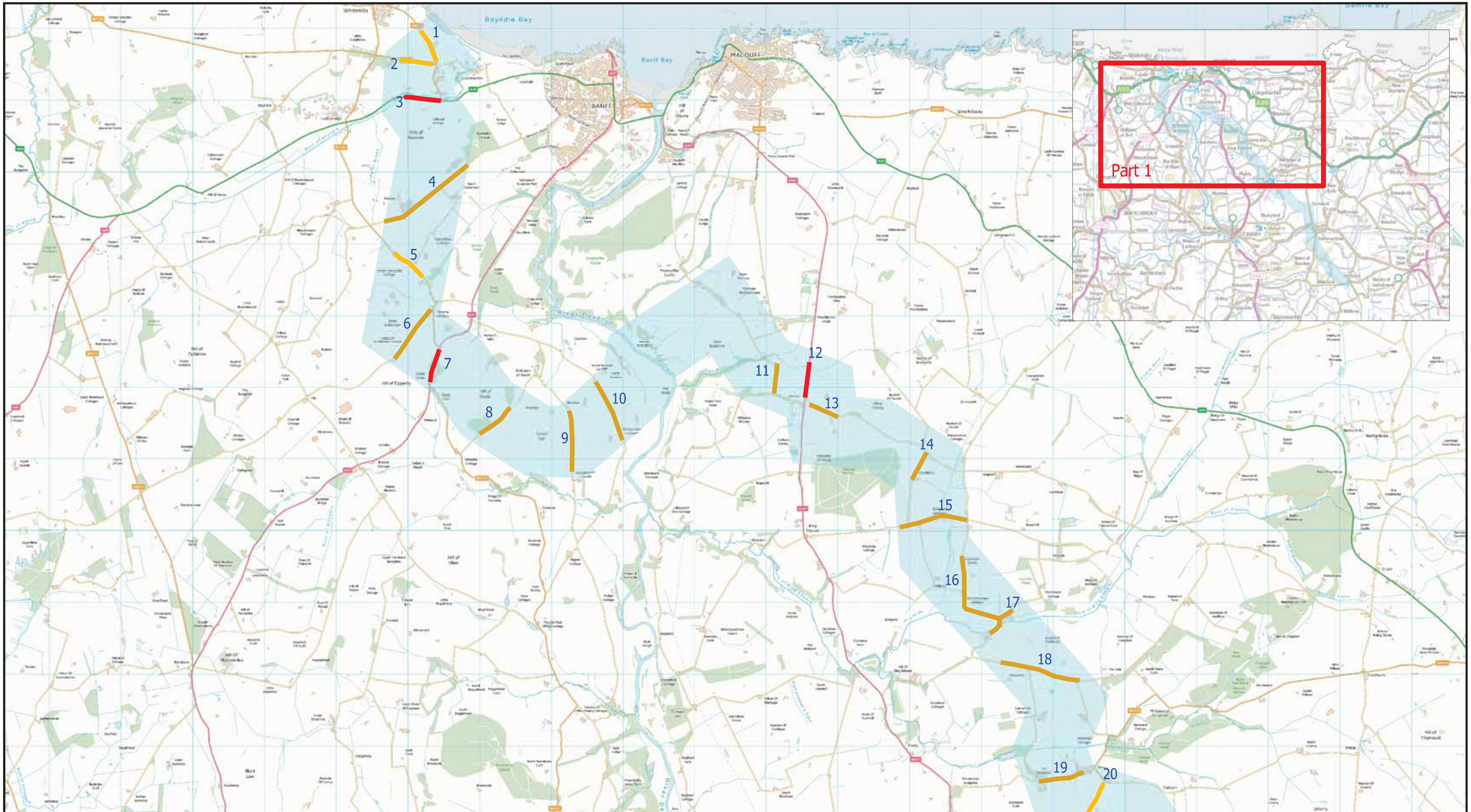
CJ	GB	June 2014	1:500 @ A3	A087928	SK004	-

Appendix C – Potential Locations for Access Points



Notes:

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3. Junction standards are based on Aberdeenshire Council's standards for Rural Passing Places.
4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Onshore Export Cable Corridor
- A-Class Road Access / Crossing
- B-Class Road Access / Crossing
- C-Class & Unclassified Road Access / Crossing

MORL Modified Onshore Transmission Infrastructure

Moray Offshore Renewables Ltd

LOCATION:
Indicative Onshore Export Cable Corridor - Part 1

DRAWING TYPE:
Potential Road Sections for Access Junction & Crossing Point Locations

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Notes:

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4. Existing Road Carriageway shown is an example only and while based on Aberdeenshire standards the example is not intended to accurately reflect any of the roads from which access is to be taken.

Key:

- Onshore Export Cable Corridor
- A-Class Road Access / Crossing
- B-Class Road Access / Crossing
- C-Class & Unclassified Road Access / Crossing

MORL Modified Onshore Transmission Infrastructure

Moray Offshore Renewables Ltd

LOCATION:
Indicative Onshore Export Cable Corridor - Part 2

DRAWING TYPE:
Potential Road Sections for Access Junction & Crossing Point Locations

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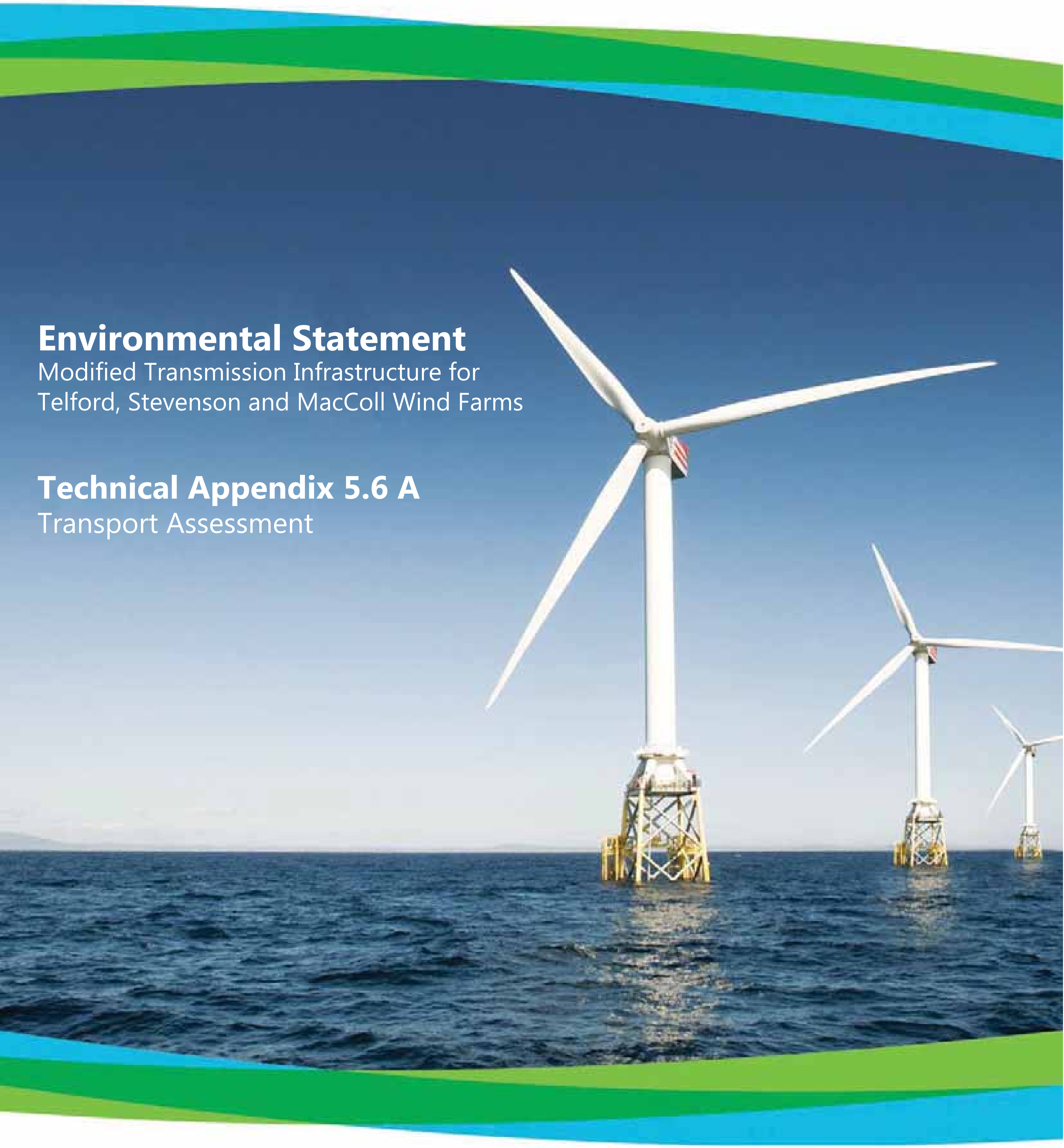
moray offshore renewables ltd

Developing Wind Energy In The Outer Moray Firth



Environmental Statement

Modified Transmission Infrastructure for
Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.6 A

Transport Assessment

edp renewables

This document was produced by WYG Environment Planning Transport Ltd on behalf of Moray Offshore Renewables Ltd

Document Owner	**Jordan Dunn**
Document Status	**Final**
File Name	**Technical Report – Transport Assessment.docx**

Revision	**Date**	**Description**	**Originated By**	**Checked By**	**Approved By**
A1	13 June 2014	Final	JD	GB	GB
A2					

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Table of Contents

1 Introduction

WYG has been commissioned by Moray Offshore Renewables Ltd (MORL) to undertake a Transport Assessment associated with the planning in principle application for the installation of the modified transmission infrastructure (modified TI). This study will focus on the onshore transmission infrastructure (OnTI) which includes the onshore aspects of the export cable and two substations to the south west of New Deer.

This report has been prepared in accordance with instructions from MORL on the above project details.

WYG has reviewed the transport issues associated with the construction of the development and with the operation of the development once the OnTI is in place.

The assessment undertook a review of the available information and assumed traffic numbers for a series of construction activities associated with the installation of the modified onshore export cable and construction of the substations. By quantifying the traffic associated with the construction activities, the significance of the likely effects were assessed by determining the increase in traffic.

The Transport Assessment forms Appendix 5.6A of Chapter 5.6 – Traffic and Transportation which along with the following Appendices assesses the likely transport effects and associated mitigation related to the OnTI;

- Construction Traffic Management Plan (CTMP) – Appendix 5.6B;
- Route Survey Report (RSR) – Appendix 5.6C; and
- Construction Traffic Method Statement – Appendix 5.6D.

Report Structure

Following this introductory chapter the report is structured as follows:

- **Chapter Two** describes the proposed development along with details of the construction programme and predicted traffic generation;
- **Chapter Three** reviews the relevant transport and planning policies;
- **Chapter Four** sets out the methodology used within the Transport Assessment (TA);
- **Chapter Five** sets out the baseline transport conditions encountered within the study area;
- **Chapter Six** provides a summary of potential impacts and associated transport related effects;
- **Chapter Seven** provides a summary of the proposed mitigation measures detailed within the accompanying CTMP – Appendix 5.6B;
- **Chapter Eight** provides an assessment of the traffic impact of the development of the site;
- **Chapter Nine** provides a review of the wider impacts likely to occur during the construction and operational phases along with suggested mitigation measures; and
- **Chapter Ten** summarises the findings of the Transport Assessment and outlines the key conclusions.

2 Development Proposals

2.1 Proposed Development

The proposed development is for the installation of modified TI to connect the three consented wind farms (Telford, Stevenson and MacColl offshore wind farms) the Outer Moray Firth to the pre-existing onshore National Electricity Transmission System (NETS).

The TI will include both offshore and onshore cable systems. An offshore cabling system from the three consented wind farms will come onshore at a landfall point at Inverboyndie bay. From there, underground onshore cabling will run southeastwards to connect with the NETS at New Deer which lies approximately 17 miles west of Peterhead in Aberdeenshire. Two substations located adjacent to one another will be located at New Deer to facilitate the connection of the TI to the NETS and are included in this assessment.

2.1.1 OnTI

The OnTI will be made up of the following key components:

- Underground cables;
- Transformers;
- Switchgear;
- Control and instrumentation equipment;
- Control buildings;
- Fenced compounds; and
- Access tracks.

The installation of the OnTI including the substations will require materials to be transported to site by road and, in addition to the above, temporary facilities including the provision of construction compounds, storage facilities and laydown areas.

One of the main traffic effects associated with the construction of the OnTI relates to the need to import abnormal indivisible loads (AILs) to the substation site. These loads will comprise the electrical equipment for the substation compounds (in particular the grid transformers). For this study, the port of Peterhead has been considered as the port of entry for the delivery of AILs for the substation construction.

There will also be a requirement to bring construction plant and materials (cable drums, concrete, pipes, blockwork, steel, etc.) to both the substations and cable route sites. These will be delivered by standard Heavy Goods Vehicles (HGVs).

Construction workers and operatives commuting to the site during the construction, commissioning, operation and maintenance and decommissioning periods would generate light–vehicle traffic, such as cars and Light Goods Vehicles (LGVs).

2.2 Access Strategy

Transportation to and from the modified export cable installation site would be via the existing trunk and local road networks. Studies relating to the exact route of the onshore cables within the 500 m wide limits of deviation are ongoing and, to date, no access points on the route have been identified for the traffic relating to the installation of the cable. Access points are likely to be located at roughly 2-4 km intervals along the length of the cabling route and will be located on A, B and C Class roads. The proposed track network will also cross the public highway at numerous points along the route.

The access point to the substations will be located on the C296 south of the junction with the C121B.

It is proposed that each access junction layout would be based on one of a series of standard layouts produced in line with Aberdeenshire Council (AC) standards for various road types including:

- High capacity, A class high speed road;
- Secondary route, high speed road;
- Secondary route, low speed road; and
- Unclassified road.

Proposed layouts for each road type are included within the accompanying CTMS – Appendix 5.6D.

2.3 Development Programme

Construction of the modified OnTI is likely to occur in phases between 2016 and 2019. The key stages associated with the construction are as follows:

- Installation of jointing pit at landfall site;
- Installation of cables between landfall site and onshore substation; and
- Construction of onshore substations.

2.4 Development Traffic Generation

Once operational, the OnTI assets will operate automatically with visits as required for periodic overhauls, scheduled maintenance and unscheduled maintenance. Traffic movements associated with the operation of the development would therefore be low.

The OnTI would be decommissioned following the end of their operational life. Decommissioning traffic would be a matter for the legislative process whenever the cable is decommissioned and would be addressed at that point.

Construction of the development will result in the highest traffic generation. The Transport Assessment therefore only considers this element.

3 Transport Planning Policy and Guidance

3.1 Legislation and Policy Context

A review of relevant transport and planning policies has been undertaken and is summarised below. The review provides the basis for the wider development context of the proposed development.

3.1.1 National Policy and Guidance

3.1.1.1 Scottish Planning Policy (SPP) 2010

Advice Note 75 (Planning for Transport). SPP is a statement of Scottish Government Policy on land use planning.

SPP notes that a Transport Assessment should be carried out where a change of use or new development is likely to result in a significant increase in the number of trips.

The SPP also states that *"the primary purpose of the strategic transport network is to provide for the safe and efficient movement of strategic long distance traffic between major centres, although in rural areas it also performs important local functions. Development proposals that have the potential to affect the performance or safety of the strategic transport network need to be appraised to determine their effects. If required, mitigation measures should be agreed with Transport Scotland that would, where practicable, achieve no net detriment to safety or in overall performance, including journey times and connections, emissions reduction and accessibility."*

A review of the SPP is currently being undertaken with the draft SPP issued for consultation in April 2013 with the final policy due to be published in June 2014. In relation to the assessment of the transport impacts of development no major changes in policy are proposed.

3.1.2 Regional Policy and Guidance

3.1.2.1 Nestrans Regional Transport Strategy 2013

The Nestrans' Regional Transport Strategy (RTS) was approved by Scottish Ministers and published in 2008 and updated in 2013. Its stated vision is to provide a *"A transport system for the north east of Scotland which enables a more economically competitive, sustainable and socially inclusive society."* The objectives of the strategy include:

- economy – to enhance and exploit the north east's competitive economic advantages, and reduce the impacts of peripherality;
- accessibility, safety and social Inclusion – to enhance choice, accessibility and safety of transport for all in the north east, particularly for disadvantaged and vulnerable members of society and those living in areas where transport options are limited;
- environment – to conserve and enhance the north east's natural and built environment and heritage and reduce the effects of transport on climate, noise and air quality; and
- spatial planning – to support transport integration and a strong, vibrant and dynamic city centre and town centres across the north east.

3.1.3 Local Policy

3.1.3.1 Local Transport Strategy 2012

The Aberdeenshire Council Local Transport Strategy was adopted in 2012 with the aim to *"encourage individuals and businesses to consider ways to travel less, travel more actively and, where vehicular travel is necessary, how journeys could be made more effectively."*

The strategy does not contain any specific policies relating to transmission infrastructure renewable energy or construction traffic although the general aims of the strategy particularly in relation to effective travel remain valid.

3.1.4 Guidance

3.1.4.1 Institute of Environmental Assessment (IEMA)/Guidelines for the Environmental Assessment of Road Traffic, 1993

The IEMA guidelines provide a reference for the assessment of the environmental impact of road traffic associated with major new developments. The purpose of the guidelines is to provide the basis for a systematic, consistent and comprehensive appraisal of traffic impacts for a wide range of development projects. The guidelines are not intended to be exhaustive nor a reference for the very detailed or specific problems that occur in assessing the environmental impact of traffic. The guidelines are intended to complement professional judgment as the environmental impact of traffic will vary project by project.

4 Methodology

4.1 Introduction

This section sets out the methods used to characterise existing and/or future baseline conditions at the site and in the surrounding area and is based on site visits, review of published information/maps, consultation, policy review etc.

Consideration has been given to the proposed access routes to the OnTI and the changes to trunk and local / minor road traffic patterns as a result of the additional development traffic on parts of the local road network. The assessment recommends measures to manage the effect of development traffic and to minimise disruption to the surrounding road network within the study area, and the assessment is undertaken on this basis.

4.2 Scoping

A scoping exercise relating to access, traffic and transport effects was undertaken with Transport Scotland and AC roads officers in May 2014 with the responses detailed in Table 4.1.

Table 4.1 Scoping Consultees

Organisation	Consultation Response
Aberdeenshire Council	AC satisfied with the proposed methodology. Principally concerned with traffic management measures rather than the likely traffic impact.
Transport Scotland	No response

4.3 Appraisal Methodology

4.3.1 Baseline Characterisation

The study area, agreed with AC roads, comprises the parts of the public road network that could be used by construction and operational traffic accessing the site. The roads identified as forming the likely route to site by construction traffic include the A97/A98/A947/B9105/B9170/B9121/C92S/C7S/C295.

The public road network that could be used by construction traffic accessing the site will also include numerous minor C/U Class routes that will be crossed by the proposed access track network.

The baseline review focuses on the nature of the surrounding road infrastructure and the level of traffic that uses it. It has been informed by desktop studies and consultation, comprising the following:

- Review of responses to the scoping letter;
- Collection of traffic flow data;
- Review of any roads hierarchy promoted in relevant Local Transport Strategies;
- Identification of sensitive junction locations;
- Identification of constraints to the roads network, with or without height/width/weight restrictions;
- Identification of areas of road safety concerns;
- Identification of other traffic sensitive receptors in the area (routes, communities, buildings etc.);
- Review of Ordnance Survey (OS) plans to derive a local area roads network; and
- Consideration of potential supply locations for construction materials, if not available on-site, to inform extent of local area roads network to be considered in the assessment.

Field surveys have also been undertaken to further enhance the understanding of the road network in the study area and to identify potential constraints on the network, including:

- Visual inspection of all roads identified in the study area network;
- Photographic/video record of any constraints; and
- Automatic Traffic Counts (ATC) to determine existing traffic flows on the surrounding road network.

4.3.2 Method of Assessment

The assessment has been undertaken in accordance with the Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic'. The IEMA guidelines include details on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement was used to develop a classification of sensitivity for various receptors. The guidelines also identify the key effects that are most important when assessing the significance of traffic effects from an individual development: Table 2.2 of Volume 11, Section 2, Part 5 of the Design Manual for Roads and Bridges (DMRB) entitled 'Assessment and Management of Environmental Effects' sets out four levels against which the magnitude of these effects should be assessed – major, moderate, low and negligible.

4.3.3 Significance Criteria

4.3.3.1 Receptor Sensitivity

The receptors that may be subject to any traffic effects arising from the construction of the proposed development are likely to be construction traffic routes and settlements along these. These settlements are classified by size, function, presence of school and community facilities, traffic calming or traffic management measures, vehicle speed limits and position on the roads hierarchy, using the criteria identified Table 4.2. This classification is based upon subjective judgement and relative sensitivity to the potential traffic effects of the modified OnTI.

Identification of receptor sensitivity requires the definition of both base-line conditions and estimation of conditions for the appropriate year of assessment. Each receptor will have a different value and level of sensitivity to change. Quantification of environmental effects is easier for some receptors than others. Traffic noise has been extensively researched and methods of measurement developed. Other effects such as severance are more subjective as there are no current proven or reliable techniques for study. Table 4.2 provides descriptions of receptor sensitivity based on DMRB guidelines HA 205/08 'Assessment and Magnitude of Environmental Effects.

For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data or quantified information where possible.

Table 4-2 Receptor Sensitivity

Sensitivity	Description
High	Typically receptors with high importance and rarity on an international and national scale and with limited potential for substitution. To include large rural settlements containing a high number of community and public services and facilities, areas with traffic control signals, waiting and loading restrictions, traffic calming measures and minor rural roads, not constructed to accommodate frequent use by HGV.
Medium	Typically receptors with high or medium importance and rarity on a regional scale and with limited potential for substitution. To include intermediate sized rural settlements containing some community or public facilities and services, areas with some traffic calming or traffic management measures and local A or B class roads, capable of regular use by HGV traffic.
Low	Typically receptors with low or medium importance and rarity on a local scale (on-site or neighbouring the site). To include small rural settlements with few community or public facilities or services, areas with little or no traffic calming or traffic management measures and trunk or A-class roads, constructed to accommodate significant HGV composition.
Negligible	Typically receptors with little importance and rarity. To include roads with no adjacent settlements including new strategic trunk roads or motorways that would be little effected by additional traffic.

4.3.3.2 Magnitude of Effect

The IEMA guidelines identify general thresholds for traffic flow increases of 10% and 30%. The guidelines also suggest that 30%, 60% and 90% changes in traffic levels should be considered as "slight, moderate and substantial" effects respectively with regard to severance and intimidation. It is also generally considered that traffic flow increases of less than 10% are negligible, given that daily variation in background traffic flow may vary by this amount. Based on these guidelines and perceptions, the magnitude of the effect can be estimated for the traffic-based effects using the criteria in Table 4.3.

Table 4-3 Effect Magnitude

High	Medium	Low	Negligible
>90% increase in traffic	60% - 90% increase in traffic	30% - 60% increase in traffic	0% - 30% increase in traffic

4.3.3.3 Significance of Effect

To determine the overall significance of the effects, the results from the receptor sensitivity and effect magnitude classifications are correlated and classified using the scale summarised in Table 4.4.

Table 4-4 Matrix for Determination of Significance of Effect

Sensitivity / Magnitude	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

For the purposes of assessing significant effects, under the EIA regulations, this matrix provides a guide subject to professional judgement. For example, the introduction of a low number of additional HGV movements on a route that is currently subject to low numbers of HGV trips is recorded as being highly statistically significant, even though the numbers of additional trips could be just five to ten additional vehicles. Despite the fact that additional traffic volumes may be exceptionally low, the effect may be statistically high. However, it is not necessarily significant in terms of the EIA regulations. Effects are considered to be significant for the purposes of the EIA Regulations where the effect is classified as being of equal to or greater than moderate significance.

5 Baseline Conditions

5.1 Current Baseline

5.1.1 Local Road Network

It is likely that the majority of traffic associated with the delivery of plant and materials associated with the cable installation and substation construction will originate from the trunk road network to the south and east of the site (A90/A96). Quarry sourced materials will arrive from local quarries surrounding the site with construction staff assumed to be based locally during the construction period. The assessment has focussed on the likely effect on the following roads identified as forming the likely routes to site by construction traffic:

- The A98 is the primary east-west route through the northern coast of Aberdeenshire running between the A96 at Fochabers and Fraserburgh. The road is single carriageway along its entirety;
- The A97 is a distributor road route running from Banff south to Huntly and the A96. The road is single carriageway along its entirety;
- The A947 is a distributor road route running from Banff south through Turrifff before joining the A96 south of Dyce. The road is single carriageway along its entirety;
- The A948 is a distributor road running from New Deer to Ellon and the A90. The road is single carriageway along its entirety;
- The A981 is a distributor road running from Fraserburgh to New Deer and the A948. The road is single carriageway along its entirety;
- The B9105 is a rural distributor road running from the A98 at Cook through Fintry to the A947 north of Turrifff. The road is single carriageway along its entirety;
- The B9170 is a rural distributor road running from the A947 south of Turrifff through Cuminestown and New Deer before turning south to Inverurie. Construction traffic is likely to utilise the section of the route between the A947 and New Deer. The road is single carriageway along its entirety;
- The B9121 is a rural distributor road running between Whitehills and the A97 at Tipperty. A further section continues south from the A97 joining the B9025 at Slack of Scotston. Construction traffic is likely to utilise the section of the route between the A98 and the A97. The section of road within the study area is wide single track without passing places;
- The C9S is a minor rural road running from the A947 at Foulzie and the A98 at Fishriegreen. Construction traffic is unlikely to utilise this route. The section of road within the study area is single track without passing places;
- The C7S is a minor rural road running from the A947 at King Edward through Gorrachie to the C9S at Fishrie. Construction traffic is likely to utilise the section of the route between the A947 and Gorrachie. The section of road within the study area is single track without passing places;

- The C29S is a minor rural road running from the B9170 at Oldmill to the B9005 near Gight Castle. Construction traffic is likely to utilise the section of the route between the B9170 at Oldmill and the proposed substation. The section of road within the study area is wide single track without passing places; and
- The C121B is a minor rural road running from the B9170 near Hillhead of Auchreddie to the C26S at Keithen. Construction traffic is likely to utilise the section of the route between the B9170 near Hillhead of Auchreddie and Burnside. The section of road within the study area is wide single track without passing places.

5.2 Traffic Volumes

As part of the scoping discussions 17 sites were identified that would allow an accurate estimate of the potential impact of the construction phase to be made. To gauge existing usage, ATC surveys were commissioned at the following locations:

- A98 west of Boyndie;
- B9121 south of Fiskaidly;
- A98 west of the B9038;
- A97 south of B9121;
- A947 near Keilhill;
- C92S east of Foulzie;
- C7s west of Gorrachie;
- B9105 south of Fintry;
- A947 north of Turriff;
- A947 south of the B992;
- A98 east of the B9027;
- B9170 west of Cuminestown;
- C29S south of Cuminestown;
- C121B west of C295;
- B9170 west of New Deer;
- A948 west of the B9028; and
- A981 west of the B9028.

For each location, one week's worth of count data was collected during June 2014 as agreed with AC roads with the locations surveyed illustrated in Plates 5.1 and 5.2.

Plate 5-1 Traffic Survey Locations (Northern Section)

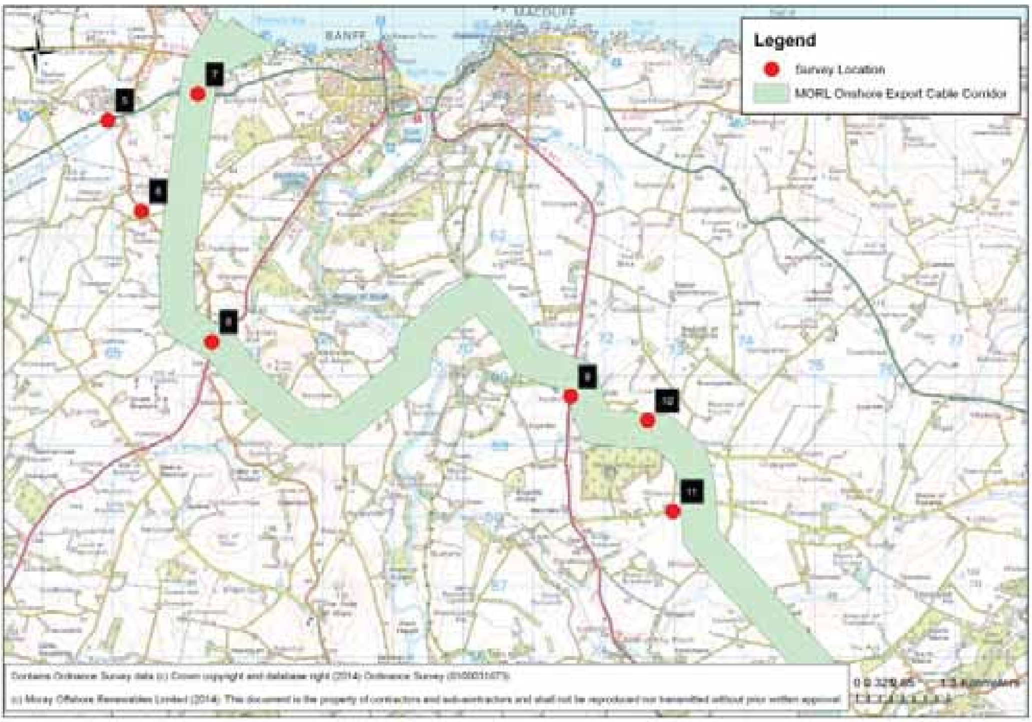
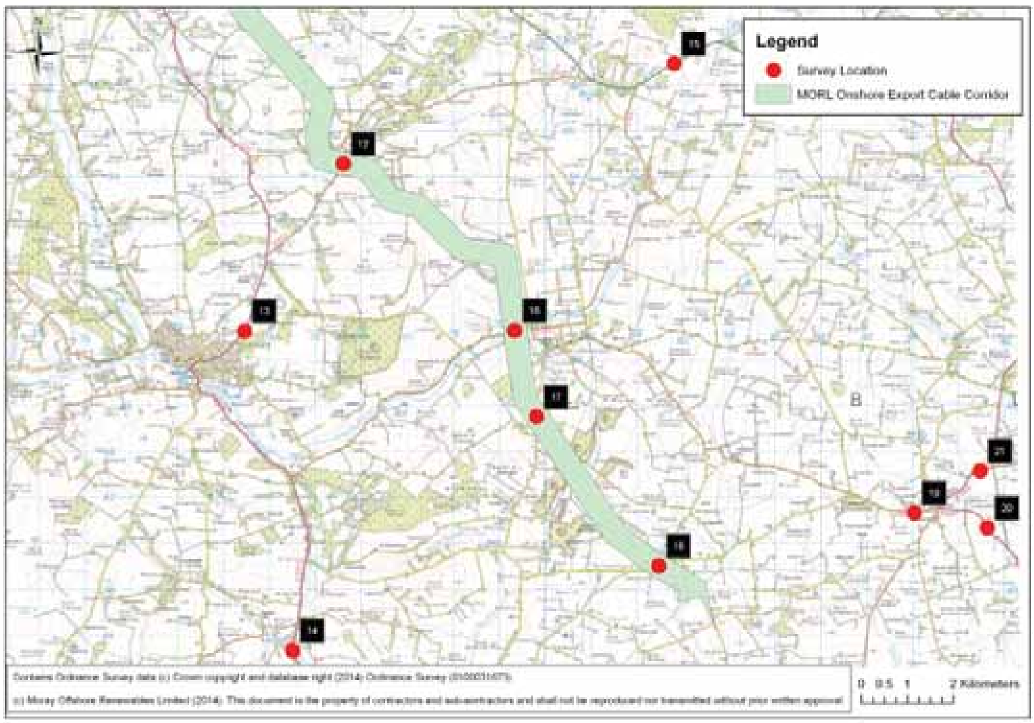


Plate 5-2 Traffic Survey Locations (Southern Section)



The counters installed on the A947 near Keilhill, A948 west of the B9028 and A981 west of the B9028 were damaged during the survey period. The A948 and A981 counters were able to provide two weekdays worth of data and this is considered adequate to provide an estimate of the likely weekday traffic flows. The counter on the A947 north of Turriff has been used as a proxy for the A947 Keilhill counter due to the lack of usable data.

The traffic counters used allowed the traffic flows to be split into vehicle classes as well into overall directional traffic volume. The vehicle classes reported in the survey were as follows:

- Motorcycles and pedal cycles;
- Cars;
- Lights – this classification covers light goods vehicles (up to 3.5 tonne) and cars with trailers/caravans;
- Other goods vehicles – Class 1 (OGV1) & buses; this classifications covers smaller commercial vehicles between 3.5 and 7.5 tonnes and includes rigid 2 and 3 axle trucks and articulated trucks up to 3 axles as well as buses and coaches; and
- Other Goods Vehicles – Class 2 (OGV2); this classification covers all heavy goods vehicles with four or more axles.

Table 5.1 summarises the weekday traffic data collected at the 17 sites with data split into the following categories:

- Cars/Lights; and
- HGV (OGV 1 + OGV 2).

Table 5-1 Existing Traffic Flows (Weekday Average Two Way Flows)

Survey Location	Time Period	Cars / Lights	HGV	Total
A98 west of Boyndie	12 Hours	3466	856	4322
	24 Hours	4174	989	5163
B9121 south of Fiskaidly	12 Hours	227	50	278
	24 Hours	279	58	337
A98 west of the B9038	12 Hours	5342	874	6217
	24 Hours	6475	1003	7478
A97 south of B9121	12 Hours	1003	215	1219
	24 Hours	1189	223	1411
A947 near Keilhill	12 Hours	5196	907	6103
	24 Hours	6471	1072	7543
C9S east of Foulzie	12 Hours	48	16	64
	24 Hours	59	18	78
C7S west of Gorrachie	12 Hours	109	31	140
	24 Hours	130	37	167
B9105 south of Fintry	12 Hours	1004	223	1227
	24 Hours	1217	255	1427
A947 north of Turriff	12 Hours	5196	907	6103
	24 Hours	6471	1072	7543
A947 south of the B992	12 Hours	3491	725	4216
	24 Hours	4588	895	5482
A98 east of the B9027	12 Hours	2576	735	3311
	24 Hours	3029	838	3867
B9170 west of Cuminestown	12 Hours	1515	377	1892
	24 Hours	1870	438	2308
C29S south of Cuminestown	12 Hours	327	73	401

Survey Location	Time Period	Cars / Lights	HGV	Total
	24 Hours	416	87	503
C121B west of C29S	12 Hours	190	43	233
	24 Hours	234	51	285
B9170 west of New Deer	12 Hours	1232	354	1587
	24 Hours	1552	409	1962
A948 west of the B9028	12 Hours	826	188	1013
	24 Hours	1094	225	1319
A981 west of the B9028	12 Hours	2241	393	2634
	24 Hours	2865	465	3320

5.2.1 Traffic Speeds

The ATC surveys were also used to collect speed statistics. The 5-day average and 85th percentile speeds observed at the count locations are summarised below in Table 5.2.

Table 5-2 Speed Summary (Two Way)

Survey Location	Average Speed	85^{th} Percentile Speed	Speed Limit
A98 west of Boyndie	56	66	60
B9121 south of Fiskaidly	36.3	44.2	60
A98 west of the B9038	39.8	52.6	60
A97 south of B9121	50.3	60.9	60
A947 near Keilhill	56.5	67.4	60
C92S east of Foulzie	41.9	56.0	60
C7s west of Gorrachie	49.8	58.1	60
B9105 south of Fintry	39.1	45.9	60
A947 north of Turriff	56.7	66.0	60
A947 south of the B992	58.1	65.8	60
A98 east of the B9027	58.1	65.8	60
B9170 west of Cuminestown	45.1	54.8	60
C29S south of Cuminestown	48.7	56.0	60
C121B west of C295	34.9	45.2	60
B9170 west of New Deer	48.8	56.7	60
A948 west of the B9028	44.9	51.0	60
A981 west of the B9028	45.8	54.3	60

5.2.2 Accident History

Road traffic accident data was obtained for the four years from the start of 2009 to the end of 2012 at the following locations which form the study area:

- A98 between the A947 and B9121;
- B9121 between the A98 and A97;
- A97 between the A98 and B9121;
- A947 between the A98 and Turrifff;
- B9105;
- B9170 between the A947 and New Deer;
- C7S between the A947 and Gorrachie; and
- C121B.

Appendix A of this report provides a summary of the 73 injury accidents recorded on the routes for the four year period. There is no obvious pattern in relation to the injury accidents recorded with the majority of accidents located on the A947 to the south of Banff and only two accidents recorded involving HGVs.

5.3 Future Baseline

Construction of the OnTI would be completed by 2021 subject to planning consent from AC. For the purpose of this assessment, a 37 month construction period has been assumed with the peak construction period occurring during 2018. Any lengthening in the programme would have a reduced effect on the surrounding road network in respect to overall trip generation.

To assess the likely effects during the construction phase, base year traffic flows were determined by applying the National Road Traffic Forecast (NRTF) high growth factors to the surveyed traffic flows. Applying high NRTF growth factors provides a robust assessment as they represent higher than average growth. The NRTF high growth factor is 1.0670.

2018 Base traffic conditions are indicated in Table 5.4.

Table 5-4 2018 Base Traffic Flows (Weekday Average Two Way Flows)

Survey Location	Time Period	Cars / Lights	HGV	Total
A98 west of Boyndie	12 Hours	3698	913	4612
	24 Hours	4454	1055	5509
B9121 south of Fiskaidly	12 Hours	242	53	297
	24 Hours	298	62	360
A98 west of the B9038	12 Hours	5700	933	6634

Survey Location	Time Period	Cars / Lights	HGV	Total
	24 Hours	6909	1070	7979
A97 south of B9121	12 Hours	1070	229	1301
	24 Hours	1269	238	1506
A947 near Keilhill	12 Hours	5544	968	6512
	24 Hours	6905	1144	8048
C92S east of Foulzie	12 Hours	51	17	68
	24 Hours	63	19	83
C7s west of Gorrachie	12 Hours	116	33	149
	24 Hours	139	39	178
B9105 south of Fintry	12 Hours	1071	238	1309
	24 Hours	1299	272	1523
A947 north of Turriff	12 Hours	5544	968	6512
	24 Hours	6905	1144	8048
A947 south of the B992	12 Hours	3725	774	4498
	24 Hours	4895	955	5849
A98 east of the B9027	12 Hours	2749	784	3533
	24 Hours	3232	894	4126
B9170 west of Cuminestown	12 Hours	1617	402	2019
	24 Hours	1995	467	2463
C29S south of Cuminestown	12 Hours	349	78	428
	24 Hours	444	93	537
C121B west of C295	12 Hours	203	46	249
	24 Hours	250	54	304
B9170 west of New Deer	12 Hours	1315	378	1693
	24 Hours	1656	436	2093
A948 west of the B9028	12 Hours	881	201	1081

Survey Location	Time Period	Cars / Lights	HGV	Total
	24 Hours	1167	240	1407
A981 west of the B9028	12 Hours	2391	419	2810
	24 Hours	3057	496	3542

6 Potential Effects

Potential traffic and transport effects associated with the modified OnTI would be related to traffic movements during the construction period. During construction, vehicles would access the site transporting construction staff, construction materials (aggregates, sand, cable), plant items and substation components.

As described in Section 2.4 potential effects during the operational phase would be extremely unlikely due to the low levels of movements.

The perception of changes in traffic is dependent upon a wide range of factors including its volume, speeds, function and its composition (e.g. percentage of heavy goods vehicles). Therefore, the assessment of the environmental effects of traffic requires a number of stages, namely:

- Determination of existing and forecast traffic levels and characteristics;
- Determining the time period suitable for assessment;
- Determining the year of assessment; and
- Identifying the geographical boundaries of assessment.

In accordance with the Guidelines, the assessment was undertaken on road links where:

- Traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Traffic flows are predicted to increase by 10% or more in any other specifically sensitive areas.

6.1 Potential Construction and Decommissioning Effects

The assessment presents the potential effects of construction traffic, and identifies those which are likely to be significant.

The effects recommended to be potentially important in the EIA guidelines, when assessing the traffic effects from an individual development, listed below, have been considered.

- Severance – severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery resulting from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself;
- Driver delay – these delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.
- Pedestrian delay – the delay to pedestrians, as with driver delay, is likely only at , or close to the capacity of the system;
- Pedestrian amenity – the guidelines for the environmental assessment of road traffic suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where traffic flow (or its lorry component) is halved or doubled;
- Fear and intimidation – there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation, from known traffic and physical conditions;
- Accidents and safety – professional judgement will be used to assess the implications of local circumstances, or factors which elevate or lessen risks of accidents; and
- Dust and dirt – there are no simple formulas to predict the levels of dust and dirt which might arise although an estimation of the likely construction volumes will be useful background to provide an informed decision.

No consideration of possible decommissioning effects has been included as part of this assessment. At the end of the proposed development's operational life, there may be an impact on the local road network due to the movements of HGVs associated with the removal of equipment and materials. However, the number of vehicle movements is anticipated to be lower than that predicted for construction and any baseline data collected for the purposes of this assessment would not be relevant so far in the future.

6.2 Potential Operational Effects

Significant effects related to traffic movements during the operational phase are unlikely to arise. The traffic generated once the site is operational would be associated mainly with service and maintenance trips using mainly 4x4 type vehicles with potentially occasional HGV movements to access the site for heavier maintenance and repairs.

7 Mitigation

The primary mitigation measure to help minimise the effects of the construction traffic was careful consideration of the road network to identify a preferred route to and from the access junction to the proposed development. This considered physical characteristics of the roads network and the number and location of potentially sensitive receptors along the various routes.

7.1 Mitigation By Design

The proposed access strategy has been designed to minimise the effect of construction traffic on rural C and U Class roads. Where possible, access junctions relating to the onshore cable route will be positioned on the A and B class road network.

The accompanying CTMS – Appendix 5.6D provides further information in relation to the proposed access strategy during the construction phase.

7.2 Mitigation During Construction

The access routes for construction traffic from the strategic road network to the proposed track network will be finalised following the confirmation of the proposed cable route and the appointment of the main contractor.

The local road network in the vicinity of the modified OnTI generally consists of 5 m wide narrow single carriageway roads. It is likely that upgrades to the local road network may be required in specific areas subject to confirmation of the final access route and these will be agreed with AC prior to construction. Upgrades are likely to take the form of localised carriageway widening and carriageway strengthening to ensure the safe movement of construction traffic.

Additional mitigation is likely to be required to accommodate the transport of the abnormal transformer components and this is detailed in the accompanying Route Survey Report (RSR) and associated CTMP – Appendix 5.6B.

During the construction period the Applicant would maintain a website containing the latest information relating to traffic movements associated with vehicles accessing the site. This will be agreed with the local roads authority.

The following measures are recommended in terms of site operation and maintenance during the construction phase;

- All materials delivery lorries (dry materials) would be sheeted to reduce dust and stop spillage on public roads; and

- Specific training and disciplinary measures would be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway, wheel wash facilities will be established at the site entrance.

The CTMP – Appendix 5.6B sets out measures to be put in place to reduce the impact of noise, dust and excessive speed.

Vehicles will be fitted with identification numbers to allow the public to identify any vehicles that may be speeding or causing specific issues and drivers will be required to pass through sensitive areas at low speed.

In order to mitigate against pedestrian amenity effects, it is recommended that construction traffic is discouraged from travelling through settlements such as Fintry, Cuminestown, New Deer and New Blyth during peak school hours.

A road sweeper would also be deployed on the various sections of the road network close to site access junctions to ensure that the road network is kept clean and free running.

Wherever possible, contractors will be encouraged to use low emissions vehicles through the CTMP thus mitigating against air pollution.

7.3 Mitigation During Operation

Site roads would be well maintained and monitored to limit any material being brought onto public roads by maintenance traffic travelling to and from site during the operational phase.

8 Traffic Impact Assessment

8.1 Predicted Traffic Generation

The assessment is based upon construction traffic estimates derived by the Applicant over the estimated 37 month construction period for the modified OnTI. The estimated construction traffic movements are provided in full in Appendix B of this report and summarised in Table 8.1 below.

Table 8-1 Predicted Construction Trips

Activity	Total Trips (Two Way)	Peak Month Trips (Two Way)	Daily Trips (Two Way)
Landing Point			
Set Up	116	0	0
Excavation	68	0	0
Piling	34	0	0
Construction Works	31	16	2
Cable Installation	32	32	2
Remediation	58	58	4
General Supplies	48	16	2
Staff	720	240	10
Onshore Cable			
Set Up	320	0	0
Excavation	32093	6074	254
Laying	5051	631	26
Jointing	456	76	4
Backfill	104	17	2
Remediation	6501	0	0
General Supplies	572	44	2
Staff	11232	864	2
Substation			

Activity	Total Trips (Two Way)	Peak Month Trips (Two Way)	Daily Trips (Two Way)
Setup	204	0	0
Site Preparation	128	0	0
Foundations	1256	0	0
Buildings	300	0	0
AIL deliveries	132	0	0
Installations	600	0	0
Commissioning	128	0	0
Remediation	128	43	2
General Supplies	960	40	2
Staff	9504	396	16

8.2 Development Traffic Distribution

8.2.1 Landfall Point

It is assumed that quarry sourced construction materials will approach by way of the B9139 or the A98 through Banff with 50 % approaching from either direction. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96 split evenly between the A98 and the A947. Construction staff will approach by way of the A98 from the east.

All construction traffic will access the landing area by way of an access junction on the B9038 north of Inverboyndie.

8.2.2 Onshore Export Cable Corrdior

In order to distribute traffic associated with the 33 km long cable corrirdor the corridor has been split into three distinct sections as follows:

- Section 1 – Proposed substation to the B9105 south of Fintry with an approximate length of 13 km;
- Section 2 – B9170 west of Cuminestown to the River Deveron with an approximate length of 11 km; and
- Section 3 – River Deveron to the landing area with an approximate length of 9 km.

8.2.2.1 Cable Section 1

It is assumed that quarry sourced materials will approach by way of the A98/B9027/B9170 or A947/B9170. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96/A947/B9170/B9105 or the A90/A948/B9170 with 50 % approaching from either direction. Construction staff will approach by way of the A947/B9170/B9105 or the A948/B9170 with 50 % approaching from either direction.

Cable section 1 is likely to have four main access points along this section of the route with traffic distributed as follows:

- C121B west of the C295 – 33 %;
- C29S south of Cuminestown – 11 %;
- B9170 west of Cuminestown – 23 %; and
- B9105 south of Fintry – 33 %.

8.2.2.2 Cable Section 2

It is assumed that quarry sourced materials will approach by way of the A947 or A98/B9105. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96/A98/A947 or A947 with 50% approaching from either direction. Construction staff will approach by way of the A947 with 50% approaching from either direction.

Cable section 2 is likely to have three main access points along this section of the route with traffic distributed as follows:

- B9105 south of Fintry – 34 %.
- C7S west of Gorrachie – 33 %; and
- A947 north of Keilhill – 33 %.

8.2.2.3 Cable Section 3

It is assumed that quarry sourced materials will approach from the north by way of the B9139/B9121 or the A98 through Banff with 50 % approaching from either direction. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A96 split evenly between the A98 and the A947. Construction staff will approach by way of the A98 from the east.

Cable section 3 is likely to have three main access points along this section of the route with traffic distributed as follows:

- A97 south of Tipperty– 34 %.
- B9121 north of Tipperty – 33 %; and
- A98 west of Inverboyndie – 33 %.

8.2.3 Substations

It is assumed that quarry sourced materials will approach by way of the A98/B9027/B9170/C295. Exported fill material will leave the site in the opposite direction.

The remaining construction traffic will approach by way of the A90 split evenly between the A981 and A948 and then following the B9170/C121B/C295 to site. Construction staff will approach by way of the A948/B9170/ C121B/C295.

8.3 Predicted Traffic Effect

The 2018 future year traffic data was combined with the peak daily construction traffic flows to estimate the total trips on the study network during the peak of the construction phase. This was then distributed across the road network.

Table 8.2 illustrates the peak weekday 2018 construction traffic flow; Table 8.3, the 2018 Base plus peak construction traffic (Total) flows; and Table 8.4, the percentage increase in 2018 Total traffic over 2018 Base traffic.

Table 8-2 Weekday Construction Traffic (Weekday Average Two Way Flows)

Survey Location	Time Period	Cars / Lights	HGV	Total
A98 west of Boyndie	12 Hours	0	50	50
	24 Hours	0	50	50
B9121 south of Fiskaidly	12 Hours	3	27	30
	24 Hours	3	27	30
A98 west of the B9038	12 Hours	16	77	94
	24 Hours	16	77	94
A97 south of B9121	12 Hours	3	28	31
	24 Hours	3	28	31
A947 near Keilhill	12 Hours	6	92	98
	24 Hours	6	92	98
C92S east of Foulzie	12 Hours	0	0	0
	24 Hours	0	0	0
C7s west of Gorrachie	12 Hours	4	30	34
	24 Hours	4	30	34
B9105 south of Fintry	12 Hours	9	68	77
	24 Hours	9	68	77
A947 north of Turrifff	12 Hours	10	34	43
	24 Hours	10	34	43
A947 south of the B992	12 Hours	0	8	8
	24 Hours	0	8	8
A98 east of the B9027	12 Hours	0	54	54
	24 Hours	0	54	54
B9170 west of Cuminestown	12 Hours	3	26	29
	24 Hours	3	26	29

Survey Location	Time Period	Cars / Lights	HGV	Total
C29S south of Cuminestown	12 Hours	2	13	14
	24 Hours	2	13	14
C121B west of C295	12 Hours	21	42	62
	24 Hours	21	42	62
B9170 west of New Deer	12 Hours	23	7	30
	24 Hours	23	7	30
A948 west of the B9028	12 Hours	23	7	30
	24 Hours	23	7	30
A981 west of the B9028	12 Hours	0	0	0
	24 Hours	0	0	0

Table 8-3 2018 Total Flows (Weekday Average Two Way Flows)

Survey Location		Cars / Lights	HGV	Total
A98 west of Boyndie	12 Hours	3698	963	4662
	24 Hours	4454	1105	5559
B9121 south of Fiskaidly	12 Hours	245	80	327
	24 Hours	301	89	390
A98 west of the B9038	12 Hours	5716	1010	6728
	24 Hours	6925	1147	8073
A97 south of B9121	12 Hours	1073	257	1332
	24 Hours	1272	266	1537
A947 near Keilhill	12 Hours	5550	1060	6610
	24 Hours	6911	1236	8146
C92S east of Foulzie	12 Hours	51	17	68
	24 Hours	63	19	83
C7s west of Gorrachie	12 Hours	120	63	183
	24 Hours	143	69	212
B9105 south of Fintry	12 Hours	1080	306	1386
	24 Hours	1308	340	1600
A947 north of Turriff	12 Hours	5554	1002	6555
	24 Hours	6915	1178	8091
A947 south of the B992	12 Hours	3725	782	4506
	24 Hours	4895	963	5857
A98 east of the B9027	12 Hours	2749	838	3587
	24 Hours	3232	948	4180
B9170 west of Cuminestown	12 Hours	1620	428	2048
	24 Hours	1998	493	2492

Survey Location		Cars / Lights	HGV	Total
C29S south of Cuminestown	12 Hours	351	91	442
	24 Hours	446	106	551
C121B west of C295	12 Hours	224	88	311
	24 Hours	271	96	366
B9170 west of New Deer	12 Hours	1338	385	1723
	24 Hours	1679	443	2123
A948 west of the B9028	12 Hours	904	208	1111
	24 Hours	1190	247	1437
A981 west of the B9028	12 Hours	2391	419	2810
	24 Hours	3057	496	3542

Table 8-4 Percentage Impact Increase 2018 Base v 2018 Total (Weekday Average Two Way Flows)

Survey Location		Cars / Lights	HGV	Total
A98 west of Boyndie	12 Hours	0%	5.48%	1.08%
	24 Hours	0%	4.74%	0.91%
B9121 south of Fiskaidly	12 Hours	1.24%	50.94%	10.10%
	24 Hours	1.01%	43.55%	8.33%
A98 west of the B9038	12 Hours	0.28%	8.25%	1.42%
	24 Hours	0.23%	7.20%	1.18%
A97 south of B9121	12 Hours	0.28%	12.23%	2.38%
	24 Hours	0.24%	11.76%	2.06%
A947 near Keilhill	12 Hours	0.11%	9.50%	1.50%
	24 Hours	0.09%	8.04%	1.22%
C92S east of Foulzie	12 Hours	0%	0%	0%
	24 Hours	0%	0%	0%
C7s west of Gorrachie	12 Hours	3.45%	90.91%	22.82%
	24 Hours	2.88%	76.92%	19.10%
B9105 south of Fintry	12 Hours	0.84%	28.57%	5.88%
	24 Hours	0.69%	25.00%	5.06%
A947 north of Turriff	12 Hours	0.18%	3.51%	0.66%
	24 Hours	0.14%	2.97%	0.53%
A947 south of the B992	12 Hours	0%	1.03%	0.18%
	24 Hours	0%	0.84%	0.14%
A98 east of the B9027	12 Hours	0%	6.89%	1.53%
	24 Hours	0%	6.04%	1.31%
B9170 west of Cuminestown	12 Hours	0.19%	6.47%	1.44%

Survey Location		Cars / Lights	HGV	Total
	24 Hours	0.15%	5.57%	1.18%
C29S south of Cuminestown	12 Hours	0.57%	16.67%	3.27%
	24 Hours	0.45%	13.98%	2.62%
C121B west of C295	12 Hours	10.34%	91.30%	24.90%
	24 Hours	8.40%	77.78%	20.39%
B9170 west of New Deer	12 Hours	1.75%	1.85%	1.77%
	24 Hours	1.39%	1.61%	1.43%
A948 west of the B9028	12 Hours	2.61%	3.49%	2.78%
	24 Hours	1.97%	2.92%	2.13%
A981 west of the B9028	12 Hours	0%	0%	0%
	24 Hours	0%	0%	0%

8.4 Link Capacity Assessment

The average link capacities for the various links within the study area have been estimated using the NESA Manual, Chapter 3. The theoretical capacities are detailed below:

- A98 – around 14,400 vehicles per 12 hours;
- B9121 – around 1,680 vehicles per 12 hours;
- A97 – around 14,400 vehicles per 12 hours;
- A947 – around 14,400 vehicles per 12 hours;
- C92S – around 1,680 vehicles per 12 hours;
- C7S – around 1,680 vehicles per 12 hours;
- B9105 – around 10,800 vehicles per 12 hours;
- B9170 – around 9,600 vehicles per 12 hours;
- C29S – around 1,680 vehicles per 12 hours;
- C121B – around 1,680 vehicles per 12 hours;
- A948 – around 10,800 vehicles per 12 hours;
- A981 – around 10,800 vehicles per 12 hours;

A comparison of the theoretical capacity versus the estimated '2018 Future Year Traffic Base Traffic Flow + Construction Phase Trips' 12-hour flows for the links in the network is illustrated in Graph 8.1 in Appendix C.

8.5 Summary

The impact review was undertaken for weekday conditions and the results indicate that the greatest impact of construction traffic will be on the B/C Class sections of the road network represented in the assessment by the B9105/B9121/C7s/C29s/C121B. However, this reflects the low number of trips and particular HGV trips on these sections of the road network. The comparison of development traffic flows with theoretical link capacities indicates that there is significant spare capacity on the local road network and no link capacity issues associated with the construction traffic would be anticipated.

With reference to the IEMA guidelines, total traffic flows are not predicted to increase by more than 30 % on any link although HGV levels will increase by more than 30 % on B9121/C7s/C121B. The critical links are therefore considered to be the above along with B0105 and C29s which are considered to be sensitive locations. The maximum number of additional HGV movements per day is 92 on the A947. This is considered low when spread over the course of a day on an A Class road.

A route evaluation has been carried out for the minor road network against the key environmental criteria identified by the IEMA guidelines.

9 Identification of Wider Effects and Significant Effects

9.1 Receptor Sensitivity

The B/C class routes included within the evaluation are generally minor rural roads which are either narrow single carriageway or single track and not designed for frequent use by HGVs. There are a limited number of small settlements along the proposed access routes along with numerous residential properties located close to the road. These receptors are considered to have a medium sensitivity.

In addition to the routes described above Fintry and Cuminestown have been included as receptors as the main settlements along the above routes. Fintry is classed as a small rural settlement with Medium sensitivity due to the position of a school on the western edge. Cuminestown is classed as an intermediate rural settlement including a school with Medium sensitivity.

9.2 Effect Magnitude and Identification of Significant Effects

9.2.1 Severance

The increase in traffic flow affecting receptors along the B9105/B9121/C7s/C29s/C121B is summarised in Table 8.3. Based on the two-way average daily Total traffic flows, the severance / fear and intimidation impact is estimated to be **minor significance** at the receptors along the access route and within Fintry and Cuminestown due to the low volumes of overall traffic.

9.2.2 Driver / Pedestrian Delay

There is the potential for limited driver delay during the peak construction phases due to the limited passing opportunities along the narrow sections of the B/C Class road network although localised improvements may be introduced where required to accommodate the safe movement of construction traffic.

There is significant spare capacity along the links assessed and the driver / pedestrian delay impact is therefore estimated to be **minor significance** at the receptors along the route.

9.2.3 Pedestrian Amenity

The magnitude of the impact on pedestrian amenity has been considered in terms of the threshold described in the MEA. Therefore based on the estimated two-way percentage increases in HGV traffic summarised in Table 8.3 the threshold for changes to pedestrian amenity has not been reached in any locations although the C7s and C121B are considered to be close to the threshold.

There are currently no pedestrian facilities along the C7s and C121B and limited pedestrian demand. Pedestrian footways are available within Cuminestown although the increase in HGV movements on the B9170 is lower at 6.47%.

With mitigation measures in place through the CTMP the pedestrian amenity impact is likely to be **minor significance** at the receptors along the route.

9.2.4 Accidents and Safety

Accident data was analysed along the B9105/B9121/C7s/C29s/C121B with the overall number of accidents considered to be low.

Due to the width of the route it will be necessary for construction vehicles to maintain a low speed along the minor road network. Construction working will also be limited to daytime operations with the aim of further reducing the accident risk. With mitigation measures in place the accidents and safety impact is therefore estimated to be **minor significance** at the receptors along the route.

9.2.5 Dust and Dirt

There are no specific guidelines to determine magnitude of impact of dust and dirt although its impact is likely to be limited to the immediate vicinity of the site access junctions, with mitigation proposed to ensure that the impact is **minor significance**.

9.3 Cumulative Effects

AC and Transport Scotland did not request that any other schemes were taken into account as part of the access, traffic and transport impact assessment. No cumulative impact assessment was therefore undertaken for this assessment.

10 Summary

This Transport Assessment considers the likely significant effects on the road network and the local settlements through which the road passes due to traffic associated with the modified OnTI.

Information supporting this assessment has been collected from a detailed desktop study and related field surveys as explained in Chapter 4.

The assessment undertook a review of the available information and assumed traffic numbers for a series of construction activities associated with the installation of the modified onshore export cable and construction of the substations. By quantifying the traffic associated with the construction activities, the significance of the likely effects could be realised by determining the increase in traffic.

The additional traffic due to the OnTI construction activities will result in increases of traffic flows on the local roads leading to the cable route and the substation sites. When considering actual volumes of traffic however, the predicted flows are well within the practical operating capacity of these roads and the environmental effect are, therefore, considered minor significance; assuming appropriate mitigation measures, such as a robust Traffic Management Plan, are implemented.

Appendix A – Accident Data

Appendix A - Accident Data Summary

Location	Severity			No Vehicles / Peds		Vehicles Types											Road Feature		Surface Condition					Lighting	
	Slight	Serious	Fatal	Single	Multiple	Car + Motorcycle	Motorcycle	Motorcycle + Other	Car	Car + Bus/Coach	Car + Car	Car + Pedestrian	Car + Other	Car + HGV	HGV + HGV	HGV	Junction / Access	Pedestrian Crossing	Dry	Wet or Damp	Flood	Frost or Ice	Snow	Daylight	Darkness
A98	12	5		8	9	2	1		7		4		1	1	1		11	3	10	5			2	15	2
A97	5			3	2	1			3				1				3		3	1		1		4	
A947	27	4		17	14		1	1	14	2	6		1	1	1	2	7	1	2	23	1		2	21	8
B9105	7	4		3	4	1			3		3						3		4	2			1	4	1
B9170	3	2		2	4				1		1			3			1		2	3				2	3
C7S	1	1	1	1	2		1		1		1								1	2				3	
C121B	1			1					1													1		1	

Appendix B– Construction Traffic Profile

Transport Indicative Construction Programme

Vehcile Classes

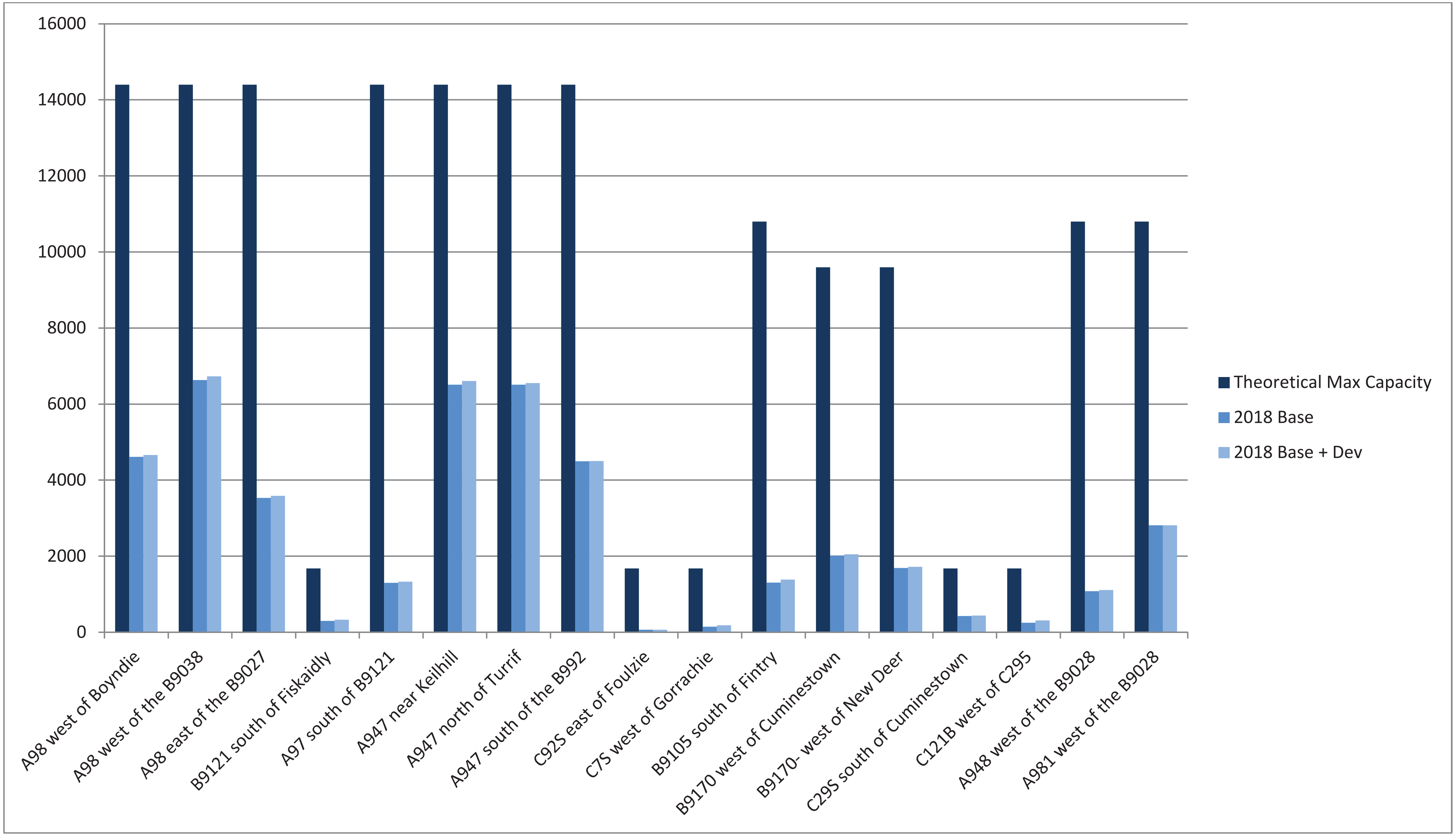
	May 2016	June	July	August	September	October	November	December	January 2017	February	March	April	May	June	July	August	September	October	November	December
Landing Point																				
Set Up																				
Excavation																				
Piling																				
Construction Works																				
Cable Instalation																				
Remediation																				
General Supplies																				
Staff																				
Cable Run																				
Set Up																				
Excavation																				
Laying																				
Jointing																				
Backfil																				
Remediation																				
General Supplies																				
Staff																				
Substation																				
Set Up				204																
Site Preparation					43	43	43													
Foundations							251	251	251	251	251									
Buildings											60	60	60	60	60					
AIL deliveries																44	44	44		
Installations																			150	150
Commissioning																				
Remediation																				
General Supplies				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Staff				396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
Total Per Month	0	0	0	640	479	479	730	687	687	687	747	496	496	496	496	480	480	480	586	586
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	0	0	0	27	20	20	30	29	29	29	31	21	21	21	21	20	20	20	24	24

	January 2018	February	March	April	May	June	July	August	September	October	November	December
Landing Point												
Set Up			116									
Excavation			34	34								
Piling				34								
Construction Works				16	16							
Cable Instalation					32							
Remediation					58							
General Supplies			16	16	16							
Staff			240	240	240							
Cable Run												
Set Up		160										
Excavation			6074	6074	6074	6074						
Laying				631	631	631	631					
Jointing					76	76	76					
Backfil					17	17	17					
Remediation							87	87				
General Supplies		44	44	44	44	44	44	44				
Staff		864	864	864	864	864	864	864				
Substation												
Set Up												
Site Preparation												
Foundations												
Buildings												
AIL deliveries												
Installations	150	150										
Commissioning			64	64								
Remediation					43	43	43					
General Supplies	40	40	40	40	40	40	40					
Staff	396	396	396	396	396	396	396					
Total Per Month	586	1654	7888	8453	8547	8186	2198	995	0	0	0	0
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24
Total Per Day	24	69	329	352	356	341	92	41	0	0	0	0

	January 2019	February	March	April	May	June	July	August	September	October	November	December	January 2020	Total	Cars & Lights	HGV
Landing Point																
Set Up														116		116
Excavation														68		68
Piling														34		34
Construction Works														31		31
Cable Instalation														32		32
Remediation														58		58
General Supplies														48	48	
Staff														720	720	
Cable Run																
Set Up		160												320		320
Excavation			1949	1949	1949	1949								32093		32093
Laying				631	631	631	631							5051		5051
Jointing					76	76	76							456		456
Backfil					17	17	17							104		104
Remediation							3163	3163						6501		6501
General Supplies			44	44	44	44	44	44						572	572	
Staff			864	864	864	864	864	864						11232	11232	
Substation																
Set Up														204		204
Site Preparation														128		128
Foundations														1256		1256
Buildings														300		300
AIL deliveries														132	96	36
Installations														600		600
Commissioning														128		128
Remediation														128		128
General Supplies														960	960	
Staff														9504	9504	
Total Per Month	0	160	2857	3488	3582	3582	4796	4071	0	0	0	0	0	70776	23132	47644
Assumed Working Days	24	24	24	24	24	24	24	24	24	24	24	24	24			
Total Per Day	0	7	119	145	149	149	200	170	0	0	0	0	0		33%	67%

Appendix C– Theoretical Link Capacity

Graph 8.1: Theoretical Capacity Profile



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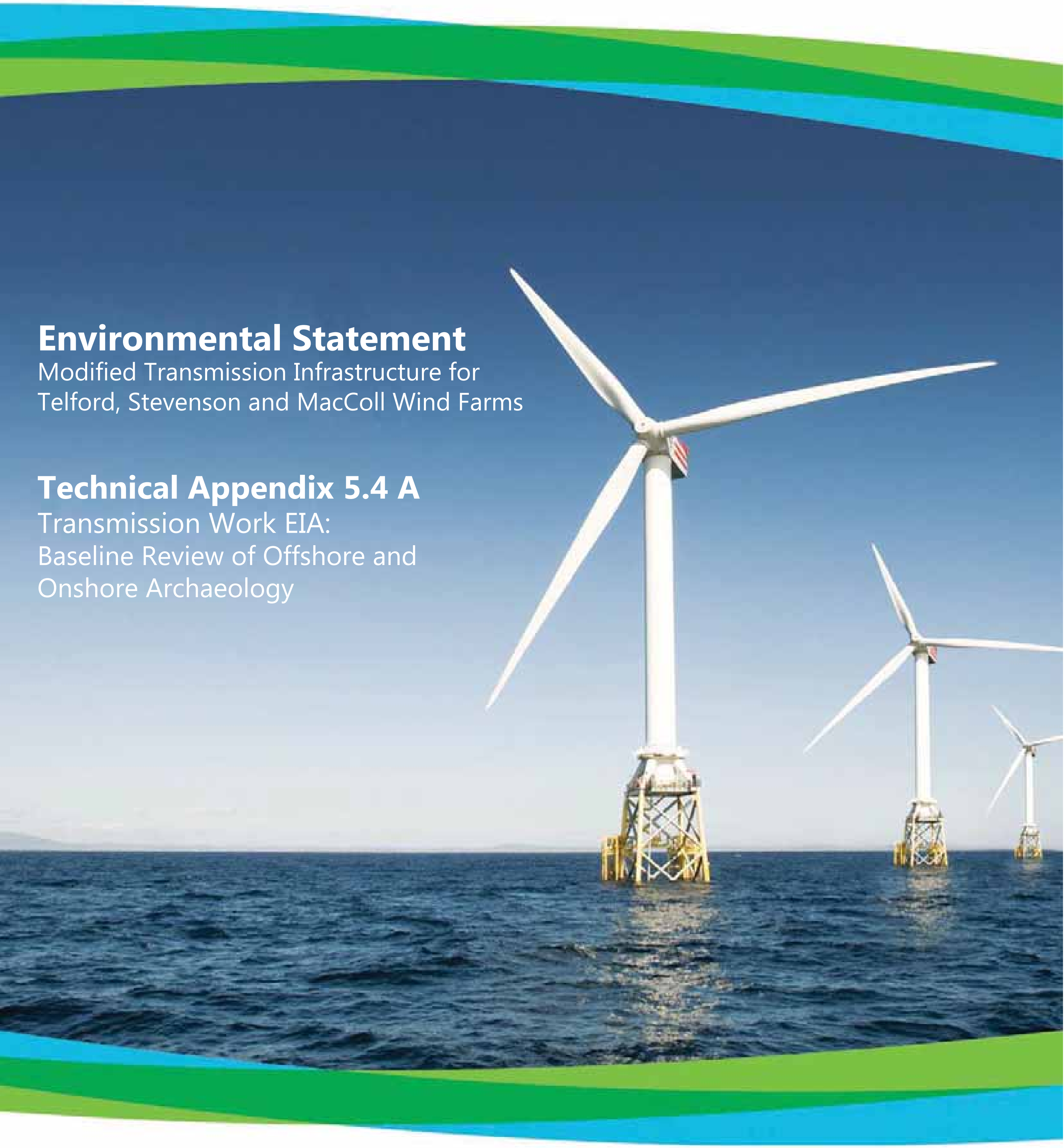
Developing Wind Energy In The Outer Moray Firth



Environmental Statement

Modified Transmission Infrastructure for
Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.4 A

Transmission Work EIA:
Baseline Review of Offshore and
Onshore Archaeology

renewables

Document Owner		**WA Coastal & Marine**			
Document Status		**Final**			
File Name		**WA Coastal & Marine – Transmission Work EIA: Baseline Review of Onshore and Offshore Archaeology**			
Revision	**Date**	**Description**	**Originated By**	**Checked By**	**Approved By**
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Table of Contents

List of Figures

1. Introduction and Background

Wessex Archaeology (**WA**) has been commissioned by Moray Offshore Renewables Ltd (MORL), to carry out a cultural heritage assessment for modified Transmission Infrastructure (TI) for Telford, Stevenson and MacColl Offshore Wind Farms. The assessment is intended to satisfy the EIA requirements associated with the Marine Licence application for the offshore transmission infrastructure (OfTI) and onshore Planning Application for the onshore transmission infrastructure (OnTI).

The Telford, Stevenson and MacColl Wind Farms (three consented wind farms) are located on the Smith Bank in the outer Moray Firth, approximately 50 km from the Aberdeenshire coastline. The TI will connect the three consented wind farms to the National Grid near New Deer in Aberdeenshire, via a landfall at Inverboyndie. It will consist of the following:

- up to two offshore substation platforms (OSPs) within the consented wind farm area;
- twelve cables in four triplecore offshore export cable trenches between the OSPs and a landfall at Inverboyndie (70 km of 220 kV HVAC cable for inter-platform cables and cabling up to the boundary of the three consented wind farms; and a maximum of 52 km of 220 kV HVAC offshore export cable corridor length from the boundary of the three consented wind farms);
- twelve cables installed in four trenches in trefoil arrangement from the Inverboyndie landfall to New Deer (approximately 33km length);
- Onshore substations area near New Deer in Aberdeenshire (MORL substation plus additional substation).

2. Aims and Objectives

This technical report comprises one element of the cultural heritage assessment. It is a baseline review of the known cultural heritage of the modified TI.

As different legislation, guidance and practical considerations apply to marine and terrestrial sites, the TI has been divided into two units for this review: the modified Offshore Transmission Infrastructure (modified OfTI), comprising that part of the TI below MHWS; and the modified Onshore Transmission Infrastructure (OnTI), that part of the TI that is fully terrestrial between the landfall and the substation/s near New Deer.

The aims of the baseline review for both the modified OfTI and the OnTI are as follows:

- to set out the statutory, planning and policy context relating to the historic environment that applies to both offshore and onshore sections of the TI;
- to provide a regional overview of the historic environment to the extent that it is relevant to cultural heritage assets likely to be impacted by the TI;
- to identify, describe and map known cultural heritage assets that may be impacted by the TI; and
- to summarise the potential for the presence of hitherto unknown sites that may be impacted by the proposal.

3. Statutory, Planning and Policy Context

A summary of relevant Local, UK, Scottish and international legislation, planning and policy guidance is given in **Appendix I**.

4. Methodology

4.1 Best Practice

This assessment is consistent with available best practice guidance, including:

- The Code of Practice for Seabed Development (The Joint Nautical Archaeology Policy Committee, 2008;
- Collaborative Offshore Wind Research Into the Environment (COWRIE) Code of Practice for Seabed Development: Historic Environment Guidance for the Renewable Energy Sector (WA 2007);
- COWRIE Guidance for Assessment of Cumulative Impact on the Historic Environment from Offshore Renewable Energy (Oxford Archaeology 2008); and
- Standard and Guidance for Desk Based Assessment (Institute for Archaeologists 2008).

The assessment also satisfies the requirements for environmental assessment arising from European Council Directive 85/337/EEC and later directives, codified in Directive 2011/92/EU.

4.2 Study Area

For the purpose of the review, the modified OfTI and OnTI have been assigned separate Archaeological Study Areas (ASAs). These correspond with the footprint within which the TI may be installed, the ‘Offshore Corridor’ and the ‘Onshore Corridor’ (**Figures 1 & 2**). The modified OfTI covers 66.38 km^2, the OnTI 48.79 km^2.

The intertidal zone between Mean Low Water Springs (MLWS) and Mean High Water Springs (MHWS) falls within the marine planning regime. It has therefore been included in the modified OfTI ASA. The MHWS used in this report is derived from Ordnance Survey OpenData. The dataset used is regularly updated administrative boundary mapping for Great Britain (England, Scotland and Wales) provided by the Ordnance Survey as part of the Boundary-Line Open Data dataset. Boundary-Line is captured at 1:10,000 scale.

The ASAs were buffered in order to capture additional data that would:

- improve understanding of the local historic environment context of individual heritage assets within the ASAs;
- improve the probability of locating heritage assets that might fall within the ASAs but whose records are poorly constrained spatially;
- ensure that heritage assets close to or just beyond the ASAs and which might be affected by the scheme are included in the review.

For the purposes of National Monuments Record for Scotland (NMRS) and Local Authority Sites and Monuments Record (SMR) data searches, the search areas comprised the modified OfTI ASA plus a small buffer of 200m. Due to UKHO search requirements, a larger search area was used. In order to provide the regional overview, contextual data has been drawn from a much wider area which roughly corresponds with north-east Scotland.

The proposed substation area within the modified OnTI was buffered to 5k m to incorporate Cultural Heritage Assets which may be considered for impacts to their setting and selected designated assets within the surrounding region (**Figure 2**).

4.3 Data Sources

The baseline knowledge for the ASAs has been derived from a number of data sets, including:

- The Wrecks and Obstructions database held by the UKHO. This has been updated as a result of Civil Hydrography Programme surveys undertaken in the Moray Firth;
- The Royal Commission on Ancient and Historic Monuments (RCAHMS) National Database (NMRS);
- The Aberdeenshire Local Authority SMR - http://www.aberdeenshire.gov.uk/smrpub/default.aspx - accessed 29/05/14);
- Databases of designated assets held by Historic Scotland (http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2000:10:0: - accessed 29/05/14).
- Maps held by the National Library of Scotland;
- Relevant available archaeological assessments, including the MORL three consented wind farms and Beatrice OWF and associated TI; and
- Other readily available published sources.

4.4 Chronology

The dating convention Before Present (BP) is used throughout this report to describe the age of archaeological events occurring during the Palaeolithic and Mesolithic periods and follows the normal convention of calculating dates before 1950. From the Mesolithic period onwards, the time scales Before Christ (BC) and *Anno Domini* (AD) is used.

Geological time, prior to periods of archaeological interest, is expressed in millions of years (Ma). Major glacial and interglacial stages are also referred to in terms of Marine Isotope Stages (MIS), to facilitate correlation with other sources.

In relation to onshore heritage assets, the main archaeological periods that will be assessed are broadly defined by the following date ranges outlined in Table 1

Table 1. List of archaeology included in the assessment

Early Prehistoric	Late Upper Palaeolithic	14,700 – 11,600 BP
	Mesolithic	8500 – 4100 BC
Later Prehistoric	Neolithic	4100 – 2500 BC
	Chalcolithic & Bronze Age	2500 – 800 BC
	Iron Age	800 BC – AD 400
Roman		AD 77 – 211
Medieval		400 – 1500
Post-medieval & 19th century		1500 – 1899
Modern		1900 – present day
Based on http://www.scottishheritagehub.com/content/welcome (last accessed 22/04/2014); Pettitt and White (2012).		

4.5 Review – modified OnTI

Records of known onshore and intertidal features of cultural heritage interest are given a numerical sequence beginning **WA 1000**. These are listed in gazetteers at the end of this Technical Appendix. The **WA_ID** numbering sequence is specific to this assessment and does not link to other elements of the three consented wind farms (i.e. offshore archaeological assessment).

4.6 Review – modified OfTI

The gazetteer of documented wrecks within the modified OfTI consists of **eight records**. There are no designated wrecks within the ASA.

In order to structure the review, cultural heritage within the modified OfTI has split into four categories: submerged prehistory; maritime; aviation and intertidal. The former considers evidence for periods in which the modified OfTI was not fully maritime (submerged prehistory). The latter considers the periods from approximately the Mesolithic when sea level reached its current level and in which the modified OfTI below MHWS has been fully marine or intertidal.

For maritime, aviation and intertidal, a brief regional overview of the historic environment by period has been given. This is not intended to be comprehensive. Instead it provides a focussed context for subsequent discussion of the known assets within the ASA and the potential for the presence of hitherto unknown assets.

Known assets have then been discussed, followed by potential. Care has been taken to ensure that records of losses that may have occurred within the ASA, but for which there is no known archaeological evidence have been included in this discussion.

Documented wrecks (maritime and aviation) have been assigned **WA** unique identifying numbers (UIDs) beginning with **WA 2000** and are listed in **Appendix II.** Casualties (recorded losses of watercraft and aircraft) for which there is no known wreck) have given the UID assigned by the parent database (generally their NMRS numbers) and are listed in **Appendix III**. Intertidal sites have been given parent UIDs if wrecks or casualties and are included in the relevant Appendix. Other intertidal sites are listed in **Appendix IV**. Geophysical anomalies identified in previous assessments have retained their parent UIDs and are listed in **Appendix V**.

Documented wrecks, casualties, intertidal sites and anomalies are shown on **Figure 1**. The resultant gazetteer of maritime and aviation documented wrecks compiled here is clipped to the modified OftI, with the exception of the documented wreck of the Minsk (WA 2000) which due to the uncertainty of the wrecks possible location, less than 10m outside the modified OfTI, this wreck has been retained in the gazetteer (**Appendix I**).

Live and dead wreck records have been obtained from UKHO (June 2014). Data on intertidal cultural heritage features has been derived from the National Monuments Record for Scotland as maintained by RCAHMS in its Canmore database (received May, updated June 2014). Designated asset data from Historic Scotland has also been obtained (May 2014). **WA** were advised by Aberdeenshire Council Archaeology Services that the offshore HER data has not been digitised and could not be obtained.

4.7 Geology

The superficial geology of the OnTI at the landfalls are characterised by marine beach deposits and raised marine deposits of Holocene and older date. These coastal deposits overlie glacial material; Devensian till and glacio-fluvial deposits widely across the region. At Banff, the River Deveron has substantial deposits of Holocene alluvium, with peat and colluvium along the lower reaches; as do the larger burns and rivers in the area.

In the modified OfTI, Holocene and post-Last Glacial Maximum Late Pleistocene, the upper Quaternary marine geology in the region is characterised by undifferentiated deposits, of glacial and glaciomarine origin (Andrews *et al*. 1990).

4.8 Topography

The topography of the area is of undulating coastal plain comprised of fields under cultivation, permanent pasture and areas of woodland.

4.9 Site Visits and Walkover Survey

Site visits and walkover survey of the OnTI was undertaken between the 27th and 28th May 2014. This survey involved visiting the route of the modified onshore export cable route corridor and proposed substations location. Ground access was heavily restricted across to the majority of the route which was under crop and where access was not possible the route was viewed from the nearest road or publically accessible location. The proposed intertidal land-fall area at Boyndie Bay were accessible and a full-coverage walkover survey was undertaken across the intertidal zone at or near low tide.

Site visits were made to designated Cultural Heritage Assets within 5km of the proposed substation site with regards to their setting within the Outer ASA. These visits were informed by the Zone of Theoretical Visibility (ZTV) established by the projects Landscape and Visual Consultants (Chapter 5.3: Seascape, Landscape and Visual Assessment).

No additional cultural heritage assets were recorded at the accessible areas of the modified OnTI ASA, i.e. Boyndie Bay.

A photographic record of the OnTI ASA is presented in **Appendix VII**.

4.10 GIS

Geospatial data was analysed using an ESRI Arcview 10 GIS work space. Data that could not be mapped was compiled in a project archive and used qualitatively.

All locations are given in British National Grid (OSGB36).

5. Cultural Heritage Baseline – Submerged Prehistory

5.1 Cultural Heritage Baseline – Submerged Prehistory

5.1.1 Introduction

The early prehistoric record of Scotland has recently been confirmed to extend to at least the last 14,000 years (Ballin *et al*. 2010a), comprising Later Upper Palaeolithic and Mesolithic periods of archaeology (Saville & Wickham-Jones 2012). During these periods, global (eustatic) sea level was substantially lower than present due to more extensive glaciers around the world storing more of the Earth's water as ice during the last ice age. As the ice sheets melted, global sea level rose around 120m in the last 20,000 years or so (e.g. Fairbanks 1989) to present-day levels. Therefore, for early prehistoric periods of archaeology much of the available coastal land that could have been exploited by human groups is now fully-underwater or located in the inter-tidal zone (Bailey & Flemming 2008, Momber *et al*. in prep.). Consideration of submerged prehistory and palaeogeography is an important and emerging field of prehistoric research and a key consideration for understanding the full range of archaeology and cultural heritage that may be encountered in coastal and offshore developments (Bicket *et al*. 2014).

Generally, the potential for encountering submerged prehistoric archaeology in coastal and marine environments is driven by a range of geomorphological, geological and earth processes which influence the relative position of sea-level at a given time and location (Bicket 2011a). Within a Scottish context isostatic readjustment of the land following the end of the last ice-age has a significant control over local and regional relative sea level and the area of the coast and inundated continental shelf that may have been available for past human exploitation (Atkinson & Hale 2012).

5.1.2 The Submerged Prehistory Resource

Currently, there are no known submerged prehistoric sites in Scotland; a pattern which is strongly linked to the lack of systematic survey in coastal and offshore environments, lack of baseline datasets and the small-size of the artefacts and sites under consideration, rather than an absence of archaeology (Bicket *et al*. 2014). However, there is significant potential for encountering early prehistoric archaeology associated with early Holocene inundated coastlines, i.e. *palaeo-landscapes* (Bicket *et al*. 2014, Bicket 2011b, Momber *et al*. in prep). *In situ* intertidal early Mesolithic sites are known (Ballin *et al*. 2010b). The general early prehistory resource for Scotland comprises some Later Upper Palaeolithic artefacts, but mainly comprises Mesolithic archaeological material including a substantial number of artefacts from coastal contexts, associated with dunes, submerged forests and relict peat deposits (e.g. Ballin *et al*. 2010b) preserved in intertidal environments around the Scottish coast (Atkinson & Hale 2012).

5.1.3 North East Scotland early prehistory context

Regionally, early prehistoric artefacts and structures of Mesolithic date have been encountered such as flint napping material at Hill of Foulzie (**WA 1078**), the hut circles inland at Silvercrest, near Elgin (Suddaby 2007) and the artefacts from coastal contexts at Culbin Sands (Callander 1911). A further 67 sites are noted in the Aberdeenshire Sites and Monuments Record (SMR); with 9 in the Moray SMR (Aberdeenshire Council, online resource).

It is likely that the region was impacted by the second Storegga tsunami of around 8000 years ago (Dawson *et al*.), which may have had a substantial effect on Mesolithic groups living at the coast (Weninger *et al*. 2008).

Recent relative sea-level predictions for north-east Scotland (Bradley 2011) suggest that by around 6,500 years ago, sea level was around the level of the current mean high water springs (MHWS). By the early Neolithic (c. 4000 BC) sea level is likely to have been roughly equivalent to that of today or slightly higher.

This scenario defines a crude context for establishing potential for submerged early prehistory in the region; comprising the contemporary intertidal zone and inundated continental shelf in the study area into water depths in excess of -10m OD (e.g. Bradley 2011, model G2:13).

5.1.4 Quaternary Marine Geology in the modified OfTI ASA

Previous assessments of submerged prehistory potential (MORL ES, Technical Appendix 5.5 A) focussed upon the development area in the Outer Moray Firth and referred to literature characterising regions to the west of the current study area, e.g. the Inner Moray Firth and Beauly Firth in a region which has significantly different patterns of isostacy, influencing relative sea-level models and the assessment of inundated coastal landscapes and potential for submerged prehistory (Headland Archaeology 2012). The current study area lies between two main sources of relative sea level data (recently reassessed in Bradley 2011, models 13, North East Scotland, and 5, Moray Firth). This current assessment, focused on the modified OfTI ASA, provides additional context to that earlier assessment (MORL 2012), and considers that the RSL pattern experienced at the coast here may sit somewhere between these two extremes with a degree of uncertainty influencing the potential for encountering early prehistoric material in coastal and nearshore environments within existing presented data (MORL 2012). No geophysical or geotechnical data has been assessed for the modified OfTI ASA to clarify the assessment of the modified OfTI further.

For the period of archaeological interest, the Holocene and post-Last Glacial Maximum Late Pleistocene, the upper Quaternary marine geology in the region is characterised by undifferentiated deposits, of glacial and glaciomarine origin (Andrews *et al*. 1990), but not characterised at a scale suitable for archaeological assessment. Previously, assessed geotechnical samples within the nearshore area of a previous iteration of the modified OfTI were identified as having potential for palaeoenvironmental assessment (MORL 2012, section 6) and a range of organic lenses, fine-grained sediments and soil layers were reported (MORL 2012). Planned coring locations at the coast were not able to be sampled (MORL 2012); an area of high potential. In lieu of detailed coastal and nearshore geophysical and geotechnical datasets (e.g. Gribble and Leather 2011) within the modified OfTI ASA a general assessment is made here. As with the central North Sea, nearshore and coastal units contemporary with the Forth Formation (Stoker *et al*. 2008) and early Holocene terrestrial, fluvial, estuarine and coastal deposits which currently may not be mapped, provide the main context for speculating on submerged prehistory potential in North East Scotland.

5.1.5 Potential

There is potential for encountering submerged prehistoric material (artefacts, ecofacts and sites) and palaeolandscape features of archaeological interest within the intertidal zone and offshore study area relating to the post-glacial inundated continental shelf. Locally, such sediments have been identified from a previous iteration of the modified OfTI (MORL 2012).

In particular, in intertidal/coastal and nearshore areas where early Holocene geomorphology is preserved at or beneath current sea level (e.g. inundated terrestrial, fluvial and estuarine landforms and deposits); there exists potential for encountering archaeological material and sedimentary archives of geoarchaeological and palaeogeographical value.

Nearshore seabed sediments are characterised by sandy Holocene marine sediments (MAREMAP, online resource) which may afford protection to archaeological material and palaeogeographical features preserved beneath them. In addition, reworked artefacts and other material of archaeological interest may be preserved within seabed sediments.

In situ organic and finer-grained sediments may also comprise important geoarchaeological, palaeoenvironmental or palaeogeographical information, such as reference or index points relating to past sea-level. These resources are of high value for understanding submerged prehistoric landscapes and early prehistory at the coast in a region which currently has no developed baseline datasets for archaeological purposes and to establish the potential for submerged prehistory in more detail.

6. Cultural Heritage Baseline – Maritime

As discussed in Section 5 above, the modified OfTI ASA was probably inundated and became a fully marine environment at the beginning of the Neolithic period onwards. As such, any subsequent activity within it below Mean Low Water (MLW) can be considered to have been of a maritime nature, relating specifically to trade, population movement, war and the exploitation of the sea as a resource.

The discussion below relates principally to evidence and potential in relation to the remains of watercraft, i.e. wrecks. However, experience elsewhere within the UK suggests that maritime finds that cannot be associated with known wrecks or casualties are commonly made in the UK, for example the stone anchors and fishing weights that are sometimes discovered around inshore reefs. Whilst no such finds have been recorded in the databases searched, an unquantifiable potential exists for their discovery within the modified OfTI.

The principal evidence used to assess the maritime archaeological baseline is the data sets held by the UKHO and NMRS. Aberdeenshire HER holds offshore records but that data has not yet been uploaded to the HER and is not searchable.

A search of the UKHO wreck database has not identified any 'live' wrecks in the modified OfTI ASA. However, there are eight dead wrecks within the modified OFTI cable corridor (**Figure 1**; **Appendix II**). It should be noted in this context that the UKHO wreck inventory is largely composed of the results of hydrographic (rather than archaeological) survey and casualty reporting, with its principal concern being the recording of seabed features of potential navigational interest. As a result it is more likely to be representative of the distribution of relatively intact 19th and 20th century shipwrecks than the more ephemeral wrecks of earlier periods or of the distribution of smaller boat wrecks.

In addition to recording known wrecks, the NMRS also records documented maritime losses ('casualty records') for which the wreck has either not been found or for which an exact wreck position is not available. In most cases these records have been assigned an approximate position based upon available information about where the vessel was lost. The accuracy of these positions depends upon the quality of that information and affects the usefulness of the record. For example, 'wrecked on Salt Rock' may help identify a geophysical anomaly in the vicinity, whereas 'off Whitehills will not. Casualty records are referred to in this assessment as 'casualties'.

Casualty records which have estimated positions near to the modified OfTI ASA have been included in the discussion of potential **(Figure 1**; **Appendix III).** A total of 20 casualty records have been mapped within the modified OfTI ASA.

There are a number of factors which adversely affect the discussion of potential. There is very little useful documentary evidence relating to pre-18th century losses and it is not until the 19th century that information starts to become recorded that enables casualties to be mapped with any degree of usefulness. Furthermore, the recording of boat as opposed to ship losses did not begin to any systematic extent until the 20th century. This combined with uncertainties with regard to the survival of physical evidence means that the existence of a casualty record within the modified OfTI is not a reliable indicator that wreck material is actually present.

Potential is heavily influenced by the type of vessel, circumstances of loss and by the preservation environment. For example, a vessel that is stranded on a high energy hard shore or one that is stranded on an open beach and then subject to salvage may leave little physical evidence of its presence, whereas one that founders offshore and then is rapidly buried by seabed sediment may survive relatively intact. Only broad scale information is available concerning seabed sediments and therefore the discussion about potential will need to be briefly reconsidered in the light of post-consent geophysical survey. In the meantime available surface sediment mapping suggests that the type of deep sandy sediments that can lead to spectacular preservation are largely absent from the modified OfTI ASA, particularly at its southern landfall end, although the rapid shelving to deep water offshore does suggest that except for very close inshore the preservation environment may be a favourable one of fairly low energy. Analysis of some types of maritime finds and assemblages can also be an issue for potential, with close dating of the remains of small boats and associated assemblages potentially problematic unless a dendrochronology date can be obtained.

It is undoubtedly the case that ship and boat wrecks are common archaeological sites in coastal waters in Scotland and that the number of known wrecks sites is considerably less than those that actually exist. It is commonly said that eight to forty wrecks exist in the UK for every mile of coastline. However, linking such broad scale statements with potential is potentially misleading. There are very wide variations in wreck density and any useful discussion of potential must necessarily be highly localised.

No offshore navigational hazards likely to influence potential have been located within the modified OfTI ASA. The coastline itself is a potential hazard, in that it is predominantly a hard coastline that lacks natural shelter in gales coming from the north-west through to the north-east. The fetch coming from the north-east in particular was great. The small fishing ports along the north coast, although generally defended from the 19th century onwards, are likely to have been difficult to enter and sailing vessels travelling along the coast, crossing the Moray Firth or fishing in coastal waters are likely to have been particularly vulnerable. However, whilst it is possible that vessels in difficulties would have deliberately tried to strand themselves in the sandy bays that constitute the proposed landfalls, there is nothing in the natural environment to suggest that there should be an abnormally large density of wrecks in the modified OfTI ASA.

6.1 Cultural Heritage Baseline – Maritime (pre-AD 1500)

6.1.1 Background

The scale, pattern and character of maritime activity across Scotland as a whole prior to AD 1100 remains very poorly understood. Documentary evidence exists only for the Roman and Early Medieval periods and is very sparse and difficult to extrapolate from. What little is known is derived from archaeological evidence, although direct evidence of boats and ships of this period in maritime contexts is lacking in the East Coast Archaeological Sea Zone. Instead our understanding within this zone is implied from the study of terrestrial assemblages and from maritime archaeological evidence further afield.

Archaeological evidence associated with settlement and economic activity currently suggests that coastal and short sea voyages were regularly undertaken in north-west Europe from about 7,000 BC. Prehistoric populations in the north-east of Scotland are likely to have made extensive use of watercraft for nearshore sea fishing and for movement along the coast. The presence of prehistoric populations in the Northern Isles also implies their use for migration. However, the limited population of northern Scotland during the subsequent prehistoric periods means that scale of maritime activity is likely to have been fairly small.

Sparse historical sources indicate that there was almost certainly some Roman naval activity in the Moray Firth. Terrestrial archaeological evidence also suggests that there was some seaborne trade that moved goods from the Roman south to north-east Scotland and raw material south in return, although maritime activity is likely to have remained predominantly local.

Whilst the early medieval period was dominated by Scandinavian expansion and trade, the population base was still limited and most maritime activity in both inner and outer Moray Firth is likely to have been remained associated with inshore fishing and coastal trading. Long distance voyages and those out of sight of land are likely to have remained relatively rare.

Documentary records of shipping losses become more common in the medieval period. However, these are rarely specific with regard to the exact location. It is likely that the medieval period saw an increase in marine traffic, with a consequent increase in losses. A number of ports on the Moray Firth such as Inverness and Banff had become busy trading centres by the 12th century and it is likely that inshore fishing for cod and whitefish was carried out all along the coast of the Firth. Overseas trade appears to have grown and the ports of the Firth had links with Scandinavia, the Baltic and later with France.

No pre-AD 1500 watercraft are recorded as having been found in a maritime context in the East Coast Archaeological Sea Zone. Although the evidential base for sea-going watercraft in the periods concerned is small, it is likely that the great majority were boats (usually classified as being less than 12m in length), constructed of wood and either sailed or rowed. Many of those found in Scotland are log boats. There is very little evidence for more seaworthy decked (enclosed) hulls, although these will have been increasingly used for trade in the medieval period. Many of the pre-1100 vessel finds made in the UK have also been assessed as being suited only for inland use or in benign open waters for fishing. However, it should be remembered that it was commonplace in the 19th century for Shetland men to fish up to sixty miles offshore in small open boats.

6.1.2 Known wrecks

There are no known pre-AD 1500 wrecks within the modified OfTI ASA.

6.1.3 Potential

The NMRS records no pre-AD 1500 casualties in the modified OfTI ASA. A search of other sources has identified none in the vicinity.

Two factors suggest that the potential for pre-AD 1500 watercraft finds within the modified OfTI is very low, if not remote. Firstly, the footprint of the modified OfTI within the narrow fringe of coastline likely to have been navigated by most vessels of this period is very small. Secondly, the great lapse of time means that relatively small wrecks of this period are unlikely to survive, except when they are buried rapidly and the seabed sediments provide an exceptionally good preservation environment which is not then disturbed.

6.2 Cultural Heritage Baseline – Maritime (Post-medieval)

6.2.1 Background

Whilst fishing continued to be important in the subsistence economies of coastal communities, the ports of the Moray Firth became increasingly important for the commercial fishery during the post-medieval period. Long lining for cod, mackerel and white fish and potting for lobsters continued, as did an important salmon fishery in the inner Firth and associated rivers and the exploitation of mussel beds and other intertidal resources. However, the most important development was the rise of the herring fishery. Herring and sprat migrated into the Firth in the summer months and a thriving inshore fishery had existed as early as the 17th century. The subsequent introduction of drift nets and salting allowed a trade in herring to develop. Larger boats allowed the fishermen of the Firth to follow the herring migration and by the end of the 18th century the industry and the ports all along the coast of the Firth that exploited were booming.

The trade of the Firth's ports appears to have expanded during this period, with a consequential rise in vessel movements. In addition the general expansion of Northern European trade, both with Britain and worldwide, resulted in the greatly increased use of the north passage around Scotland and much of this traffic in traversing the mouth of the Firth was vulnerable to being funnelled into it by adverse weather.

The range of sizes and complexity of merchant ships increased during the post-medieval period. During the 18th century vessel types that specialised in particular trades started to develop, for example the strong flat bottomed ‘collier’ types that were designed to operate from both ports and beaches.

6.2.2 Known wrecks

There are no known post-medieval wrecks in the modified OfTI ASA.

6.2.3 Potential

Wreck recording was still in its infancy in the 18th century and few losses are recorded in the standard inventories. Of the 626 losses recorded by Larn for north-east Scotland between Macduff and Strathy Point, only 3% were lost in the 18th century. There tends to be little in the way of useful locational information. It is therefore difficult to assess potential based upon casualty records.

There is a single 18th century casualty record for the modified OfTI ASA. An unnamed vessel is documented in the NMRS (#327709) referring to a loss in 1745, but with few supporting details.

6.3 Cultural Heritage Baseline – Maritime (19th century)

6.3.1 Background

Economic activity in the Moray Firth continued to be dominated by the fishing industry during the 19th century. Fishing, particularly the herring fishery, grew exponentially and provided a livelihood for much of the region’s population. Investment in the industry led to major improvements to existing harbours and the building of artificial harbours at places such as Helmsdale and Whitehills. By the mid-19th century, Wick, Buckie and Fraserburgh were amongst the most important herring fishery ports in Europe. The scale of the fishing industry based in the Firth’s harbours was staggering. By 1882 there were almost 15,000 registered fishing vessels in Scotland, of which about 3500, or 23%, were from the Moray Firth ports (Groome1882-5). The consequential rise in vessel movements and the failure to improve the safety of the industry inevitably led to an increase in the number of boats lost.

Whilst vessels involved in the fisheries of the Firth had traditionally been small open boats, by the end of the 19th century a number of regional vessel types had emerged (Osler 1997, 34-40). The typical open herring boat of the Firth was called a ‘scaffie’ or ‘Buckie boat’ and a number of distinctive decked boats more suitable for offshore water, in particular the ‘decked scaffie’ or ‘fifie’ and the famous ‘zulu’, were developed. The clinker built scaffie was cheap to build, which made it popular. It was also light, which enabled it to be pulled up onto the beach. In its largest form it could be up to 12m long and carvel-built. The seasonal herring fishery drew fishermen from as far away as Lewis and the number of different types of fishing boat in the Firth at that time would have been considerable.

Merchant shipping also saw greatly increased activity, both in terms of vessels calling at commercial ports on the Firth and those sailing past the Firth, either coastwise to the north and west coasts or further afield, in particular transatlantic traffic from Northern Europe. The pace of industrial revolution and the increasing use of coal for domestic heating led to a great increase in the number of vessels carrying coal. Most of this coal is likely to have been from either the north-east of England or the Fife coalfields.

Whilst the subject is too broad and complicated to merit discussion in a study such as this, it is worth noting that the 19th century was a revolutionary period in the shipping industry and saw the transition from wood and sail to iron and steel and steam. Vessel size increased massively and many of the specialised cargo ship types in use today were developed. With its deep water and potential for preservation, the maritime archaeological resource of the Firth is likely to hold important evidence of this crucial period.

No 19th century vessels found in the Moray Firth appear to have been archaeologically studied in a way that has resulted in formal publication. This evidential gap is to some extent mitigated by the survival of a number of preserved vessels, in particular examples of the regional fishing vessel types and by an increasing amount of documentary evidence concerning their design and use. Nevertheless, wreck sites are likely to a rich source of evidence concerning the use of the Firth in the 19th century.

6.3.2 Known wrecks

There are no known 19th century wrecks in the modified OfTI ASA.

The undated wreck **WA** 7002 (UKHO 79583), located approximately 3.05km west of the offshore centreline, could be a 19th century wreck (or a vessel built in the 19th century; see Section 11 below).

6.3.3 Potential

There are 13 references to 19th century vessels lost in the vicinity of the modified OfTI ASA, most have general references to being located "off Banff" or "off Portsoy".

Casualties in the Moray Firth are likely to have been more common in the 19th century due to the increasing number of vessel movements. We know of more of them due to better casualty recording and they tend to be associated with improving locational information. Some indication of this is given in the standard published inventories. For example, of the 626 losses recorded by Larn for north-east Scotland between Macduff and Strathy Point, 384 or 61% were lost in the 19th century.

These vessels were probably typical of the small unspecialised merchant ships of the 19th century that were capable of carrying both bulk and general cargoes, although the possibility that they were of a more specialised bulk cargo type called a 'collier' or 'collier brig' that had emerged in the 18th century cannot be ruled out.

6.4 Cultural Heritage Baseline – Maritime (Modern)

6.4.1 Background

Fishing remained the dominant maritime activity within the Moray Firth for much of the 20th century and is likely to have accounted for most of the vessels movements. Most of the small artificial harbours built to serve the fishing industry remained active into the 20th century, although the introduction of the larger steam drifters meant that commercial fishing was increasingly centred in the larger harbours. A small number of commercial ports such as Buckie also remained important and the Caledonian Canal, previously a commercial failure, saw a brief period of activity linking west and east coasts during the First World War.

The Moray Firth assumed some military importance during both world wars. This was due to the coastal convoy routes that skirted it and used it as an anchorage. Invergordon on the Cromarty Firth was an important naval base and anchorage and was considered as a possible base for the Grand Fleet, before being rejected on the grounds that it was too far away from the likely battleground in the North Sea. Nevertheless, Cromarty/Invergordon remained a popular anchorage for 'resting' crews and access to the rail network meant that supply vessels worked between the Firth and the fleet in Scapa Flow.

Although U-boats were a distinct threat due to the deep water that reached right into the Inner Firth, the principal hazard was sea mines. Many of the larger fishing vessels were employed in the mine sweeping, patrolling and tender role and many of the fishermen themselves were called up for service in the Royal Naval Reserve. The danger of air attack was only a factor in the Second World War and then only really significant for a fairly brief period after the fall of Norway. The threat posed by bad weather is likely to have remained a major hazard throughout.

The major change in fishing vessels was the widespread introduction of steam and then internal combustion engines for both propulsion and gear handling. Whilst being much more expensive to build and operate than the sailing boats it replaced, the iconic steam drifter was less weather dependant, quicker at getting the catch to market and was undoubtedly a factor in the over fishing that contributed to the decline of the industry. Despite this fishing vessels using sail and wood survived well into the century, although engines were often fitted (see the 1923 *Sovereign* below, which had a small engine). However, the 20th century saw the end of commercial sail in Scottish waters.

No archaeological studies of 20th century vessels found in the Moray Firth appear to have been formally published and the little data that is available is derived from hydrographic and other surveys and from recreational divers. As with 19th century, this evidential gap is to some extent mitigated by preserved vessels and by the relative ubiquity of documentary evidence concerning 20th century watercraft. Nevertheless, wreck sites are likely to a rich source of evidence concerning the use of the Firth in the 20th century.

6.4.2 Known wrecks

Within the modified OfTI ASA are eight documented wrecks, listed as Dead by the UKHO. There are considerable uncertainties with the positions of these wrecks. However, the definition of 'Dead' wreck, indicates that a wreck represents no upstanding hazard to navigation and remains of vessels may be flattened or buried at the seabed; still representing a cultural heritage asset.

One wreck is documented as the Ebenezer (**WA 2007**), a Norwegian 3-masted brig which was wrecked on Salt Rock, Knock Head off Whitehills in 1900. Subsequent surveys identified an increasingly broken-up wreck, which by the 1980s was not observed at the site. Remains associated with the vessel may be dispersed across the area (Figure 1).

There are four documented modern period wrecks within the modified OfTI ASA. Three date to wartime-era losses. Two Danish steam ships, the Minsk (**WA 2000**) and Charkow (**WA 2001**) were reportedly torpedoed by German submarines in on the same day 1940, the 19th of March. Eleven of the crew of the Minsk and the entire crew of the Charkow were reported killed. A British steam trawler, Loch Loyal (**WA 2004**) sank following a collision on the 8th August 1940 (**Figure 1**).

6.4.3 Potential

Casualties in north-east Scotland remained common in the 20th century, despite significant improvements in navigational safety. For the first recorded time, warfare appears to have been a significant causal factor. Despite the fact that the principal coastal convoy routes during both world wars skirted the Moray Firth, 63 of the 222 20th century losses recorded by Larn for north-east Scotland occurred during the 12 years of war. However, fishing remained the principal reason for vessel movements and the small boats used remained highly vulnerable in the frequently poor weather of the Firth. This is reflected in the casualty data for the modified OfTI ASA, although neither of the losses appears very likely to have resulted in the presence of a wreck within the ASA.

Fishing gear from a small local fishing vessel called the *Sovereign*, possibly a scaffie, was found washed up on 9th December 1923 in Sandend Bay (NMRS 310934). Registered in the small port of Whitehills to the east, it is likely to have foundered in heavy seas whilst fishing. Although the find spot has been given a position that is within the modified OfTI ASA in Sandend Bay, this is arbitrary and the loss probably occurred outside the bay, possibly several miles away.

It is worth noting that experience elsewhere in the UK suggests that reporting schemes linked to offshore development typically result in the reporting of archaeological material that is principally late 19th or 20th century in date but which cannot be linked with a specific vessel or even wreck. These are normally termed 'stray finds' by archaeologists.

6.5 Cultural Heritage Baseline – Maritime (Undated)

6.5.1 Known Wrecks

Four documented wrecks are unknown vessels and have no diagnostic details associated with them (**WA 2002**, **2003**, **2005**, **2006**)(**Figure 1**).

6.5.2 Geophysical Anomalies

Two geophysical anomalies within the modified OfTI were identified in the MORL ES, 2012 (Technical Appendix 5.5 A) (**Figure 1**). Both Anomaly 40 and 42 were assessed as being of low archaeological potential and possibly natural features.

It is anticipated that these anomaly locations will be in the study area of the forthcoming archaeological assessment of geophysical data for the modified OfTI. If relocated, the interpretation of these anomalies will be reviewed.

7. Cultural Heritage Baseline – Aviation

7.1 Cultural Heritage Baseline – Aviation (Modern)

7.1.1 Background

Aviation is an activity relevant to the modern period only. Although the First World War saw the beginnings of naval aviation, prior to the Second World War only limited flying was carried out over the sea. However, the period 1939-45 saw a dramatic increase in the number of offshore flights.

The Moray Firth saw a considerable increase in aircraft activity during this period. There appears to have been little fighting but the Firth was patrolled and overflown by Coastal Command and was used extensively for bomber and Fleet Air Arm crew training. During the war several bases around the Moray Firth, including Kinloss, Lossiemouth, Milltown, Invergordon and Wick were used either for training or for operations by Coastal Command. RAF Banff at Boyndie close to the Inverboyndie landfall was a strike base for raids on German North Sea shipping between 1943 and 1946.

Following the war, many of these bases continued in use, either for training or Coastal Command. As the Cold War intensified and the threat of Soviet strikes across the North Sea grew, these bases also developed a role in the country's air defence.

One consequence of the increase in flights carried out over the Firth was an increase in the number of aircraft crashes at sea. Mapping of Air/Sea Rescue operations during the war shows a distinct concentration of losses in the Moray Firth. There is also a concentration of terrestrial crash sites along the coast. By their very nature training flights are potentially hazardous and many of the crashes appear to have occurred as a result of training flights that went wrong.

7.1.2 Known Aircraft Crash Sites

There is one documented wreck of an aircraft in the modified OfTI ASA (**WA 2008**); however there is significant positional uncertainty. The position given is 4.5km from the Inverboyndie landfall. However, the position is for a loss that occurred 'off Whitehills' and is therefore extremely approximate. In the absence of a confirmed crash site the NMRS record cannot be regarded as a reliable indication of where any surviving wreckage may be.

7.1.3 Potential

The scale of aircraft losses offshore around the UK tends to be underestimated. Recent studies and aircraft discoveries suggest that although very few crash sites are charted, there are likely to be many uncharted aircraft wrecks in coastal waters. The concentration of Air/Sea Rescues within the Firth suggests that there is therefore a potential for uncharted and unknown aircraft wrecks anywhere within the modified OfTI ASA (Figure 1).

This potential is inevitably somewhat reduced by issues of site formation and survivability. Whilst much of the seabed is fairly deep and therefore relatively low in energy, aircraft wrecks tend to be far less robust than 20th century shipwrecks and are particularly vulnerable to damage and dispersal as a result of trawling.

Nevertheless, there are indications that aircraft crash sites may survive close to shore. For example, in 1983 a Merlin engine, possibly from an Armstrong Whitely bomber was trawled up and dumped at Lossiemouth. Another, this time with wooden rather than a metal propellor was dumped at Burghead. Aircraft wreckage is also anecdotally reported to be washed up on the coast following storms (The Aviation Forum website):

"The beaches of the Moray coastline are strewn with WW2 and post-war aircraft parts, especially after a storm tide. With so many WW2 RAF training bases around, it's not surprising, considering how many Whitleys, Wellingtons, Beaufighters, Mosquitos, Defiants etc have crashed a short distance out to sea over the years, not to mention all the Gannets, Buccaneers, and even Jaguars! The most likely areas to find relics are Findhorn beach, and Lossiemouth west beach, both just north of Kinloss and Lossiemouth airfields respectively. I once even found WW1 ammunition (rifle and pistol bullets, artillery shells) in a large hessian sack on Culbin north beach…

When I first had a nose around the Warwick wreck in the 1980s, the area was littered with damaged (but intact) .303 rounds, and more disturbingly, scraps of blue uniform material…"

It should be noted that a significant number of crash sites offshore around the UK have been located by aviation enthusiasts and divers. However, the reporting of these finds to either the UKHO or the RCAHMS tends to be very patchy. These records are not therefore fully representative of the number of aircraft crash sites that have been found.

The presence of former RAF Boyndie close to the Inverboyndie landfall suggests that there is increased potential for the presence offshore of objects jettisoned from aircraft. This could conceivably include UXOs.

8. Cultural Heritage Baseline – Intertidal

8.1 Cultural Heritage Baseline – Intertidal (all periods)

8.1.1 Background

The intertidal zone at Inverboyndie lies between the small 18th century harbour at Blackpots, used to service a local brick and tile works, and the much larger and older harbours at Banff and MacDuff. Banff was an established port in the medieval period and acquired a purpose-built harbour in the 17th century; and MacDuff became a significant harbour in the 18th century. The intertidal zone at Inverboyndie is also likely to have been exploited for subsistence.

8.1.2 Known Sites

A number of casualties that have stranded in Inverboydie Bay have been given positions that place them in or on the edge of the intertidal zone. Whitehills Harbour lighthouse, (**WA modified OfTI_1000**), Whitehills Harbour (**WA modified OfTI_1001**), and Knock Head harbour (**WA modified OfTI_1002**), located to the west of the proposed cable landfall at Boyndie Bay (**Appendix IV**).

8.1.3 Potential

There is potential for wreck material from any of the casualties in Inverboyndie Bay to be in the intertidal zone of the modified OfTI ASA at the respective landfalls. There is also potential for wreck material from other unknown losses to be present.

9. Cultural Heritage Baseline – Onshore Archaeology

9.1 Introduction

Cultural Heritage Assets within the OnTI ASA (**Figures 3-5**) are discussed below within their wider context. A general assessment of potential for encountering unknown archaeological material is set out based on the regional baseline discussed above.

9.2 Statutory and local heritage designations

Within the ASA there are currently 37 cultural heritage designations (Appendix VI: Features of Cultural Heritage Interest (a site or structure may have multiple designations) (Figure 3-5), comprising:

- 2 Category A-listed structures;
- 14 Category B-listed structures;
- 11 Category C-listed structures;
- 1 Battlefield
- 2 Gardens & Designed Landscapes;
- 7 Scheduled Monument (of which one is also A-listed and two are also B-listed);

Within the OnTI ASA there are a further 153 undesignated cultural heritage assets (Figures 3-5) derived from Aberdeenshire Council Archaeology Service sources.

The resultant integrated gazetteer of known cultural heritage assets comprises 190 individual features (Appendix VI: Figure 3, 4). Small positional uncertainties between duplicate records across the source databases (ACAS and Historic Scotland) have been merged where possible. In some cases a particular site or feature may have duplicate entries where it was felt the spatial uncertainty was too great to facilitate merging. Each entity has been assigned a unique identifier (**WA** ID).

9.3 Previous Studies

Various archaeological investigations have been undertaken within the Modified OnTI area. In 1890 a large midden was recorded and partially excavated on the dunes at Boyndie Bay (**WA1042**). The date is unknown but the presence of glazed pottery suggested that at least some of the material was post-medieval in date (Anderson 1890).

There have been two archaeological watching briefs and a walk over survey undertaken across the OnTI ASA. Archaeological watching briefs undertaken prior to the erection of three wind turbines at Cairnhill Wind Cluster (**WA1114** – DES 2009, 27) (two of which lie within the Modified OnTI area) and with the erection of a single turbine at South Colleonard (**WA1025**), to the south of Banff identified no archaeological features or artefacts (MAS 2014). A walkover survey associated with the extension of Bridgend Quarry (**WA1089** -located almost entirely within the Modified OnTI area) also revealed no archaeological features or artefacts (MAS 2012).

Field walking on the Hill of Foulzie has identified prehistoric activity within the area. A number of prehistoric lithic scatters have been identified (**WA1073**, **1075** & **1076**). In addition the site of a Mesolithic flint knapping and possible occupation site was identified through field walking and excavation (**WA1078**, DES 2005). This site uncovered cooking pits and possible postholes of Mesolithic and late Neolithic date alongside thousands of pieces of worked flint, chert and prehistoric pottery.

9.4 Archaeological and Historical Context

9.4.1 Introduction

This section outlines the wider cultural heritage context in the vicinity of the Modified OnTI area by archaeological period (**Figure 3-5**). Specific cultural heritage assets located within the Modified OnTI area are discussed in Section 9.5.

9.4.2 Historic Landscape Character

Historic Land-use Assessment polygons across the proposed Modified OnTI area indicate that the land is predominately amalgamated fields relating to farming from the 19th century to present. The exception to this is the 18th and 19th century designed landscapes associated with Eden House, Hatton Castle and Fyvie Castle (**WA1063**, **1102** and **1108**). These are each designed landscape of woods, walks, parks and ornamental architecture providing landscaping around the castles and houses. Hatton Castle and Fyvie Castle are on the Inventory of Gardens and Designed Landscapes maintained by the Scottish Government's heritage agency Historic Scotland and provide a setting for the main structures within the policies of each estate.

9.4.3 Archaeological Overview of Aberdeenshire

Aberdeenshire is rich in prehistoric sites, including a wide variety of burial cairns, standing stones, stone circles and recumbent stone circles built in the Bronze Age around the second millennium BC. The latter is unique to the north-east and excellent examples of these ritual sites survive throughout the region. Earlier traces of human occupation can be seen in the later Neolithic and early Bronze Age burial mounds built from stone or earth and traces of even earlier occupation in the Mesolithic have been identified throughout the region. The cropmark perseveration of multi-period prehistoric landscapes within the upland parts of the region is high and sites such as the Hills of Boyndie show roundhouses, enclosures, burial mounds and clearance cairns (Historic Scotland 1993). These later prehistoric settlements are common throughout the region, often containing underground storage chambers called souterrains. Broadly contemporary with these Iron Age villages are the impressive hillforts located at important locations such as the Mither Tap O'Bennachie and the Tap O'Noth.

The region is well known for its impressive medieval sites such as Tower Houses and Castles, for example the visually impressive Dunnottar Castle, a multi-phase castle dating from at least the 15th century. It is likely to have been settled considerably earlier and may have been a major prehistoric fort overlooking the sea on the east coast of the region.

Outwith the city of Aberdeen and the royal burghs the later history of rural Aberdeenshire is based on farming and fishing although the shipbuilding, wool, linen and papermaking were all active industries in the area. The development of the agricultural landscape in the 18th and 19th centuries is evident throughout the region. The region was active in World War II and the city of Aberdeen endured one of the worst bombing raids in Scotland outside of Clydebank.

9.5 Designated Cultural Heritage Assets within 5km of Proposed Substations Area

9.5.1 Introduction

Designated Cultural Heritage within the Outer OnTI ASA are discussed, organized by period, focusing upon selected Assets within the Outer OnTI ASA (**Figure 5**).

9.5.2 Later Prehistory

North Mains of Auchmaliddie Recumbent Stone Circle (**WA1184**) survives as two white quartzite stones, one of which is thought to be the recumbent and its western flanking stone. The Recumbent Stone Circle is unique in Aberdeenshire. It is part of the wider British and Irish tradition of erecting rings of standing stones during the third and second millennia BC. The distinctive feature of these stone circles is one of the stones is laid on its side in the south-west or southern arc of the ring, flanked by two erect stones. There are 99 known recumbent stone circles in Aberdeenshire and it is thought that the recumbent stone and its flanking stones form a frame to view a standstill moon that occurs every 18.6 years.

9.5.3 Post-medieval & 19th century

An example of late medieval Aberdeenshire tower house is preserved at the ruined 16th century Gight Castle (**WA1168**). The castle was constructed c. 1513-70 and is a rubble built L-plan tower house, one of four Aberdeenshire castles possibly constructed by a single master mason. Outbuildings include stables and coach house. The castle is also B-listed (**WA1167**) and has scheduled dovecot (**WA1164**) 200 m to its west.

The eastern edges of the designed landscapes surrounding Hatton and Fyvie castles are both located within the OnTI ASA and are within the Inventory of Gardens and Designed Landscapes. Hatton Castle designated landscape (**WA1102**) is 18th and 19th century in date and includes woodland, drives, lakes and a walled garden. Fyvie Castle designed landscape (**WA1108**) is later 18th century intake landscape of parks, woodland and an artificial loch.

There are 17 B- and C-listed buildings within the OnTI ASA. These structures predominately reflect the post-medieval settlement and farming activity. This includes 19th century farm buildings such as the C-listed Mill of Auchreddie (**WA1189**), Little Ardo farmhouse (**WA1182** – C-listed) and the probable dovecots or hen-houses at Fetterletter (**WA1136**). The religious aspects of 19^{th} century life are reflected in the church and churchyard at New Deer (**WA1186**) and the church and churchyard at Monquhitter (**WA1133** and **WA1134**).

The northern edge of the boundary for the Battle of Fyvie as outlined by the Inventory of Battlefields is located within the Outer OnTI ASA (**WA1110**). The battle of Fyvie was fought in October 1644 between the 1st Marquis of Montrose and the Covenanter army of the Marquis of Argyll. The two armies met at Fyvie Castle where the battle took place on high ground to the east of the castle where Argyll attacked Montrose's position on the higher ground around the castle repeatedly. Montrose escaped and claimed victory. The battle is significant as one of Montrose's string of victories on behalf of Charles I in aid of the Royalist cause, and one of only two of his victories won without the aid of his Irish ally Alasdair Mac Colla.

9.6 Cultural Heritage Assets within the Onshore Export Cable Route Corridor

9.6.1 Introduction

Known Cultural Heritage Assets within the Inner ASA and particularly the Modified OnTI area are discussed below. Previously unrecorded features encountered during the site visits are also discussed (**Figure 3-5**).

9.6.2 Designated Cultural Heritage Assets within the Onshore Export Cable Route Corridor

There are 14 statutorily designated cultural heritage assets within the onshore esport cable route corridor. These comprise 4 Scheduled Ancient Monuments; 10 Listed Buildings.

The statutory designated cultural heritage assets reflect both the prehistoric burial practices which survive in Aberdeenshire and the high-status medieval settlement and the 19th century farming and fishing activity and settlement within the area. The Hill of Alvah (**WA1035**) and Stirling Cairn (**WA1051**) are upstanding burial cairns formed from mainly from stone. They are conspicuous monuments in the landscape and would have been a focus for the Bronze Age builders and potentially their predecessors. The Hill of Boyndie (**WA1010**) is a cropmark site of at least three square barrows, circular enclosures and ditches which may represent an early medieval burial ground.

Inchdrewer Castle (**WA1002**) is located to the south-west of Banff. The L-shaped tower house is an early 16th century construction and was the main seat of the Ogilvies of Dunlugas.

Within the former burgh town of Banff is a cluster of 19th century category B- and C-listed structures (**WA1034**, **1041**, **1046** and **1048**). Within Banff is the scheduled St Brandon's Old Kirk, a 17th century structure possibly built on the site of an earlier ecclesiastical building (**WA1040**). In the countryside to the south of Banff is the category A-Listed South Colleonard House. Built c. 1870 the house is regarded for its Italianate design (**WA1039**).

To the southwest of the policies of Craigston Castle is the B-listed Fintry House, a later 18th century house, formally part of the estate of Fintry (**WA1105**).

Within the hamlet of Millbrex is the B-Listed 19th century Millbrex Church (**WA1162**).

9.6.3 Undesignated Cultural Heritage Assets within the OnTI Cable Corridor

The land across the Modified OnTI area contains widespread prehistoric activity. Findspots of worked prehistoric flint and chert (**WA1004**, **1073**, **1075**, **1076**, **1080**, **1081**, **1084**, **1085**, **1159**), a polished stone axe (**WA1050**), and cremation urns (**WA1022** and **1107**) indicate activity from the Mesolithic to the Bronze Age. Cropmarks of prehistoric settlement and enclosure are also across the Cable Corridor (**WA1014**, **1023**, **1056**, **1058**, **1060**, **1067**, **1072** and **1106**) and also later prehistoric burials (**WA1019**, **1044** and **1049**).

Medieval activity is slight within the OnTI ASA. There is a possible medieval settlement surviving as cropmarks at Tipperty (**WA1045**). Two findspots of medieval silver rings (**WA1005** and **1017**) may well be lost items. Documentary and map references indicate that the area once had a number of manor houses which are now destroyed (**WA1032** and **1179**) and a possible motte (**WA1119**).

Evidence of post-medieval farming practice survives within the OnTI ASA as upstanding structures and cropmarks. The upstanding structures illustrate the areas fishing and farming activities of the 18th and 19th century. Remains of these crofts and farmsteading are throughout the Modified OnTI area (**WA1000**, **1001**, **1011**-**1012**, **1024**, **1029**-**1030**, **1036**, **1059**-**1060**, **1064**, **1066**, **1069**, **1071**, **1071**, **1077**, **1087**, **1090**, **1094**, **1099**, **1101**, **1112**, **1129**, **1135**, **1142**-**1145**, **1148**-**1149**, **1152**, **1153**-**1154**, **1157**, **1171**, **1173**, **1175** and **1180**). Peat cutting and quarrying is also evident (**WA1038**, **1083**, **1141** and **1156**) and upstanding rig and furrow can be identified (**WA1018** and **1082**). Small-scale industry of 18th and 19th century date is also indicated by the remains of a distillery (**WA1043**) and mills (**WA1028**, **1068**, **1098** and **1120**).

The surviving elements of the 18th and 19th century designed garden and landscape of Eden House (**WA1063**) also indicate that the area was attractive to prosperous high status families.

The 1st Edition Ordnance Survey map of 1867 also indicates that the Modified OnTI area was a busy rural landscape of crofts and farmsteads which have now been removed (**WA1027**, **1052**, **1055**, **1088**, **1091**-**1092**, **1097**, **1111**, **1116**, **1123**, **1126**-**1128**, **1137**-**1139**, **1146**-**1147**, **1155**, **1163**, **1169**, **1172**, **1174** and **1176**). The 1st Edition Ordnance survey map also shows a number of small-scale industrial buildings which have now been removed including quarries (**WA1065**) and mills (**WA1070**, **1122** and **1150**).

The war memorial at Millbrex highlights the human loss within the area from both WWI and WWII (**WA1160**).

9.6.4 Undesignated Cultural Heritage Assets within the intertidal part of the Onshore Export Cable Corridor

Cultural Heritage Potential in the ASA

This area of Aberdeenshire was an active landscape from the earliest prehistoric times. The low-lying and well-drained fertile soils and its access to rich fishing areas within the North Sea have made it extensively settled throughout human history. The land across the proposed Modified OnTI area is pasture or arable fields. The field systems within the proposed Modified OnTI area have been reconfigured during agricultural improvements in the 18th-19th century. However areas which have avoided deep ploughing and areas of permanent pasture could contain archaeological material from earlier periods.

Regionally there is potential for encountering archaeological material of prehistoric date; the north-east of Scotland is an important region for Neolithic and Bronze Age activity and the Modified OnTI area shows extensive prehistoric activity in the form of findspots of worked stone tools. The Mesolithic site at Hill of Foulzie (**WA1078**) shows that early prehistoric activity can survive within the area and the Bronze Age Recumbent Stone Circle at North Mains of Auchmaliddie (**WA1184**) within the Outer OnTI ASA shows the potential for later prehistoric activity.

Iron Age activity within Aberdeenshire is extensive. The cropmark evidence of roundhouses, souterrains and enclosures within the Inner OnTI ASA indicate that the potential for surviving archaeological remains of this date is high. Roman activity is notable across the region with low-moderate potential for being encountered at the Modified OnTI area.

The earlier medieval landscape is preserved across the region by tower houses and castles which has been over-printed by more recent industrial activity and agricultural land management. There is moderate potential for encountering medieval material locally and map evidence indicates that many former manor houses have been removed.

There is high potential for encountering post-medieval archaeology particularly associated with 18th and 19th century farming buildings and field boundaries and small-scale industries such as lime kilns, peat cutting and mills. On the coast around Sandend and Banff the potential for activity associated with the extensive 18th and 19th century fishing industry is high.

There is considerable World War II activity in the region recorded by pillboxes and anti-tank defenses at Sandend and the airfield at Boyndie suggest that there may be further unrecorded evidence of this event within the vicinity of the OnTI ASA.

10. Summary

10.1 Submerged Prehistory

There are no known submerged prehistoric sites in the modified OfTI ASA. However, existing assessments of geotechnical samples in the area (MORL 2012) indicated the preservation of fine-grained sediments and organic rich Holocene sediments. These may relate to inundated coastal geomorphology and have potential for preserving archaeological material and sites; in addition to features of palaeoenvironmental and palaeogeographical interest which may be preserved within the modified OfTI as a whole.

10.2 Maritime

No wrecks have been identified within the modified OfTI in either the UKHO or NMRS databases. However, two wrecks do exist in the vicinity of the OfTI ASA, a First World War steamship and an unidentified vessel, probably of the late 19th or 20th centuries.

No casualty or other records have been identified that suggest that the probability of there being a pre-AD 1500 wreck within the ASA is greater than very unlikely. There is some evidence to suggest that wreck material from 18th and 19th century wrecks could be present within the intertidal zone or just offshore in Boyndie Bay and therefore within or close to the cable corridor at both proposed landfalls. However, there is insufficient data to say anything further about probability at these locations, other than that the possibility cannot be discounted.

The available data suggests that the probability of encountering wrecks elsewhere in the modified OfTI ASA appears to be low, although it cannot be discounted, particularly in the absence of geophysical survey. Stray finds not associated with identified wrecks may be present.

10.3 Aviation

No aircraft wrecks have been identified in the modified OfTI in either UKHO or NMRS databases. There is one casualty record within the modified OfTI, but this is based only upon an approximate position of loss. Nevertheless, records suggest that a significant number of aircraft were lost over the Moray Firth during the Second World War as a result of training and Coastal Command flights. This and the loss record suggest that there must be potential for the presence of aircraft wreckage in the modified OfTI. The probability is probably fairly low. There is also potential in the Inverboyndie section for objects jettisoned from aircraft, including perhaps UXOs, to be present due to the nearby presence of RAF Boyndie.

10.4 Intertidal

Following walkover surveys of both proposed land fall locations, no additional sites with surface expression were identified. There is potential for encountering unknown archaeological and palaeoenvironmental features within the construction footprint of the cable landfall.

10.5 Onshore

There are a large number of cultural heritage assets within the modified OnTI ASA dating from later prehistory, post-medieval and modern periods.

The designed landscape of Eden House (**WA1063**) is located within the onshore export cable route corridor. Intact elements of the gardens may have higher potential in terms of surviving archaeological remains due to likelihood of avoiding the deep plough. The survival of archaeological remains within areas of arable or pasture fields is unknown, but where deep ploughing has not been undertaken, the potential for prehistoric or post medieval remains to be encountered is considered to be high.

11. Archive

The WA digital and hard copy archives for this project are currently held by WA under project number 104620.

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Appendix I: Statutory, Planning and Policy Context

International and European Policy and Legislation

Legislation/Policy	Summary
ICOMOS - International Council of Monuments and Sites Charter on the Protection and Management of Underwater Cultural Heritage (1996) (the Sofia Charter)	The Charter upon which the Annex of the UNESCO Convention is largely based includes a series of statements regarding best practice, intending 'to ensure that all investigations are explicit in their aims, methodology and anticipated results so that the intention of each project is transparent to all'. The UK is a member of the International Council of Monuments and Sites.
UNESCO Convention on the Protection of the Underwater Cultural Heritage (2001)	The UNESCO Convention was concluded in 2001, and is a comprehensive attempt to codify the law internationally with regards to underwater archaeological heritage. The UK abstained in the vote on the final draft of the Convention, however, it has stated that it has adopted the Annex of the Convention, which governs the conduct of archaeological investigations, as best practice for archaeology. Although the UK is not a signatory, the convention entered into force on 2nd January 2009 having been signed or ratified by 20 member states.
European Convention on the Protection of the Archaeological Heritage (Revised) (1992) (the Valletta Convention)	The Valletta Convention was ratified by the UK Government in 2000 and came into force in 2001. The convention binds the UK to implement protective measures for the archaeological heritage within the jurisdiction of each party, including sea areas. Insofar as the UK exerts jurisdiction over the Continental Shelf, then it would appear that the provisions of the Valletta Convention apply to that jurisdiction.
European Landscape Convention (2000)	The European Landscape Convention (2000) became binding on the UK from 1 March 2007. Its principal clauses require the Government to protect and manage landscapes and to integrate landscape into regional and town planning policies including its cultural, environmental, agricultural, social and economic policies. The Convention applies to the entire territory of the UK and includes land, inland water and marine areas. It is not regarded as applying to sea areas regulated by the UK that lie beyond territorial waters.

UK Policy and Legislation

Legislation/Policy	Summary
Ancient Monuments and Archaeological Areas Act 1979 (as amended)	This Act is primarily land based, but in recent years it has also been used to provide some level of protection for underwater sites. Scheduled Monuments and Areas of Archaeological Importance are afforded statutory protection by the Secretary of State, and consent is required for any major works. The law is administered by English Heritage and the Department of Culture, Media and Sport.
Revised Draft Overarching National Policy Statement for Energy (EN-1) (Department for Energy and Climate Change, 2010)	This National Policy Statement (NPS) sets out national policy for energy infrastructure, and the importance of archaeological assessment in the development process.
Revised Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (Department for Energy and Climate Change, 2010)	This NPS, taken together with the overarching NPS (EN-1), provides the primary basis for decisions by the Planning Inspectorate on renewable energy infrastructure development applications. It sets out the importance of the historic environment and the ways it can be impacted be development, outlines guidance for application assessments, Planning Inspectorate decision making, and mitigation measures.
Revised Draft National Policy Statement for Energy (EN-5) (Department for Energy and Climate Change, 2010)	This NPS, taken together with the overarching NPS (EN-1) provides for decision making on above ground electricity lines of 132kv and over and other electricity networks associated with a Nationally Significant Infrastructure Project e.g. substations and converted stations.
Marine Policy Statement 2011	The Marine Policy Statement was jointly published by all UK Administrations in March 2011 as part of a new system of marine planning being introduced across UK seas.
Merchant Shipping Act (1995)	This Act sets out the procedures for determining the ownership of underwater finds that turn out to be 'wreck', defined as any flotsam, jetsam, derelict and lagan found in or on the shores of the sea or any tidal water. It includes ship, aircraft, hovercraft, parts of these, their cargo or equipment. If any such finds are brought ashore, the salvor is required to give notice to the Receiver of Wreck that he/she has found or taken possession of them and, as directed by the Receiver, either hold them pending the Receiver's order or deliver them to the Receiver. The act is administered by the Maritime and Coastguard Agency.

Scotland Policy and Legislation

Historic Scotland carries the responsibilities of Scottish Ministers with regard to nationally important archaeological and built heritage matters. These responsibilities are carried out in collaboration with other bodies such as Scottish Natural Heritage, public authorities and local planning authorities where appropriate on matters of planning or licensing.

Legislation/Policy	Summary
Marine and Coastal Access Act 2009 (Marine Policy Statement 2011)	Scottish Ministers have powers over marine planning, licensing and conservation over the Scottish Marine Area from 12 - 200 nm offshore. The inshore area (to 12 nm) is covered by Scottish Legislation.
National Planning Framework for Scotland 2 (2009)	Long term spatial strategy for Scotland's development including the protection of the environment. One of the main elements of the spatial strategy to 2030 is to conserve and enhance Scotland's distinctive natural and cultural heritage, and continue to safeguard internationally protected sites, habitats and species.
Marine (Scotland) Act 2010	The Marine (Scotland) Act 2010 received Royal assent on 10th March 2010 and replaces the PWA (1973) in Scotland. Aspects of this Act relevant to offshore development and archaeology include provision for a new statutory marine planning system and for improved marine historic conservation. This includes new powers to select and manage Marine Protected Areas (MPAs) for the protection and enhancement of marine biodiversity and for the preservation of, 'a marine historic asset of national importance located, or believed to be located, in the area'.
Scottish Historic Environment Policy (2008, revised 2011)	The Scottish Historic Environment Policy (SHEP) sets out Scottish Ministers' policies, providing direction for Historic Scotland and a policy framework that informs the work of a wide range of public sector organisations.
Scottish Planning Policy 2010	A statement of the Scottish Government's policy on nationally important land use planning matters. It sets out policy on how archaeological remains and discoveries should be handled. The guidance is aimed at planning authorities in Scotland, and is also of direct relevance to developers, owners, statutory undertakers, government departments, conservation organisations and others whose actions have a direct physical impact upon the natural or built environment.
Historic Environment (Amendment) (Scotland) Act 2011	The Historic Environment (Amendment) (Scotland) Act 2011 (HEA 2011) received Royal Assent on 23rd February 2011. The Act amends the Historic Buildings and Ancient Monuments Act 1953, the AMAA (1979) and The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 to harmonise aspects of historic environment legislation with the planning regime.
Historic Scotland's Marine Heritage Strategy 2012-15	In April 2012, Historic Scotland published a Strategy for the protection, management and promotion of marine heritage (2012-2015) setting out priorities for protecting, managing and promoting Scotland's outstanding marine heritage under the Marine (Scotland) Act 2010.

Aberdeenshire Policy and Guidance

Policy	Summary
Aberdeenshire Local Plan (2008)	Policies - Env\18: Listed Buildings, Env\19: Archaeological Sites and Ancient Monuments, Env\20: Historic Gardens and Designed Landscapes, with the focus on conservation, and avoidance of adverse impacts to these cultural heritage resources
Aberdeenshire Local Development Plan (2012)	Policies and supplementary guidance - SG Historic Environment1: Listed Buildings; SG Historic Environment 2: Conservation Areas; SG Historic Environment 3: Historic gardens and designed landscapes; and, SG Historic Environments 4: Archaeological sites and monuments. The policies focus on conservation, and avoidance of adverse impacts to these cultural heritage resources through the planning process.

Appendix II: Documented Cultural Heritage Assets In The modified OfTI ASA

WA No.	Name of vessel	Year of loss	Description	BNG Easting	BNG Northing
2000	Minsk	1940	Danish steamship (76.8x11.3x4.6m) sunk on 19th March 1940. Approximate position of wreck recorded. The Minsk was built by Burmeister & Wain in 1911 and was owned at the time of loss by DET FORENEDE D/S. The vessel was equipped with a triple-expansion engine. The vessel was on route between Kirkwall and Esjberg when it was torpedoed near the Pentland Firth with 11 killed. In a 2012 survey the wreck was not located.	361707	914337
2001	Charkow	1940	Danish steamship (71.9x11x6.4m) sunk on 19th March 1940 after being torpedoed by a German submarine. All crew killed. Approximate position recorded. Survey in support of oil rig installation in 1986 did not locate the wreck.	361671	910628
2002			Position reported as foul ground, with anchors buried in seabed by ;pca; fishing skipper. Not located following sonar survey by HMS Fox.	361463	895816
2003			Possible wreckage reported by local fishing skipper, not located during survey by HMS Fox.	364377	877607
2004	Loch Loyal	1940	British Steam Trawler of 196 tonnes that sank following a collision on 8th August 1940. In 1986 possible wreckage was reported by a local fishing skipper but was not identified during a subsequent survey.	363112	876535
2005			In 1986 possible wreckage reported by a local fishing skipper but was not subsequently located during a survey.	363257	876133
2006			In 1986 possible wreckage reported by a local fishing skipper but was not subsequently located during a survey.	361405	874263
2007	Ebenezer	1900	A 3-masted sailing barque, the Ebenezer was a Norwegian ship which was wrecked on Salt Rock off Whitehills enroute between Porsground and Grimsby.	366065	866244

WA No.	Name of vessel	Year of loss	Description	BNG Easting	BNG Northing
			The wreck is reportedly broken in halfwith the bow on the rocks, with the stern drifted to the west, which was not located in a 1977 survey. In 1982 a survey reported the vessel entirely broken up with elements of the wreckage in gullys around Salt Rock. The ship's bell was recovered (by BSAC). A further survey by HMS Bulldog in 1987 detected no wreckage and amended the wreck to 'DEAD' suggesting the wreck has no upstanding elements proud of the seabed.		
2008		1943	Unconfirmed report of aircraft lost off Whitehills on 14th June 1943.	365000	869000

Appendix III: Documented Casualties in the modified OfTI ASA

NMRS No.	Name of vessel	Description	BNG Easting	BNG Northing
NMRS_209358	Alpha: North Sea	Schooner (19th Century)	365000	866000
NMRS_329186	Unknown 1836	Schooner	365000	866000
NMRS_209387	Sappemeer: Knock Head, North Sea	Schooner (19th Century)	365800	866100
NMRS_262712	Jeune Harriet: North Sea	Lugger (19th Century)	360000	882000
NMRS_327054	Unknown 1836	Sloop	365000	866000
NMRS_208719	William Henry: Knock Head, North Sea	Schooner (19th Century)	365800	866100
NMRS_275499	Jane: Salt Rock, Knock Head, North Sea	Schooner (19th Century)	365900	866100
NMRS_327081	Unknown 1826	Craft (Possible)	366000	866000
NMRS_209506	Young Peter: Whitehills Harbour Entrance, North Sea	Ketch (19th Century)	365400	865700
NMRS_327709	Unknown 1745	Craft (Possible)	367000	867000
NMRS_311142	Leader: North Sea	Steam Drifter	366000	866000
NMRS_326931	Earl Of Clarendon	Schooner	365000	871000
NMRS_329485	Unknown 1853	Craft (Possible)	367000	867000

NMRS No.	Name of vessel	Description	BNG Easting	BNG Northing
NMRS_283926	Dunairn: Salt Rock, Knock Head, North Sea	Craft (19th Century)	365900	866100
NMRS_251592	Supply: Whitehills Harbour, North Sea	Lugger (19th Century)	365400	865700
NMRS_309602	Loch Loyal: North Sea	Steam Trawler (20th Century)	362980	878080
NMRS_227557	Charkow: North Sea	Steamship (20th Century)	361000	910000
NMRS_309277	Thurne: North Sea	Steam Drifter (20th Century)	360000	888000
NMRS_207853	Carisbrook: North Sea	Steamship (20th Century)	361400	912800
NMRS_222102	Telegram: North Sea	Smack (20th Century)	360000	901000

Appendix IV: Cultural Heritage Assets in the Intertidal Zone

WA No.	Name of asset	Link	BNG Easting	BNG Northing
OftI_1000	Whitehills Harbour, Lighthouse	http://canmore.rcahms.gov.uk/en/site/18435/	365470	865730
OftI_1001	Whitehills Harbour	http://canmore.rcahms.gov.uk/en/site/18434/	365561	865712
modified OfTI_1002	Knock Head, Harbour	http://canmore.rcahms.gov.uk/en/site/133063/	365960	865880

Appendix V: Known Geophysical Anomalies within modified OfTI cable corridor

EDA EIA Anomaly No.	Interpretation	UTM z30N Easting	UTM z30N Northing
HAID 40	Possible object/ possible natural feature, sidescan anomaly: dark and light reflector. Low archaeological potential	520255	6441619
HAID 42	Scar/gouge, sidescan anomaly: dark reflector. Low archaeological potential.	517981	6440666

Appendix VI: Gazetteer of Known Cultural Heritage Assets – modified OnTI ASA

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1000	Inchdrewar	Farmstead still in use. The 1867 1st edition OS map shows a C-shaped building with the court open to the north-east. Two outbuildings are marked at the north-east. The 1888 2nd edition shows that the buildings have been modified so the court is now…	Standard	365467	860579	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0144	NJ66SE0144
1001	Mains Of Inchdrewar	Farmstead still in use. The 1867 1st edition OS map shows an L-shaped building with two outbuildings and an enclosure to the south. A mill lade and pond are shown to the north-west. To the west of the farm are two small buildings within a triangula…	Standard	365566	861039	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0139	NJ66SE0139
1002	Inchdrewer Castle	Castle, built initially as an L-shaped tower house in the early 16th century (date of construction variously given as c.1500 and c.1542 by different sources). Built of rubble with tooled ashlar dressings. In the late 16th century a round tower contain…	A	365598	860714	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3049	3049
1003	Mains Of Inchdrewar	Site of a now destroyed Dove Cot shown only on the 1st edition OS map.	Standard	365633	860936	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0138	NJ66SE0138
1004	Easter Culbeuchly	Collection of flints; over 200 worked flints, 9 polished stone axes, 4 spindle whorls, a stone hammer and a Roman coin of Constans II (AD641-68, minted at Carthage) have been found by farmer.	Standard	365680	861505	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0004	NJ66SE0004

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1005	Mill Of Boyndie	Silver gilded 'fede' ring dating to the 14th-15th century. The bezel is in the form of clasped hands with incised panels either side forming a hoop. The hoop is joined at the back by quatrefoils which join to form a heart. Claimed as Treasure Trove (T...	Standard	365700	864100	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0113	NJ66SE0113
1006	Lower Inchdrewer	A probable unenclosed settlement is showing as crop marks in an arable field. Ring -ditches, souterrains and a faint trace of a circular enclosure are visible. There are also pits and other indeterminate marks.	Standard	365754	861249	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0105	NJ66SE0105
1007	Knock Thunder	An Auxiliary army secret hideout lay within an area of woodland, south of Hills of Boyndie. It consisted of two Anderson shelters of corrugated iron buried under the ground and linked with a series of large concrete drain pipes to form entrances and ...	Standard	365826	863206	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0126	NJ66SE0126
1008	Lower Inchdrewer	LOWER INCHDREWER	B	365833	861116	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3051	3051
1009	Birchwood	Enclosure; situated on rising ground to N of site of Buchragie House; the remains of an irregularly shaped enclosure formed by a large spread bank of earth and stones; S side has been destroyed by surface quarrying. This may be a garden associated wi...	Standard	365849	864532	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0095	NJ66SE0095
1010	Hills Of Boyndie,Barrows & Enclosures 700m SW Of Mill Of Boyndie	Cropmarks: At least 3 square barrows, one with a semi-circular internal feature; also cropmarks of c4-5 circular enclosures and ditches around the barrows. A circular feature also lies to NW.	Scheduled	365849	863654	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:05779	5779

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1011	Loch Of Fiskaidly	Remains of a farmstead depicted on the 1864 1st edition OS map. It shows two rectangular buildings and a an enclosure with a well. The same layout is shown on the OS 2nd edition map. The western building has since been removed,. The northern one appea...	Standard	365869	862846	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0118	NJ66SE0118
1012	Lower Inchdrewar	Mid 18th century farmhouse, and farmstead, still in use, depicted on OS 1st and 2nd edition maps. The 1st edition OS map shows an L-shaped building with a horse-mill attached at the north-east, an outbuilding to the south-east and a mill lade and pond...	Standard	365870	861092	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0140	NJ66SE0140
1013	Buchragie House	Site of House; during the 16th and 17thC Buchragie served as a dowerhouse for the Ogilvies of Boyne. The only evidence that a structure formerly occupied this site is a rectangular platform abutting onto the west side of a drystone dyke. A rectang...	Standard	365920	864389	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0076	NJ66SE0076
1014	Hills Of Boyndie	A ring ditch, showing as a thin trace, and other crop marks, are visible on an aerail photograph taken in 1988. They lie in a field to the south of one containing square barrows (NJ66SE0052), so they may represent an extension to the crop mark comple...	Standard	365946	863462	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0081	NJ66SE0081
1015	Hills Of Boyndie	A small, square feature, surrounded by two concentric circular traces, is visible on an aerial photogrpah taken in 1988. This probably represents a burial site of the later prehistoric period.	Standard	365980	863263	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0079	NJ66SE0079

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1016	Kirkhill	Site of circular enclosure; two circular encampments described by NSA. ONB describes only one of these as being 90 links in diameter; nothing known of second; area now disused quarry; no trace.	Standard	365990	864650	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0094	NJ66SE0094
1017	Inverboyndie	Silver and niello ring of late 12th century type, decorated with three panels of cruciform decoration separated by two fields of rectangular form. Claimed as Treasure Trove (TT86/03) and allocated to Aberdeenshire Heritage.	Standard	366010	864009	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0163	NJ66SE0163
1018	Coach Brae	An area of Rig and Furrow is visible on aerial photographs from 1976. The rigs run NW/SE.	Standard	366084	860344	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0147	NJ66SE0147
1019	Hills Of Boyndie	Square enclosures; cropmarks of two possible square enclosures (possibly barrows) with possible pits sightly to the north.	Standard	366100	863266	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0078	NJ66SE0078
1020	Easter Culbeuchly	A cinerary urn cemetery; found 1961 during removal of a natural mound for sand and gravel. Two urns were destroyed, three others in AUAM and a pygmy cup was retained by farmer. A few pieces of burnt bone were also found. Cropmarks of pits and a pos...	Standard	366116	861352	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0003	NJ66SE0003
1021	Lower Inchdrewer	Cist found; contained bones, ashes and urn. No trace of hillock now.	Standard	366150	861150	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0011	NJ66SE0011

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1022	Easter Culbeuchly	Urn cemetery. Several urns placed on a sort of stone bench supported by blocks of stones, some inverted and others with a flat stone on top, were found when a mound situated c.50yds north of the farm was being removed. No further information.	Standard	366160	861530	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0012	NJ66SE0012
1023	Slacks Lodge	Cropmarks of two possible ring-ditches are visible on aerial photographs from 1976.	Standard	366198	860137	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0145	NJ66SE0145
1024	Paddocklaw	Farmstead, in use, depicted on the 1st edition OS map of 1867 as an L-plan steading, open to the SE, with two rectangular buildings to the S and 1 to the E; a farmhouse is shown to the NW; mill dam, sluice and lade to S; and gravel pits are shown to t...	Standard	366217	861761	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0177	NJ66SE0177
1025	South Colleonard	A watching brief was carried out by MAS in April 2014 during topsoil stripping for a wind turbine base and access track. No archaeological features or artefacts were recorded.	Standard	366225	862792	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0240	NJ66SE0240
1026	Boyndie Cemetery	At least one ring ditch was recorded by aerial photography in 1996, with the faint trace of a possible second one.	Standard	366263	864604	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0104	NJ66SE0104
1027	Mill Of Boyndie	A small square building is depicted on the 1867 1st edition OS map, to the north of the Mill of Boyndie. On the 1888 edition it is noted as a dovecot. Now destroyed.	Standard	366300	864141	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0132	NJ66SE0132

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1028	Mill Of Boyndie	"Remains of a mill and lade that is depicted on the 1867 1st edition OS map. It shows an extensive range of buildings with a mill pond located to the west. Main house dated 1809 fronting 18th century single storey.	Standard	366332	864079	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0131	NJ66SE0131
1029	Tipperty	Cottage still in use. It is first shown on the 2nd edition OS map. It is depicted as two small buildings.	Standard	366343	860923	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0150	NJ66SE0150
1030	Tipperty	Cottage still in use. It is first shown on the 2nd edition OS map. It is depicted as two buildings within a rectangular enclosure.	Standard	366345	860839	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0149	NJ66SE0149
1031	Paddocklaw	Solid blobs and triangular-shaped cropmarks; indeterminate.	Standard	366378	861777	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0051	NJ66SE0051
1032	The Slacks/ Hill Of Alvah	Possible site of manor.	Standard	366441	859793	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0023	NJ65NE0023
1033	Cairnelpie	Site of cairn; when this cairn was removed the fragments of a human skeleton were found; traditionally thought to be the remains of a person murdered at the spot; now no trace.	Standard	366450	861360	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0009	NJ66SE0009
1034	Mill Of Boyndie Farmhouse	MILL OF BOYNDIE FARMHOUSE	B	366482	864094	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3242	3242

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1035	Hill Of Alvah, Cairns 1350m WSW Of Mill Of Alvah	A large grass-covered mound of earth and small stones sits in a impressive situation. The top of the mound is level and slightly hollowed. There are some medium-sized boulders visible in the turf on mound but the general make-up is of earth and smal...	Scheduled	366522	860176	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:11034	11034
1036	Tipperty	Farmstead still in use. On the 1st edition OS map it is shown as a U-shaped steading with the court open to the east. There is an extension to the south. Several smaller buildings are marked to the south. To the east there is a building within a p...	Standard	366529	860797	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0148	NJ66SE0148
1037	Arrdanes/Swordanes	Alleged site of battle between the Scots and the Danes; said to be when Indulf the Scottish King was slain, but more likely to be in reign of Malcolm II. 'Arrdanes' and 'Swordanes' are supposed to refer to the two separate divisions of the Danish arm...	Standard	366550	864680	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0014	NJ66SE0014
1038	Tipperty	Remains of a quarry which is shown on both the 1st and 2nd edition OS maps. It is still marked on the 2005 map.	Standard	366576	860993	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0151	NJ66SE0151
1039	South Colleonard With Urns, Gates And Gatepiers	SOUTH COLLEONARD	A	366635	862668	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:6662	6662
1040	Boyndie Old Kirk,Church 200m NW Of Boyndie Bridge	Remains of a church, built in the 17th Century possibly on the site of an earlier church. The W gable and vaulted basement remain, and there is a datestone inscribed 1723. It has a large round-arched doorway with chamfered voussoirs and segmental re...	Scheduled	366655	864512	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:05668	5668

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1041	Inverboyndie St Brandon's Church (Old Parish Church Of Scotland) And Burial Ground	BOYNDIE, OLD PARISH CHURCH	B	366656	864520	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3237	3237
1042	Boyndie Bay	Midden; situated on an elongated grass-covered dune/mound. During excavation at a depth of 1m a layer of dark coloured sand containing a quantity of shells, bone, pieces of charcoal, and fragments of burnt pottery, was found. Above this were 7-8 alt...	Standard	366680	864840	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0024	NJ66SE0024
1043	Banff Distillery	Distillery; an irregular group of buildings, mostly rubble with a circular section brick chimney. During WWII the distillery was bombed by a lone German plane on the 16th August 1941. One warehouse containing whisky was destroyed.	Standard	366732	864324	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0036	NJ66SE0036
1044	Gowanhill	Cropmarks; possible barrows and other cropmarks in area of set-aside; area pegged out and excluded from forestry scheme.	Standard	366793	863413	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0085	NJ66SE0085
1045	Tipperty	Cropmarks of a possible medieval settlement connected with the chapel and well of St Colm noted near this location are visible on aerial photographs taken in 1976. There are numerous small circular, square and rectangular features visible.	Standard	366819	860669	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0156	NJ66SE0156
1046	Inverboyndie Bridge Over The Burn Of Boyndie	BRIDGE OF BOYNDIE	B	366829	864424	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3236	3236

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1047	St Colm's Well	Well; this spring is now completely enclosed by a turf-covered, barrel-vaulted stone building; lies 150 yds S of site of Pre-Ref chapel of same name; water piped to a cattle trough, allegedly of the rate of 27 gallons a minute. It is supposed to have...	Standard	366901	860656	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0087	NJ66SE0087
1048	Inverboyndie, Jandar And Brandon View With Garden Walls	INVERBOYNDIE, 1 LINKS VIEW	C	366932	864429	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:3050	3050
1049	Gowanhill	Cropmark; possible barrow showing as a faint rectilinear trace; in set-aside land; area pegged out before tree planting in adjacent ground.	Standard	366935	863532	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0084	NJ66SE0084
1050	Cauldron Braes	An axe of pale grey flint, 'ground to a cutting edge', was found on Cauldron Braes. The exact find location is unknown.	Standard	367000	860000	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0013	NJ66SE0013
1051	Stirling Cairn, Cairn 750m SW Of Mill Of Alvah	Long cairn; orientated N/S; mound consists of earth and stones, now covered with turf and gorse; some large stones can be seen protruding from the side of the mound and two earthfast stones on the SW side may be part of a kerb.	Scheduled	367287	860162	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:11035	11035
1052	Berryhillocks	Two buildings and enclosures are depicted on the 1st edition OS map of 1867 at this location. They are still there in 1888 but nothing is depicted here on present maps.	Standard	368216	859753	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0039	NJ65NE0039

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1053	Berryton Cottage	Possible circular cropmarks; indeterminate.	Standard	368495	859520	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0027	NJ65NE0027
1054	Sandlaw	Remains of cairn; a slight, almost circular, grass-covered mound, although the ONB states that it had been completely ploughed away. There are quantities of stones in a patch of rough pasture to the N. Although the content of the mound cannot be as...	Standard	368827	859119	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0002	NJ65NE0002
1055	Sandlaw	A house and enclosure are depicted here in the 1st edition OS map of 1867. Nothing is visible now.	Standard	368855	860475	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0108	NJ66SE0108
1056	Sandlaw	Faint cropmark of ring ditches over two fields.	Standard	368901	859956	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0019	NJ65NE0019
1057	Mains Of Montcoffer	Site of a now destroyed large orchard that is depicted on the 1864 1st edition OS map.	Standard	369167	861197	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0121	NJ66SE0121
1058	South Sandlaw	There are cropmarks of possible hut stances showing as dark circular features in a field of cereal crop. There is also a possible pit-defined oval shaped enclosure and other scattered crop mark features and pits.	Standard	369232	859750	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0040	NJ65NE0040

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1059	Nether Inverichnie	Farmstead, depicted on the 1st edition OS map as a U-plan steading open to the SE, with two rectangular buildings to the E and one to the SW. On the 2nd edition map, the two buildings to the E have been extended to form a square steading with central ...	Standard	369407	860700	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0179	NJ66SE0179
1060	Inverichnie	Ring ditch; cropmark showing as a broad trace.	Standard	369658	861085	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0077	NJ66SE0077
1061	Inverichnie	Linear cropmarks.	Standard	369917	860394	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ66SE0083	NJ66SE0083
1062	Lower Wanford	Farmstead still in use. It is depicted on the first edition OS map of 1867 as a U-shaped steading open to the southwest with a horse-engine in the courtyard, and a small farmhouse in an enclosure to the west. By the second edition, the steading has be...	Standard	370042	861457	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0093	NJ76SW0093
1063	Eden House	Remains of an 18th-19th Century Designed Landscape.	Standard	370094	859677	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ65NE0082	NJ65NE0082
1064	Lower Wanford	Remains of a cottage depicted on the first edition OS map as a small rectangular building within an enclosed garden area. By the second edition a smaller second building has been added just to the southwest. Part of the original cottage may survive,...	Standard	370366	861156	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0095	NJ76SW0095

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1065	Lower Wanford	Site of a gravel pit depicted on the second edition OS map of 1888, but not on later editions.	Standard	370415	861220	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0094	NJ76SW0094
1066	Upper Wanford	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows a L-shaped building with what appears to be a lade running to it from a mill pond and dam. There are also two rectangular buildings, one small and one large. The far...	Standard	370493	861570	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0059	NJ76SW0059
1067	Wester Keilhill	Cropmarks of a possible circular enclosure with internal features are shown on aerial photographs from 1976. The northern half of the possible feature is covered by tree cover.	Standard	370767	860347	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0075	NJ76SW0075
1068	Denmill	Mill. A building, comprising two compartments, is depicted on the OS 1st edition map, and current OS maps also show a disused mill, although this does not appear on the 2nd edition. A photographic survey of the mill was carried out in 2012 prior to co...	Standard	370951	860388	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0106	NJ76SW0106
1069	Wester Keilhill	Farmstead still in use which is shown on the 2nd edition OS map of 1888. It is shown as an L-shaped building with an outbuilding to the north and one to the east. The 2005 map shows that these structures are still in use and have been modified.	Standard	371128	860288	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0074	NJ76SW0074
1070	Burnside Of Montbletton	Site of a now destroyed mill pond and dam system that is depicted on both the 1867 1st edition and the 1888 2nd edition OS maps. It is unclear where the lade ran from these ponds but it may have fed the mill at Denmill to the NW.	Standard	371281	860328	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0064	NJ76SW0064

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1071	Keilhill Cottage	Cottage still in use which is shown on the 2nd edition OS map as a small rectangular structure. The 2005 map shows that it has been modified.	Standard	371562	859878	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0072	NJ75NW0072
1072	Over Foulzie	Cropmarks of three dark irregular blobs which are probably infilled quarry pits and a possible small ring-ditch to the east of the blobs, are visible on vertical aerial photographs taken in 1976.	Standard	371668	859449	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0069	NJ75NW0069
1073	Hill Of Foulzie	Site of findspot of 54 pieces of worked chert; found scattered across the hillside during fieldwalking undertaken in the winter of 2002-3. Within this general area an apparently discrete, roughly oval spread, measuring circa 10m x 13m, was identified...	Standard	371772	859575	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0058	NJ75NW0058
1074	Foulzie	Farmstead still in use. On the 1st edition OS map it is shown as a collection of a long rectangular building, a lengthy L-shaped building, two smaller buildings and a pond with a sluice. By the 2nd edition OS map the buildings have been modified into...	Standard	371846	859859	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0071	NJ75NW0071
1075	Hill Of Foulzie	Site of findspot of chert; fieldwalking undertaken to the south of the standing stone in the boundary during early 2003 recovered just under 30 pieces of worked chert. These were similar to those recovered at NJ75NW0056.	Standard	371894	859607	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0057	NJ75NW0057

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1076	Hill Of Foulzie	Site of findspot of over 700 pieces of chert; lithic scatter; geophysical survey evidence of rig and furrow. The ground immediately to the north of a standing stone situated on the boundary between the farms of Nether and Over Foulzie, was investigat...	Standard	371899	859662	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0056	NJ75NW0056
1077	Over Foulzie	Farmstead still in use. On the 1st edition OS map it is shown as two rectangular buildings at right angles to each other and a smaller building within an enclosure to the east. To the south is a mill-pond with sluice and a small rectangular building,...	Standard	371952	859342	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0068	NJ75NW0068
1078	Hill Of Foulzie	Site of a Mesolithic flint knapping site covering approx. 50m x 30m. Over two hundred flints including scrapers and cores have been recovered from the surface. There are also several large stones and one piece of burnt orange daub from here that may i...	Standard	371972	859502	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0032	NJ75NW0032
1079	Over Foulzie	Boundary stone; depicted on the 2nd edition OS map and is still marked on the 2005 map.	Standard	372004	859577	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0070	NJ75NW0070
1080	Backhill Of Foulzie	Site of findspot of a flint scatter; this low lying field was fieldwalked in March 2003 when a circa 200m x 75m lithic spread was identified. Approximately 300 lithic finds were recovered with chert pebbles, waste, cores, borers and scapers being pre...	Standard	372091	860250	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ76SW0057	NJ76SW0057
1081	Hill Of Foulzie	Site of findspot of chert; a sparse scatter of 12 worked pieces of chert and a fragment of burnt daub were found during fieldwalking in March 2003.	Standard	372207	859362	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0059	NJ75NW0059

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1082	Wood Of Balchers	Remains of rig and furrow; various areas of rig and furrow survive within the wood recorded by the Forestry Commission. NJ7268 5885 - a series of poorly defined rigs running approximately N-S. NJ 72685885 to NJ 72325842 - rigs running c.NW-SE, roughly...	Standard	372223	858613	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0080	NJ75NW0080
1083	Hill Of Foulzie	Remains of a quarry. On the 1st edition OS map two small quarry pits are shown on the north-west of the summit of the Hill of Foulzie. By the 2nd edition OS map the southernmost has been expanded and the northern of the two is not shown. The quarry...	Standard	372352	859696	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0073	NJ75NW0073
1084	White Cottage	Site of findspot of four pieces of chert; found during fieldwalking in 2003. Included are a delicate point and part of a finely worked leaf-shaped arrowhead similar to the one found further down the hill at NJ 717 595.	Standard	372386	859621	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0055	NJ75NW0055
1085	Hill Of Foulzie	Site of findspot of a lithic scatter. This area was walked twice in 2003, but nothing of archaeological interest was encountered. During the 2004-2005 field walking seasons, 302 pieces of worked chert/flint have been found, including points, scraper...	Standard	372456	859556	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0079	NJ75NW0079
1086	White Cottage	Boundary stone still standing that is depicted on the 1888 2nd edition OS map but not on the 1867 1st edition.	Standard	372537	859602	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0060	NJ75NW0060

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1087	Milltrack	Farmstead of Milltrack; depicted on the OS map of 1867 as several buildings including an L-shaped building, a single range, the two almost forming a U-shaped steading with open court to the east. A probable house with garden lies to the west. South ...	Standard	373453	857422	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0051	NJ75NW0051
1088	Bridge Of Fortrie	Site of a small building, with two attached enclosures; depicted on the OS map of 1867 to the west of Bridge of Fortrie. By the 1888 edition it had been removed. It is unknown if anything survives.	Standard	373527	858858	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0047	NJ75NW0047
1089	Bridgend Quarry	A walkover survey was carried out in June 2012 over the site of a proposed quarry extension. The three fields were under crop, but fieldwalking along the agricultural tram lines recorded no archaeological features or artefacts.	Standard	373723	856888	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0081	NJ75NW0081
1090	Fortrie	Farmstead of Fortrie; depicted on the OS map of 1867 as a U-shaped steading with open court to the south. Two other smaller buildings, one a house, lie to the south. A mill pond lies to the north of the farm. By the 1888 edition a second long range...	Standard	373746	859004	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0048	NJ75NW0048
1091	Lintmill	Site of a mill and farmstead; depicted on both the 1867 1st edition and the 1888 2nd edition OS maps. To the northwest is an associated rectangular building that was probably the mill, with a lade running to it from a weir in the east. To the SE of ...	Standard	373783	856654	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0066	NJ75NW0066

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1092	Gowanlea	Site of a now destroyed farmstead that is depicted on the 1867 1st edition OS map. It shows two rectangular buildings arranged on an L-plan with an attached enclosure. By the time of the 2nd edition map the two buildings had been joined.	Standard	373819	857451	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0033	NJ75NW0033
1093	Gowanies	Site of a boundary stone depicted on the 1888 1st edition OS map.	Standard	373964	857424	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0034	NJ75NW0034
1094	Cowesmill	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows a L-shaped steading, four rectangular buildings, a large pond and a tree-lined garden. The same layout is shown on the 1888 2nd edition map. The pond is just show...	Standard	374080	856503	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0067	NJ75NW0067
1095	Gowanlea	Site of a now destroyed boundary stone that is depicted on the 1888 1st edition OS map but not on the earlier 1867 edition.	Standard	374088	857375	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0036	NJ75NW0036
1096	Gowanlea	Boundary stone still in use; first depicted on the 1888 1st edition OS map.	Standard	374089	857427	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0035	NJ75NW0035
1097	Wood Of Gairnieston	Site of a building, with attached garden enclosure on the south side; depicted on the OS map of 1867. By the 1888 edition a second building has been added. Nothing is now visible at this location.	Standard	374355	855889	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0053	NJ75NW0053

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1098	Mill Of Balmaud	Mill of Balmaud; depicted as a complex of at least eight buildings on the OS map of 1867 and 1888. A mill pond and lade lie to the east. Only a few of the original buildings now stand along with a number of later additions. The lade appears to surv...	Standard	374507	856807	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0050	NJ75NW0050
1099	Gairnieston	Farmstead still in use. On the 1st edition OS map (c.1867) it is called 'Midtown' and is shown as a small L-shaped building, probably the farmhouse, with a larger C-shaped building and a long L-shaped building to the north. To the north-west of the l...	Standard	374842	855379	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NW0077	NJ75NW0077
1100	St John's Well	Site of well; associated with chapel of name NJ75SE0008; no trace and name not known locally.	Standard	375305	854330	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0009	NJ75SE0009
1101	Yonderton	Farmstead still in use. On the 1st edition OS map (c.1867) it is shown as a large L-shaped building with four smaller buildings to the south and a separate building to the south-east. To the immediate east is a pond and a second pond with sluice is ...	Standard	375485	855346	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75NE0060	NJ75NE0060
1102	Hatton Castle	A well-wooded 18th to 19th-century designed landscape centred on HATTON Castle. Developed from an older, late medieval estate, the policies feature sinuous entrance drives, lakes, estate buildings, a mausoleum and a distinctive walled garden.	Inventory Garden And Designed Landscape	375623	846755	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2400:15:0::::GARDEN:GDL00399	GDL00399
1103	Slap	Site of cists; found when sand digging a natural hillock; worked flints found in one and an adult skeleton and undecorated beaker found in other. Beaker is SP Step 1 N/NR (undecorated).	Standard	375700	854500	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0001	NJ75SE0001

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1104	St John's Chapel	Site of church/chapel dedicated to St John. No further information.	Standard	375700	854516	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0008	NJ75SE0008
1105	Fintry Farmhouse	Farmhouse built in the late 18th century. The original house 2-storey, L-plan. The SW arm extended later to give 5-window SE frontage. 2-window SW gable. Ashlar chimneys with copes. Basement milk-house. There is a railed walled garden.	B	375726	854559	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16420	16420
1106	Craigston Castle	Cropmarks; features are visible in a field of cereal crop on a vertical aerial photograph. There is at least one ring ditch, though as there are a number of faint arcs, this could suggest others being in the area though not showing so clearly. There...	Standard	376136	854652	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0006	NJ75SE0006
1107	Hill Of Brackans	Site of findspot of a cinerary urn; found in the vicinity of the Hill of Brackans. No further information.	Standard	376398	853300	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0042	NJ75SE0042
1108	Fyvie Castle	An intact designed landscape of parks, woods and a long artificial loch, developed in the later 18th century to provide new pleasure grounds for the much older Fyvie Castle	Inventory Garden And Designed Landscape	376531	839282	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2400:15:0::::GARDEN:GDL00184	GDL00184
1109	Hill Of Brackans	Site of a now destroyed WWII Royal Observer Corps Post. The site is now occupied by a covered reservoir.	Standard	376554	853355	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0018	NJ75SE0018

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1110	Fyvie	The battle of Fyvie was fought in October 1644 between the 1st Marquis of Montrose and the Covenanter army of the Marquis of Argyll. The two armies met at Fyvie Castle in Aberdeenshire, where Montrose was entrenched on high ground above the castle. Argyl	Inventory Battlefield	377082	839012	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2500:15:0::::BATTLEFIELD:fyvie	BF22
1111	Hill Of Cotburn	Site of two buildings and a well are depicted on the OS map of 1867 at this location. By the 1888 edition both had gone. Now only the well survives.	Standard	377159	853653	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0031	NJ75SE0031
1112	Hill Of Cotburn	Remains of a farmstead; depicted on the OS map of 1867 as L-shaped with an extension to the north on the eastern side, and another to the east at the north end, with an open court in the centre. By the 1888 edition only the northern part of the origi...	Standard	377445	853664	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0030	NJ75SE0030
1113	Tifty, Waterwheelhouse.	MILL OF TIFTY, WATERWHEEL	C	377595	840781	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:13720	13720
1114	Cairnhill Wind Cluster	A watching brief was carried out by MAS in November 2008 over the excavation of the footprints of three turbines to be erected. The soil strip was carried out without the presence of the archaeologist, but a thorough walkover of each site was underta...	Standard	377733	852894	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0064	NJ75SE0064

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1115	Mhor Cairn, Cairnhill	Site of cairn; evidently a chambered tomb with Clava affinities. It was described by ONB as a heap of stones, but by Anderson as a prehistoric cairn outlined by a ring of stones enclosing a circular area, the whole embedded in an elongated clearance ...	Standard	378401	852260	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0003	NJ75SE0003
1116	Woodend	Site of a small farmstead depicted on the 1st edition OS map but is no longer visible. It shows two rectangular buildings, one with a small attached enclosure on its NW side, and a separate enclosure to the SW. By the time of the 2nd edition map the...	Standard	378816	849570	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ74NE0023	NJ74NE0023
1117	Castle Of Auchry	Boundary stone; standing beside a track c200m north-east of Castle of Auchry Farm.	Standard	378985	850799	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0024	NJ75SE0024
1118	Castle Of Auchry	Boundary stone; standing to the north-east of Castle of Auchry Farm on the west side of the Aultan Burn.	Standard	379076	850762	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0025	NJ75SE0025
1119	Castlehill	Possible site of a motte.	Standard	379100	849100	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ74NE0011	NJ74NE0011
1120	North Everton	Remains of a threshing mill, pond and lade that are depicted on the 1st and 2nd edition OS maps. Only the N end of the mill building appears to survive today.	Standard	379173	852532	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0037	NJ75SE0037
1121	Manse (Formerly Woodhead Manse).	WOODHEAD, MANSEWOOD	C	379306	838555	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:9626	9626

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1122	Waterside	Site of a now destroyed Saw and Threshing Mill and mill-pond with sluice which are shown on the 1st edition OS map. By the 2nd edition map only the mill building is shown. None of these features is shown on the 2005 map.	Standard	379425	850531	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0050	NJ75SE0050
1123	Teuchar	Site of a now destroyed farmstead shown only on the 1st edition OS map. It is shown as a narrow U-shaped building with the court open to the east. A horse-mill is shown attached to the north, there are enclosures to the west and south, and a possibl...	Standard	379427	850200	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0052	NJ75SE0052
1124	Waterside	Farmstead still in use. On the 1st edition OS map the farmstead is represented by two buildings to the west of the track. By the 2nd edition OS map there are additional shallow C-shaped building to the east of the track. The 2005 map shows that thi...	Standard	379449	850476	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ75SE0051	NJ75SE0051
1125	Auchry House, Lodge.	AUCHRY LODGE	B	379702	850781	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16111	16111
1126	Quarry Croft	Site of a now destroyed croft that is depicted on the 1867 1st edition OS map but not on the 1888 2nd edition one. The map shows a rectangular building, a roofless rectangular building and possibly the remains of two other buildings. Two rectangular...	Standard	379778	847942	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ74NE0041	NJ74NE0041

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1127	Roadside	Site of a now destroyed farmstead that is depicted on the 1867 1st edition OS map. It shows a large L-shaped building with attached enclosure to the south, two small square buildings and rectangular building that may be the farmhouse. Only the west ...	Standard	379782	848374	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ74NE0026	NJ74NE0026
1128	South Teuchar	Site of a now destroyed rectangular building, probably a cottage, that is depicted on the 1867 1st edition OS map. It also shows two attached enclosures.	Standard	379927	849551	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ74NE0025	NJ74NE0025
1129	Rowan Croft	Remains of a farmstead that is depicted on the 1867 1st edition OS and 1888 2nd edition maps. Both show a long rectangular building with a square enclosure, the remains of which can still be seen as grass covered footings.	Standard	380046	847976	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0024	NJ84NW0024
1130	Roadside	Site of a now destroyed farmstead that is depicted on the 1867 1st edition OS map and 1888 2nd edition sheet. They show two rectangular buildings with two enclosures to the south. The site is now under cultivation.	Standard	380062	848379	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0025	NJ84NW0025
1131	Manse Of Monquhitter, Cuminestown Including Garden Walls.	MONQUHITTER MANSE	B	380112	850465	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16107	16107
1132	Monument To William Cumine (Gulielmi Coming') Of Auchry Monquhitter Churchyard.	MONAUHITTER CHURCHYARD, WILLIAM CUMINE OF AUCHRY MONUMENT	B	380200	850500	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16123	16123

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1133	Monquhitter Parish Church, Cuminestown	CUMINESTOWN, MONQUHITTER PARISH CHURCH	B	380238	850523	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16122	16122
1134	Monquhitter Churchyard	MONQUHITTER PARISH CHURCH, CHURCH YARD	C	380309	850526	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16106	16106
1135	Waggle Hill	Remains of a croft that is depicted on the 1867 1st edition OS map. It shows a rectangular building and two rectangular enclosures that are joined to one another.	Standard	380387	847115	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0035	NJ84NW0035
1136	Fetterletter, Twin Circular Structures N.W. Of Farmhouse	FETTERLETTER, TWIN CIRCULAR STRUCTURES	C	380395	838945	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:9627	9627
1137	Waggle Hill	Site of a now destroyed croft that is shown on the 1867 1st edition OS map. It depicts a long rectangular building and a subrectangular enclosure to the east.	Standard	380526	847211	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0034	NJ84NW0034
1138	Waggle Hill	Site of a now destroyed small rectangular building that is depicted on the 1867 1st edition OS map.	Standard	380573	847408	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0033	NJ84NW0033
1139	Waggle Hill	Site of a farmstead which is depicted on the 1867 1st edition OS map as having an L-shaped range of buildings with adjoining square enclosure and a separate building to the SE, presumably the farmhouse itself. Parts of these structures appear on the 2...	Standard	380800	846871	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0009	NJ84NW0009

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1140	Moss Of Blackpool	Remains of a mound with a possible ditch is visible on an aerial photograph.	Standard	381020	843940	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0045	NJ84SW0045
1141	Moss Of Blackpool	Remains of an area of former peat workings; visible on an aerial photograph.	Standard	381046	844025	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0043	NJ84SW0043
1142	Upper Greenfield	Farmstead still in use. The 1st edition OS map of 1867 shows an L-shaped building with an enclosure to the east. By the 1888 map, the enclosure is not shown and the building has been modified into a C-shaped building with the court open to the south. ...	Standard	381077	847335	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0042	NJ84NW0042
1143	Little Millbrex	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows a U-shaped steading which is unchanged on the 1888 2nd edition map. Part of the steading has since been removed, and another building added to the SW.	Standard	381090	844123	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0041	NJ84SW0041
1144	Northburnhill	Farmstead still in use. The 1867 1st edition OS map shows two buildings plus an enclosure to the south. By the 1888 2nd edition these buildings have been combined into a Ushaped steading building with the court open to the east. A further building lie...	Standard	381113	847809	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0041	NJ84NW0041
1145	Millbrex	Croft still in use which is shown on the OS maps from the 1st edition map onwards. On the 1st edition map it is depicted as a Z-shaped range of buildings with two smaller buildings with a square enclosure to the west. By the 2nd edition map the two sm...	Standard	381131	844512	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0071	NJ84SW0071

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1146	Little Millbrex	Site of a now destroyed croft shown on both the 1st and 2nd edition OS maps. On the 1st edition OS map it is depicted as a rectangular building within a rectangular enclosure. By the 2nd edition map only the building is shown.	Standard	381140	843572	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0063	NJ84SW0063
1147	Millbrex	Site of a cottage which is shown only on the 1st edition OS map. It is depicted as a small rectangular building within a rectangular enclosure.	Standard	381227	844312	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0072	NJ84SW0072
1148	Millbrex	Remains of a croft that is depicted on the 1867 1st edition OS map. The map shows three rectangular buildings. By the 1888 2nd edition map two of the buildings have merged to become a L-shaped building and the other rectangular building has gone.	Standard	381233	844453	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0036	NJ84SW0036
1149	Millbrex	Remains of a croft that is depicted on the 1867 1st edition OS map. The map shows four rectangular buildings and a rectangular garden. By the 1888 2nd edition map just three buildings remain, one of which is roofless.	Standard	381328	844390	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0037	NJ84SW0037
1150	Meadowside	Site of a now destroyed mill and lade that is depicted on the 1867 1st edition OS map. It shows a single rectangular building and a threshing mill.	Standard	381380	846279	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0030	NJ84NW0030
1151	Little Millbrex	Farmstead still in use which is shown on the OS maps from the 1st edition map onwards. On the 1st edition map it is depicted as an L-shaped building, with horsemill attached to the west front, two smaller buildings to the east and a rectangular garden...	Standard	381383	844095	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0073	NJ84SW0073

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1152	Little Millbrex	Farmstead still in use. On the 1st edition OS map it is depicted as a H-shaped steading, with mill-pond with sluice to its north and an irregular enclosure and a compact L-shaped building to the east. By the 2nd edition OS map the mill-pond has a mill...	Standard	381423	843475	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0062	NJ84SW0062
1153	Middletack	Remains of a farmstead which is depicted on the 1867 1st edition OS map. The map shows the farmstead as consisting of a single rectangular building with an attached square enclosure and a well to the east. They also appear on the 2nd edition OS map, w...	Standard	381515	846685	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0010	NJ84NW0010
1154	Ladyswell	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows a U-shaped steading with a probable attached horsemill on its west side. The 1888 2nd edition map shows the same layout but the horsemill is no longer shown. Further...	Standard	381541	844220	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0038	NJ84SW0038
1155	Moss Of Blackpool	Site of a croft. On the 1st edition OS map it is depicted as an L-shaped building with an irregular enclosure and draw well. On the 2nd edition map the building and enclosure are shown in a modified condition.	Standard	381560	843932	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0065	NJ84SW0065
1156	Moss Of Blackpool	Remains of an area of former peat workings; visible on an aerial photograph.	Standard	381582	844064	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0042	NJ84SW0042
1157	Ladyswell	Remains of a croft that is depicted on the 1867 1st edition OS map as being L-shaped with a rectangular enclosure. By the 1888 2nd edition map the building is only rectangular in shape, with a smaller enclosure.	Standard	381687	844241	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0039	NJ84SW0039

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1158	Kirkton Of Millbrex	Site of a now destroyed stone, probably a rubbing stone, which is shown only on the 1st edition OS map.	Standard	381867	843226	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0061	NJ84SW0061
1159	Millbrex	Site of findspot of two flint arrowheads; no further information.	Standard	382000	843000	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0013	NJ84SW0013
1160	Millbrex War Memorial	Millbrex war memorial stands in the grounds of the churchyard. It has a central rectangular block with the inscriptions on the front and sides, at the corner of which are four small circular columns standing on larger circular plinths. This supports a...	Standard	382090	843182	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0022	NJ84SW0022
1161	Millbrex Church	The church is rectangular on plan and built largely of coursed granite rubble, apart from the west front, which is of red sandstone ashlar. The window surrounds in the other elevations are of ashlar sandstone too. The large double-pitch roof is slated...	Standard	382101	843183	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0018	NJ84SW0018
1162	Millbrex Church	MILLBREX CHURCH	B	382102	843208	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:9629	9629
1163	Moss Of Swanford	Site of a now destroyed croft that is depicted on the 1867 1st edition OS map. The map shows three rectangular buildings, one of which is roofless. By the 1888 2nd edition map only one rectangular building remains.	Standard	382234	844545	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0040	NJ84SW0040

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1164	Gight Castle, Dovecot 200m WNW Of		Scheduled	382451	839302	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:08229	8229
1165	Parkhill	This site is a confusion with one of the two beaker sites from Parkhill, Newmachar NJ81SE0010 which was discovered in 1867 (IAGS 9/81).	Standard	382551	846159	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0001	NJ84NW0001
1166	Blue Cairn	Site of a cairn; removed c1856 for road materials. No finds were noted when site was dug over to a 30cm depth. However, a very slight crop mark is visible at this location on a vertical aerial photograph taken in 1977, which could indicate that some ...	Standard	382580	844100	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0004	NJ84SW0004
1167	Gight Castle	GIGHT CASTLE	B	382648	839204	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:9628	9628
1168	Gight Castle	Ruin. Circa 1513-70. Rubble-built L-plan tower-house with ribbed groin-vaulted vestibule. Complex wall chambers. Badly ruined, nothing survives above 1st floor. L-plan outbuildings of later date fairly complete though roofless, 2-storey, S. part stable	Scheduled	382708	839170	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:02508	2508
1169	South Millbrex	Site of a now destroyed croft that is depicted on the 1867 1st edition OS map. The map shows a rectangular building and a U-shaped steading with an attached horse gang. By the 1888 2nd edition map just two adjoining rectangular buildings are shown wit...	Standard	382750	843379	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0070	NJ84SW0070

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1170	Burnside	Site of cairn; removed c1856 for road material; lay ESE of NJ84SW0004. The site was cultivated to a depth of 30cm but no finds made.	Standard	382930	844000	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0005	NJ84SW0005
1171	South Faddonhill	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows three rectangular buildings, a U-shaped steading, a large pond and a rectangular enclosure or a roofless building. By the 1888 2nd edition map the roofless building ...	Standard	383012	842726	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0069	NJ84SW0069
1172	Faddon Hill	Site of a now destroyed croft that is depicted on the 1867 1st edition OS map. The map shows two rectangular buildings and a rectangular enclosure. By the 1888 2nd edition map only one building and the enclosure remain.	Standard	383264	843690	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0067	NJ84SW0067
1173	North Faddonhill	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows three enclosures, four rectangular buildings 'one with a possible attached horsemill' and a L-shaped building. By the 1888 2nd edition map this has changed to three...	Standard	383356	843272	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0068	NJ84SW0068
1174	Hillhead Of Asleid	Site of a farmstead; depicted at this position on the OS map of 1867 as a Z-shaped building with a small square building to the east and west sides. By 1888 it is shown as a ruin. The site is now under cultivation.	Standard	383384	845163	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0019	NJ84NW0019
1175	Netherton Of Greens	Remains of a small farmstead is depicted on the OS map of 1867 and 1888. They show a long L-shaped building, with an attached enclosure on the west side. Some features still remain.	Standard	383387	845799	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0017	NJ84NW0017

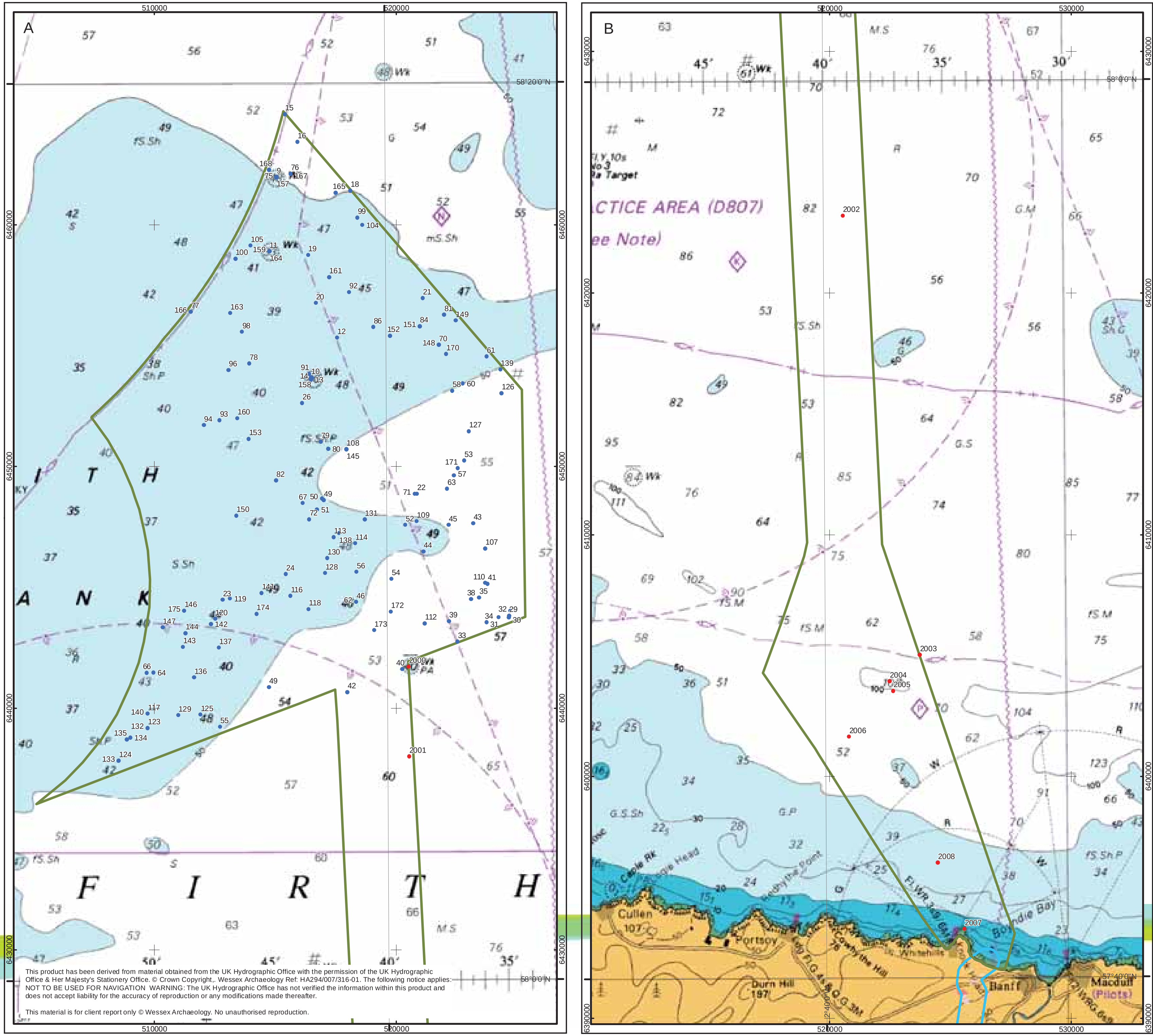
WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1176	Abbotshaugh	Site of the farmstead of Abbotshaugh; originally stood to the east at this grid reference. It is depicted on the OS map of 1867 as being a U-shaped structure. By 1888 only the northern part remained with an attached enclosure. A modern bungalow now st...	Standard	383803	845656	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84NW0018	NJ84NW0018
1177	Balthangie Cottage.	BALTHANGIE COTTAGE	C	384053	850981	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16109	16109
1178	Cairnbanno	Remains of a rectangular building that is depicted on both the 1867 1st edition and the 1888 2nd edition OS maps.	Standard	384490	844098	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0032	NJ84SW0032
1179	Cairnbanno	Site of manor; a charter of c1211 from Fergus, Earl of Buchan mentions 'the manor of Cairnbanno'.	Standard	384500	844800	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0020	NJ84SW0020
1180	Cairnbanno	Farmstead still in use that is depicted on the 1867 1st edition OS map. The map shows a L-shaped farmhouse and a U-shaped steading with a rectangular extension to the rear. By the 1888 2nd edition map a further two rectangular buildings have been adde...	Standard	384678	844290	http://www.aberdeenshire.gov.uk/smrpub/shire/detail.aspx?refno=NJ84SW0031	NJ84SW0031
1181	Cairnbanno House (Now Farmhouse).	CAIRNBANNO HOUSE	B	384718	844284	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16160	16160
1182	Little Ardo Farmhouse, S. Section Only	LITTLE ARDO	C	385539	838627	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16466	16466

WA ID	Name	Description	Status	BNG Easting	BNG Northing	Link	Source ID
1183	Hill Of Culsh (Dingwall Fordyce) Monument.	HILL OF CULSH, DINGWALL FORDYCE MONUMENT	B	388109	848299	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16156	16156
1184	North Mains Of Auchmaliddie, Stone Circle 500m SW Of	The site of this recumbent stone circle falls on the summit of a hill, where two stones of white quartzite now lie prone beside a trackway running along the SE boundary of a field; these almost certainly represent the recumbent and its W flanker.	Scheduled	388155	844859	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2300:35:::::P35_SELECTED_MONUMENT:09392	9392
1185	God's Acre (Churchyard Of Deer).	NEW DEER, CHURCHYARD OF DEER	C	388591	846869	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16153	16153
1186	New Deer Parish Church (St Kane)	NEW DEER PARISH CHURCH	B	388605	846931	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16152	16152
1187	10, 11 Gladstone Terrace, New Deer.	NEW DEER, 10-11 GLADSTONE TERRACE	C	388684	846861	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16155	16155
1188	St. Kane's Manse Sundial.	NEW DEER, ST KANE'S MANSE, SUNDIAL	C	388710	846907	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16154	16154
1189	Mill Of Auchreddie.	MILL OF AUCHREDDIE	C	389130	846929	http://data.historic-scotland.gov.uk/pls/htmldb/f?p=2200:15:0::::BUILDING:16157	16157

Appendix VII: Photographic Register – modified OnTI ASA

Photo ID	Description	Easting	Northing	Facing
1078	View along centre of corridor	382983	843921	NW
1079-1080	View along centre of corridor	382343	845456	NW
1081	View along centre of corridor	381318	846731	SE
1082-1083	View along centre of corridor	381318	846753	NW
1073	View from edge of GDL to substation location	377215	840706	NE
1074	View from edge of GDL to substation location	377215	840706	NE
1075	View from edge of GDL to substation location	377215	840706	NE
1070	View from battlefield to substation location	377677	839759	NE
1071	View from battlefield to substation location	377676	839767	NE
1067	View of Dovecot	382467	839316	W
1072	View from battlefield to substation location	377676	839767	NE
1068	View from Dovecot to substation location	382467	839316	N
1069	View from Dovecot to substation location	382473	839322	NE
1064	Gight Castle	382820	839195	W
1065	View from castle to substation location	382766	839251	NE
1066	Gight Castle	382628	839257	S
1055	View from monument to substation location	388155	844821	W
1056	View from monument to substation location	388166	844820	W
1057	View from monument to substation location	388147	844830	NW
1058	View from monument to substation location	388179	844834	W
1059	View from monument to substation location	388167	844832	NW
1060	View from monument	388141	844819	N
1061	View from monument	388141	844819	N
1062	View from monument	388136	844830	NE
1063	View from monument	388153	844808	NE
1076	View from GDL to substation	375686	845573	SE
1077	View from GDL to substation	375686	845573	SE
1084	View along centre of corridor	380622	847669	SE
1085	View along centre of corridor	379815	848824	SE
1086	View along centre of corridor	379826	848803	NW
1087	View along centre of corridor	378738	850526	NW
1088	View along centre of corridor	378744	850514	SE
1089	View along centre of corridor	376982	852966	NW
1090	View along centre of corridor	376998	852964	SE
1091	View along centre of corridor	375899	854501	NW
1092	View along centre of corridor	375899	854501	NW
1093	View along centre of corridor	374886	856052	SE
1095	View along centre of corridor	374270	856721	NW
1094	View along centre of corridor	374275	856692	SE
1096	View along centre of corridor	373760	857305	NW
1097	View along centre of corridor	373773	857287	SE
1098	View along centre of corridor	366313	862149	
1099-1100	View along centre of corridor	366301	862108	E

Photo ID	Description	Easting	Northing	Facing
1101	View of church	366638	864534	E
1102-1110	Panarama from church running NW through to East	366668	864540	NW-E
1111	View of church	366674	864526	S
1112	View along centre of corridor	366874	864452	NE
1113	View along centre of corridor	366857	864427	SW
1114	View along beach	367305	864673	W
1115	View along beach - pipe outlet	366733	864931	SE
1116	View along beach	366781	864895	N
1117	View along centre of corridor	365085	862596	SE
1118	View along centre of corridor	364987	862403	NW
1119	View along centre of corridor	365013	862389	E
1120	View along centre of corridor	364245	862599	SE
1121	View along centre of corridor	364211	862603	NW
1122	View of airfield	361727	863331	NE
1123	View along centre of corridor	360107	864395	SE
1124	View along centre of corridor	358830	864343	NW
1125	View along centre of corridor	358808	864354	SE
1126-30	Portsoy Harbour	359108	866454	Var
1131-34	Panorama NW to N	357062	864980	Var
1135-39	Panorama S-SE	357335	865111	Var
1140	View along centre of corridor	357299	865129	NW
1141-43	Panorama SW - NW	356471	865342	Var
1144-1150	Panorama NE - SE	356504	865388	Var
1151	View of anti-tank blocks on beach	355584	866237	SE
1152	View of anti-tank blocks on beach	355619	866214	NW
1153 - 55	View of anti-tank blocks on beach	355667	866194	E
1156-69	Panarama 360 from beach	355790	866154	Var
1170	Pillboxes	355967	866084	SE
1171	View of beach from pillbox	356067	866056	W
1175	View of beach from pillbox	356098	866046	W
1172-74	View of beach from pillbox	356098	866073	W
1176 - 88	View from headland - panarama	356081	866068	Var
1189	View of Sandend windmill	356081	866041	S
1190	Pillbox in village	355519	866434	W
1221-24	Panarama 360	367346	859598	Var
1225-1247	Panarama 360	368811	859782	Var
1248-62	Panarama 360	370307	861236	Var
1191-1220	Sandend Harbour	355557	866511	Var



edp renewables
REPSOL

Moray Offshore Renewables Ltd

KEY

- Documented wrecks
- Identified geophysical anomalies (MORL 2012)
- Modified OfTI ASA
- Modified OnTI ASA

Horizontal Scale: 1:150,000 A3 Chart

0 2,500 5,000 Meters

Geodetic Parameters: British National Grid

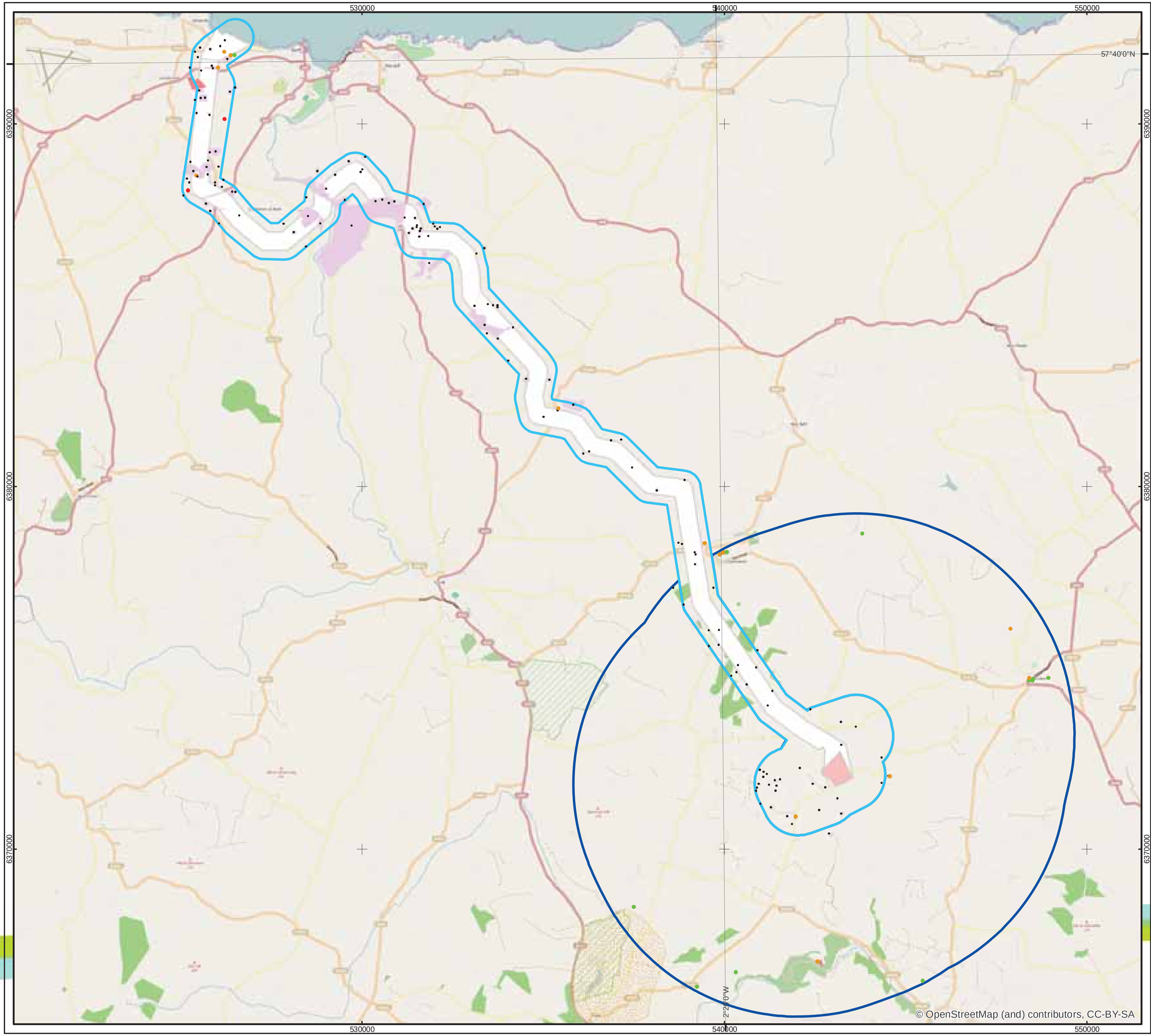
Produced: KMN
Reviewed: ES
Approved: AH

Date: 20/06/2014 Revision: A

REF: 8460001-PSO0061-WES-MAP-001

Figure 1: Site location and known Cultural Heritage Assets – OfTI ASA

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Listed Building

- A-listed structure
- B-listed structure
- C-listed structure
- Undesignated cultural heritage asset
- Modified OnTI ASA
- Additional 5km buffer
- Substation Area
- Onshore Export Cable Corridor
- Battlefields
- Gardens/Designed Landscapes
- Scheduled Monuments
- HER

Horizontal Scale: 1:100,000 A3 Chart

0 2,500 5,000 Meters

Geodetic Parameters: British National Grid

Produced: KMN
Reviewed: ES
Approved: AH

Date: 20/06/2014 | Revision: A

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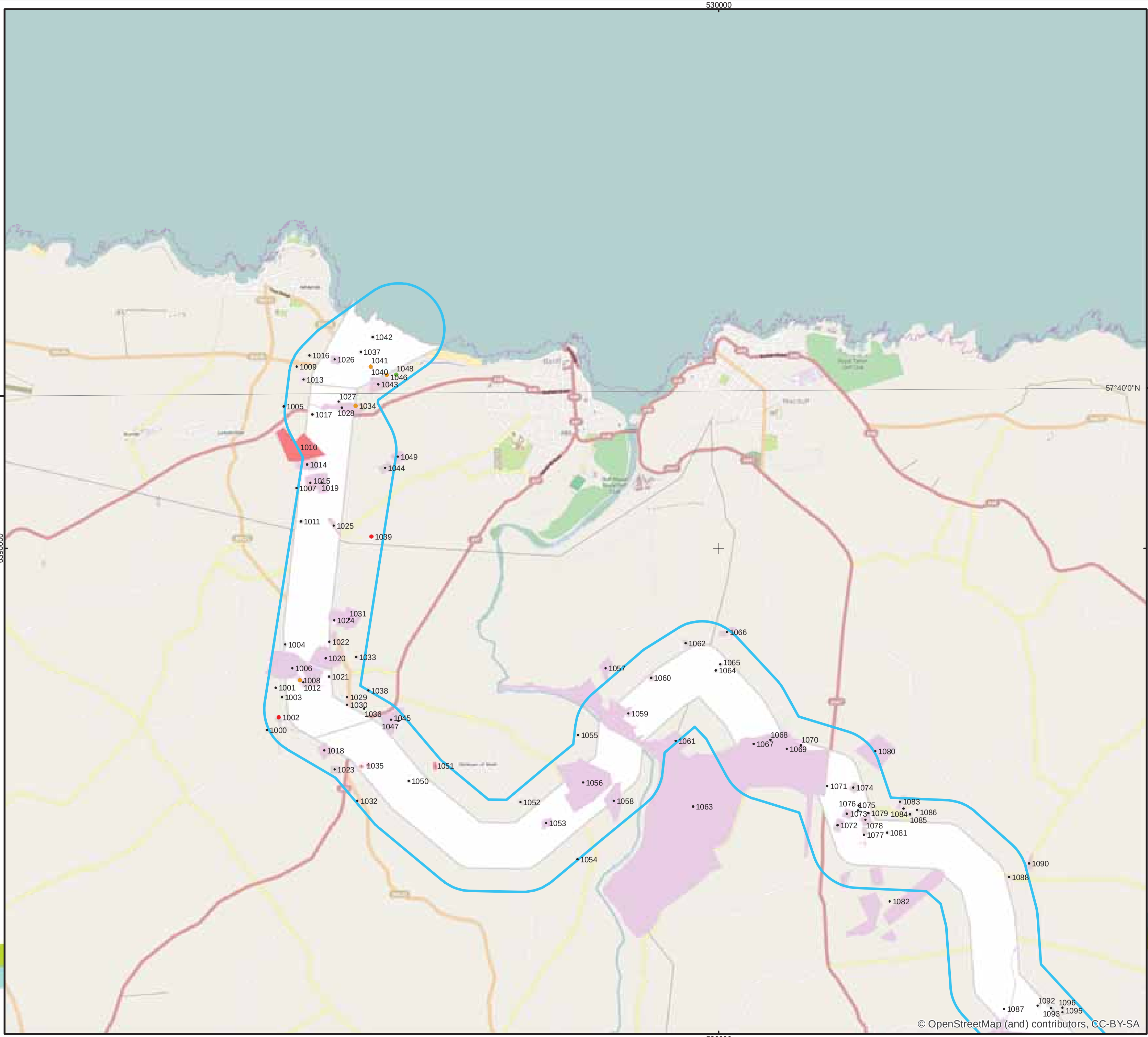
Figure 2: Site location and known Cultural Heritage Assets – OnTI ASA

Moray Offshore Renewables Ltd



Moray Offshore Renewables Ltd

KEY

Listed Building

- A-listed structure
- B-listed structure
- C-listed structure
- Undesignated cultural heritage asset
- Modified OnTI ASA
- Additional 5km buffer
- Substation Area
- Onshore Export Cable Corridor
- Battlefields
- Gardens/Designed Landscapes
- Scheduled Monuments
- HER

Horizontal Scale: 1:40,000 A3 Chart

0 1,000 2,000 Meters

Geodetic Parameters: British National Grid

Produced: KMN
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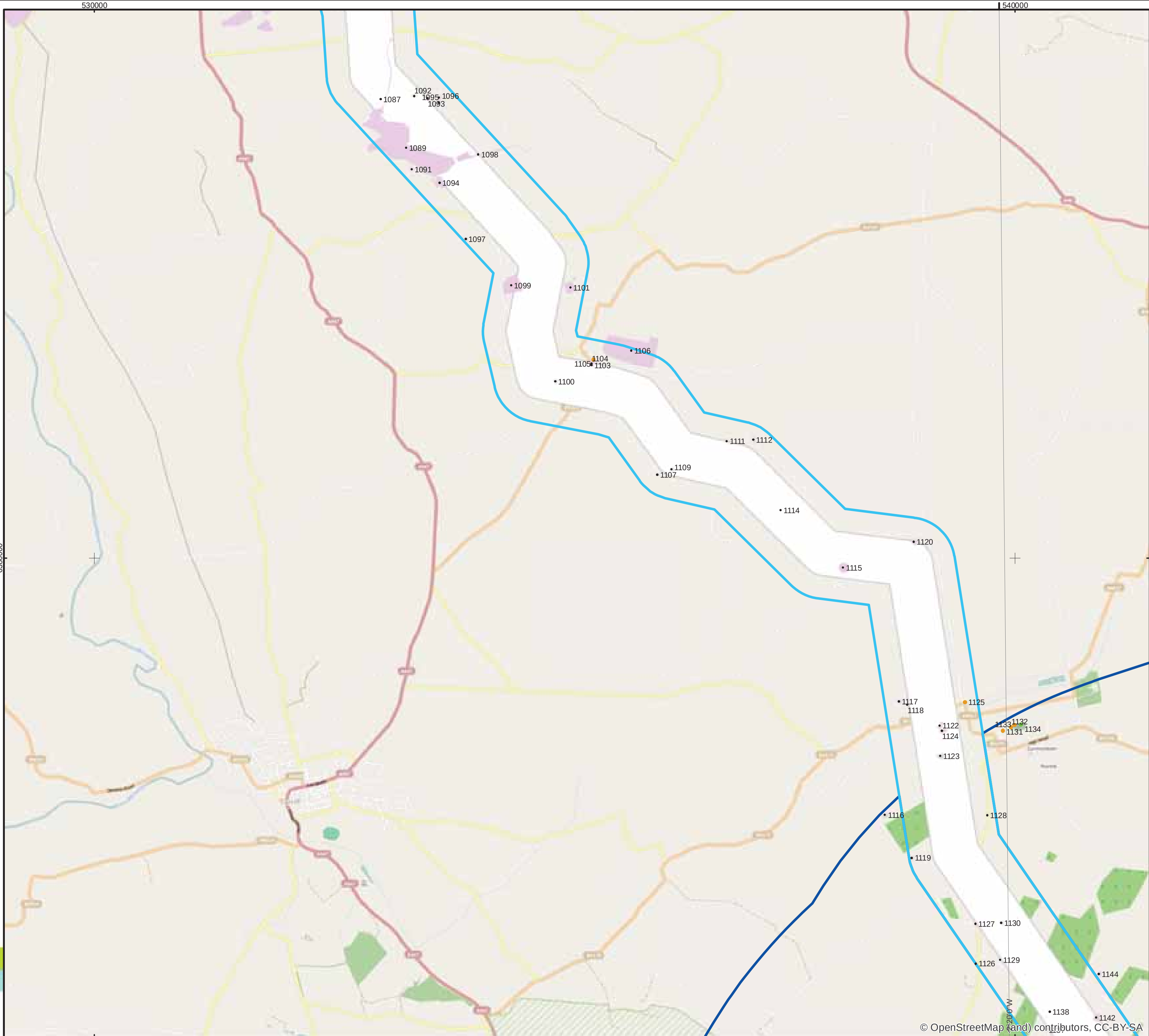
Date: 20/06/2014 Revision: A

REF: 8460001-PSO0061-WES-MAP-003

Figure 3: Cultural Heritage Assets within the OnTI Cable Corridor (North)

Moray Offshore Renewables Ltd

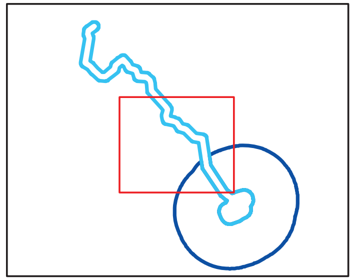


Moray Offshore Renewables Ltd

KEY

Listed Building

- A-listed structure
- B-listed structure
- C-listed structure
- Undesignated cultural heritage asset
- Modified OnTI ASA
- Additional 5km buffer
- Substation Area
- Onshore Export Cable Corridor
- Battlefields
- Gardens/Designed Landscapes
- Scheduled Monuments
- HER



Horizontal Scale: 1:40,000 A3 Chart

0 1,000 2,000 Meters

Geodetic Parameters: British National Grid

Produced: KMN
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Date: 20/06/2014 Revision: A

REF: 8460001-PSO0061-WES-MAP-004

Figure 4: Cultural Heritage Assets within the OnTI Cable Corridor (South)

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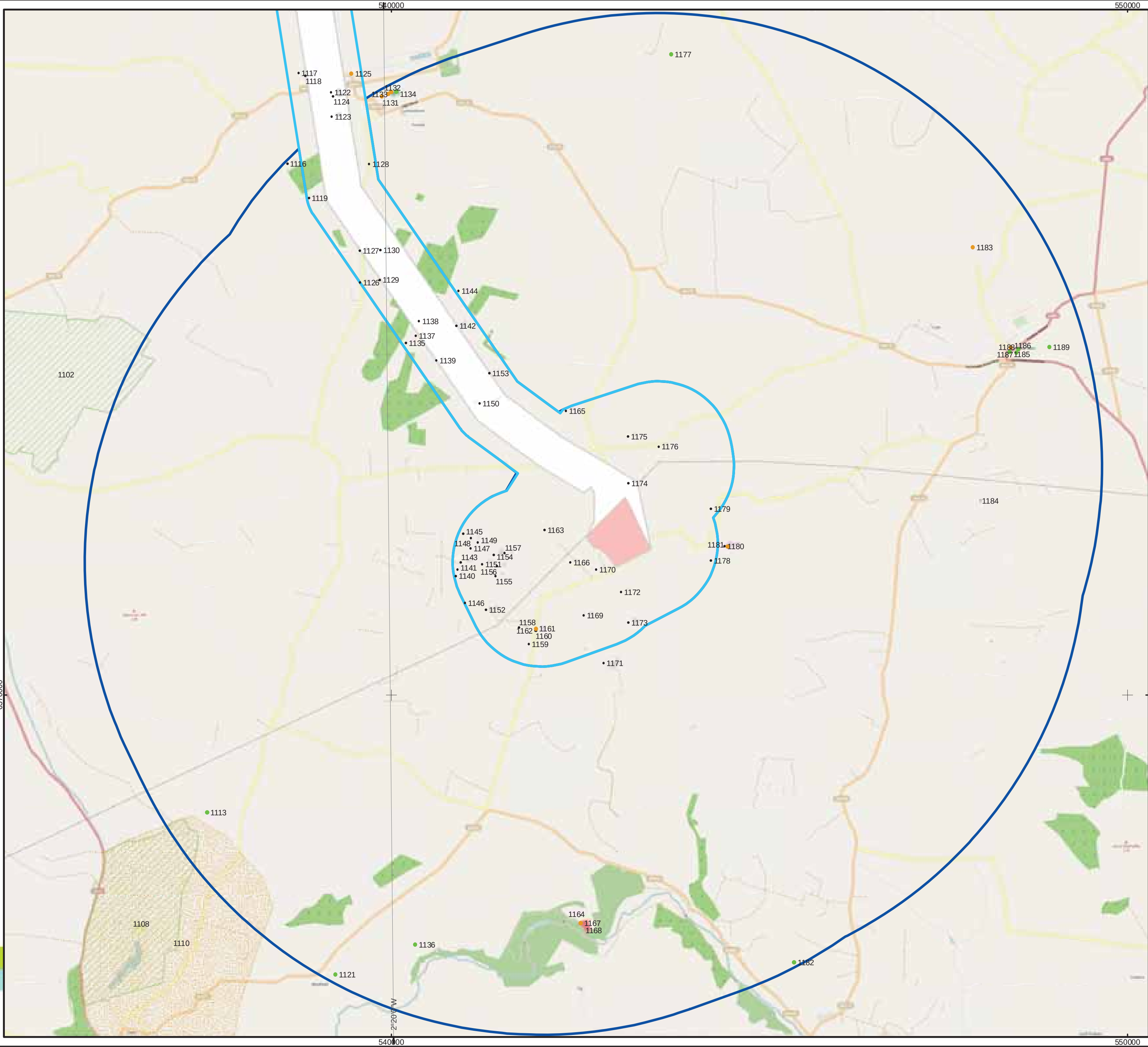

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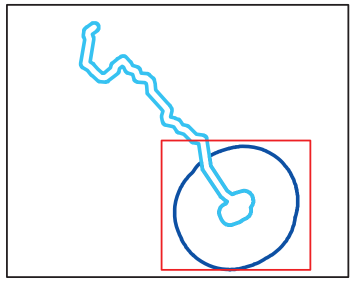
REPSOL

Moray Offshore Renewables Ltd

KEY

Listed Building

- A-listed structure
- B-listed structure
- C-listed structure
- Undesignated cultural heritage asset
- Modified OnTI ASA
- Additional 5km buffer
- Substation Area
- Onshore Export Cable Corridor
- Battlefields
- Gardens/Designed Landscapes
- Scheduled Monuments
- HER



Horizontal Scale: 1:50,000 A3 Chart

0 1,250 2,500 Meters

Geodetic Parameters: British National Grid

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Figure 5: Cultural Heritage Assets within 5km of proposed substation

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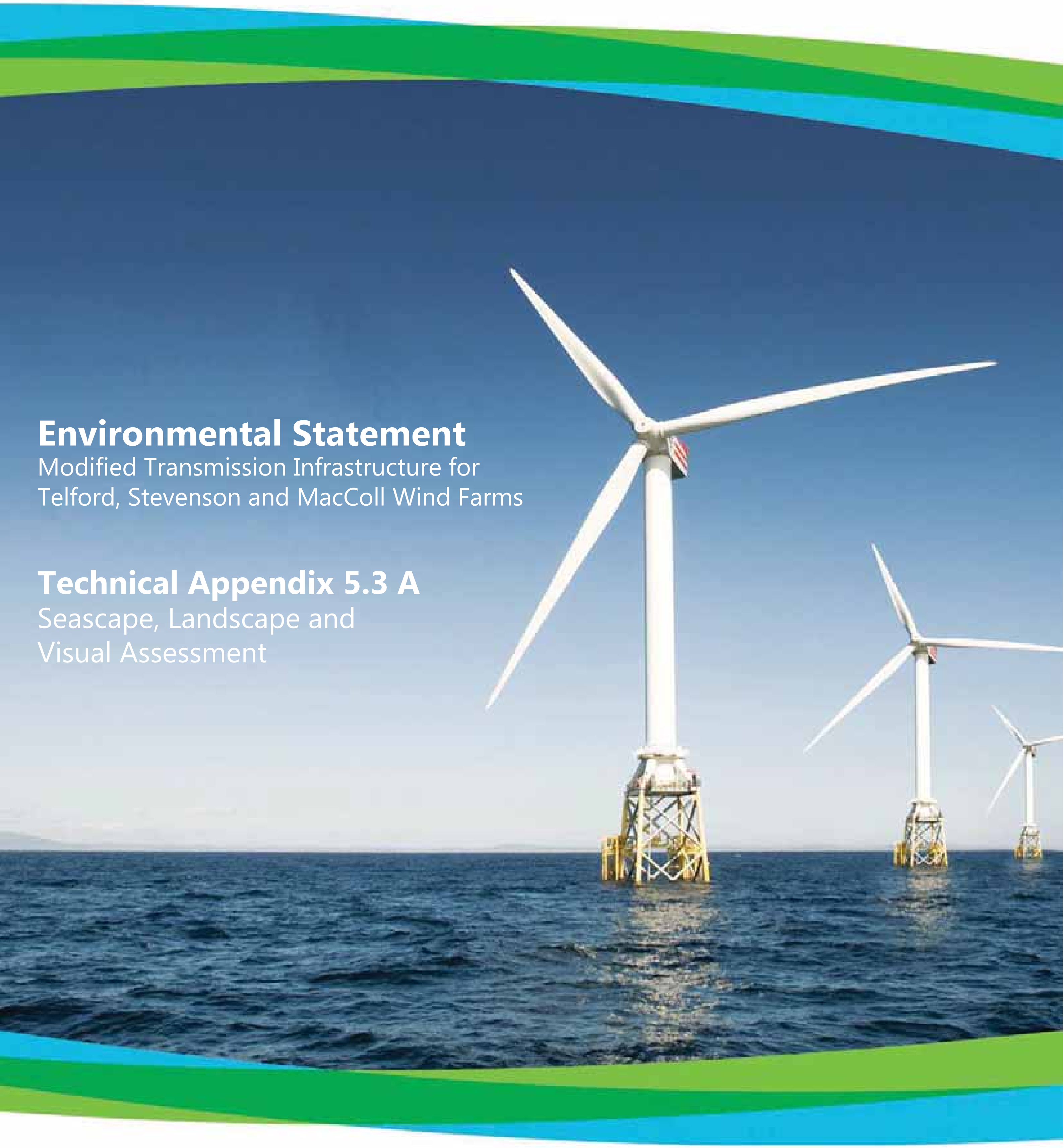
Developing Wind Energy In The Outer Moray Firth



Environmental Statement

Modified Transmission Infrastructure for
Telford, Stevenson and MacColl Wind Farms

Technical Appendix 5.3 A

Seascape, Landscape and
Visual Assessment

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Document Owner	
Document Status	
File Name	

Revision	Date	Description	Originated By	Checked By	Approved By
A1	20/06/2014	Draft for review			
A2	24/06/2014	V2 post legal draft			

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Table of Contents

1 Introduction

This methodology has been prepared by chartered landscape architects at Optimised Environments Ltd (OPEN) and describes in detail the methodology that has been used to carry out the Seascape, Landscape and Visual Impact Assessment (SLVIA) of the Modified Transmission Infrastructure (modified TI). The SLVIA identifies and assesses the significance of changes resulting from the modified TI on both the landscape as an environmental resource and on people's views and visual amenity. The SLVIA methodology is structured as follows:

- SLVIA baseline study;
- Types of effect;
- Significance of effects;
- Assessment of landscape effects;
- Assessment of visual effects;
- Assessment of cumulative landscape and visual effects;
- Nature of effects;
- Duration and reversibility; and
- Visual representations.

The following sources have been used in the formulation of methodology for the assessment and the presentation of visual representations:

- Guidelines for the Assessment of Landscape and Visual Impacts: Third Edition (Landscape Institute and IEMA, 2013);
- Assessing the Cumulative Impact of Onshore Wind Energy Developments (SNH, 2012);
- Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment (Landscape Institute, 2011) ;
- Landscape Character Assessment Guidance for England and Scotland (SNH and TCA 2002);
- Siting and Designing Wind farms in the Landscape: Version 2 (SNH, 2014);
- Wildness in Scotland's Countryside Policy Statement No. 02/03; (Scottish Natural Heritage 2003);
- Assessing the Impacts on Wild Land Interim Guidance Note (Scottish Natural Heritage 2007); and
- Scottish Natural Heritage (2012) published on their web-site, updated wildness mapping for the whole of Scotland (http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/mapping/).

The SLVIA is based on the Rochdale Envelope parameters described in Chapter 5.3.1. In compliance with EIA regulations, the likely 'worst case' scenario is assessed and illustrated in the SLVIA.

The SLVIA for the modified TI has been undertaken within a 50 km radius study area of the three consented wind farms as shown in Figure 5.3.1. The study area is not intended to provide a boundary beyond which the three consented wind farm sites and modified TI will not be seen, but rather to define the area within which to assess the potential significant landscape and visual effects of the modified TI.

2 SLVIA Baseline Study

Introduction

The baseline study describes the existing seascape, landscape and visual environment of the sites and study area. Establishing a baseline helps to gain an understanding of what makes the seascape and landscape distinctive, its important components or characteristics, and how it is changing prior to the introduction of the modified TI. The baseline is instrumental in the identification of the seascape and landscape character receptors and visual receptors/views to be included in the assessment. The baseline seascape, landscape and visual conditions are described for the modified TI.

Seascape character is an extension of landscape character, but emphasises other elements that are slightly different or more important at the coast, when defining the character of seascape compared to landscape. Seascape is defined as 'An area of any extent or scale which includes the sea as a key feature. Seascape has physical and experiential attributes, and encompasses the interrelationship between the sea and the sky, and may include land' (SNH, 2005).

Defining the baseline character of the study area requires a specific focus on both the 'seaward' and the 'landward' elements. Landscape character contributes to seascape character and vice versa. The coastal character assessment:

- Analyses the coastal landscape; and
- Identifies its elements and experiential qualities that are distinctive and typify the place.

The emphasis placed on individual aspects of assessment varies, however, these include landform, open-ness, climate, scale, seascape, coastal and landscape character and features, marine features, aspect, visibility, designations and cumulative impacts.

A coastal character methodology, informed by those used for SNH's aquaculture studies (SNH, 2008) has been applied to identify Coastal Character Areas (CCAs) informed by, and at a scale comparable to, the existing SNH Landscape Character Assessments (LCAs) (SNH, 1997 and 1998). Although developed for aquaculture capacity studies, the methodology identifies areas of consistent coastal character with strong integrity, such as a specific bay or stretch of coast. Other desk sources, such as the Beaches of Scotland series (Countryside Commission for Scotland, 1970 and 1977) have been used to inform the basis of Coastal Character Areas, together with site specific field surveys.

The baseline seascape characterisation has been informed by SNH's Seascapes Report (SNH, 2005), which identifies national seascape types/units, although this is a strategic assessment with general descriptions and has limitations for use with specific development proposals.

Other guidance on seascape assessment in Wales and England is relevant, particularly the Guide to Best Practice in Seascape Assessment (CCW, 2001) and Seascape and Visual Impact Report (DTI, 2005). These recommend definition of seascape units based on land/sea/headland intervisibility at local, regional, national scales, together with seascape and visual characteristics, activities, visibility and views.

The approach to seascape assessment responds to the advice on characterisation provided by SNH in their scoping opinion and consultations to date, focusing on both the 'seaward' and the 'landward' elements of the study area. The baseline assessment comprehensively reviews the coastal and seascape/landscape character using:

- Landscape character information taken from the relevant terrestrial Landscape Character Assessment (SNH national series of LCAs);
- Coastal character information based on national coastal character descriptions and relevant coastal references in the terrestrial LCA; and
- More detailed characterisation and/or subdivision of the coast into Coastal Character Areas.

The key characteristics and sensitivity of these seascape character types/units are identified, as appropriate, with respect to the modified TI.

Coastal and Seascape / Landscape Characterisation Methodology

SNHs 'Guidance on Landscape/Seascape Capacity for Aquaculture' (2008) provides a methodology for assessing the seascape capacity for aquaculture development. The methodology described has been adapted for the purpose of the SLVIA of the modified TI to define the baseline character and visual qualities of the coastal landscape/seascape. The methodology is divided into a series of broad stages, summarised in Table 1.

Table 1: Summary of Coastal Character Approach

Preliminary stage: Prepare a brief
- Define / agree the study area, development scenarios and mapping scale.

Stage One: Identify National Seascape Character Types
- Identify national level' seascape character types from SNH Seascape Study (2005); and
- National seascape types will form a framework within which these coastal character areas will 'nest'.

Stage Two: Identify Terrestrial Landscape Character Types
- Identify terrestrial landscape character types to understand coastal character and landscape types where the sea or coast provides the defining characteristics or for use in the OFTO onshore assessment.

Stage Three: Identify Coastal Character Areas
- Undertake initial site visit and desk study to identify Coastal Character Areas;
- Undertake detailed survey and analysis of relevant seascape / coastal character within each Coastal Character Area;
- Identify key characteristics, experiences, features and visual qualities;
- Identify key viewpoints and photography;
- Identify boundaries and names of Coastal Character Areas with geographical integrity; and
- Output: a map showing the Coastal Character Areas.

Stage Four: Undertake Sensitivity Analysis
- Assess the sensitivity of individual Coastal Character Areas to the modified TI; and
- Prepare explanation and justifications.

Stage Five: Undertake Impact Assessment
- Assess the magnitude of change of the modified TI on Coastal Character Areas; and
- Assess the effect of the modified TI on Coastal Character Areas by making judgements on their sensitivity and magnitude of change to the modified TI.

Preliminary Stage: Prepare a Brief

Development Scenario

The SLVIA is based on the Rochdale Envelope described in Chapter 5.3.1. In compliance with EIA regulations, the 'worst case' scenario is assessed and illustrated in the SLVIA.

Search Area

A search area has been identified to establish a reasonable study area for the SLVIA. The search area, shown in Figure 5.3.1, encompasses:

- The three consented wind farm sites and Modified OfTI;
- The adjacent Caithness, Moray and Aberdeenshire coastlines;
- The southern edge of the Orkney Isles; and
- Inland parts of Aberdeenshire covering the onshore export between Inverboyndie and the onshore substation near New Deer.

Within this search area, a SLVIA study area is defined for the Modified Offshore Transmission Infrastructure (Modified OfTI) and the Modified Onshore Transmission Infrastructure (Modified OnTI), as shown in Figure 5.3.1.

Stage One: Identify National Seascape Character Types

The baseline seascape characterisation has been informed by SNH's Seascapes Report (SNH, 2005). The study provides a 'nationwide' look at the coast. Scotland's coastline is classified into 33 'seascape units', comprising 13 'coastal character types'.

These coastal character types and seascape units establish coastal character at the national scale, valid only at the broad, strategic level. When assessing specific development proposals, a more detailed character assessment is needed. Strategically, these 'national level' coastal character types and seascape units will form a framework within which coastal character areas will 'nest'. This hierarchy of seascape character areas is illustrated in Table 2.

Stage Two: Identify Terrestrial Landscape Character Types

A review of the relevant terrestrial Landscape Character Assessments (SNH national series of LCAs) has been undertaken to help understand the physical coastal character. The coastal character assessment is best done at a scale comparable to the existing Landscape Character Assessments, and is informed by them. In order to review the coastal character, the existing SNH terrestrial LCAs covering the coastal parts of the study area are examined in conjunction with field survey and assessment. The existing terrestrial SNH character assessment for Caithness, Moray and Nairn, and Banff and Buchan cover the coastal parts of the study area (SNH, 1997 and 1998).

These LCAs provide detailed descriptions of coastal characteristics for some of the landscape types in the study area. The landscape types identified along the coast have directly informed the definition of Coastal Character Areas, where the sea or coast provide the defining characteristics, for example the 'High Cliffs and Sheltered Bays' landscape type of Caithness. Other landscape types in the study area abut the coast and are influenced by the sea, but the sea and coast do not provide the defining characteristic, for example, the 'Small Farms and Crofts' landscape type of Caithness. These landscape types have been subject to further coastal characterisation to define Coastal Character Areas within the coastal part of these landscape types. Other landscape types, located further inland, have little or no relationship with the coast, where the sea is not a characteristic element. These landscape types have not influenced the coastal characterisation and are considered separately as distinct landscape types. Terrestrial landscape character types are used to inform the assessment of the export cable routes.

Table 2: Hierarchy of Coastal Character Assessment

NATIONAL COASTAL CHARACTER TYPES
13 coastal character types based on coastal, hinterland and marine character; these occur in 33 indicative 'National' seascape units.

(Defined in the SNH Seascapes Study)

↓

COASTAL CHARACTER AREAS
Scale 1:100,000
Areas of distinct character, the primary assessment tool. Defined on the basis of:

- Physical landform, degree of enclosure or openness and an assessment of horizontal and vertical scale;
- Degree of influence of the sea and 'maritime' qualities on both landscape and coast of the area, including coastal dynamics;
- Shape, scale and degree of fragmentation of the coastline;
- Presence of human artefacts, distribution of settlement/pattern and amount of human activity;
- Landscape features, including historic features and their setting;
- Experience of the coast, landscape and seascape, including degree of remoteness and potential opportunity to appreciate wildness; and
- Visual catchment.

Stage Three: Identify Coastal Character Areas

Coastal Character Areas further subdivide the National Seascape Types into areas of consistent coastal character with a strong identity, such as a specific bay or a section of coast or loch with a similar character. The characteristics described in Table 2 are used to help identify Coastal Character Areas.

A detailed desk and field survey has been carried out to identify, analyse and present the elements of the coastal landscape which are most likely to be affected by the modified TI. Coastal Character Areas are identified as areas of distinct character at the local/regional level. This scale was considered most appropriate for the assessment given the location of the OSPs over 20 km from the coast, the area covered by development and the large size of the study area. When assessing the specific development proposals, consisting of three offshore wind farms located at long distances offshore, a coastal character at the scale comparable to the existing terrestrial LCAs was considered most suitable.

Coastal Character Areas vary in size, according to the determining characteristics of the coast. Uniform, linear coastlines tend to define larger Coastal Character Areas, while definitive enclosed bays or headland features tend to define smaller Coastal Character Areas. Coastal Character Areas embrace consistent areas of seascape, usually with a common geographic or place name, which forms the basis of the character area. They are usually a stretch of coastline with a relatively consistent overall character, or a whole island or sea loch. The key characteristics and features of the Coastal Character Areas are described based on relevant desk studies, such as the SNH's terrestrial LCAs and field survey assessment. A checklist of issues explored to consider the key characteristics of Coastal Character Areas is outlined in Table 3.

Table 3: Coastal Character - Key Characteristics

Topic	Analysis of physical characteristics	Analysis of experiential characteristics	Judgements	Recognised values
Maritime influences	Aspect and orientation Existing marine based activities. Maritime processes and dynamics. Scale, distance and expansiveness of open sea.	Sense of space and light. Sense of exposure. Sense of containment or open-ness. Sounds associated with the sea, smell of the sea.	Unity of landscape character. Aesthetic qualities, including characteristics, experiences, and perceptions which create exceptional aesthetic quality. Assessing significance of physical characteristics. Assessing intensity and significance of experiential characteristics. Identification of dominant physical or experiential characteristics. Identification of aesthetic attributes. Determining the extent of the relevant setting for significant features and landmarks identifying relevant cultural associations with place	Landscapes and seascapes designated because of their scenic, landscape or recreational value landmarks designated because of their cultural or historic significance. Longer distance routes. Roads designated as scenic or tourist routes.
Character of coastal edge	Shape and scale of coastline. Degree of indentation and enclosure. Presence of offshore islands. Fragmentation of edge Deposition features, tidal variations, landmarks and shoreline development.	Sense of exposure. Sense of containment or open-ness.		
Character of immediate hinterland	Key elements of landscape character topography and relief vegetation pattern. Existing settlement pattern landmarks.	Sense of containment or open-ness. Presence of maritime influence.		

Topic	Analysis of physical characteristics	Analysis of experiential characteristics	Judgements	Recognised values
Wildness / isolated coast	Presence of natural processes. Presence of development/ human activity. Actual accessibility ruggedness of terrain.	Sense of naturalness perceived remoteness sense of isolation.	Intensity of sense of wildness degree of ruggedness and perceived accessibility. Degree to which natural processes dominate the experience of place.	Wild land search areas.

Stage Four: Undertake Sensitivity Analysis

The sensitivity of a Coastal Character Area is an expression of its ability to accommodate the modified TI as part of its own character or as part of the visual setting or context of the coastal character. This is dependent on the value, quality, existing character and position of the Coastal Character Area in relation to the modified TI as explained below:

- The value of the Coastal Character Area is a reflection of its importance in terms of any designations that may apply, or as a landscape/seascape resource;
- The quality of the Coastal Character Area is a reflection of its attributes, such as sense of place and scenic quality, and the extent to which attributes have remained intact;
- The existing coastal character determines the degree to which the receptor may accommodate the influence of the development; and
- The position of the Coastal Character Area in relation to the modified TI will influence its sensitivity to the change proposed and will vary according to whether they have a close/direct or distant/indirect relationship.

Levels of sensitivity – high, medium-high, medium and medium-low, low – are applied to each Landscape Type and Coastal Character Area. The sensitivity of each receptor is a product of the specific combination of value, quality and existing landscape character as evaluated for that receptor. It is not possible to provide definitions for each of the levels of sensitivity (low, medium-low, medium, medium-high and high) as the level of sensitivity of each receptor is a product of consideration of the factors specific to each receptor and the application of professional judgement. The combination of criteria and the resulting level of sensitivity are described in the evaluation of sensitivity for each receptor.

Stage Five: Undertake Impact Assessment

The significance of the effect on Coastal Character is dependent on the multiple factors considered in determining the sensitivity and the magnitude of change and by applying professional judgement to assess whether the modified TI will have an effect that is significant or not significant. A significant effect will occur where the combination of the variables results in the modified TI having a definitive effect on the receptor, so that its landscape character is redefined by the presence of the modified TI. A not significant effect will occur where the effect of the modified TI is not definitive, and the landscape character of the receptor continues to be defined principally by its baseline characteristics. The methodology for the impact assessment for the SLVIA is described fully in Section 2.

Visual Baseline

The baseline assessment includes the identification and agreement of specific viewpoints identified during desk and field survey. Field survey was undertaken to identify and locate appropriate viewpoints for the visual assessment, and to shoot baseline photography to illustrate the existing views from viewpoints in the study area. An outline of the relevant issues considered when defining the baseline visual character is shown in Table 4.

Table 4: Methodology for Coastal/Seascape Assessment: Visual Assessment

Topic	Analysis of physical elements	Analysis of type of views	Judgements	Recognised values
Visual assessment	Presence of the coastal edge. Presence of the open sea. Focal points or features within the views. Aspect and orientation of viewpoint, character of seascape.	Overlook from settled areas. Views experienced as part of a sequence. Elevated viewpoints panoramas. Sudden revelations. Glimpse views.	Significance of views and viewpoints. Significance and dominance of compositional elements. Quality of visual composition from viewpoints. Aspect and transient qualities such as quality of light and reflectivity.	Views which contribute to the experience of a landscape or seascape designated for its scenic quality. Views to and from features designated because of their historic significance. Views from longer distance routes. Views from popular recreational areas or specific facilities.

A proposed viewpoint list, map and Zone of Theoretical Visibility (ZTV) were provided to SNH, Marine Scotland and local authorities during the consultation. Feedback on the viewpoints and format of the visualisations was provided during the consultation stages by SNH, the Highland Council and Moray Council.

3 Types of Effects

The SLVIA is intended to determine the effects that the modified TI will have on the landscape and visual resource.

Landscape Effects

The SLVIA considers the effects of the modified TI on the landscape as a resource. Landscape effects are either direct effects on the physical fabric of the site, or effects on landscape character. The assessment of landscape effects is carried out as follows:

- Assessment of physical effects: physical effects are direct effects on the physical fabric of the site, such as the removal of trees and alteration to ground cover. This category of effects is made up of landscape elements, which are the components of the landscape such as hedgerows or woodland that may be physically affected by the modified TI.
- Assessment of effects on landscape character: landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that alter this pattern of elements, or through visibility of the modified TI, which may alter the way in which the pattern of elements is perceived. This category of effects is considered in terms of landscape character receptors, which fall into two groups; landscape character types/areas and landscape designations.

Visual Effects

The SLVIA considers the effect of the modified TI on views and visual amenity. Visual effects include effects on visual receptors, i.e. groups of people that may experience an effect, and views (viewpoints). The visual assessment is carried out as follows:

- An assessment of the effects of the modified TI on views from principal visual receptors, including residents of settlements, motorists using roads, people using recreational routes, features and attractions throughout the study area (as ascertained through the baseline study); and
- An assessment of the effects of the modified TI on representative viewpoints that have been selected to assess the effect on locations relevant to these visual receptors and from specific viewpoints, chosen because they are key or promoted viewpoints in the landscape.

Cumulative Effects

Cumulative landscape and visual effects arise where the study areas for two or more developments overlap so that both are experienced at proximity where they may have a greater incremental effect, or where developments may combine to have a sequential effect, irrespective of any overlap in study areas. This means that the addition of the modified TI to a situation where other developments are apparent in the baseline landscape and visual context may result in a greater effect than where the modified TI is seen in isolation.

4 Significance of Effects

The objective in assessing the effects of the modified TI is to predict the significant effects of the modified TI on the landscape and visual resource. In accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 and Marine Works (Environmental Impact Assessment) Regulations 2007 (the EIA Regulations), the SLVIA effects are assessed to be either significant or not significant. The SLVIA does not define levels of significance as the EIA Regulations do not provide for these.

The significance of effects is assessed through a combination of two considerations - the sensitivity to change of the landscape element, landscape character receptor or visual receptor, and the magnitude of change that will result from the modified TI.

OPEN's methodology requires the application of professional judgement in accordance with the Landscape Institute's GLVIA3. Although it is not reliant on the use of a matrix, the following matrix (Table A7.1) has been included to illustrate how combinations of the ratings for sensitivity and magnitude of change can give rise to significant effects, as well as to give an understanding of the threshold at which significant effects may arise.

Table 5: Illustrative Significance Matrix

Illustrative Matrix of Significant Effects						
Magnitude **Sensitivity**	**High**	**Medium-high**	**Medium**	**Medium-low**	**Low**	**Negligible**
High	Significant	Significant	Significant	Significant or not significant	Not significant	Not significant
Medium-high	Significant	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant
Medium	Significant	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant
Medium-low	Significant or not significant	Significant or not significant	Not significant	Not significant	Not significant	Not significant
Low	Significant or not significant	Not significant	Not significant	Not significant	Not significant	Not significant

Effects that are assessed within the dark grey boxes in the matrix are assessed to be significant in terms of the requirements of the EIA Regulations. Those effects that are assessed within the light grey boxes may be significant, or not significant, depending on the specific factors and effect that is assessed in respect of a particular landscape or visual receptor. In accordance with the GLVIA3, experienced professional judgement is applied to the assessment of all effects and reasoned justification is presented in respect of the findings in each case.

5 Assessment of Landscape Effects

Landscape character is the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and the way that this pattern is perceived. Effects on landscape character arise either through the introduction of new elements that physically alter this pattern of elements, or through visibility of the modified TI, which may alter the way in which the pattern of elements is perceived. This category of effects is made up of physical effects and effects on landscape character (landscape character types and designated areas).

Assessment of Physical Effects

The physical effects of the modified TI are restricted to the area of the site where existing landscape elements may be changed. Physical effects are the direct effects as a result of the modified TI on the fabric of the site, such as the removal of trees and alteration to ground cover. The objective of the assessment of physical effects is to determine what the likely physical effects of the modified TI will be, which landscape elements will be affected, and whether these effects will be significant or not significant. The variables considered in the sensitivity of landscape elements and the magnitude of change that the modified TI will have on them are described below.

Sensitivity of Landscape Elements

The sensitivity of a landscape element is an expression of its value and quality, and the potential to mitigate the effect.

- The value of a landscape element is a reflection of its importance in the pattern of elements which constitute the landscape character of the area. For example, the value of woodland is likely to be increased if it provides an important component of the local landscape character. If a landscape element is particularly rare – as a remnant of an historic landscape layout for example – its value is likely to be increased;
- The quality of a landscape element is a reflection of its condition and state of repair. For example, a woodland that has been poorly managed and is in poor condition would be considered to have a reduced quality; and
- The potential for mitigation of the effect on a landscape element is a reflection of the degree to which the element can be restored, replaced or substituted. For example, it may be possible to restore ground cover following the excavation required for cable installation, and this would reduce the sensitivity of this element.

The evaluation of sensitivity is described for each receptor in the assessment. Levels of sensitivity – high, medium-high, medium, medium-low and low - are applied. The sensitivity of each receptor is a product of the specific combination of value, quality and potential for mitigation as evaluated by professional judgement.

Magnitude of Change on Landscape Elements

The magnitude of change on landscape elements is quantifiable, and is expressed in terms of the degree to which a landscape element will be removed or altered by the modified TI, the extent of existing landscape elements that will be lost and the contribution of that element to the character of the landscape. Definitions of magnitude of change are applied in order that the process of assessment is made clear. These are:

- High, where the modified TI will result in the complete removal or alteration of a key landscape element;
- Medium, where the modified TI will result in the removal of a notable part of a landscape element or a notable alteration to a key landscape element; and
- Low, where the modified TI will result in the removal of a minor part of a landscape element or a minor alteration to a key landscape element; and
- Negligible, where the modified TI will result in the removal of a negligible amount of a landscape element or is barely discernible.
- None, where the modified TI will result in no change to the landscape element.

There may also be intermediate levels of magnitude of change - medium-high and medium-low - where the change falls between two of the definitions.

Significance of Effects on Landscape Elements

The significance of the effect on landscape elements is dependent on all of the factors considered in the sensitivity of the receptor and the magnitude of change upon it, and by applying professional judgement to assess whether or not the modified TI will have an effect that is significant or not significant.
A significant effect will occur where the degree of removal or alteration of the landscape element is such that the form of the element will be redefined. If the landscape element is of a high sensitivity, a significant effect can occur with a limited degree of removal or alteration. A not significant effect will occur where the form of the landscape element is not redefined as a result of the modified TI. If the landscape element is of lower sensitivity, it may undergo a higher level of removal or alteration yet remain as a not significant effect.

Assessment of Effects on Landscape Character

The objective of the assessment of effects on landscape character is to determine what the likely effects of the modified TI will be, which landscape character receptors will be affected, and whether these effects will be significant or not significant. The methodology for the assessment of effects on landscape character involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

Landscape Baseline and Scope Assessment

The landscape baseline provides an understanding of the landscape in the area that may be affected – its constituent elements, its character, distinctiveness, condition and value, and the way this varies spatially. The landscape baseline describes aspects of the landscape that may be significantly affected, as required by Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 and Schedule 3 of the Marine Works (Environmental Impact Assessment) Regulations 2007 (together the EIA Regulations). Establishing the landscape baseline will, when reviewed alongside the description of the modified TI, form the basis for the identification and description of the landscape effects of the modified TI. The baseline description of the landscape that may be affected is primarily determined by the physical footprint of the modified TI components and their Zone of Theoretical Visibility (ZTV).

An overview of the landscape baseline is described and a scope assessment identifies landscape receptors that may experience significant effects, which require to be assessed in full. A detailed description of the baseline is provided for each landscape receptor that may experience significant effects, allowing the full baseline to be described for landscape receptors that may be significantly affected. Those receptors which are identified as not having the potential to undergo significant effects and significant cumulative effects, are not included in the subsequent detailed assessment, but are noted with reasons given for their exclusion.

The baseline study of each landscape character receptor collates and presents information relevant to the assessment drawn from a combination of desk study and field-work. The baseline study covers the following issues:

- The description of the landscape character receptor drawn from the relevant documentation such as the Landscape Character Assessment or citations in respect of landscape designations;
- A description of the landscape character receptor based on field work to determine how typical or not the landscape character receptor is in relation to documented descriptions;
- Those features and patterns of the landform, land-cover and land-use which make the landscape character receptor distinctive;
- The visual and sensory experience of the landscape and how it associates with other landscapes including in particular the landscape character receptor where the modified TI is located; and
- How change in this landscape character receptor, either through natural or human processes, is presently affecting character and how they are predicted to affect character in the future.

The landscape baseline also describes current pressures that may cause change in the landscape in the future, in particular drawing on information for wind energy and infrastructure developments that are not yet present in the landscape, but are at other stages in the planning process. Operational and under construction wind energy developments are regarded as part of the baseline landscape character of the area. Any changes resulting from the modified TI are assessed within this context in the assessment of landscape and visual effects.

Sensitivity of Landscape Character Receptors

The sensitivity of a landscape character receptor is an expression of its ability to accommodate the modified TI as part of its own character or as part of the visual setting or context of the character receptor. This is dependent on the value of the landscape receptor and its susceptibility to change.

Value of the Landscape Receptor

The value of a landscape character receptor is a reflection of the value which society attaches to that landscape. The assessment of the landscape value is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following range of factors:

- Landscape designations: A receptor that lies within the boundary of a recognised landscape related planning designation will be of increased value, depending on the proportion of the receptor that is covered and the level of importance of the designation; international, national, regional or local. It is important to note that the absence of designations does not preclude local resource value, as an undesignated landscape character receptor may be important as a resource in the local or immediate environment, particularly when experienced in comparison with other nearby landscapes.
- Landscape quality: The quality of a landscape character receptor is a reflection of its attributes, such as scenic quality, sense of place, rarity and representativeness and the extent to which these attributes have remained intact. A landscape with consistent, intact and well-defined, distinctive attributes is generally considered to be of higher quality and, in turn, higher value, than a landscape where the introduction of inappropriate elements has detracted from its inherent attributes.
- Landscape experience: The experience of the landscape character receptor can add to its value and relates to a number of factors including the perceptual responses it evokes, the cultural associations that may exist in literature or history, or the iconic status of the landscape in its own right, the recreational value of the landscape for outdoor pursuits, and the contribution of other values relating to the nature conservation or archaeology of the area.

Susceptibility to Change

The susceptibility of a landscape character receptor to change is a reflection of its ability to accommodate the changes that will occur as a result of the addition of the modified TI. The assessment of the susceptibility of the landscape receptor to change is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- The specific nature of the modified TI: The susceptibility of landscape receptors is assessed in relation to change arising from the specific development proposed, including the specific components and features of the modified TI proposed, its size, scale, location, context and characteristics.
- Landscape character: The key characteristics of the existing landscape character of the receptor is considered in the evaluation of susceptibility as, they determine the degree to which the receptor may accommodate

the influence of the modified TI. For example, a landscape that is of a particularly wild and remote character may have a high susceptibility to the influence of the modified TI due to the contrast that it would have with the landscape, whereas a developed, industrial landscape, where built elements and structures are already part of the landscape character, may have a lower susceptibility. However, there are instances when the quality of a landscape may have been degraded to an extent whereby it is considered to be in a fragile state and therefore a degraded landscape may have a higher susceptibility to the modified TI.

- Landscape association: The extent to which the modified TI will influence the character of the landscape receptors across the study area, relates to the associations that exist between the landscape receptor where the modified TI is located and the landscape receptor from which the modified TI is being experienced. In some situations this association will be strong where the landscapes are directly related, for example the influence on a valley landscape by an enclosing upland landscape where the modified TI is set along the skyline, and in other situations weak where the landscapes are not directly related, for example the influence on a coastal landscape which is strongly associated with the seaward aspect and not the landward aspect where the modified TI is situated.
- Landscape Planning Policies and Strategies: The degree to which the modified TI achieves landscape planning policies and strategies, set out within the development plan or planning guidance. A landscape which is defined in planning guidance as area of search for this kind of development, for example, may be considered to be less susceptible to change, as the planning policy strategy for that area indicates that some change in the landscape could be accommodated. On the other hand, landscapes which are defined in planning policy as areas where the baseline situation should be maintained or protected, may be considered to be of higher susceptibility to change.

Sensitivity Rating

An overall sensitivity assessment of the landscape receptor is made by combining the assessment of the value of the landscape character receptor and its susceptibility to change. An overall level of sensitivity is applied for each landscape receptor - high, medium-high, medium, medium-low and low - by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of sensitivity for each receptor. Criteria that tend towards higher or lower sensitivity are set out in Table 6.

Table 6: Sensitivity to Change – Landscape Receptors

Criteria tending towards higher or lower sensitivity		
	National/International → **Local/Regional** → **Community**	
Value	Designated landscapes with national policy level protection or defined for their natural beauty. Higher quality landscapes with consistent, intact and well-defined, distinctive attributes. Rare or unique landscape character types or features. Aesthetic or perceptual aspects of designated wildlife, ecological or cultural heritage features that contribute to landscape character. Evidence that the landscape is valued or used substantially for recreational activity. Landscape with perceptual qualities of wildness, remoteness or tranquillity. Landscape with strong cultural associations that contribute to perceptions of scenic quality.	Landscapes without formal designation. Despoiled or degraded landscape with little or no evidence of being valued by the community. Lower quality landscapes with indistinct elements or features that detract from its inherent attributes. Widespread or 'common' landscape character types or features. Limited or no wildlife, ecological or cultural heritage features, or limited contribution to landscape character. No evidence that the landscape is used for recreational activity. Landscape with inherent character has been changed by human activity. Landscape with few cultural associations.

Criteria tending towards higher or lower sensitivity		
Susceptibility to Change	**High Susceptibility → Medium Susceptibility**	**→ Low Susceptibility**
	Landscape vulnerable or fragile to change through the loss or addition of features that would alter key landscape characteristics. Strong or direct association between proposed development and the landscape receptor. Landscape is defined in planning policy as having limited/no capacity for development. Landscape strategy is to maintain or protect existing character. Undue consequences are likely to arise from the proposed development.	Robust landscape, able to accommodate change or loss of features without altering key characteristics. Weak and indirect association between proposed development and the landscape receptor. Landscape is defined in planning policy as having capacity for development. Landscape strategy indicates some change could be accommodated. Undue consequences are unlikely to arise from the proposed development.
Sensitivity to Change	**High → Medium**	**→ low**

Magnitude of Change on Landscape Character Receptors

The magnitude of change on views is an expression of the scale of the change that will result from the modified TI, and is dependent on a number of variables regarding the size or scale of the change and its geographical extents. The basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

- The degree to which the pattern of elements that makes up the landscape character will be altered by the modified TI, by removal or addition of elements in the landscape. The magnitude of change will generally be higher if the features that make up the landscape character are extensively removed or altered, and/or if many new components are added to the landscape;
- The extent to which the effects change the key characteristics of the landscape as identified in the baseline study and which may be critical to the distinctive character of the landscape. This may include, for example, the scale of the landform, its relative simplicity or irregularity, the nature of the landscape context, the grain or orientation of the landscape, the degree to which the receptor is influenced by external features and the juxtaposition of the modified TI in relation to these key characteristics; and the distance between the landscape character receptor and the modified TI. Generally, the greater the distance, the lower the scale of change as the modified TI will constitute a less apparent influence on the landscape character; and
- The amount of the modified TI that will be seen. Visibility of the modified TI may range from a small part of the modified TI to a large part of the modified TI; generally the greater the extent of the modified TI that can be seen, the higher the scale of change.

The geographic area over which the landscape effects will be experienced is also assessed, which is distinct from the size or scale of effect. The extent of the effects will vary depending on the specific nature of the modified TI and is principally assessed through analysis of the extent of visibility of the modified TI within the landscape receptor, to assess the geographical extent of the receptor that will be affected.

Magnitude of Change Rating

An overall assessment of the magnitude of change resulting from the modified TI on the landscape receptor is made by combining the assessments of size or scale of change and geographical extent. The basis for the assessment of magnitude for each receptor is made clear using evidence and professional judgement.

The levels of magnitude of change that can occur are defined as follows:

- High, the modified TI will result in a major alteration to the baseline characteristics of the landscape, providing the prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving landscape;
- Medium, the modified TI will result in a moderate alteration to the baseline characteristics of the landscape, providing a readily apparent influence and/or introducing elements that may be prominent but are not uncharacteristic in the receiving landscape;
- Low, the modified TI will result in a minor alteration to the baseline characteristics of the landscape, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape; and
- Negligible, the modified TI will result in a negligible alteration to the baseline characteristics of the landscape, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving landscape.

There may also be intermediate levels of magnitude of change - medium-high and medium-low - where the change falls between two of the definitions. Criteria that tend towards higher or lower magnitude of change are set out in Table 7.

Table 7: Magnitude of Change – Landscape Receptors

Criteria tending towards higher or lower magnitude		
Size or scale of change	**Large ⟶ Moderate**	**⟶ Small**
	Major loss of existing landscape elements which contribute to the landscape character. Major alteration to pattern of elements, or perception of landscape pattern, through removal or addition of landscape elements. Major change to key characteristics which define the distinctive character of the landscape. Development located within or	Minor or negligible loss of existing landscape elements. Minor alteration to pattern of elements, or perception of landscape pattern. Minor change to key characteristics, or changes to characteristics which are not part of inherent distinctiveness. Development located at long distance outside landscape

Criteria tending towards higher or lower magnitude		
	close to landscape receptor and results in large scale change to its landscape character. Large amount of proposed development visible resulting in higher scale of change.	receptor and result in small scale change to its landscape character. Small amount of proposed development visible resulting in lower scale of change.
Geographical extent of change	**Regional** → **Local** → **Site**	
	Effect of change occurs at a regional scale of the landscape character type or wider landscape types beyond the host landscape. Changes occur over widespread/extensive areas within host landscape type and/or adjacent landscape types.	Effect of change occurs at the local/site level. Changes occur over a limited area within the host landscape type.
Magnitude of Change	**High** → **Medium** → **Low**	

Significance of Effects on Landscape Character Receptors

The significance of the effect on each landscape character receptor is dependent on all of the factors considered in the sensitivity of the receptor and the magnitude of change resulting from the modified TI. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the modified TI will have an effect that is significant or not significant on the landscape character receptor. An assessment of the factors considered in the evaluation of the sensitivity of each landscape character receptor and the magnitude of the change resulting from the modified TI are presented in the assessment in order that the relevant considerations which have informed the significance can be considered transparently. The matrix shown in Table A7.1 helps to inform the threshold of significance when combining sensitivity and magnitude to assess significance.

A significant effect will occur where the combination of the variables results in the modified TI having a defining effect on the receptor. A not significant effect will occur where the effect of the modified TI is not definitive, and the landscape character of the receptor continues to be characterised principally by its baseline characteristics. In this instance the modified TI may have an influence on the receptor and may alter the landscape character, but this influence will not be a defining one. A major loss or irreversible effect over an extensive area, on elements and/or perceptual aspects that are key to the character of nationally valued landscapes are likely to be of greatest significance. Reversible effects, over a restricted area, on elements and/or perceptual aspects that contribute to but are not key characteristics of the character of landscapes that are of lower value, are likely to be of least significance.

Assessment of Visual Effects

The assessment of visual effects is an assessment of how the introduction of the modified TI will affect the views available to people and their visual amenity. The assessment of visual effects is carried out in two parts:

- An assessment of the effects that the modified TI will have on a series of viewpoints that have been selected to represent the views available to people from representative or specific locations within the study area; and
- An assessment of the effects that the modified TI will have from principal visual receptors, including residents of settlements, motorists using roads and people using recreational routes, features and attractions throughout the study area.

The objective of the assessment of effects on visual receptors is to determine what the likely effects of the modified TI will be on the people experiencing views across the study area, and whether these effects will be significant or not significant. The methodology for the assessment of visual effects involves the undertaking of a baseline study, evaluation of sensitivity, magnitude of change and an assessment of significance.

Visual Baseline and Scope Assessment

The visual baseline establishes the area in which the modified TI may be visible, the different groups of people who may experience views of the modified TI, the viewpoints where they will be affected and the nature of the views at those points. The visual baseline describes aspects of the landscape that may be significantly affected, as defined in the EIA Regulations. The baseline description of the groups of people (referred to as visual receptors) and viewpoints that may be affected is primarily determined by the Zone of Theoretical Visibility (ZTV) of the modified TI.

An overview of the visual baseline is described and a scope assessment identifies visual receptors that may experience significant effects, which require to be assessed in full. A full description of the baseline is provided for each visual receptor that may experience significant effects, allowing the full baseline to be described for visual receptors that may be significantly affected. Those receptors which are identified as not having the potential to undergo significant effects are not included in the subsequent detailed assessment, but are noted with reasons given for their exclusion.

The baseline study establishes the visual baseline, including the area from which the modified TI may be visible, the different groups of people who may experience views of the modified TI (visual receptors), the viewpoints where they will be affected and nature of views at these points. The baseline study establishes the visual baseline in relation to the following issues:

- The area from which the modified TI may be visible, that is land from which it may potentially be seen, is established and mapped using an initial ZTV of the modified TI;
- The location, type and number of visual receptors experiencing visibility of the modified TI, the likely views experienced and the activity / occupation they are engaged in;
- Selection of viewpoints from within the ZTV, including representative viewpoints selected to represent the experience of different types of visual receptor and specific viewpoints selected because they are key/promoted viewpoints in the landscape;

- The location, character and type of each viewpoint with an indication of the type of visual receptor likely to be experiencing the view from each viewpoint;
- The nature of the view in terms of both the direction of view towards the modified TI as well as the wider available view, making reference to the principal orientation, focal features, and visible extents in terms of both horizontal degrees and distance;
- The character of the view in terms of its content and composition, its horizontal and vertical scale as well as depth and sense of perspective, important attributes such as prominent skylines and focal points and ultimately identifying the defining patterns and features which characterise the view; and
- The influence of human intervention and how the addition of artefacts and modification through land use affect the baseline situation. This may include operational wind farms where they are a feature of the baseline landscape and visual context.

The visual baseline also describes current pressures that may cause change to the visual amenity of the area in the future, in particular drawing on information for wind energy developments that are not yet present in the landscape, but are at other stages in planning process. Operational and under construction wind energy developments are regarded as part of the baseline visual context. Any changes resulting from the modified TI are assessed within this context in the assessment of landscape and visual effects.

Sensitivity of Visual Receptors

The sensitivity of visual receptors is determined by a combination of the value of the view and the susceptibility of the visual receptors to the change that the modified TI will have on the view.

Value of the View

The value of a view or series of views is a reflection of the recognition and the importance attached either formally through identification on mapping or being subject to planning designations, or informally through the value which society attaches to the view(s). The value of a view is classified as high, medium-high, medium, medium-low or low and the basis for this assessment is made clear using evidence and professional judgement, based on the following criteria:

Formal recognition: The value of views can be formally recognised through their identification on OS or tourist maps as formal viewpoints, sign-posted and with facilities provided to add to the enjoyment of the viewpoint such as parking, seating and interpretation boards. Specific views may be afforded protection in local planning policy and recognised as valued views. Specific views can also be cited as being of importance in relation to landscape or heritage planning designations, for example the value of a view will be increased if it presents an important vista from a designated landscape or lies within or overlooks a designated area such as a National Scenic Area, which implies a greater value to the visible landscape.

Informal recognition: Views that are well-known at a local level and/or have particular scenic qualities can have an increased value, even if there is no formal recognition or designation. Views or viewpoints are sometimes informally recognised through references in art or literature and this can also add to their value. A viewpoint that is visited or used by a large number of people will tend to have greater importance than one gained by very few people, although this is not always the case.

Scenic quality: The value of the view is a reflection of the scenic qualities gained in the view. This relates to the content and composition of the landscape, whereby certain patterns and features will increase the scenic quality and others will reduce the scenic quality. The value of the view will also be increased if the condition of the landscape is near to the optimum for its type.

Susceptibility to Change

Susceptibility relates to the nature of the viewer experiencing the view and how susceptible they are to the potential effects of the modified TI. A judgement to determine the level of susceptibility therefore relates to the nature of the viewer and their experience from that particular viewpoint or series of viewpoints.

Nature of the viewer: The nature of the viewer is described by the occupation or activity which they are engaged in at the viewpoint or series of viewpoints. The most common groups of viewers considered in the visual assessment include residents, road-users, workers and walkers. Viewers whose attention is focused on the landscape – walkers, for example are likely to have a higher sensitivity, as will residents of properties that gain constant views of the modified TI. Viewers travelling in cars or on trains will tend to have a lower sensitivity as their view is transient and moving. The least sensitive viewers are usually people at their place of work as they are less sensitive to changes in the view; however this also depends on the nature of their work and the work place which they occupy.

Experience of the viewer: The experience of the visual receptor relates to the extent to which the viewer's attention or interest may be focused on the view and the visual amenity they experience at a particular location. The susceptibility of the viewer to change arising from the proposed development may be influenced by the viewer's attention or interest in the view, which may be focused in a particular direction, from a static or transitory position, over a long or short duration, and with high or low clarity. For example if the principal outlook from a residential property is aligned directly towards the modified TI, the experience of the visual receptor will be altered more notably than if the experience related to a glimpsed view seen at an oblique angle from a car travelling at high speed. The visual amenity experienced by the viewer varies depending on the presence and relationship of visible elements, features or patterns experienced in the view and the degree to which the landscape in the view may accommodate the influence of the modified TI.

Sensitivity Rating

An overall level of sensitivity is applied for each visual receptor or view – high, medium-high, medium, medium-low, low – by combining individual assessments of the value of the receptor and its susceptibility to change. The basis for the assessments is made clear using evidence and professional judgement in the evaluation of each receptor. Criteria that tend towards higher or lower sensitivity are set out in Table 8.

Table 8: Sensitivity to Change – Visual Receptors

Criteria tending towards higher or lower sensitivity		
Value of the View	**High Value → Medium Value**	**→ Low Value**
	Specific viewpoint identified in OS maps and/or tourist information and signage. Facilities provided at viewpoint to aid the enjoyment of the view. View afforded protection in planning policy. View is within or overlooks a designated landscape, which implies a higher value to the visible landscape. View has informal recognition and well-known at a local level, as having particular scenic qualities. View or viewpoint is recognised through references in art or literature. View has high scenic qualities relating to the content and composition of the visible landscape.	Viewpoint not identified in OS maps or tourist information and signage. No facilities provided at viewpoint to aid enjoyment of the view. View is not afforded protection in planning policy. View is not within, nor does it or overlook, a designated landscape. View has no informal recognition and is not known as having particular scenic qualities. View or viewpoint is not characteristic through references in art or literature. View has low scenic qualities relating to the content and composition of the visible landscape.
Susceptibility to Change	**High Susceptibility → Medium Susceptibility**	**→ Low Susceptibility**
	Viewers such as walkers, or tourists, whose main attention and interest is on their surroundings. Residents that gain static, long-term views of the modified TI in their principal outlook. Viewpoint is visited or used by a large number of people. A view that is focused in a specific directional vista, with notable features of interest in a particular part of the view. A view of an undeveloped landscape with little or no built development and/or human influence. Existing elements, features or patterns in view that will contrast with the modified TI.	Viewers whose main attention is not focused on their surroundings, such as people at work, or specific forms of recreation. Viewers whom are transient and dynamic, such as those travelling in cars or on trains, where the view is of short duration. View is visited or gained by very few people. Open views with no specific point of interest. A view of a developed, industrial landscape where built elements and structures are present. Existing elements, features or patterns in view that may assist with integration of the modified TI.
Sensitivity to Change	**High → Medium**	**→ Low**

Magnitude of Change on Views

The magnitude of change on views is an expression of the scale of the change that will result from the modified TI, and is dependent on a number of variables regarding the size or scale of the change and its geographical extents.

Size or Scale

An assessment is made about the size or scale of change in the view that is likely to be experienced as a result of the modified TI, based on the following criteria:

- The scale of the change in the view, with respect to the loss or addition of features in the view and changes in its composition;
- The distance between the visual receptor and the modified TI. Generally, the greater the distance, the lower the magnitude of change, as the modified TI will constitute a smaller scale component of the view;
- The amount and size of the modified TI that will be seen. Visibility may range from one blade tip to all of the turbines. Generally, the larger the modified TI appears in the view, and the more of the modified TI that can be seen, the higher the magnitude of change;
- The field of view available and the proportion of the view that is affected by the modified TI. Generally, the more of a view that is affected, the higher the magnitude of change will be. If the modified TI extends across the whole of the open part of the outlook, the magnitude of change will generally be higher as the full view will be affected. Conversely, if the modified TI covers just a part of an open, expansive and wide view, the magnitude of change is likely to be reduced as the modified TI will not affect the whole open part of the outlook; and
- The scale and character of the context within which the modified TI will be seen and the degree of contrast or integration of any new features with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. The scale of the landform and the patterns of the landscape, the existing land use and vegetation cover, and the degree and type of development and settlement seen in the view will be relevant. For example, a large-scale simple landform can provide a more appropriate receiving environment than a more intimate, small-scale setting where the modified TI may result in uncomfortable scale comparisons that attract the eye of the viewer and increase the magnitude of change.
- The consistency of the appearance of the modified TI. If the modified TI appears in a similar setting and form and from the same angle each time it is apparent it will be characterised as a single, familiar site and this tends to reduce the magnitude of change. If, on the other hand, it appears from a different angle, and this is seen in a different form and setting, the magnitude of change is likely to be higher as it will be a less familiar component of the landscape.

Geographical Extent

The geographic area over which the visual effects will be experienced is also assessed, which is distinct from the size or scale of effect. The extent of the effects will vary depending on the specific nature of the modified TI and is principally assessed through analysis of the extent of visibility of the modified TI from visual receptors, to assess the geographical extent of the receptor that will be affected, based on the following criteria:

- The distance over which the modified TI may be seen. If the modified TI is visible over long distances, its overall magnitude will be higher than a development which is visible only at short range;
- The extent of the visual receptor that will experience changes through visibility of the modified TI. If the modified TI is visible from a limited part of a settlement, or road for example, the overall magnitude of change on that receptor is likely to be lower than if there were widespread visibility.
- The extent to which the change would affect views, whether this is unique to a particular viewpoint or if similar visual changes occur over a wider area represented by the viewpoint;
- The position of the modified TI in relation to the principal orientation of the view and activity of the receptor. If the modified TI is seen in a specific, directional vista, the magnitude of change will generally be greater, than if it were seen in a glimpsed view at an oblique angle of view.

Magnitude of Change Rating

An overall assessment of the magnitude of change resulting from the modified TI on each visual receptor is made by combining the assessment of size or scale and geographical extent. The basis of the assessment is made clear using evidence and professional judgement. The levels of magnitude of change that can occur on views are defined as follows:

- High, the modified TI will result in a major alteration to the baseline view, providing the prevailing influence and/or introducing elements that are substantially uncharacteristic in the receiving landscape;
- Medium, the modified TI will result in a moderate alteration to the baseline view, providing a readily apparent influence and/or introducing elements that may be prominent but are not uncharacteristic in the receiving landscape;
- Low, the modified TI will result in a minor alteration to the baseline view, providing a slightly apparent influence and/or introducing elements that are characteristic in the receiving landscape; and
- Negligible, the modified TI will result in a negligible alteration to the baseline view, providing a barely discernible influence and/or introducing elements that are substantially characteristic in the receiving landscape.

There may also be intermediate levels of magnitude of change - medium-high and medium-low - where the change falls between two of the definitions. Criteria that tend towards higher or lower magnitude of change are set out in Table 9.

Table 9: Magnitude of Change – Visual Receptors

	Criteria tending towards higher or lower magnitude	
Size or scale of change	**Large → Moderate**	**→ Small**
	Large scale change in the view resulting from loss and/or addition of features and changes in its composition. Proposed development located in close proximity to the viewpoint and will form large scale component of the view. All or majority of the modified TI will be visible in the view e.g. full towers and rotor sweep. Proposed development effects large proportion of available field of view. Proposed development has high degree of contrast/low degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. Proposed development appears inconsistently, in a different setting and/or form each time it is visible.	Small scale change in the view resulting from loss and/or addition of features and changes in its composition. Proposed development located at long distance from the viewpoint and will form small scale component of the view. Limited amount of the modified TI will be visible in the view e.g. extremity of blade tips. Proposed development effects small proportion of available field of view. Proposed development has low degree of contrast/high degree of integration with existing landscape elements, in terms of scale, form, mass, line, height, colour and texture. Proposed development appears consistent, in a similar setting and/or form each time it is visible.
Geographical extent of change	**Extensive/long distance → Scattered/mid-range**	**→Limited/short distance**
	Proposed development is visible over long distances. Proposed development is visible from widespread areas/extensive parts of visual receptor. Visibility/views of proposed development occur over a wider area represented by multiple viewpoints.	Proposed development is visible only at short range. Proposed development is visible from restricted areas/limited parts of visual receptor. Visibility/view of proposed development is unique to a particular location or viewpoint.
Magnitude of Change	**High → Medium**	**→ Low**

The Significance of Effects on Views

The significance of the effect on each view is dependent on all of the factors considered in the sensitivity of the view and the magnitude of change resulting from the modified TI. These judgements on sensitivity and magnitude are combined to arrive at an overall assessment as to whether the modified TI will have an effect that is significant or not significant on the visual receptor. The matrix shown in Table A7.1 helps to inform the threshold of significance when combining sensitivity and magnitude to assess the significance of effect.

A significant effect will occur where the combination of the variables results in the modified TI having a defining effect on the view. A not significant effect will occur where the appearance of the modified TI is not definitive, and the view continues to be defined principally by its baseline characteristics. In this instance the modified TI may affect the appearance of the view, but this effect will not be a defining one. Irreversible, long-term effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant, as are effects on people at recognised viewpoints with high scenic quality. Large-scale changes which introduce new, non-characteristic or discordant elements into the view are also more likely to be significant than small changes or changes involving features already present within the view.

The assessment of visual effects assumes clear weather and optimum viewing conditions. This means that effects that are assessed to be significant may be not significant under different, less clear conditions. Viewing conditions and visibility tend to vary considerably and therefore the likelihood of effects resulting from the modified TI will vary greatly dependent on the prevailing viewing conditions.

Assessment of Cumulative Landscape and Visual Effects

Introduction

Cumulative effects arise where the study areas for two or more projects or developments overlap so that both of the developments are experienced at a proximity where they may have a greater incremental effect, or where developments may combine to have a sequential effect, irrespective of any overlap in study areas.

The objective of the Cumulative Landscape and Visual Impact Assessment (CLVIA) is to describe, visually represent and assess the ways in which the modified TI will have additional effects when considered together with other developments and to identify related significant cumulative effects arising as a result of the modified TI. The guiding principle in preparing the CLVIA is to '*focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process'* (SNH, 2012), in accordance with SNH guidance.

Cumulative Effect Scenarios Assessed

The objective of the Cumulative Impact Assessment (CIA) is to describe, visually represent and assess the ways in which the modified TI will have additional effects on SL&V receptors when considered together with other existing, consented or proposed developments and to identify related significant cumulative effects arising from the modified TI. The guiding principle in preparing the CIA of SL&V receptors is to focus on the likely significant effects and in particular those which are likely to influence the outcome of the consenting process, in accordance with the EIA Regulations.

The main SLVIA (Section 5.3.4) assesses the effect of the modified TI in addition to developments already present in the landscape. This scenario involves the assessment of the addition of the modified TI to the existing baseline which includes operational wind energy developments.

An additional CIA has been undertaken to assess the likely significant cumulative effects of the OfTI and OnTI elements of the modified TI and the three consented wind farms. An assessment of the likely significant cumulative effects of the modified TI with consented projects and unconsented planning applications has also been undertaken, which includes onshore wind energy developments (identified in Figure 5.3.38).

Types of Cumulative Effect

Cumulative effects on landscape character arise when two or more projects or development, through the introduction of new landscape features, change the key characteristics of a landscape or change it to such an extent that they create a different 'landscape type. Developments may also have a cumulative effect on the character of landscapes that are designated for their landscape value.

Cumulative effects on visual amenity consist of combined and sequential effects. Combined visibility occurs where the observer is able to see two or more developments from one viewpoint. Combined visibility may either be 'in combination', where several projects or developments are within the observer's main angle of view at the same time, or 'in succession', where the observer has to turn to see the various projects or developments. Sequential visibility occurs when the observer has to move to another viewpoint to see different developments. Sequential effects are assessed along regularly used routes such as major roads, railway lines and footpaths. The occurrence of sequential effects range from 'frequently sequential' (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to 'occasionally sequential' (long time lapses between appearances, because the observer is moving slowly and/or there are large distances between the viewpoints).

Assessing the Significance of Cumulative Landscape and Visual Effects

The significance of cumulative effects is determined through a combination of the sensitivity of the landscape receptor or visual receptor and the cumulative magnitude of change resulting from the modified TI. The sensitivity of landscape receptors and visual receptors is taken from the main assessment carried out in the SLVIA. The cumulative magnitude of change is assessed with additional criteria, as described below.

Cumulative Magnitude of Change

The cumulative magnitude of change is an expression of the degree to which landscape character receptors and visual receptors will be changed by the addition of the modified TI in addition to other projects and developments. The cumulative magnitude of change is assessed based on a number of criteria, set out as follows:

- The location of the modified TI in relation to other projects or developments. If the modified TI is seen in a part of the view that is not affected by another project or development, this will generally increase the cumulative magnitude of change as it will extend development influence into an area that is currently unaffected. Conversely, if the modified TI is seen in the context of other projects or developments, the cumulative magnitude of change may be lower as it is not extending development to undeveloped parts of the outlook;

- The extent of the developed skyline. If the modified TI will add notably to the developed skyline in a view, the cumulative magnitude of change will tend to be higher, as the appearance of the skyline has a particular influence on both views and landscape receptors;
- The number and scale of developments seen simultaneously or sequentially. Generally, the greater the number of clearly separate projects or developments that are visible, the higher the cumulative magnitude of change will be. The addition of the modified TI to a view where a greater number of smaller projects or developments are apparent will usually have a higher cumulative magnitude of change than a view of one or two large developments, as this can lead to the impression of a less co-ordinated or strategic approach;
- The scale comparison between developments. If the modified TI is of a similar scale to other visible projects or developments, particularly those seen in closest proximity to it, the cumulative magnitude of change will generally be lower, as it will have more integration with the other sites and will be less apparent as an addition to the cumulative situation;
- The consistency of image of the modified TI in relation to other projects or developments. The cumulative magnitude of change of the modified TI is likely to be lower if its form, arrangement and layout are broadly similar to other projects or developments in the landscape, as they are more likely to appear as relatively simple and consistent components of the landscape;
- The context in which the projects or developments are seen. If projects or developments are seen in a similar landscape context, the cumulative magnitude of change is likely to be lower due to visual integration and cohesion between the sites. If projects or developments are seen in a variety of different landscape settings, this can lead to a perception that wind farm development is unplanned and uncoordinated, affecting a wide range of landscape characters.
- The distance of the modified TI from the viewpoint or receptor. As in the assessment of the modified TI itself, the greater the distance, the lower the cumulative magnitude of change will tend to be; and
- The magnitude of change of the modified TI as assessed in the main assessment. The lower this is assessed to be, the lower the cumulative magnitude of change is likely to be. Where the modified TI itself is assessed to have a negligible magnitude of change on a view or receptor there will not be a cumulative effect as the contribution of the modified TI will equate to the 'no change' situation.

Definitions of cumulative magnitude of change are applied in order that the process of assessment is made clear. These are:

- High, the addition of the modified TI to other projects or developments in the landscape or view, will result in a major cumulative change, loss or addition to the cumulative situation;
- Medium, the addition of the modified TI to other projects or developments in the landscape or view will result in a moderate cumulative change, loss or addition to the cumulative situation;

- Low, the addition of the modified TI to other projects or developments in the landscape or view will result in a minor cumulative change, loss or addition to the cumulative situation;
- Negligible, where the addition of the modified TI to other projects or developments in the landscape or view will result in a negligible change, loss or addition to the cumulative situation; and
- None, where the addition of the modified TI to other projects or developments in the landscape or view will have no incremental change, loss or addition to the cumulative situation and its addition equates to a 'no change' situation.

There may also be intermediate levels of cumulative magnitude of change – medium-high and medium-low – where the change falls between two of the definitions.

Significance of Cumulative Effects

The objective of the cumulative assessment is to determine whether any effects that the modified TI will have on landscape receptors and visual receptors, when seen or perceived in combination with other projects or developments, will be significant or not significant. Significant landscape and visual effects may arise where a new landscape type is created as a result of the addition of the modified TI to other projects or developments, which results in a development typology becoming so prolific that they become the prevailing landscape and visual characteristic.

Less extensive, but nevertheless significant cumulative landscape and visual effects may also arise as a result of the addition of the modified TI, where it results in a landscape or view becoming defined by the presence of more than one projects or developments, so that other patterns and components are no longer definitive, or where the modified TI contrasts with the scale or design of other projects or developments.

Higher levels of significance may arise from cumulative landscape and visual effects related to the modified TI being in close proximity to other projects or developments when they are clearly visible together in views, however provided that the modified TI is designed to achieve a high level of visual integration, with few notable visual differences between projects or developments, these effects may not necessarily be significant. Higher levels of significance may result from developments that have some geographical separation, but remain highly inter-visible, potentially resulting in extending effects into new areas, such as an increased proliferation of development on a skyline, or the creation of multiple, separate landscapes defined by a particular type of development.

Nature of Effects

The nature of effects refers to whether the landscape and/or visual effect of the modified TI is positive or negative (herein referred to as 'beneficial' and 'adverse').

The EIA Regulations state that the ES should include '*a description of the likely significant effects of the proposed development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the proposed development.*'

Guidance provided by the Landscape Institute on the nature of effect in GLVIA3 states that '*in the SLVIA, thought must be given to whether the likely significant landscape and visual effects are judged to be positive (beneficial) or negative (adverse) in their consequences for landscape or for views and visual amenity'*, but it does not provide guidance as to how that may be established in practice. The nature of effect is therefore one that requires interpretation and, where applied, this involves reasoned professional opinion.

Judgements on the nature of effect are based on professional experience and reasoned opinion informed by best practice guidance.

Adverse, neutral or beneficial, effects are based on the following definitions:

- Beneficial effects contribute to the landscape and visual resource through the enhancement of desirable characteristics or the introduction of new, beneficial attributes. The modified TI contributes to the landscape by virtue of good design, even if it contrasts with the existing character. The removal of undesirable existing elements or characteristics can also be beneficial, as can their replacement with more appropriate components;
- Neutral effects occur where the modified TI fits with the existing landscape character or visual amenity. The modified TI neither contributes to nor detracts from the landscape and visual resource and can be accommodated with neither beneficial or adverse effects, or where the effects are so limited that the change is hardly noticeable. A change to the landscape and visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation;
- Adverse effects are those that detract from the landscape character or quality of visual attributes experienced, through the introduction of elements that contrast, in a detrimental way, with the existing characteristics of the landscape and visual resource, or through the removal of elements that are key in its characterisation.

Duration and Reversibility

The effects of the modified TI are of variable duration, and are assessed as short-term or long-term, and permanent or reversible.

6 Visual Representations

Zone of Theoretical Visibility (ZTV)

The Zone of Theoretical Visibility (ZTV) of the onshore substations has been generated using Geographic Information System (GIS) software (ESRI ArcGIS Version 10.2.2) to demonstrate the amount of the development that may theoretically be seen from any point in the study area.

There are limitations in this theoretical production, and these should be considered in the interpretation and use of the ZTV:

- The ZTV illustrates the 'bare ground' situation, and does not take into account the screening effects of vegetation, buildings, or other local features that may prevent or reduce visibility;
- The ZTV is based on a 5m data grid (Ordnance Survey (OS) Digital Terrain 5 Model (DTM)) and therefore does not pick up some subtle changes in the landform, which may result in minor inaccuracies in the analysis; and
- The ZTV does not indicate the decrease in visibility that occurs with increased distance from the modified TI. The nature of what is visible from 1 km away will differ markedly from what is visible from 6 km away, although both may be indicated on the ZTV has having the same level of visibility.

These limitations mean that while the ZTV is used as a starting point in the assessment, providing an indication of where the modified TI will theoretically be visible, the information drawn from the ZTV is checked in the field, to ensure that the assessment conclusions represent the visibility of the modified TI reasonably accurately.

Visualisations

The viewpoint assessment is illustrated by a range of tools including photographs and photomontages. The photographs used to produce the photomontages have been taken using a Canon EOS 5D Digital SLR camera with a fixed 50mm lens. This camera has a full-frame (35 mm negative size) CMOS sensor, therefore with a fixed 50mm lens, it provides a focal length that is widely regarded as best practice, based on relevant guidance (Landscape Institute, 2011).

The photographs are taken at a height of around 1.6m above ground level with a 50% overlap between frames. The frames are individually cylindrically projected and then digitally joined to create a fully cylindrically projected panorama using Adobe Photoshop software. This process avoids the wide-angle effect that would result should these frames be arranged in a perspective projection, whereby the image is not faceted to allow for the cylindrical nature of the full 360-degree view but appears essentially as a flat plane. For this reason the most representative image of the appearance of the modified TI is obtained by curving the images or by viewing all parts of the panoramic images at a constant distance in order to maintain the correct viewing distance for all parts of the view. Tonal alterations are made using Adobe software to create an even range of tones across the photographs once joined.

Visual representations that illustrate the modified TI model set within a computer-generated image of the landform are used in the assessment to predict the theoretical appearance of the onshore substation. These are produced with Visual Nature Studio software and are based on 5 m resolution OS Terrain 5 DTM.

The layout of the onshore substations has been modelled in the visual representations using several 'development envelopes' related to the height, width and depth of each part of the substation 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 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 substation and the TO substation and to differentiate between buildings and external electrical equipment. The colours shown are not indicative of the colour of the substation buildings.

The position of the development envelopes on the landform has been shown relative to their position on the OS Terrain 5 DTM and are a representation of the maximum height of the onshore substation buildings and electrical infrastructure within the site. In reality the onshore substations compound is likely to be profiled to a level platform with screening earthworks profiled around the onshore substations compound. This would further reduce visibility of the onshore substations in views.

Woodland planting mitigation proposals within the onshore substations area are shown in the visual representations to provide an indication of the likely screening of the onshore substation 15 years post construction. These visual representations assume a woodland height of 6 – 10m and a 2 m planting density.

The photographs and visualisations shown for each viewpoint cover a 72-degree view as it allows the modified TI to be seen in the context of the surrounding landscape, including familiar features and components of the setting. When reproduced at A3 scale, as is the case in this assessment, the 72-degree view photographs and photomontages should be viewed from a distance of around 32cm in order to gain as accurate an impression as possible of the real effect on the views.

The photographs and other graphic material such as wirelines and photomontages used in this assessment are for illustrative purposes only and, whilst useful tools in the assessment, are not considered to be completely representative of what will be apparent to the human eye. The assessments are carried out from observations in the field and therefore may include elements that are not visible in the photographs.

7 References

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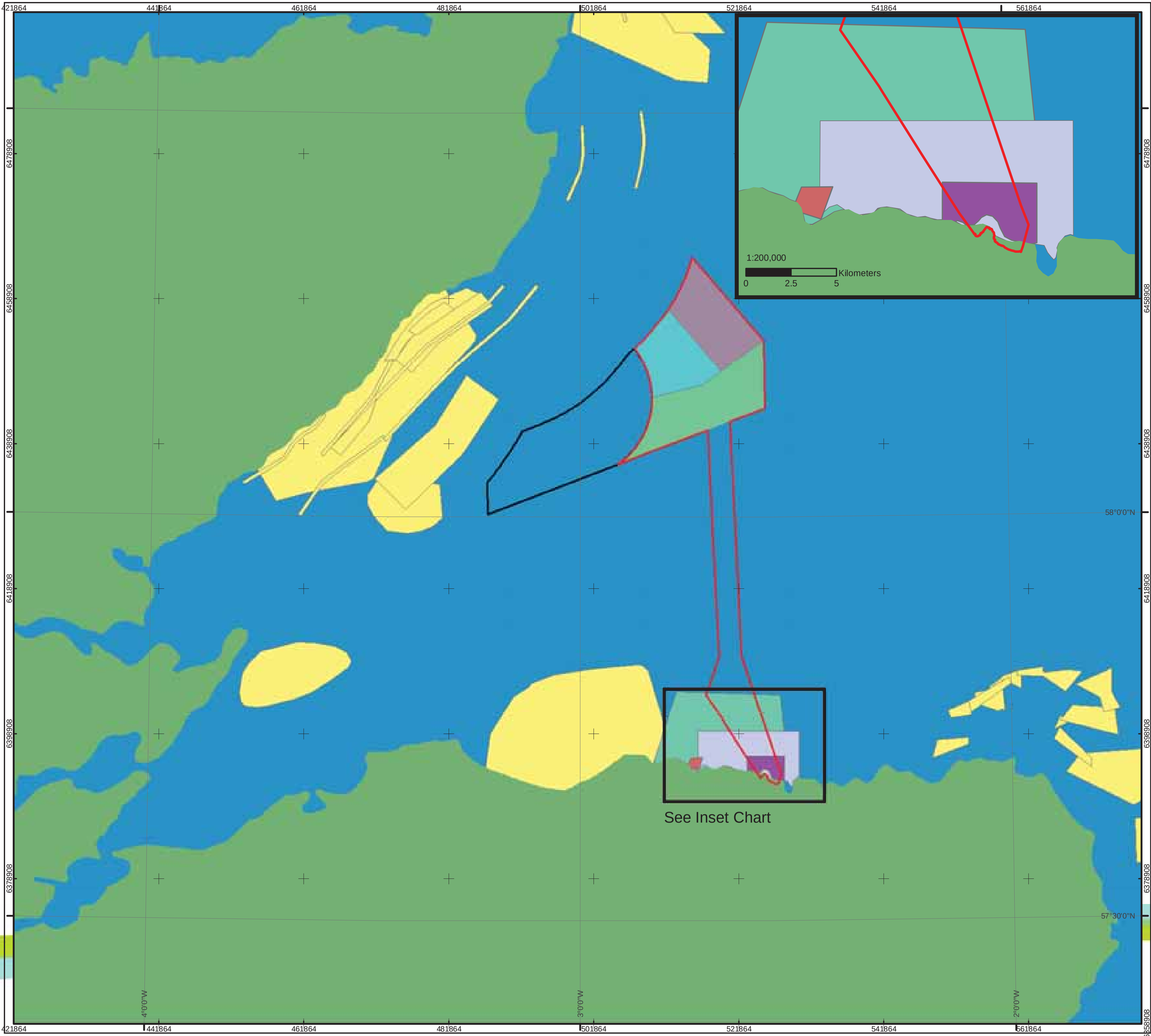

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KEY

- Modified Offshore Transmission Infrastructure
- MacColl
- Stevenson
- Telford
- Western Development Area
- Inverboyndie Landfall Site (5 vessel)

Creel Grounds

- Sandend Landfall Site (1 vessels)
- Inverboyndie Landfall Site (1 vessel)
- Inverboyndie Landfall Site (1 vessel)
- Previosly Collected Creel Grounds (2011)

Horizontal Scale: 1:500,000 A3 Chart

0 12,000 24,000 Meters

Geodetic Parameters: WGS84 UTM Zone 30N

Produced: RP
Reviewed: ES
Approved: PM

Date: 18/06/2014 | Revision: C

REF: 8460001-PSO0162-BMM-MAP-029

Figure 5.33
Creel Fishing Grounds

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