FOREWIND

DOGGER BANK
TEESSIDE A & B

March
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Environmental Statement Chapter 18 Appendix B Archaeological Written Scheme of Investigation

Application Reference 6.18.2

Dogger Bank Teesside A & B
Archaeological Written Scheme of Investigation (Offshore)

Prepared for:
Forewind Ltd.
Davidson House
Forbury Square
Reading
RG1 3EU

Prepared by:
Wessex Archaeology
Portway House
Old Sarum Park
Salisbury
WILTSHIRE
SP4 6EB

www.wessexarch.co.uk

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This Written Scheme of Investigation was written by Victoria Cooper and figures were created by Kitty Brandon. Quality control was carried out by John McCarthy. The project was managed for Wessex Archaeology by Nikki Cook and Victoria Cooper.

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1 INTRODUCTION

1.1.1 Dogger Bank Teesside A & B is the second stage of development in the Dogger Bank Zone of The Crown Estate's Round Three licences for UK offshore wind farms. Development rights to the Dogger Bank Zone were awarded by The Crown Estate to Forewind Limited (Forewind), a consortium comprising RWE Npower Renewables Ltd, SSE Plc, Statoil and Statkraft, in January 2010.

1.1.2 Dogger Bank Teesside A & B comprises two offshore wind farms, each with a generating capacity of up to 1.2GW, which will connect into the national grid just south of the Tees Estuary. The Dogger Bank Teesside A & B projects will have a total combined generating capacity of up to 2.4GW (***Figure 1***):

- *Dogger Bank Teesside A is located within the eastern part of Tranche B, with a size of 560km² and with closest point from shore at 196km.*
- *Dogger Bank Teesside B which straddles Tranche A and Tranche B, with the majority of the project located in Tranche B. It is 593km² and is 165km from shore at its closest point.*

1.1.3 Forewind has identified four 'tranches' to define potential project locations and to allow for survey planning. Dogger Bank Creyke Beck A & B, the first stage of development of the Dogger Bank Zone, is located within Tranche A. Dogger Bank Teesside C & D are located in Tranche C (***Figure 1***).

1.1.4 Export cables will be installed within a corridor (***Figure 1***) linking the wind farms to the cable landfall on Teesside coastline located between Redcar and Marske-by-the-Sea.

1.1.5 Forewind has also identified the need for Temporary Working Areas (TWAs) for use during construction and maintenance, within which vessels may carry out intrusive activities such as deploying anchors or jack-up legs as part of the construction process. These TWAs have been defined as 750m either side of the export cable corridor, tapering in the nearshore area to just over 200m at the landfall, and 1000m around the Teesside project boundaries (***Figure 1***). These areas have not been subject to full geophysical survey.

1.1.6 An Environmental Statement for Dogger Bank Teesside A & B has been prepared and submitted for both the onshore and offshore elements of the project. Wessex Archaeology was commissioned by Forewind to undertake the Environmental Impact Assessment (EIA) for marine and coastal archaeology below Mean High Water. The impact assessment informs ***Chapter 18*** of the Environmental Statement and is included as ***Appendix 18A*** to the Environmental Statement.

1.1.7 The impact assessment was undertaken using the worst case scenario in line with the Rochdale Envelope approach to EIA. This allows for the full range of development options for Dogger Bank Teesside A & B to be assessed. The approach also incorporates the application of mitigation to ensure that significant impacts will not occur.

1.1.8 This WSI has been prepared by Wessex Archaeology on behalf of Forewind in support of their objective to prevent significant impacts to archaeological receptors.

1.1.9 Reference is made to Forewind as the developer throughout this WSI. However, from the point of consent, Dogger Bank Teesside A & B will be taken forward to construction by two special purpose companies known as Bizco 2 and Bizco 3. All responsibilities thus set out for Forewind will subsequently apply to Bizco 2 and Bizco 3. This will also apply to any future operating companies responsible for the construction, operation and decommissioning of Dogger Bank Teesside A & B and, hence, for the implementation of this WSI.

1.1.10 This report comprises:

- *an overview of development parameters relevant to marine and coastal archaeology below Mean High Water;*
- *a summary of the known and potential archaeological baseline;*
- *an outline of the potential impacts to archaeological and cultural heritage receptors from the construction, operation and decommissioning of Dogger Bank Teesside A & B;*
- *a description of the mitigation proposed by Forewind to prevent significant impacts occurring;*
- *a statement on the roles and responsibilities in implementing, monitoring and updating this WSI; and*
- *the scheme of investigations for mitigation and monitoring.*

1.1.11 In its current form, this WSI encompasses the wide range of development options under consideration by Forewind for inclusion in the Development Consent Order (DCO) to allow post-consent flexibility in the final project design. As such, this high level WSI addresses all possible requirements for archaeological consideration at all stages of development of Dogger Bank Teesside A & B. Scheme specific WSIs will be produced for each of the Dogger Bank Teesside projects once the scheme design has been finalised. The scheme specific WSIs will detail the specific packages of archaeological works that have been agreed. Individual method statements for each package of works will be produced to detail the nature of archaeological works to be carried out, as set out in ***Section 8.2***.

1.1.12 This document and the scheme specific WSIs will be monitored and updated throughout the consents and post-consent process to ensure that the scheme of investigation is appropriate to the final project design.

2 DEVELOPMENT DESCRIPTION

2.1 Construction

2.1.1 Each of the proposed offshore wind farm projects will have an installed generating capacity of up to 1,200 MW. As set out in ***Chapter 5*** of the Environmental Statement for Dogger Bank Teesside A & B (*Project Description*), the offshore elements for each project would comprise:

- *up to 200 wind turbines and supporting tower structures (400 maximum);*
- *wind turbine foundations and associated support and access structures;*
- *one offshore converter platform, and associated foundation (2 maximum);*
- *up to four offshore collector platforms, and associated foundations (8 maximum);*
- *up to two offshore accommodation or helicopter platform(s) for operations and maintenance activities, and associated foundations (4 maximum);*
- *subsea inter-array cables (950km maximum per project, 1,900km maximum):*
  - *between the wind turbines;*
  - *between wind turbines and offshore collector platforms;*
  - *between wind turbines and offshore converter platform; and*
  - *linking to meteorological stations and accommodation platforms.*
- *inter-platform cable connections (320km maximum per project, 640km maximum):*
  - *between offshore collector platforms; and*
  - *between offshore collector platforms and High Voltage Direct Current (HVDC) offshore converter platforms.*
- *offshore export cable systems, carrying power from the offshore HVDC converter platforms to the landfall(s) (573km maximum for Teesside A, 484km maximum for Teesside B, 1057km maximum);*
- *crossing structures at the points where project cables cross existing subsea cables and pipelines or other Dogger Bank project cables;*
- *up to five offshore meteorological monitoring stations (10 maximum);*
- *protection against scour and subsea foundation damage (where necessary);*
- *cable protection measures (where necessary); and*
- *up to ten vessel mooring buoys (20 maximum).*

2.1.2 A wide range of foundation options (categorised as types of monopole, multileg or gravity base) are under consideration for the wind turbines, platforms and other offshore structures. The final selection will be made in considerations of factors including the selected wind turbine type or platform size, ground conditions, water depth, the wind, wave, current and tidal regime, economic factors at the time of design and construction, and the results of the environmental assessment.

2.1.3 The final chosen layout of the wind turbines will depend upon factors including stakeholder feedback, seabed obstructions, ground conditions, water depth, economic factors, and the chosen wind turbine.

2.1.4 Seabed preparation may be required in some conditions and for some foundations types, most commonly for gravity base structures. This could include:

- *removal of soft, mobile, or uneven sediments (typically using suction dredging);*
- *the levelling of the seabed without removal of sediments; and*
- *installation of a stone or aggregate foundation bed as an alternative levelling strategy or to ensure full baseplate contact with the seabed.*

2.1.5 The seabed conditions for Dogger Bank Teesside A & B are such that only limited seabed preparation is anticipated.

2.1.6 The installation of offshore cables is expected to comprise:

- *pre-installation survey;*
  - *geophysical surveys conducted approximately 3-6 months prior to the marine installation works; and*
  - *visual inspection and confirmation of the route may be carried out using an ROV.*
- *route clearance (options include pre-lay grapnel run or the use of ROVs or grabs to remove obstacles at the surface);*
- *cable lay and burial (ploughing, jetting, mechanical trenching or mass flow excavation);*
  - *direct burial during the laying campaign (cables laid and buried as part of a single activity);*
  - *pre-trenching (trenches created separately in advance, cables then subsequently laid into the trenches as a separate activity); or*
  - *post-lay burial (cables laid separately in advance, cables then subsequently buried as a separate activity).*
- *remedial cable protection (if required), options include:*
  - *rock or gravel protection;*
  - *concrete mattresses;*
  - *flow energy dissipation devices (used to describe various solutions that dissipate flow energy and entrap sediment, and including options such as frond mats, and mats of large linked hoops);*
  - *protective aprons or coverings (solid structures of varying shapes, typically prefabricated in concrete or high-density plastics), and;*
  - *bagged solutions, (including geotextile sand containers, rock-filled gabion bags or nets, and grout bags, filled with material sourced from the site or elsewhere).*
- *cable and pipeline crossings (if required), common options include one or a combination of:*
  - *pre-lay and post-lay concrete mattresses;*
  - *pre-lay and post lay rock dumping;*
  - *pre-lay steel or concrete structures; or*
  - *pre-constructed HDPE castings or other innovative approaches.*

- *post-installation survey.*

2.1.7 Pre-installed permanent moorings at intervals around the project area may also be required. The single buoy mooring under consideration consists of a single floating buoy, fixed to the seabed by a system of one or more anchors.

2.1.8 This WSI also addresses the cable landfall where the offshore export cables will come ashore to connect to the onshore cable systems. The method assessed in the Environmental Statement is to use the Horizontal Directional Drilling (HDD) technique, starting from the transition bay location, drilling under the cliffs and beach, then exiting in the seabed. In some cases it may be necessary for the HDD to exit on the beach which would require additional works such as the installation of cofferdams and open cut trenching, to reach the sub-tidal zone.

2.1.9 A wide range of vessels will be required during the construction phase although precise details of the vessels that will be used and their total numbers and movements will not be known until the technical specifications and construction contracts have been finalised. The types of vessels are likely to comprise:

- *large and medium crane vessels, both floating (using dynamic positioning or anchor spreads) and jack-up type;*
- *logistics, transportation and feeder vessels;*
- *tugs and anchor handling vessels;*
- *hotel and accommodation vessels;*
- *personnel transfer craft (including for commissioning activities);*
- *dredging, seabed preparation, and aggregate handling craft;*
- *diving support vessels;*
- *guardships;*
- *general offshore and subsea construction vessels, plus associated ROVs;*
- *cable installation and maintenance vessels; and*
- *survey vessels, suitable for the range of pre and post-construction survey activities.*

2.1.10 Vessels may be required to deploy anchors or to jack-up into position during activities to secure their position.

2.2 Operation and Maintenance

2.2.1 Once operational the wind farms will require regular planned and unplanned maintenance throughout their lifetimes. A wide range of vessels may be required including:

- *offshore support vessels, (general purpose large offshore O&M support vessel, potentially including accommodation, parts storage, medium crane, and personnel transfer capabilities;*
- *offshore motherships (with potentially similar capabilities to offshore support vessels, plus the ability to launch and recover small crew transfer vessels (daughter-craft);*

- *offshore accommodation or floatel vessels (specialised version of offshore support vessels, focussed on providing accommodation and welfare facilities);*
- *crew transfer vessels (between vessels and/or offshore structures, may also have other general O&M capabilities);*
- *large offshore crane vessels (major offshore construction vessels, potentially jack-up, semi-submersible, or other hull forms).*
- *cable maintenance and repair vessels; and*
- *general purpose, support, and survey vessels (including tugs, guardships, and anchor handlers to support large vessel operations, also survey vessels, small cargo and parts transportation, and various specialised and general-purpose vessels as required to support the operation of Dogger Bank Teesside A & B).*

2.2.2 Vessels may be required to deploy anchors or to jack-up into position during activities to secure their position.

2.2.3 Precise details of the vessels that will be used and their total numbers and movements will not be known until the technical specifications and operations and maintenance contracts have been finalised.

2.2.4 No planned maintenance activity for the cables or landfall is envisaged during the operational phase of the project.

2.3 Decommissioning

2.3.1 The Crown Estate's leases for the Dogger Bank Teesside A & B wind farms currently have durations of 50 years although manufacturers of the key wind farm components, including wind turbines and offshore platforms, typically design for an operational life of 20 to 30 years. However, if operational circumstances allow, it may be possible for a component to operate beyond the original design life. For example, the design life may in practice be longer than originally assumed or key turbine components may be replaced due to routine maintenance or as part of a planned life extension programme. This may allow the predicted operational life to be extended. It is also possible that the wind farm may be replanted at the end of its design life of 20 to 30 years (subject to a new planning consent application).

2.3.2 At the end of the wind farm's life, decommissioning may be undertaken that broadly follows a reverse programme to the construction process. Final decommissioning of the Dogger Bank Teesside A & B components or their replacements would be expected to take place at the end of The Crown Estate lease term. A decommissioning plan will be produced taking into account the latest technological advances as well as legislative and environmental requirements at the time that the work is due to be undertaken.

2.3.3 Preliminary decommissioning plans for some key components of Dogger Teesside A & B include the following:

- *decommissioning of the foundations:*
  - *piled foundations cut below seabed and protruding section removed;*
  - *it may be preferable to leave gravity bases in place, removal using heavy lift vessel if considered necessary; and*
  - *use of a pump system to release suction bucket foundations.*

- *it may be preferable to leave scour protection and subsea protection in place, if considered necessary, removal may include:*
  - *dredging of the scour protection;*
  - *recovery of individual boulders (rock fill) using a grab vessel; and*
  - *recovery of other systems such as frond mats, concrete aprons, or proprietary cable protection systems, onto a crane vessel.*
- *It is envisaged that buried cables will be left in place, if considered necessary removal may include:*
  - *mass flow excavation;*
  - *grapnels; or*
  - *other available future techniques.*

2.3.4 Landfall infrastructure will be left in-situ where considered appropriate.

3 BASELINE SUMMARY

3.1 Introduction

3.1.1 The baseline data for marine and coastal archaeology has been set out in **Chapter 18** of the Environmental Statement for Dogger Bank Teesside A & B.

3.1.2 Three study areas were established by Wessex Archaeology (***Figure 1***):

- *Dogger Bank Teesside A Marine Study Area (MSA): boundary of Teesside A plus a 1km buffer incorporating the TWA (not extending beyond the eastern boundary of the Dogger Bank Zone);*
- *Dogger Bank Teesside B MSA: boundary of Teesside B plus a 1km buffer incorporating the TWA; and*
- *Export Cable Corridor MSA: boundary of the export cable corridor plus a 750m buffer incorporating the TWA and the intertidal zone at the landfall up to Mean High Water.*

3.1.3 The baseline within these study areas was established with reference to:

- *Archaeology at the landfall;*
- *Submerged Prehistory;*
- *Maritime Archaeology;*
- *Aviation Archaeology; and*
- *Historic Seascape Character.*

3.1.4 The principal sources consulted during the archaeological assessment were:

- *seabed and sub-seabed geophysical survey datasets gathered for the current development;*
- *geotechnical data gathered for the current development;*
- *the United Kingdom Hydrographic Office (UKHO) records of charted wrecks and obstructions;*
- *records held by the National Record of the Historic Environment (NRHE);*
- *records held by the Redcar and Cleveland Historic Environment Record (HER);*
- *modern Admiralty and geological charts relevant to the MSA; and*
- *secondary sources relating to previous archaeological and geophysical work in the region and including both academic papers and unpublished reports that are in the public domain.*

3.1.5 Data from the consulted sources was combined and assessed to produce gazetteers of all sites, finds and geophysical anomalies with the study areas and presented in ***Appendix 18A*** of the Dogger Bank Teesside A & B Environmental Statement. A summary of the findings are presented below.

3.2 Archaeology at the Landfall

3.2.1 Archaeological sites and findspots at the landfall are illustrated in ***Figure 2***.

3.2.2 There are ten records of sites and findspots that fall within the intertidal zone of the cable corridor MSA at the landfall. Two are located within the export cable corridor:

- ***WA1003****: World War II weapons pit (destroyed); and*
- ***WA1004****: World War II earth trench (destroyed).*

3.2.3 Eight are located within the 750m buffer:

- ***WA1002****: World War II anti-tank Cube (demolished);*
- ***WA1005****: World War II Type 23 pillbox (demolished);*
- ***WA1006****: World War II earth trench (destroyed);*
- ***WA1007****: World War II weapons pit (destroyed);*
- ***WA1008****: World War II minefield (destroyed);*
- ***WA1009****: findspot of a Neolithic-Bronze Age domesticated cattle bone;*
- ***WA1010****: World War II weapons pit (destroyed); and*
- ***WA1010****: World War II weapons pit (destroyed).*

3.2.4 During a site visit by Wessex Archaeology no archaeological remains were seen at any of the recorded locations. Structural debris that may be associated with the destroyed World War II installations was observed including:

- *worn brick, tile and concrete fragments along beach;*
- *concrete base at 239756 6058062 (UTM31N) possible associated with pillbox* ***WA1005****;*
- *remains of steps at 239704 6058091 (UTM31N) possibly associated with a former cliff top structure;*
- *concrete anti-tank cube at 239486 6058302 (UTM31N) possibly associated with* ***WA1002****; and*
- *line of shaped rocks of unknown purpose at date 239900 6057986 (UTM31N).*

3.2.5 None of these observed features are located below Mean High Water and do not, therefore, fall within the scope of this WSI.

3.2.6 There is potential for further archaeological material to be buried within the beach. This material is most likely to comprise derived artefacts and structural debris associated with destroyed features, eroded from the cliffs or washed up on the beach from the sea. There may also be potential for *in situ* and derived prehistoric material beneath the marine sands as discussed below.

3.3 Prehistory

Known Archaeological Receptors

3.3.1 There are no known prehistoric sites or finds from offshore contexts within the MSAs.

Potential Archaeological Receptors

3.3.2 The archaeological assessment of geophysical data and geotechnical data has demonstrated potential for the discovery of prehistoric material, artefactual and palaeoenvironmental, associated with later Pleistocene and early Holocene deposits and palaeogeographic features. Four phases of features have been identified within Tranche B that correspond to features previously recorded in Tranche A (Phase Ia, Phase Ib, Phase II and Phase III) (***Figure 3*** and ***Figure 4***).

3.3.3 From the later Pleistocene there is minimal potential for archaeological remains within discrete areas of Yarmouth Roads Formation, Egmond Ground Formation and Eem Formation if present.

3.3.4 At the base of the Holocene sediments, a pre-transgression land surface was identified in the geophysical data assessed for Tranche A (Wessex Archaeology 2013a). There is potential that evidence for post-glacial recolonisation of the area by humans may be found associated with these terrestrial surfaces that survived the subsequent marine transgression.

3.3.5 Phase Ia and Phase Ib palaeolandscape features are interpreted as being part of an exposed terrestrial environment which is likely to have been inhabited by human populations and are of high archaeological and palaeoenvironmental potential.

3.3.6 Phase II shows a less extensive fluvial system overlying the silted up remains of the Phase Ia channel complexes. Although they are interpreted as being terrestrial features likely to have been created during a period of human occupation, their interpretation is less certain and their sandier fill is less likely to preserve palaeoenvironmental material. However, they still potentially contain some material, possibly both *in-situ* and derived, of both archaeological and palaeoenvironmental interest.

3.3.7 The origin of the Phase III features is less certain, possibly representing scours associated with the last marine transgression or relict sub-glacial valleys. The archaeological potential of these features is uncertain.

3.3.8 Further features have been seen in the export cable corridor data (***Figure 5***). The features of highest archaeological potential have been identified close to the landfall at Redcar. These small channel features, possibly represent the original offshore course of Skelton Beck, which flows into the North Sea along the coast at Saltburn-by-the-Sea.

3.3.9 Significant palaeoenvironmental potential has also been recognised across the Study Area. Upper organic sediments within one of the boreholes (BH1282) assessed as part of the geoarchaeological review, sampled from 2.00 to 3.48m overlying the glacial Dogger Bank sediments have been shown to be the earliest dated (post Devensian Glacial maximum *c*.18,000 BP) organic deposits in the Dogger Bank area.

3.3.10 The full assessment and interpretation of the potential for submerged prehistory is presented in ***Chapter 18*** (***Section 4.2***) and ***Appendix 18A*** (***Section 6*** and ***Appendix 1, 2*** and ***3***) of the Dogger Bank Teesside A & B Environmental Statement.

3.4 Maritime

3.4.1 Full details of known maritime receptors are presented in ***Chapter 18*** (***Section 4.3***) and ***Appendix 18A*** (***Section 7*** and ***Appendix 1, 2*** and ***3***) of the Dogger Bank Teesside A & B Environmental Statement.

3.4.2 Within Dogger Bank Teesside A there are two wrecks (A1) located during assessment of geophysical data and an additional six UKHO records (A3) not seen in the geophysical data. Details of these eight maritime sites are summarised in ***Table 1***.

Table 1: Known Maritime Receptors in Teesside A

WAID	Description	Condition	External ID
WA70587 (Wreck Sheet 1)	Large (34.5 x 10 x 0.7m) wreck site orientated NE-SW and located within a depression on a sandy area of the seabed. Very large and distinct magnetic anomaly (1159nT) indicating ferrous construction. Not charted by the UKHO.	Very well preserved wreck. Hull and stern are intact with visible decking structure. Potential for presence of surrounding, buried debris. Possibly related to debris seen 123m south west of the wreck location (**WA70586**).	Gardline ID BW005, BM209
WA70590 (Wreck Sheet 2)	Large (40 x 14 x 0.4m) dark reflector with strong and large shadow, size and curvilinear edge consistent with wreck remains. Elongate depression identified on bathymetry data. No associated magnetic anomaly. Not charted by the UKHO.	Individual elements visible in the target possibly split in two pieces.	-
WA70616	*Sand Dune* was a motor cruiser reported as derelict and drifting in 1995. Charted as a live wreck but marked 'position for filing only'.	No remains have been recorded at this position.	UKHO 4976
WA70617	*St Luke* was a British motor cruiser that sank in 1975. Charted as a live wreck.	The wreck is recorded by the UKHO as a dangerous wreck, position approximate. Not seen in the geophysical data.	UKHO 4950
WA70618	Unknown sailing vessel first reported in 1911. Also shown on 1965 Danish fishing chart. Charted as a live wreck.	Recorded in 1911 with two masts and yards showing 10ft above water. The wreck is recorded by the UKHO as a dangerous wreck. Not seen in the geophysical data.	UKHO 6910
WA70619	Wave and tidal current measuring device charted as an obstruction in 2012.	Not seen in the geophysical data.	UKHO 79038
WA70620	Unknown sailing vessel first reported in 1911. Also shown on 1965 and 1968 Danish fishing charts. Charted as a live wreck.	Recorded in 1911 as very dangerous with topmast and upper topsail showing. The wreck is recorded by the UKHO as a non-dangerous wreck. Not seen in the geophysical data.	UKHO 31201
WA70621	Recorded location of the loss of *Membland*, a British steam ship lost 15th February 1915, presumably after striking a mine. Recorded as dead by the UKHO and marked 'position for filing only'.	No remains have been recorded at this position. *Membland* possibly located elsewhere (UKHO 5983).	UKHO 31199

3.4.3 Maritime receptors in Dogger Bank Teesside A are illustrated in ***Figure 6.***

3.4.4 Within Dogger Bank Teesside B there are four wrecks (A1) located during assessment of geophysical data and an additional three UKHO records (A3) not seen in the geophysical data. Details of these seven maritime sites are summarised in ***Table 2***.

Table 2: Known Maritime Receptors in Teesside B

WAID	Description	Condition	External ID
WA70636 (Wreck Sheet 3)	Medium sized (15 x 13 x 0.9m) dark reflector with large shadow. Circular mound within a depression. Large (144nT) magnetic anomaly over wreck location. Not charted by the UKHO.	Probable wreck or partial wreck remains. One side of the wreck is visible and the other half possibly buried by sand. Remains appear poorly preserved.	Gardline ID BW002, BM084
WA70637 (Wreck Sheet 4)	Large (29 x 9 x 0.7m) distinct wreck site. Orientated approx. NNW-SSE and located within a depression. Very large (1999nT) magnetic anomaly over wreck location. Not charted by the UKHO.	Well preserved, mostly intact wreck with individual structures and elements are visible. The wreck is associated with a large scour and smaller possible bits of debris. Magnetic anomaly suggests predominantly ferrous structure.	Gardline ID BW003, BM119
WA70505 (Wreck Sheet 5)	Irregular mound within a depression with associated 60nT magnetic anomaly (16.8m x 10.3m x 1.8m). Classified as "Unit Debris" by GEMS but re-classified as a potential wreck by Wessex Archaeology. Similar in appearance to a well head although none are recorded at this position. Not charted by the UKHO.	No coherent structure apparent, possibly the remains of a small, badly degraded, partially ferrous vessel.	GEMS ID DBA_S1099
WA70640 (Wreck Sheet 6)	Unusual right-angled large (34.5 x 13.5 x 0.4m) object not identified by Gardline, slightly raised off the seabed. Right angled outline visible as a hard edged dark and light reflector. Not charted by the UKHO.	Uniform 'wreck' like outline. Seabed scarring and anchor scars visible on the seabed around this target	-
WA70533	Recorded position of a wreck identified in 1920. Recorded as dead by the UKHO.	No remains have been recorded at this position.	UKHO 4829
WA70536	Recorded location of the loss of *William and John* in 1648. Recorded as dead by the UKHO.	No remains have been recorded at this position.	UKHO 4948
WA70535	Recorded location of the loss of the submarine *U-66* in 1917. Recorded as live by the UKHO.	No remains have been recorded at this position.	UKHO 4947

3.4.5 Maritime receptors in Teesside B are illustrated in **Figure 6.**

3.4.6 Within the export cable corridor there is one wreck (A1) located during assessment of geophysical data and an additional 38 records of wrecks and obstructions (A3) not seen in the geophysical data. Details of these 39 maritime sites are summarised in ***Table 3***.

Table 3: Known Maritime Receptors in the Export Cable Corridor

WAID	Description	Condition	External ID
WA70657 (Wreck Sheet 7)	HMS *Ruthin Castle* was a British steam trawler ship mined off the coast of Yorkshire in 1917. Medium sized (18.5 x 6.2 x 0.9) wreck. Very indiscreet in data but debris and dark reflectors with shadow visible. Elongate, poorly defined feature at right angle to bedrock outcrop.	Buried by sands and gravels. Not in a good state of preservation. Located at recorded position of wreck 1077884 (HMS *Ruthin Castle*) but not obviously a wreck.	TSW001 UKHO 6058
WA70830	Bad obstruction (wreck) reported Kingfisher Book of Tows, Vol 1. Nothing found during survey in 1993 and amended to dead. Position for filing only.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	UKHO 6551
WA70831	Bad obstruction (wreck) reported Kingfisher Book of Tows, Vol 1. Nothing found during survey in 1993 and amended to dead. Position for filing only.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	UKHO 6101
WA70832	Fishermen's Fastener, off The Tees (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 2566).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 1919
WA70833	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937118
WA70835	Modern Fastener reported to project officer, off the coast (Admiralty Chart 2567).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 3242
WA70836	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937081
WA70837	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2226
WA70838	Unidentified seabed obstruction reported by fishermen, approximately 5 miles NE of Cowbar Nab.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937044
WA70839	Unidentified seabed obstruction reported by fishermen in a position approximately 5 miles NE of Cowbar Nab.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937040
WA70840	Unidentified seabed obstruction reported by fishermen, approximately 6 miles NE of Cowbar Nab.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937034

WAID	Description	Condition	External ID
WA70841	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2347
WA70842	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937035
WA70843	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134). Probably the same record as **WA70844**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2243
WA70844	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book). Probably the same record as **WA70843**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937023
WA70845	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2113
WA70846	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937006
WA70847	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2212
WA70848	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 937012
WA70849	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134). Probably the same record as **WA70850**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2217
WA70850	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book). Probably the same record as **WA70849**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936997
WA70851	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2232

WAID	Description	Condition	External ID
WA70852	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936992
WA70853	*Afrique*. HER record references HO PRINT-OUT MAR.1993.	Not identified within the geophysical data. *Afrique* recorded by UKHO and NRHE outside Study Area. Suspected recording error.	HER 3202
WA70854	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2149
WA70855	Wreckage off Whitby. Record references HO PRINT-OUT, MAR. 1993: 03-JUL-1988.	Not identified within the geophysical data. Suspected recording error.	HER 3259
WA70856	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2206
WA70857	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936896
WA70858	Wreckage, Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2259
WA70859	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936891
WA70860	Vessel, 19th century, Redcar Rocks. Position approximate, information on chart gives location as just east of Goat Hole on Salt Scar, this name does not exist on modern charts, possibly now called Luff Way.	Not identified within the geophysical data. Suspected recording error.	HER 2823
WA70861	Wreckage, Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134). Probably the same record as **WA70862**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2105
WA70862	Fishermen's fastener described as possible wreck (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book). Probably the same record as **WA70861**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936882

WAID	Description	Condition	External ID
WA70863	Fishermen's fastener described as possible wreck (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936883
WA70864	Fishermen's Fastener, off the coast (Kingfisher Obstruction Book, Tees Bay, 1988. Admiralty Chart 134). Probably the same record as **WA70865**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	HER 2109
WA70865	Fishermen's fastener. Unidentified seabed obstruction reported by fishermen. Possibly indicative of wreckage or a submerged feature (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book). Probably the same record as **WA70864**.	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936886
WA70866	Wreckage off Whitby. Record references HO PRINT-OUT, MAR. 1993: 04-JAN-1980.	Not identified within the geophysical data. Suspected recording error.	HER 3256
WA70867	Three fouls reported in close vicinity of 543703N 004734W (Kingfisher obstruction booklet, Whitby Area). No indication of wreckage found in 1989. Identified as area of rock ledges and amended to dead. Position for filing only.	Not identified within the geophysical data. Natural feature.	UKHO 6348
WA70868	Fishermen's fastener described as possible wreck (Sea Fish Industry Authority, 1988: Kingfisher charts, Tees Bay: obstruction book).	Possibly indicative of wreckage or a submerged feature but nothing located during geophysical survey.	NRHE 936881

3.4.7 Maritime receptors in the export cable corridor are illustrated in ***Figure 7 (a-i)***.

3.4.8 In addition to the records and anomalies identified within the geophysical survey area there are 106 further records located within the export cable corridor, outside the geophysical survey area, and within the TWA:

- *80 records of Fishermen's Fasteners that may be indicative of wreckage or a submerged feature (20 identified as probable duplicate records);*
- *three unidentified seabed obstructions recorded as fouls by the UKHO that may be indicative of wreckage or a submerged feature (**WA2016, WA2018** and **WA2020**);*
- *seven records relating to six unknown wrecks (one identified as a duplicate record);*
  - *three UKHO wrecks charted as live (**WA2014**, **WA2017** and **WA2110**);*
  - *one UKHO wreck recorded as dead (**WA2024**);*
  - *one HER wreck based on UKHO data but without corresponding UKHO record indicating probable recording error (**WA2092**); and*
  - *one HER wreck marked on an admiralty chart (**WA2094**).*
- *ten records relating to six named wrecks (four identified as duplicate records);*
  - *Rema (**WA2022**): a modern motor vessel built in 1976 (UKHO only);*

- *Moorwood (**WA2095**) a steamship sunk by a German aircraft in 1941 (HER only, recorded by the UKHO and NRHE at a different location outside the study area indicating probable recording error);*
- *HMS Ruthin Castle (**WA2148**) a steam trawler ship mined in 1917 (HER only, recorded by the UKHO and NRHE at a different location corresponding to A1 anomaly **WA70657** indicating probable recording error;*
- *Anboto Mendi (**WA2114**) a Spanish steamship torpedoed and sunk by UB21 in 1918. Recorded by the UKHO, NRHE and HER. Divers in 1995 reported a large intact bow with identifiable features;*
- *Early Percy (**WA2126**) a later 19th century British steamship lost following collision with the steamship Gainsborough in 1888. Recorded by the UKHO and NRHE. Divers in 1995 reported that the wreck was well broken up but with identifiable features; and*
- *Hartley (**WA2147**) a British steamship torpedoed and sunk by UB34 in 1918. Recorded by the UKHO and NRHE. Divers in 1990 and 1995 reported an intact wreck, except for damage amidships.*

- *three records positively identified as natural features during previous survey (**WA2136**, **WA2045** and **WA2052**);*
- *two records of modern surveying equipment losses (**WA2012** and **WA2013**); and*
- *one record identified as a recording error (Heckler, **WA2149**).*

3.4.9 Additional records in the export cable corridor (in the TWA and outside the area covered by geophysical survey) are illustrated in ***Figure 7 (a-i)*.**

3.4.10 Additional potential for further wrecks within the MSAs is discussed in ***Chapter 18*** (***Section 4.3***) and **Appendix 18A** (**Section 7.3**) of the Environmental Statement.

3.4.11 The key areas of potential are as follows:

- *Prehistoric:*
  - *potential for material associated with prehistoric maritime activities such as coastal travel and fishing and the exploitation of other marine and coastal resources. Includes vessels such as rafts, hide covered and log boats concealed and protected by extensive Holocene alluvium associated with the fairly rapid post-Devensian rise in sea level;*
  - *potential for material associated with later prehistoric boats associated with maritime activities now including cross channel trade and the exploitation of deep water resources. Larger boat types and new technologies including the Bronze Age sewn plank boats associated with growing scale of seafaring activities.*
- *Romano-British:*
  - *potential for discoveries associated with the expansion and diversification of trade with the Continent and the emergence of a distinct tradition of "Romano-Celtic" shipbuilding representing both Roman and northern European methods.*
- *Early Medieval and Medieval:*

- *potential for material associated with the renewed expansion of trade routes and new shipbuilding traditions (clinker technique) associated with Germanic and Norse invasion and migration during the Early Medieval period; and*
- *potential for material associated with medieval trade (particularly the wool and cloth trade) and fishing fleets and the development of established ports around the North Sea. Evolution of a wide range of vessel types (larger ships and vernacular boats) and the emergence of new technologies such as the use of carvel construction, developments in propulsion, the development of reliable navigation techniques and the use of ordnance.*

- *Post-Medieval and Early Modern:*
  - *increasing potential for post-Medieval shipwrecks associated with trans-oceanic communication networks including the opening up of the New World;*
  - *increasing potential for post-Medieval shipwrecks associated with establishment of the Royal Navy during the Tudor period and the increasing scale of battles at sea such as those of the Anglo-Dutch wars;*
  - *increasing potential for post-Medieval shipwrecks associated with the manufacturing industries including the transport of raw materials, particularly corn, timber, flax, iron, pitch and tar and, by the 18th century, the trade in coal from Newcastle to London;*
  - *potential for the discovery of shipwrecks associated with the introduction of iron and steel in shipbuilding and other fundamental changes associated with the industrial revolution such as steam power;*
  - *potential for the discovery of shipwrecks demonstrating diversity of vernacular boat types evolved for use in specific environments; and*
  - *potential for evidence of both large scale trade and local, coastal vessel movements including marine exploitation.*
- *World War I and World War II:*
  - *potential for the discovery of shipwrecks associated with the two world wars including both naval vessels and merchant ships. Increased shipping associated with demand to fulfil military requirements. Large numbers of vessels lost due to enemy action.*
- *Post-War Era:*
  - *potential for wrecks associated with a wide range of military, commerce, fishing and leisure activities. Losses decline due to increased safety coupled with the absence of major hostile action.*

3.4.12 It is possible that any of the assessed A2 anomalies (***Section 3.6***) (35 in Dogger Bank Teesside A, 25 in Dogger Bank Teesside B and 177 in the export cable corridor), classified as possible pieces of anthropogenic debris and considered of possible archaeological potential, may relate to maritime remains.

3.5 Aviation

3.5.1 There are two records relating to aviation remains in the study areas.

3.5.2 The first (**WA70651**) is a UKHO live obstruction located within Dogger Bank Teesside B project area and described as a foul (***Figure 6***). The record indicates a possible aircraft although there is insufficient information in the description to ascertain the origin of this

suggestion. No anomaly was observed at this location in the geophysical data and this record is classed A3.

3.5.3 The second (**WA70834**) is a UKHO dead wreck relating to a lightning aircraft that crashed in 1986 (***Figure 7b***). The description indicates that it probably broke up on impact and remains have not subsequently been located by survey. No anomaly was observed at this location in the geophysical data and this record is classed A3.

3.5.4 Additional potential for further aircraft within the MSA is discussed in ***Chapter 18*** (***Section 4.4***) and ***Appendix 18A*** (***Section 8.3***) of the Environmental Statement.

3.5.5 The key areas of potential are as follows:

- *Pre-1939:*
  - *minimal potential for material associated with the early development of aircraft, particularly associated with the mass-production of fixed wing aircraft in large numbers during WWI; and*
  - *minimal potential for the material associated with the development of civil aviation during the 1920s and 1930s.*
- *1939 to1945:*
  - *very high potential for WWII aviation remains with the North Sea acting as a focus for hostile activity.*
- *Post-1945:*
  - *potential for aviation remains associated with military activities dominated by the Cold War, the development of the jet engine and aerospace engineering, the evolution of commercial travel and recreational flying and intensifying of aviation associated with offshore industry, particularly the North Sea oil and gas industry.*

3.5.6 It is possible that any of the assessed A2 anomalies (***Section 3.6***) (35 in Dogger Bank Teesside A, 25 in Dogger Bank Teesside B and 177 in the export cable corridor), classified as possible pieces of anthropogenic debris and considered of possible archaeological potential, may relate to maritime remains.

3.6 Additional Anomalies

3.6.1 Thirty five of the anomalies assessed by Wessex Archaeology in Dogger Bank Teesside A were classified as A2. These are illustrated in ***Figure 6*** and summarised in ***Table 4***.

Table 4: A2 Anomalies of Uncertain Origin of Possible Archaeological Interest (Dogger Bank Teesside A)

Anomaly Classification	Number of Anomalies
Debris	10
Dark Reflector	4
Depression	5
Magnetic	16
Total	**35**

3.6.2 Twenty five of the anomalies assessed by Wessex Archaeology in Dogger Bank Teesside B were classified as A2. These are illustrated in ***Figure 6*** and summarised in ***Table 5***.

Table 5: A2 Anomalies of Uncertain Origin of Possible Archaeological Interest (Dogger Bank Teesside A)

Anomaly Classification	Number of Anomalies
Debris	10
Dark Reflector	4
Depression	5
Magnetic	16
Total	**35**

3.6.3 One hundred and seventy seven of the anomalies assessed by Wessex Archaeology in the export cable corridor were classified as A2. These are illustrated in ***Figure 7 (a-i)*** and summarised in **Table 6**.

Table 6: A2 Anomalies of Uncertain Origin of Possible Archaeological Interest (Export Cable Corridor)

Anomaly Classification	Number of Anomalies
Debris	45
Debris Field	10
Mound	7
Rope/chain	4
Seafloor Disturbance	2
Dark Reflector	60
Magnetic	49
Total	**177**

3.6.4 These anomalies are ambiguous and will require further investigation before the precise nature and origin can be determined and archaeological interest assessed. Further details of A2 anomalies (uncertain origin of possible archaeological interest) are presented in ***Chapter 18*** (***Section 4.5***) and ***Appendix 18A*** (***Section 7.2*** and ***Appendix 1, 2*** and ***3***) of the Environmental Statement.

3.7 Historic Seascape Character

3.7.1 A national programme of Historic Seascape Characterisation was commissioned by English Heritage in order to map an understanding of the cultural processes shaping the present landscape in coastal and marine areas. The Dogger Bank Teesside A & B project areas and the export cable corridor fall within the pilot Historic Seascape Characterisation from Scarborough to Hartlepool undertaken by Cornwall County Council (Val Baker *et al* 2007).

3.7.2 The project characterises the historic seascape at four tiered levels, the seabed, seafloor, water column and surface. The data is presented for GIS using fine gridded cells, with tiered attributes, to record the present and dominant historic character for each marine

layer. Using the GIS data, the key characteristics for Dogger Bank Teesside A & B project areas have been identified and are summarised below.

3.7.3 The historic character of the Dogger Bank is primarily one of palaeolandscapes and fishing. Specific historic associations include recognition as a sea area from BBC Radio 4's shipping forecast, the association of Dogger Bank with the first world war naval battle and Dogger Bank as the sites of the UK's strongest earthquake in 1931 measuring 6.1 on the Richter Scale (Val Baker *et al.* 2007, p. 214),

3.7.4 The primary cultural processes which characterise Dogger Bank Teesside A comprise:

- *Offshore Installation (wellhead);*
- *Fishery (Beam Trawling);*
- *Fishery (Netting and Lining); and*
- *Shipping Lane.*

3.7.5 The primary cultural processes which characterise Dogger Bank Teesside B comprise:

- *Submarine Cable;*
- *Fishery (Beam Trawling);*
- *Fishery (Netting and Lining); and*
- *Fishery (Seine Netting).*

3.7.6 The primary cultural processes which characterise the export cable corridor comprise:

- *Pipeline submarine/on land;*
- *Submarine Cable;*
- *Extractive Industry (Hydrocarbon);*
- *Fishery (Beam Trawling);*
- *Fishery (Netting and Lining);*
- *Fishery (Potting/Trunking);*
- *Fishery (Seine Netting); and*
- *Ferry Route, Navigation Route.*

3.7.7 In addition to the character as outlined above, 27 wind turbines have been installed immediately offshore from Redcar for the Teesside Offshore Wind Farm. The historic character of the nearshore area of the cable route, therefore, also now includes an offshore renewables element.

4 POTENTIAL IMPACTS

4.1.1 Potential impacts to archaeology and cultural heritage from the offshore elements of Dogger Bank Teesside A & B were assessed using realistic worst case parameters as set out in the Environmental Statement (***Chapter 18***, ***Section 5***). This allowed for the full range of potential development options for the projects to be considered as part of the Rochdale Envelope approach to impact assessment.

4.1.2 Impacts to archaeology and cultural heritage can include direct and indirect impacts and impacts to the historic seascape character.

4.1.3 Potential direct impacts comprise both direct damage to archaeological deposits and material and the disturbance or destruction of relationships between deposits and material and their wider surroundings. The worst case scenario for potential direct impacts to archaeological receptors is associated with:

- *the greatest potential area of contact with the sea floor;*
- *the maximum number of locations at which contact may occur; and*
- *the greatest volume of disturbed seabed sediments.*

4.1.4 Potential indirect impacts may occur as a result of changes to the prevailing hydrographic regime. The effect of changes to physical processes may include additional protection to archaeological receptors in terms of additional sediment cover or increased deterioration of receptors as a result of additional scour, for example. The worst case scenario for potential indirect impacts to archaeological receptors is associated with:

- *the greatest potential for increased scour around foundations and other seabed installations;*
- *the greatest potential for sediment stripping across an area as a result of increasing tide, wave and current movements, for example.*

4.1.5 Impacts to the historic seascape character will occur with the introduction of new elements causing a change in that character. The worst case scenario for historic seascape character is associated with the maximum potential change to that character.

4.1.6 The potential impacts from Dogger Bank Teesside A & B projects upon archaeology and cultural heritage are summarised in ***Table 7***.

Table 7: Summary of Potential Impacts to Archaeological Receptors

Phase	Potential Impact
Construction	Possible direct impacts to archaeological receptors and/or their physical setting from: • seabed preparation (dredging to level seabed and pre-lay grapnel runs); • installation of foundations for wind turbines and ancillary structures (collector substations, converter station, accommodation/helicopter platforms, meteorological masts) and the placing of scour protection; • installation of cabling (inter-array, inter-platform and export cables) and the placing of concrete mattresses at cable crossings; and • use of jack-up crane vessels, anchors of other vessels and anchors of permanent mooring buoys.

Phase	Potential Impact

	Possible indirect impacts that can result in the effect of increased protection may be caused by:
	• additional suspended sediment in the water column from:
	  ○ seabed preparations for the wind turbine foundations;
	  ○ scouring of the foundations, between placement of the foundation and placement of the scour protection;
	  ○ trenching of the inter-array cables; and
	  ○ trenching of the export cables.
	• changes to the bedload sediment transport processes resulting in disturbances to the 'downdrift' sediment supply; and
	• increased turbidity in the water column from landfall construction activities.

	Possible indirect impacts that can result in the effect of increased deterioration may be caused by: • scouring of the foundations, between placement of the foundation and placement of the scour protection; and • changes to the bedload sediment transport processes resulting in disturbances to the 'downdrift' sediment supply.
Operation	Possible direct impacts to archaeological receptors and/or their physical setting from: • anchors of vessels deployed during periodic overhauls and scheduled and unscheduled maintenance; and • use of jack-up crane vessels in the event of wind turbine component replacement.
	Possible indirect impacts comprising either increased protection to, or deterioration of, archaeological receptors caused by: • scour around wind turbine foundations and other seabed installations; • changes to tidal current due to the presence of foundations; • changes to wave heights due to the presence of foundations; and • changes to the bedload sediment transport processes resulting in disturbances to the 'downdrift' sediment supply.
	A change to the historic seascape character will result from the presence of an installed offshore wind farm and the associated infrastructure
Decommissioning	Possible direct impacts to archaeological receptors and/or their physical setting from: • removal foundations of wind turbine and ancillary structures; and • use of jack-up crane vessel and/or anchors of other vessels deployed during decommissioning.
	Possible indirect impacts comprising either increased protection to, or deterioration of, archaeological receptors caused by: • new changes to the hydrodynamic regime resulting from the removal of wind turbines, collector stations and converter stations and associated scour protection; and • the deployment of large vessels during decommissioning.
	A change to the historic seascape character will result from the whole or partial removal of the offshore wind farm components and the associated infrastructure.

Phase	Potential Impact
Cumulative	Cumulative impact of direct impacts to potential prehistoric, maritime and aviation receptors on a regional scale.
	Cumulative indirect impacts comprising either increased protection to, or deterioration of, known and potential archaeological receptors caused by the presence of multiple plans or projects across a region.
	Positive cumulative effect of offshore projects in the accumulation of archaeologically interpreted geophysical and geotechnical data.
Transboundary	Possible impacts to maritime and aviation receptors of foreign nationality
	Possible impacts to shared heritage of North Sea palaeolandscapes
	Positive effect of increased data on Palaeolandscapes relevant to member states bordering the North sea

4.1.7 The impact assessment was carried out in accordance with the EIA methodology set out in ***Chapter 4*** of the Environmental Statement. Significant impacts were distinguished from non-significant impacts according to defined parameters expressed as a matrix comparing magnitude of effect with the value of receptors (***Chapter 18***, ***Sections 6*** to ***11***) and ***Appendix 18A*** (***Sections 13*** to ***20***). As there is an inherent high level of uncertainty concerning archaeological remains on the seabed a precautionary approach is required. Where uncertainty occurs the precautionary approach is to assign a high value to the resource until such time as this can be ruled out.

4.1.8 The primary method of mitigation when dealing with the archaeological resource is the precautionary principle, based on the prevention of damage to receptors by proactively putting in place protective measures rather than attempting to repair damage after it has occurred. The Dogger Bank Teesside A & B Environmental Statement, therefore, included provision for a series of mitigation measures to ensure that significant impacts will not occur during the construction, operation or decommissioning of the wind farm and associated infrastructure. These measures are outlined below.

5 MITIGATION

5.1.1 This WSI is applicable to Dogger Bank Teesside A & B and the mitigation set out in this WSI applies to identified receptors in Dogger Bank Teesside A, Dogger Bank Teesside B, the Dogger Bank Teesside A & B export cable corridor and TWA.

5.2 Indirect

5.2.1 Modelling and assessment undertaken to inform ***Chapter 9*** of the Environmental Statement (*Marine Physical Processes*) demonstrated that all changes to waves, currents and tides and the expected scour resulting from the construction, operation and decommissioning of Dogger Bank Teesside A & B lie within the expected range of natural variation and no significant residual effects were identified. Significant, indirect impacts to archaeological receptors are thus not expected to occur.

5.2.2 No mitigation is required.

5.3 Historic Seascape Character

5.3.1 The character of the historic seascape was judged to be of **low** sensitivity as the ability of the historic seascape character to accommodate change is high. The current character, dominated by dense industrial, fisheries and shipping activity, is considered to be tolerant to change and able to adapt to accommodate elements associated with offshore renewables. The character will also have moderate recoverability following the removal of elements during decommissioning.

5.3.2 No mitigation is required.

5.4 Direct

5.4.1 Forewind will prevent significant impacts from occurring through the application of the following mitigation:

- *implementation of 100m Archaeological Exclusion Zones (AEZs) around archaeological sites (A1 and A3 receptors and additional records of medium and high archaeological value, excluding Fishermen's Fasteners);*
- *micrositing of design to avoid, where possible, additional anomalies identified through geophysical survey as having potential archaeological interest (A2 receptors) and the recorded positions of Fishermen's Fasteners and UKHO seabed obstructions; and*
- *measures to deal with unavoidable impacts to potential receptors, if they should occur, set out in a WSI (this report).*

5.4.2 AEZs of 100m, prohibiting development and related activities within their extents, will be placed around the extents of receptors as seen in the geophysical data for Dogger Bank Teesside A & B and the export cable corridor (A1 receptors). These seven AEZs are illustrated in **Figures *8***, ***9*** and ***10 (a-i)*** and summarised in ***Table 8***.

Table 8: Archaeological Exclusion Zones (A1s)

WA ID	Area	Site Centre Point of AEZ (100m around extent of A1s as seen in geophysical data)	
		Easting	Northing
WA70587	Dogger Bank Teesside A	484534	6107141
WA70590	Dogger Bank Teesside A	493149	6104775
WA70505	Dogger Bank Teesside B	450453	6082183
WA70636	Dogger Bank Teesside B	459220	6084897
WA70637	Dogger Bank Teesside B	466050	6090165
WA70640	Dogger Bank Teesside B	451149	6105790
WA70657	Export Cable Corridor	249763	6058493

5.4.3 AEZs of 100m will also be implemented around the recorded positions of A3 receptors and additional records assessed to be of medium and high archaeological value, excluding Fishermen's Fasteners. These AEZs (three around A3 and nine around additional records) are illustrated in **Figures *8***, ***9*** and ***10 (a-i)*** and summarised in ***Table 9***.

Table 9: Archaeological Exclusion Zones (A3s and additional records)

WA ID	Area	Site Centre Point of AEZ (100m around recorded point location)	
		Easting	Northing
WA70618	Dogger Bank Teesside A	494569	6091011
WA70620	Dogger Bank Teesside A	502564	6103992
WA70651	Dogger Bank Teesside B	441339	6100666
WA2014	Export Cable Corridor	370056	6080364
WA2017	Export Cable Corridor	339018	6073820
WA2024	Export Cable Corridor	290034	6063638
WA2092	Export Cable Corridor	262083	6060942
WA2094	Export Cable Corridor	261748	6061145
WA2110	Export Cable Corridor	260158	6059982
WA2114	Export Cable Corridor	259732	6061089
WA2126	Export Cable Corridor	258637	6059412
WA2147	Export Cable Corridor	250222	6059032

5.4.4 Buffers of 100m, to be agreed with English Heritage and the marine Management Organisation (MMO), are suggested as being of sufficient size to ensure the entire extent of the identified receptors are adequately protected. Further information regarding the application of these AEZs is included below (***Section 8.4***).

5.4.5 AEZs are not recommended for records assessed to be of low archaeological value, records not regarded of being of archaeological interest, and for records of Fishermen's Fasteners.

5.4.6 The recorded descriptions for four of the A3 wrecks (***Table 10***) suggest that they are recorded losses or dead wrecks for which there is no evidence that material remains have

ever been identified at the recorded position. As these four locations have been covered by the current survey data, and nothing has been seen at the recorded positions, avoidance is not recommended. It is considered highly unlikely that any wreck material is present at the positions. The application of ORPAD will address any unexpected discoveries.

Table 10: Recorded Losses/Dead wrecks (no material remains present)

WA ID	Area	Recorded Position	
		Easting	Northing
WA70621	Dogger Bank Teesside A	499904	6094717
WA70533	Dogger Bank Teesside B	434980	6096191
WA70535	Dogger Bank Teesside B	435936	6095176
WA70536	Dogger Bank Teesside B	436033	6095249

5.4.7 Similarly, there are seven records, all from the HER, which have been identified as recording errors rather than representing material remains (**Table 11**). Avoidance, therefore, is not recommended and the application of ORPAD will address any unexpected discoveries. The application of ORPAD will address any unexpected discoveries.

Table 11: Recording errors (no material remains present)

WA ID	Source	Area	Recorded Position	
			Easting	Northing
WA70853	HER 3202	Export Cable Corridor	258834	6059051
WA70855	HER 3259	Export Cable Corridor	259307	6059416
WA70860	HER 2823	Export Cable Corridor	255232	6058854
WA70866	HER 3256	Export Cable Corridor	255068	6058807
WA2095	HER 3118	Export Cable Corridor	261120	6058428
WA2148	HER 2831	Export Cable Corridor	249289	6059067
WA2149	HER 3119	Export Cable Corridor	250343	6059009

5.4.8 There are 33 Fishermen's Fasteners classified as A3s within the export cable corridor that were not seen in the geophysical survey data (***Table 12*** and ***Figure 10 a-i***). These are possibly indicative of wreckage or a submerged feature but, as nothing was located during geophysical survey, the presence of material at these positions is considered unlikely. It is important to note, however, that there is a possibility that archaeological material may be dispersed or buried. The application of ORPAD will address any unexpected discoveries.

Table 12: Fishermen's Fasteners not seen in geophysical data (A3s)

WAID	Source	Recorded Position		WAID	Source	Recorded Position	
		Easting	Northing			Easting	Northing
WA70830	UKHO 6551	308202	6067876	**WA70848**	NRHE 937012	263736	6060220
WA70831	UKHO 6101	304779	6067837	**WA70849**	HER 2217	263205	6060140
WA70832	HER 1919	270234	6061227	**WA70850**	NRHE 936997	263100	6060165

WAID	Source	Recorded Position		WAID	Source	Recorded Position	
		Easting	Northing			Easting	Northing
WA70833	NRHE 937118	270129	6061249	**WA70851**	HER 2232	262984	6060244
WA70835	HER 3242	267462	6059696	**WA70852**	NRHE 936992	262877	6060271
WA70836	NRHE 937081	267352	6059721	**WA70854**	HER 2149	260608	6059347
WA70837	HER 2226	265441	6058778	**WA70856**	HER 2206	256851	6059882
WA70838	NRHE 937044	265439	6058774	**WA70857**	NRHE 936896	256742	6059906
WA70839	NRHE 937040	265330	6058802	**WA70858**	HER 2259	255849	6059285
WA70840	NRHE 937034	264835	6059179	**WA70859**	NRHE 936891	255736	6059306
WA70841	HER 2347	264774	6059835	**WA70861**	HER 2105	255145	6058840
WA70842	NRHE 937035	264663	6059853	**WA70862**	NRHE 936882	255043	6058864
WA70843	HER 2243	264536	6058992	**WA70863**	NRHE 936883	255124	6058878
WA70844	NRHE 937023	264423	6059017	**WA70864**	HER 2109	255118	6060142
WA70845	HER 2113	264075	6058849	**WA70865**	NRHE 936886	255015	6060170
WA70846	NRHE 937006	263971	6058869	**WA70868**	NRHE 936881	254960	6058829
WA70847	HER 2212	263844	6060199	**-**	**-**	-	-

5.4.9 There are a further 83 records of Fishermen's Fasteners/seabed obstructions that are located outside the area covered by geophysical survey (***Table 13***). Twenty of these have been identified as likely duplicate records. As these positions have not been covered by geophysical survey, it is recommended that they are avoided during activities associated with the development until further data becomes available that may confirm the presence or absence of archaeological material. Account should be taken of the positions within the shapefiles as provided by the UKHO, NRHE and HER, including both point locations and polygons representing positional uncertainty as relevant. This information is contained within the shapefiles provided by Wessex Archaeology that accompany this report.

Table 13: Fishermen's Fasteners outside survey area

WAID	Source	Recorded Position		WAID	Source	Recorded Position	
		Easting	Northing			Easting	Northing
WA2016	UKHO 6534	355362	6077660	**WA2082**	HER 2167	263287	6059857
WA2018	UKHO 6552	308707	6066276	**WA2084**	NRHE 936996	263180	6059878
WA2020	UKHO 6550	306713	6068249	**WA2088**	HER 2118	262582	6059578
WA2023	UKHO 6234	292378	6063902	**WA2089**	NRHE 936986	262478	6059597
WA2025	NRHE 936831	272429	6062559	**WA2090a**	HER 2204	262140	6060604
WA2027a	HER 2351	271426	6061352	**WA2090b**	NRHE 936984	262029	6060623
WA2027b	NRHE 937132	271321	6061374	**WA2091a**	HER 2205	262105	6060755
WA2029	NRHE 937123	270962	6060838	**WA2091b**	NRHE 936985	262000	6060775
WA2032	NRHE 937119	269991	6061700	**WA2097a**	HER 2173	260841	6059892
WA2036a	HER 2309	268122	6059328	**WA2097b**	NRHE 936951	260735	6059912
WA2036b	NRHE 937090	268018	6059353	**WA2100**	HER 2255	260661	6059939
WA2040a	HER 2299	267339	6059833	**WA2103**	NRHE 936947	260548	6059966
WA2040b	NRHE 937080	267231	6059850	**WA2104**	HER 2612	260545	6060001

WAID	Source	Recorded Position		WAID	Source	Recorded Position	
		Easting	Northing			Easting	Northing
WA2042	HER 2343	266640	6058809	**WA2105**	NRHE 936945	260442	6060023
WA2043	NRHE 937066	266526	6058837	**WA2108a**	HER 2164	260231	6060166
WA2044a	HER 2283	266166	6059651	**WA2108b**	NRHE 936942	260123	6060187
WA2044b	NRHE 937064	266054	6059673	**WA2109a**	HER 2170	260218	6061356
WA2048	HER 2345	265414	6059709	**WA2109b**	NRHE 936948	260107	6061381
WA2050	NRHE 937048	265306	6059727	**WA2115**	HER 2147	259507	6058718
WA2051	HER 2146	265266	6059345	**WA2116**	NRHE 936925	259398	6058744
WA2053	NRHE 937043	265160	6059366	**WA2118**	NRHE 936927	259197	6059440
WA2054	HER 2613	264908	6059308	**WA2119**	HER 2250	259083	6059669
WA2056	HER 2169	264822	6059721	**WA2120**	NRHE 936924	258974	6059697
WA2058	NRHE 937036	264715	6059739	**WA2121**	UKHO 66437	258958	6059705
WA2061	HER 2106	264589	6058358	**WA2122**	HER 2603	258866	6058231
WA2062	HER 2262	264588	6059380	**WA2123a**	HER 2153	258829	6060984
WA2063a	HER 2247	264551	6059289	**WA2123b**	NRHE 936931	258727	6061008
WA2063b	NRHE 937028	264443	6059307	**WA2124**	NRHE 936914	258761	6058258
WA2065	NRHE 937031	264480	6059405	**WA2125**	HER 2140	258745	6059409
WA2066	NRHE 937014	264478	6058382	**WA2127a**	HER 2133	258490	6058251
WA2067a	HER 2249	264458	6059573	**WA2127b**	NRHE 936911	258381	6058275
WA2067b	NRHE 937030	264354	6059594	**WA2128a**	HER 2137	257997	6060731
WA2068a	HER 2242	264259	6059676	**WA2128b**	NRHE 936915	257886	6060758
WA2068b	NRHE 937022	264150	6059699	**WA2129a**	HER 2132	257590	6060585
WA2069a	HER 2241	264212	6059808	**WA2129b**	NRHE 936910	257484	6060606
WA2069b	NRHE 937021	264100	6059833	**WA2130**	HER 2162	257185	6058470
WA2073	HER 2229	264067	6059314	**WA2131**	NRHE 936895	257082	6058488
WA2076	NRHE 937009	263954	6059342	**WA2134a**	HER 2116	256391	6060743
WA2078	HER 2254	263838	6059884	**WA2134b**	NRHE 936894	256282	6060762
WA2080	NRHE 937008	263734	6059909	**WA2141a**	HER 2110	255128	6060514
WA2081a	HER 2221	263476	6059754	**WA2141b**	NRHE 936887	255022	6060540
WA2081b	NRHE 937001	263363	6059775	-	-	-	-

5.4.10 There are three recorded wrecks and one aircraft that are of recent data and are not considered of archaeological interest (***Table 14***). It should be noted, however, that while there are no archaeological requirements for AEZs around modern wrecks, consideration should be given to the continued avoidance of these wrecks during the construction, operation and decommissioning of Dogger Bank Teesside A & B.

Table 14: Wrecks/Aircraft of recent date

WA ID	Area	Recorded Position	
		Easting	Northing
WA70616	Dogger Bank Teesside A	474913	6107956

WA ID	Area	Recorded Position	
WA70617	Dogger Bank Teesside A	491400	6107708
WA70834	Dogger Bank Teesside B	268840	6059717
WA2022	Export Cable Corridor	297183	6065866

5.4.11 The wave and tidal current measuring device charted as an obstruction in 2012 (**WA70619** at 480899, 6105777) is not of archaeological interest and requires no mitigation. Similarly, the foul recorded as an area of rock ledges (**WA70867** at 255031, 6058863) is not of archaeological interest and requires no mitigation. Outside the surveyed area of the export cable corridor, modern equipment losses (**WA2012**, **WA2013**) and geological features (**WA2136**, **WA2045**, **WA2952**) are also of no archaeological interest.

5.4.12 Due to the large numbers of additional anomalies avoidance through the application of 100m AEZs was not regarded as conducive to the consents process. Rather, Forewind will avoid all additional anomalies of uncertain origin and potential archaeological interest through micrositing in the project design where possible. These locations are illustrated in ***Figures 8, 9*** *and* ***10 (a-i)*** and summarised in ***Table 15*** below.

Table 15: A2 Additional Anomalies to be avoided through micrositing

WAID	Site Centre Point		WAID	Site Centre Point	
	Easting	**Northing**		**Easting**	**Northing**
Dogger Bank Teesside A					
WA70579	495075	6104112	**WA70599**	483272	6096389
WA70580	497602	6098295	**WA70600**	478033	6102465
WA70581	500230	6096705	**WA70601**	482572	6091263
WA70582	482524	6091393	**WA70602**	506199	6107820
WA70583	486284	6091427	**WA70603**	486381	6101340
WA70584	497453	6103204	**WA70604**	474528	6107805
WA70585	497843	6103567	**WA70605**	475293	6101855
WA70586	484421	6107084	**WA70606**	501849	6099028
WA70588	506159	6107876	**WA70607**	499084	6100680
WA70589	479094	6101758	**WA70608**	485421	6105333
WA70591	481296	6096695	**WA70609**	477014	6090363
WA70592	482324	6098205	**WA70610**	484408	6107555
WA70593	492111	6104618	**WA70611**	474348	6099315
WA70594	481230	6094583	**WA70612**	504464	6106640
WA70595	495248	6091838	**WA70613**	497004	6097800
WA70596	497747	6097589	**WA70614**	482884	6091550
WA70597	482885	6104922	**WA70615**	481739	6090485
WA70598	482936	6104942	**-**	-	-
Dogger Bank Teesside B					
WA70506	451587	6084344	**WA70633**	452544	6105972
WA70507	448128	6086029	**WA70634**	450440	6102052

WAID	Site Centre Point		WAID	Site Centre Point	
	Easting	Northing		Easting	Northing
WA70622	446809	6104383	**WA70635**	453587	6102197
WA70623	447607	6105186	**WA70638**	450776	6105960
WA70624	456535	6102399	**WA70639**	457356	6102050
WA70625	448929	6107874	**WA70641**	445631	6108590
WA70626	447212	6106297	**WA70642**	450751	6102423
WA70627	446258	6105614	**WA70643**	452068	6089875
WA70628	445328	6102018	**WA70644**	450951	6107355
WA70629	451031	6105940	**WA70645**	447114	6102985
WA70630	448516	6102142	**WA70646**	454684	6098285
WA70631	448451	6102159	**WA70647**	462748	6096210
WA70632	447909	6101657	**-**	-	-
Export Cable Corridor					
WA70652	239466	6059002	**WA70742**	267036	6059514
WA70653	240728	6058315	**WA70743**	264071	6059221
WA70654	242442	6058509	**WA70744**	281678	6064855
WA70655	246535	6058094	**WA70745**	311737	6068120
WA70656	247205	6057940	**WA70746**	295451	6065887
WA70658	263242	6060197	**WA70747**	295147	6066087
WA70659	264378	6060217	**WA70748**	298576	6067614
WA70660	264317	6060110	**WA70749**	325811	6069855
WA70661	264531	6060023	**WA70750**	327988	6071901
WA70662	264876	6060080	**WA70751**	329671	6072522
WA70663	265548	6060118	**WA70752**	330961	6073050
WA70664	266056	6060163	**WA70753**	333988	6073845
WA70665	267163	6060330	**WA70754**	336649	6075201
WA70666	267206	6060434	**WA70755**	341677	6074748
WA70667	267428	6060380	**WA70756**	347767	6074349
WA70668	268056	6060715	**WA70757**	349672	6075846
WA70669	268538	6060844	**WA70758**	350206	6074676
WA70670	268548	6060866	**WA70759**	351536	6075349
WA70671	268560	6060867	**WA70760**	355831	6076330
WA70672	269294	6061534	**WA70761**	355651	6076155
WA70673	269173	6061908	**WA70762**	356581	6076092
WA70674	269510	6061780	**WA70763**	365524	6078240
WA70675	269192	6062052	**WA70764**	320770	6069621
WA70676	269318	6062166	**WA70765**	369266	6078668
WA70677	269949	6062478	**WA70766**	371928	6080153
WA70678	270184	6063042	**WA70767**	372766	6079073

WAID	Site Centre Point		WAID	Site Centre Point	
	Easting	Northing		Easting	Northing
WA70679	270846	6063511	**WA70768**	375321	6080645
WA70680	270682	6063795	**WA70769**	376336	6080583
WA70681	271183	6063767	**WA70770**	378788	6080058
WA70682	271167	6063643	**WA70771**	378455	6080988
WA70683	271385	6063641	**WA70772**	379266	6080948
WA70684	271439	6063866	**WA70773**	379425	6079887
WA70685	271670	6063522	**WA70774**	382551	6080398
WA70686	272168	6064007	**WA70775**	382901	6081548
WA70687	272612	6064082	**WA70776**	384918	6081418
WA70688	272582	6063797	**WA70777**	385776	6080790
WA70689	272666	6063890	**WA70778**	386172	6081911
WA70690	274047	6063879	**WA70779**	386243	6081975
WA70691	278292	6064397	**WA70780**	389832	6082033
WA70692	280441	6064713	**WA70781**	241858	6057710
WA70693	280527	6064549	**WA70782**	242167	6057687
WA70694	281068	6064924	**WA70783**	243307	6058375
WA70695	283264	6065117	**WA70784**	249431	6058146
WA70696	283271	6065112	**WA70785**	255695	6060169
WA70697	283272	6065071	**WA70786**	306763	6067696
WA70698	283799	6065149	**WA70787**	309290	6067588
WA70699	283670	6064919	**WA70788**	330912	6071943
WA70700	284509	6065011	**WA70789**	348285	6074249
WA70701	285269	6065007	**WA70790**	257594	6059060
WA70702	285665	6065069	**WA70791**	251688	6057686
WA70703	285667	6065065	**WA70792**	253007	6058200
WA70704	286030	6065379	**WA70793**	255181	6059317
WA70705	287068	6065103	**WA70794**	259429	6059429
WA70706	287538	6065441	**WA70795**	256239	6059211
WA70707	287750	6065085	**WA70796**	251414	6057595
WA70708	289920	6065487	**WA70797**	251323	6057406
WA70709	290407	6065693	**WA70798**	254009	6058506
WA70710	291104	6065806	**WA70799**	256435	6058964
WA70711	292599	6065925	**WA70800**	251485	6057595
WA70712	292057	6064702	**WA70801**	260400	6060366
WA70713	290774	6064687	**WA70802**	260178	6060510
WA70714	290594	6064746	**WA70803**	253374	6059105
WA70715	289873	6064585	**WA70804**	252285	6058882
WA70716	289619	6064568	**WA70805**	254910	6059746

WAID	Site Centre Point		WAID	Site Centre Point	
	Easting	Northing		Easting	Northing
WA70717	288868	6064544	**WA70806**	254986	6060248
WA70718	288280	6064580	**WA70807**	260894	6060302
WA70719	287717	6064077	**WA70808**	256621	6060290
WA70720	287077	6064104	**WA70809**	251201	6058625
WA70721	286780	6064105	**WA70810**	261276	6060434
WA70722	286752	6064103	**WA70811**	258554	6060277
WA70723	285406	6064055	**WA70812**	258603	6060050
WA70724	283875	6063792	**WA70813**	251246	6057646
WA70725	282758	6063699	**WA70814**	350352	6076090
WA70726	282553	6063745	**WA70815**	356595	6077002
WA70727	282296	6063983	**WA70816**	316725	6068857
WA70728	282158	6063947	**WA70817**	315271	6068755
WA70729	280925	6063702	**WA70818**	310567	6068006
WA70730	279905	6063704	**WA70819**	312737	6068348
WA70731	279899	6063719	**WA70820**	346185	6074442
WA70732	275492	6062893	**WA70821**	346259	6074426
WA70733	275121	6062937	**WA70822**	350110	6074617
WA70734	274066	6063213	**WA70823**	315884	6067796
WA70735	273526	6063174	**WA70824**	314537	6067570
WA70736	273381	6062779	**WA70825**	311034	6067047
WA70737	273258	6063100	**WA70826**	325492	6069923
WA70738	270314	6061832	**WA70827**	308874	6066836
WA70739	270166	6061602	**WA70828**	297372	6066612
WA70740	269622	6060430	**WA70829**	305906	6066573
WA70741	269624	6060439	**-**	-	-

5.4.13 Where avoidance is not possible, measures to deal with impacts to receptors also form part of the mitigation, as presented in this WSI (**Section 7**, **Section 8**). Unavoidable impacts may include both unavoidable impacts to potential archaeological receptors that may lie within the study areas, and impacts to known receptors that cannot be avoided due to engineering constraints of development. Unexpected material that may only be encountered during the course of the project will be addressed through adherence to the *Offshore Renewables Protocol for Archaeological Discoveries* (ORPAD) (**Section 7**).

6 RESPONSIBILITIES AND COMMUNICATION

6.1.1 Forewind will retain the services of a suitably qualified and experienced archaeological contractor (the Retained Archaeologist) to ensure the effective implementation of the WSI and other contractual commitments in relation to archaeology.

6.1.2 The English Heritage Maritime Team is the Archaeological Curator responsible for heritage matters offshore. The Maritime Team may consult English Heritage's Regional Science Advisor for the North East or East of England with regard to activities undertaken as part of this WSI.

6.1.3 The relevant contacts at English Heritage are:

- *Dr. Christopher Pater, Marine Planning Unit, English Heritage, Eastgate Court, 195 – 205 High Street, Guildford, GU1 3EH; and*
- *Jacqui Huntley, English Heritage Regional Science Advisor, North East of England Region.*

6.1.4 Contact with the Archaeological Curator will be administered by Forewind, advised by the Retained Archaeologist. In relation to the implementation of the WSI the Retained Archaeologist will report to Forewind's Environment and Consents Manager (ECM). Interaction with Forewind's Construction Team will be administered by the ECM, advised by the Retained Archaeologist.

6.1.5 The ECM will advise the Retained Archaeologist of his/her requirements or responsibilities under Forewind's Framework of Environmental Management Controls for Dogger Bank Teesside A & B.

6.1.6 The responsibilities of the Retained Archaeologist will include:

- *Maintaining, reviewing and updating this WSI, as required;*
- *Advising Forewind's Contractor(s) which elements warrant archaeological involvement;*
- *Advising Forewind's Contractor(s) in the course of evaluating scope of work specifications on their capacity to meet archaeological requirements;*
- *Advising Forewind on the necessary interaction with third parties with archaeological interests, including the Archaeological Curator;*
- *Advising Forewind on the implementation of generic archaeological requirements applicable to all construction and operational activities;*
- *Advising Forewind's ECM on Method Statements for archaeological investigations;*
- *Preparing detailed Method Statements for all archaeological activities;*
- *Ensuring that the ECM copies Method Statements to the Archaeological Curator for approval;*
- *Monitoring the work of and liaising with the Archaeological Contractor/s where this is not the Retained Archaeologist;*
- *Monitoring the preparation and submission of Archaeological Reports as appropriate and making them available to the Archaeological Curator;*

- *Preparing provisions for the management of the project archives in consultation with an appropriate Museum; and*
- *Advising Forewind on final arrangements for analysis, archive deposition, publication and popular dissemination.*

6.1.7 Where Method Statements, reports or other deliverables are submitted by Forewind to the Archaeological Curator, their agreement/acceptance will be assumed if no contrary response is received within 30 working days of submission.

6.1.8 All Construction Contractors engaged in the construction of the project will be required to:

- *Familiarise themselves with the requirements of the WSI and make them available to their staff;*
- *Obey legal obligations in respect of 'wreck' and 'treasure' under the Merchant Shipping Act 1995 and the Treasure Act 1996 respectively;*
- *Respect constraint maps and AEZs;*
- *Assist and afford access to archaeologists employed by Forewind;*
- *Inform the Retained Archaeologist of any environmental constraint or matter relating to health, safety and welfare of which they are aware that is relevant to the archaeologists' activities; and*
- *Implement the Offshore Renewables Protocol for Archaeological Discoveries (ORPAD) adopted by Forewind.*

6.1.9 The responsibility for ensuring the implementation of ORPAD rests with Forewind, who will ensure that its agents and contractors are contractually bound to implement the protocol.

6.1.10 This WSI will form an integral part of Forewind's Framework of Environmental Management Controls for Dogger Bank Teesside A & B. This will ensure that agreed mitigation is wholly incorporated within all construction, operation and decommissioning plans and that all Forewind staff and their agents and contractors are bound to implement the terms of the WSI.

7 PROTOCOL FOR ARCHAEOLOGICAL DISCOVERIES

7.1.1 Unexpected archaeological discoveries that come to light during the course of the construction, operation or decommissioning of Dogger Bank Teesside A & B will be addressed by the implementation of ORPAD. The *Protocol for Archaeological Discoveries: Offshore Renewables Project* was developed by Wessex Archaeology on behalf of the Crown Estate specifically for offshore renewables development projects. A copy of the protocol is appended to this WSI (**Appendix I**).

7.1.2 The aim of ORPAD is to reduce any adverse effects of the development on the historic environment, by enabling people working on the development to report archaeological discoveries in a manner that is both convenient to their everyday work and effective with regard to curatorial requirements.

7.1.3 The protocol anticipates discoveries being made by staff, who report to a Site Champion, who then reports to a person within the construction contractor (the Nominated Contact) who has been nominated by the contractor to co-ordinate implementation of the protocol.

7.1.4 All discoveries of archaeological material are reported by the Construction Contractor, in accordance with the communication plan, to the Nominated Contact within their organisation, who will inform the Implementation Service (IS). The IS will in turn inform the Archaeological Curator and Forewind. If the find constitutes 'wreck' within the terms of the Merchant Shipping Act (1995) then the IS will also make a report to the Receiver of Wreck. Full contact details for all relevant parties will be included in the Protocol.

7.1.5 The relevant staff on all construction vessels will be informed of the Protocol, details of the find types that may be of archaeological interest, and the potential importance of any archaeological material encountered. Hard copies of the Protocol will be made available for use on board construction vessels.

7.1.6 Tool-box talks to explain the protocol to staff, to aid the identification of archaeological discoveries, if they should occur, and how to deal with them can be provided by the IS on request free of charge.

7.1.7 Provision will be made by Forewind and/or their appointed representatives, in accordance with the Protocol, for the prompt reporting/recording to the Archaeological Curator of archaeological remains encountered or suspected during works.

7.1.8 The application of, and continued adherence to, ORPAD is the primary means of mitigation to address unexpected discoveries associated with records where it is considered unlikely archaeological material is present and with potential discoveries that have not previously been recorded.

8 SCHEME OF INVESTIGATIONS

8.1 Introduction

8.1.1 This WSI is based on recommendations made in the Dogger Bank Teesside A & B Environmental Statement and sets out the mitigation and associated high level scheme of investigations for Dogger Bank Teesside A & B. This scheme of investigations represents a general foundation for all further archaeological works that may eventually be a condition of consent. Scheme specific WSIs will be produced for each project, Dogger Bank Teesside A and Dogger Bank Teesside B, once the design for each project has been finalised, to detail the specific packages of archaeological works that have been agreed. Individual method statements for each package of works will be produced to detail the nature of archaeological works to be carried out.

8.1.2 The method statements and specifications in this document are based on archaeological best practice and guidance for offshore development. The principal sources are:

- *Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects. Guidance issued by The Crown Estate (hereafter referred to as 'Model Clauses');*
- *Joint Nautical Archaeology Policy Committee (JNAPC) Code for Practice for Seabed Development 2006;*
- *COWRIE Guidance for Assessment of Cumulative Impacts on the Historic Environment from Offshore Renewable Energy 2008.*
- *The Protocol for Archaeological Discoveries: Offshore Renewables Projects (ORPAD). The Crown Estate 2010.*

8.1.3 The scheme of investigation outlined below includes guidance outlining the requirements and expected standards in relation to:

- *recording, reporting, data management and archiving;*
- *samples and artefacts;*
- *AEZs;*
- *marine geophysical investigations;*
- *marine geoarchaeological investigations;*
- *investigations using divers and/or ROVs; and*
- *watching briefs.*

8.1.4 Further detailed information can be found in The Crown Estate Model Clauses document appended to this WSI (**Appendix II**).

8.2 Archaeological Recording, Reporting, Data Management and Archiving

Relevance and Application: Dogger Bank Teesside A & B

8.2.1 Each package of archaeological works will be accompanied by written reports pursuant to the requirements of those works and demonstrating appropriate planning, recording and data management and commitment to archiving and public dissemination of results.

8.2.2 For all aspects of recording, reporting, data management and archiving Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.2.3 Key points relevant to recording, reporting, data management and archiving are included below.

Method Statements

8.2.4 Once agreed, each package of archaeological works, including those required as a condition of consent, will be subject to a method statement to be prepared for Forewind by the Retained Archaeologist or by Archaeological Contractors monitored by the Retained Archaeologist on behalf of Forewind.

8.2.5 Forewind will submit each method statement to the Archaeological Curator and archaeological works will not commence unless the Archaeological Curators have confirmed their agreement.

8.2.6 Method Statements will include provision for Archaeological Curators to monitor the conduct of the archaeological work as appropriate.

8.2.7 Unless otherwise agreed by Forewind and the Archaeological Curators, Method Statements will address the following matters:

- *form of commission and contractual relationship with Forewind;*
- *relation between licence condition(s), WSI and the Method Statement;*
- *context in terms of relevant construction works;*
- *summary results of previous archaeological investigations in the vicinity;*
- *archaeological potential;*
- *specific objectives of archaeological works;*
- *extent of investigation;*
- *investigation methodology, to cover:*
  - *intrusive methods;*
  - *recording system;*
  - *finds, including the policy for selection,*
  - *retention and disposal and provision for immediate conservation and storage;*
  - *environmental sampling strategy;*
- *anticipated post-investigation actions, including processing, assessment and analysis of finds and samples;*
- *reporting, including Intellectual Property Rights in the report and associated data, confidentiality and timescale for deposition of the report in a publicly accessible archive;*
- *timetable, to include investigation and post investigation actions;*
- *monitoring arrangements, including monitoring by Archaeological Curators;*
- *health, safety and welfare.*

Reports

8.2.8 Each package of work will give rise to one or more Archaeological Reports, as set out in the Method Statement relating to the work.

8.2.9 Each Archaeological Report will satisfy the Method Statement for the investigation and will present the project information in sufficient detail to allow interpretation without recourse to the project archive.

8.2.10 Archaeological reports will be prepared in accordance with the guidance given in the relevant IfA's Standards and Guidance documents. Reports will typically include:

- *a non-technical summary;*
- *the aims and methods of the work;*
- *the results of the work including finds and environmental remains;*
- *a statement of the potential of the results;*
- *proposals for further analysis and publication (if appropriate); and*
- *illustrations and appendices to support the report.*

8.2.11 Illustrations will include a plan of the area subject to investigation in relation to the development scheme.

8.2.12 Each Archaeological Report will be submitted in draft to the Retained Archaeologist for submission to Forewind. If the report is prepared by the Retained Archaeologist it will be submitted directly to Forewind.

8.2.13 On completion of archaeological works relating to construction of the scheme and to a timetable agreed with Forewind and Archaeological Curators, an overarching report on the archaeology of the scheme will be prepared.

8.2.14 Except where further analysis and publication are to take place (see below), a note based on the overarching report should be published in at least one appropriate peer-reviewed local, national, thematic or period-based journal.

Post-fieldwork Assessment

8.2.15 Decisions regarding the scope of post-fieldwork assessment will be made by agreement between Forewind and Archaeological Curators following submission of investigation reports, based on the possible importance of the results in terms of their contribution to archaeological knowledge, understanding or methodological development.

8.2.16 The assessment phase may include (but is not limited to) the following elements:

- *the conservation of appropriate materials, including the X-raying of metalwork;*
- *the spot-dating of all pottery from any investigation. This will be corroborated by the scanning of other categories of material;*
- *the preparation of Site matrices with supporting lists of contexts by type, by spot-dated phase and by structural grouping supported by appropriate scaled plans;*
- *an assessment statement will be prepared for each category of material, including reference to quantity, provenance, range and variety, condition and existence of other primary sources; and*
- *a statement of potential for each material category and for the data set as a whole will be prepared, including specific questions that can be answered and the potential value of the data to local, regional and national investigation priorities.*

8.2.17 On the basis of post-fieldwork assessment, and as agreed by the relevant local or national Archaeological Curators, mitigation requirements will be satisfied by carrying out analysis of the post-fieldwork assessment to include publication of important results in a recognised peer-reviewed journal or as a monograph.

Archiving

8.2.18 It is accepted practice to keep project archives, including written, drawn, photographic and artefactual elements (together with a summary of the contents of the archive) together wherever possible and to deposit them in appropriate receiving institutions once their contents are in the public domain.

8.2.19 The relevant Archaeological Curators and the Archaeological Contractor will agree with the receiving institution a policy for the selection, retention and disposal of excavated material, and confirm requirements in respect of the format, presentation and packaging of archive records and materials, and will notify the receiving institution in advance of any fieldwork.

8.2.20 In England, the NRHE is the repository for fieldwork records. The NRHE operates a policy for the selection of records relating to sites of national importance. Forewind will produce an OASIS (Online AccesS to the Index of archaeological investigationS') form for any completed and agreed archaeological reports produced as a result of this WSI and that a copy is submitted as a PDF file to English Heritage's NRHE (oasis@english-heritage.org.uk).

8.3 Archaeological Samples and Artefacts

Relevance and Application: Dogger Bank Teesside A & B

8.3.1 The retention of environmental samples, obtained during pre-construction geotechnical surveys, that are suitable for archaeological and palaeoenvironmental assessment, will be considered by Forewind for geoarchaeological review.

8.3.2 The acquisition of data associated with palaeolandscapes and palaeoenvironments, as part of Forewind's planned geotechnical surveys, will facilitate the aim to avoid significant impacts through aiding the identification of potential prehistoric receptors within the study areas. Environmental sampling will also contribute to any requirements to offset unavoidable impacts to potential submerged prehistoric archaeology.

8.3.3 Artefacts encountered during the course of archaeological works, or as unexpected discoveries, will be addressed through the implementation of a PAD.

8.3.4 For all aspects of dealing with environmental samples and artefacts Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.3.5 Key points relevant to environmental samples and artefacts are included below.

Environmental Sampling

8.3.6 For each programme of archaeological work, environmental sampling strategies and methods – including methods for processing, assessing and/or analysing samples – will be set out in the Method Statement for the archaeological work.

8.3.7 For geotechnical and geoarchaeological samples derived from developer-led sampling programmes, Forewind will ensure that samples are made available for geoarchaeological

recording and sub-sampling, in accordance with the archaeological Method Statement, prior to any processes that may render the sample ineffective, such as strength testing.

Artefacts

8.3.8 Isolated discoveries of artefacts that may come to light during the course of the development will be dealt with through ORPAD.

8.3.9 If relevant, artefacts that are exposed in the course of scheme works will be recovered by the Archaeological Contractor or, where recovery is impracticable, recorded.

8.3.10 From the point of discovery, all finds will be held by the Archaeological Contractor in appropriate conditions pending further recording, investigation, study or conservation.

8.3.11 Recovered objects will be selected, retained or disposed of in accordance with the policy agreed with the institution receiving the archive, and in consultation with the Archaeological Curators.

8.3.12 Contingency will be made for specialist advice and conservation needs on-site should unexpected, unusual or extremely fragile and delicate objects be recovered.

Ordnance

8.3.13 In the event that any item(s) of ordnance is discovered it should be treated with extreme care as it may not be inert. Industry guidelines provided by Forewind must be followed prior to any recording of items for archaeological purposes.

Human Remains

8.3.14 In the case of the discovery of human remains, at all times they should be treated with due decency and respect. For each situation, the following actions are to be undertaken, and in any event, the Retained Archaeologist will inform Forewind and Archaeological Curators:

- *for human remains on land and in intertidal areas, application should be made to the Ministry of Justice for an exhumation licence under the Burial Act 1857;*
- *for human remains within territorial waters where the remains have been intentionally buried, application should be made to the Ministry of Justice for an exhumation licence;*
- *in all other cases, the Retained Archaeologist will immediately inform the Coroner and the Police.*

8.3.15 Where practical the human remains will be left *in situ,* covered and protected.

8.3.16 Where human remains have been found and development will unavoidably disturb them, the remains will be fully recorded, excavated and removed from the site.

Aircraft

8.3.17 The majority of aircraft wrecks are military and so fall under the legal protection of the Protection of Military Remains Act 1986.

8.3.18 Any finds that are suspected of being military aircraft will be reported immediately to the Retained Archaeologist (where appointed). In the case of a military aircraft being investigated under licence, any human remains will be reported immediately.

8.3.19 For isolated items of aircraft reported through ORPAD advice can be provided through the Implementation Service.

Wreck

8.3.20 Archaeological artefacts that have come from a ship are 'wreck' for the purposes of the Merchant Shipping Act 1995. Forewind, via their Archaeological Contractors, should ensure that the Receiver of Wreck is notified, either on behalf of or directly by Forewind, for all items of wreck that have been recovered.

8.3.21 For isolated items of wreck reported through ORPAD this obligation is addressed through the Implementation Service.

Conservation and Storage

8.3.22 All recovered materials, on land and underwater, will be subject to a Conservation Assessment to gauge whether special measures are required while the material is being held.

8.3.23 This Conservation Assessment will be carried out by the Retained Archaeologist or an Archaeological Contractor with an appropriate level of expertise, with advice from appropriate specialists.

8.3.24 The Retained Archaeologist (where appointed) or an Archaeological Contractor with appropriate expertise will implement recommendations arising from the Conservation Assessment.

8.3.25 Where no special measures are recommended, finds will be conserved, bagged, boxed and stored in accordance with industry guidelines.

8.4 Archaeological Exclusion Zones

Relevance and Application: Dogger Bank Teesside A & B

8.4.1 AEZs of 100m have been applied to known sites seen in geophysical data (A1) and selected A3 and additional records as listed in ***Table 8*** and ***Table 9***.

8.4.2 Additional anomalies (A2) and the recorded positions of Fishermen's Fasteners that were not covered by geophysical survey will be avoided by Forewind through micrositing in project design, where feasible.

8.4.3 These AEZs may be subject to change if further relevant data becomes available, including being reduced or removed as appropriate. It may also be necessary to implement new AEZs if, for example, further survey demonstrates that additional anomalies are of definite archaeological value.

8.4.4 For all aspects of the application of AEZs Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.4.5 Key points relevant to the application of AEZs are included below.

Location and Extent

8.4.6 AEZs of 100m, agreed between Forewind and the Archaeological Curator will be the principal means to preserve known sites *in situ*.

8.4.7 The agreed exclusion zones for Dogger Bank Teesside A & B comprise boundaries around the extents of A1 receptors, including debris fields, as seen in the geophysical

data, plus a buffer of 100m and a 100m buffer around the point locations of selected A3 receptors and additional records (**Section 5**).

8.4.8 Forewind will require its contractors to conduct all construction activity in such a way as to prevent any impacts by construction or related works within any AEZs, including impacts from plant and equipment that is not directly engaged in construction.

Altering Archaeological Exclusion Zones

8.4.9 AEZs may be altered (enlarged, reduced, moved or removed) as a result of further data assessment or archaeological field evaluation of data covering those areas that are subject to AEZs. Further data assessment could include a formal archaeological analysis of new geophysical data, and archaeological field evaluation could include suitable high-resolution geophysical survey and/or field survey.

8.4.10 The alteration of AEZs will only be undertaken with the agreement of Archaeological Curators. Following alteration, a new plan giving details of the AEZs will be drawn up and issued to each relevant party.

8.4.11 Forewind will notify its contractors of AEZs and of any alteration or removal of AEZs.

8.4.12 If new finds of archaeological importance come to light during the course of construction ORPAD provides for temporary exclusion zones to be introduced when discoveries are made. The temporary zone may be lifted following advice, or may form the basis of an AEZ in the event that further disturbance should be avoided.

Monitoring Archaeological Exclusion Zones

8.4.13 Provision for monitoring AEZs will be set out in a method statement agreed between Forewind and the Archaeological Curators with reference to any relevant regulatory consent. Monitoring will take place relative to the baseline data used to establish the AEZ and continue for the duration set out in the scheme specific WSI.

8.4.14 Development-related activities will not be undertaken within an AEZ. If it becomes apparent that activities have taken place within any zone, the party responsible will obtain advice from the Retained Archaeologist in accordance with their obligations with respect to the scheme-specific WSI.

8.4.15 Periodic Archaeological Reports will be prepared to review whether there have been any incursions into each zone and whether there are still archaeological grounds for maintaining each zone.

8.4.16 Post-construction monitoring will be carried out in accordance with the methods and timescales set out in the scheme-specific WSI with a view to identifying any impacts on AEZs attributable to indirect effects of construction.

8.5 Marine Geophysical Investigations

Relevance and Application: Dogger Bank Teesside A & B

8.5.1 Forewind will allow for archaeological involvement in the planning, acquisition and review of further geophysical surveys including additional pre-construction and planned post-construction surveys.

8.5.2 Geophysical data was collected within Tranche A by GEMS Survey Limited (GEMS) between July and December 2010 and a full review of the data was undertaken by GEMS in support of engineering objectives. Geophysical data was acquired in Tranche B by

Gardline Geosurvey Limited (Gardline) between June and October 2011 and March and May 2012 and a full review was undertaken by Gardline.

8.5.3 Due to the large size of the survey area, only a selection of data was reassessed by Wessex Archaeology to inform the Environmental Statement. Following discussion with English Heritage, it was agreed to review only seabed anomalies measuring 5m or greater in any one dimension, as identified by GEMS and the sites of all live wrecks recorded in the UKHO database within the Tranche A development area.

8.5.4 Within the Dogger Bank Teesside A & B project areas Wessex Archaeology assessed all Gardline targets identified to be wreck and debris remains in both magnetic and sidescan sonar data. Further to this, any magnetic anomalies over 20nT were investigated and any magnetic anomalies within the vicinity of a sidescan sonar anomaly. Additionally, sidescan sonar lines were viewed at a spacing of 1km until 118 Gardline anomaly locations had been assessed. Where no targets were observed on a survey line the adjacent lines were assessed in order to give as even coverage of the development zones as possible. In addition, any recorded wrecks and obstructions in the SeaZone dataset were investigated.

8.5.5 An examination of data beyond the selected sample as detailed above was beyond the scope of assessment for EIA and it was acknowledged that further assessment may be required to gain a full understanding of the palaeogeography and seabed features across the Study Area. As agreed with English Heritage, this will be addressed post-consent by the assessment of pre-construction geophysical data within the development footprint once the design has been finalised.

8.5.6 All data acquired within the export cable corridor was made available for archaeological assessment and Wessex Archaeology assessed all data within the survey area for the Dogger Bank Teesside A & B export cable corridor.

8.5.7 For all aspects of marine geophysical investigations Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.5.8 Key points relevant to marine geophysical investigations are included below.

Archaeological Input in Planning Marine Geophysical Investigations

8.5.9 The specification of any proposed marine geophysical surveys whose primary aim is non-archaeological will be subject to advice from the Retained Archaeologist to ensure that archaeological input is provided at the planning stage and to enable archaeological considerations to be taken into account without compromising the primary objective of the survey.

8.5.10 Where a survey is carried out primarily to meet archaeological objectives, the specification shall be prepared by the Retained Archaeologist.

Undertaking further Marine Geophysical Surveys

8.5.11 Where a survey is carried out primarily to meet archaeological objectives, the survey will be carried out by a survey company with appropriate archaeological expertise and including geophysicists with appropriate archaeological expertise onboard.

8.5.12 Where archaeological objectives have been added to a survey whose primary objectives are non-archaeological (e.g. engineering or environmental), consideration will be given to having an archaeologist or geophysicist with appropriate archaeological expertise onboard

during the acquisition of data. The onboard archaeologist will advise on the suitability for archaeological purposes of the data being acquired, and be able to propose, though communication with the Retained Archaeologist, minor changes to the survey method, settings, etc. in order to optimise archaeological results, and thereby minimise the need for repeat surveys.

8.5.13 The Model Clauses document details specifications for archaeological marine geophysical investigations with regard to:

- *sidescan sonar survey;*
- *magnetometer survey;*
- *sub-bottom survey; and*
- *multibeam survey.*

Archaeological Interpretation of Marine Geophysical Data

8.5.14 New geophysical survey data will be interpreted by an archaeologist with an appropriate level of expertise.

8.5.15 Raw survey data, together with factual reports and trackplots, will be made available in digital formats to the Archaeological Contractor.

8.5.16 Archaeological interpretation will include:

- *examination of sidescan, magnetometer, sub-bottom and multibeam data for the area and surroundings of known wreck sites and previously identified geophysical anomalies;*
- *examination of sidescan, magnetometer, sub-bottom and multibeam data within areas that will be subject to scheme impacts in order to identify as yet unknown wreck remains;*
- *assessment of sub-bottom data in order to plot the general trend of the sub-surface sediments with archaeological potential; and*
- *following the initial assessment, further detailed interpretation of sub-bottom data within those areas that will be subject to scheme impacts.*

8.5.17 The results of further geophysical interpretation will be compiled as an Archaeological Report consistent with the Model Clauses on reporting.

8.6 Marine Geoarchaeological Investigations

Relevance and Application: Dogger Bank Teesside A & B

8.6.1 Forewind will allow for archaeological involvement in the planning, acquisition and review of further geotechnical surveys including pre-construction and future monitoring surveys.

8.6.2 The archaeological assessment of new marine geoarchaeological data will facilitate Forewind's aim to avoid significant impacts through aiding further identification and clarification of known and potential receptors. The acquisition and review of new data for archaeological purposes will also contribute to any requirements to offset unavoidable impacts to potential archaeology.

8.6.3 Forewind are currently proactive in supporting a programme of geoarchaeoloigcal analysis of samples reported to date through ORPAD. The work carried out to date, together with

geoarchaeological assessment carried out specifically for the Dogger Bank Creyke Beck and Dogger Bank Teesside A & B offshore wind farm projects, has provided substantial new data contributing to developing current interpretations of North Sea palaeolandscapes.

8.6.4 It is noted that the methodological approach for geoarchaeological assessment undertaken by Forewind to date, including the integration of a geoarchaeologist within the geotechnical team, has been very successful in achieving archaeological objectives. Without the onboard presence of a geoarchaeologist and the help and cooperation of the geotechnical contractor facilitated by Forewind, it is likely that some of the samples may not have been available for study. This is particularly relevant to organic sediments and peat that were not obvious from the geophysical survey data and that may not have been clear from an onshore review of the core logs. The sampling strategy was adapted on-board during operations in consultation with the geoarchaeologist, geotechnical contractors and client representatives to retrieve as much geoarchaeological data as possible whilst achieving the geotechnical requirements of the survey.

8.6.5 For all aspects of marine geoarchaeological investigations Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.6.6 Key points relevant to marine geoarchaeological investigations are included below.

Archaeological Input in Planning Marine Geoarchaeological Investigations

8.6.7 The specification of any proposed geotechnical surveys will be subject to advice from the Retained Archaeologist to ensure that archaeological input is provided at the planning stage and to enable archaeological considerations to be taken into account. The geotechnical specification will also be informed by any previous stages of work, for example archaeological interpretation of geophysical data.

8.6.8 Archaeological Curators will be consulted regarding the proposed locations of geotechnical work and will be provided with the results of each stage of investigation.

Geoarchaeological Investigations

8.6.9 A structured approach will be taken to any necessary archaeological analysis of the material obtained as appropriate to satisfy the requirements of the Archaeological Curators for delivery of the required mitigation measures.

8.6.10 The objectives, approaches and methods to be applied in each geoarchaeological investigation will be set out in a Method Statement which will be subject to agreement with Archaeological Curators.

8.6.11 Consultation will be held between the Archaeological Contractor (and Retained Archaeologist, where appointed) and the contractor undertaking geotechnical investigations in order to enable the relevant samples to be retained for geoarchaeological analysis.

8.6.12 The Model Clauses document details specifications for archaeological marine geoarchaeological investigations with regard to:

- *archaeological recording and assessment of geotechnical cores;*
- *archaeological review of geotechnical logs;*
- *sub-sampling; and*

- *laboratory assessment and analysis of samples and sub-samples.*

8.6.13 The results of further geoarchaeological investigation will be compiled as an Archaeological Report consistent with the Model Clauses on reporting. The report will represent the stage of analysis that is agreed with English Heritage and would include a broad chronological framework for the completed analysis.

8.7 Archaeological Investigation using Divers and/or ROVs

Relevance and Application: Dogger Bank Teesside A & B

8.7.1 It is possible that certainty of the nature and extent of individual receptors or anomalies may only be achieved through the use of diver and/or ROV survey. It is expected that this may only be relevant if engineering constraints prevent the avoidance of wrecks, aircraft of other anomalies.

8.7.2 For all aspects of archaeological investigations using divers or ROVs Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

8.7.3 Key points relevant to archaeological investigations using divers or ROVs are included below.

Non-archaeological Diver/ROV Surveys

8.7.4 In order to maximise the potential benefits of any proposed diver/Remote Operated Vehicle (ROV) surveys undertaken primarily for engineering, ecological or other non-archaeological purposes, Forewind will seek archaeological input at the planning stage of any such works. Any such survey specification will be informed by previous stages of the project, including any documentary studies, as well as geophysical and geotechnical analysis, so that archaeological considerations can be taken into account.

8.7.5 Where the primary objectives of dive survey are non-archaeological, consideration will be given to having an Archaeological Contractor present during any diver or ROV surveys, either as observer(s) or participating diver(s) to optimise archaeological results and thereby reduce the need for repeat survey.

8.7.6 Following the completion of a non-archaeological diver/ROV survey, all data, including video footage, will be reviewed by an Archaeological Contractor with appropriate expertise.

Archaeological Diver/ROV Site Assessment

8.7.7 Archaeological diver or ROV-based investigations will take place where the primary objectives are archaeological and the diving is led by archaeologists.

8.7.8 Archaeological diver and/or ROV surveys can be employed in order to gather archaeological data concerning wreck sites and geophysical anomalies to safeguard the archaeological record or to alter (enlarge, reduce, move or remove) existing AEZs.

8.7.9 Specifically, an archaeological diver or ROV-based assessment may be required where it is not possible to protect an archaeological site through avoidance.

8.7.10 The results of this will be compiled as an Archaeological Report consistent with the Model Clauses on reporting.

8.8 Archaeological Watching Briefs

Relevance and Application: Dogger Bank Teesside A & B

8.8.1 Watching briefs by a suitable qualified archaeologist may be applicable to the construction of Dogger Bank Teesside A & B where material dredged during seabed preparation is deposited within an on board hopper and can be visibly assessed.

8.8.2 The project design does not currently propose any open excavations above low water. Thus, it is expected that the potential for unexpected discoveries will primarily be addressed through the application of the protocol for archaeological discoveries rather than through Watching Briefs.

8.8.3 However, in some cases it may be necessary for the HDD to exit on the beach which would require additional works such as the installation of cofferdams and open cut trenching, to reach the sub-tidal zone. If this occurs, a Watching Brief is recommended to monitor works in the intertidal zone.

8.8.4 For all aspects of archaeological watching briefs Forewind will adhere to standards and guidance as set out in the *Model Clauses* document.

Watching Brief

8.8.5 A watching brief is a formal programme of archaeological monitoring and will involve attendance by an Archaeological Contractor during groundworks.

8.8.6 Excavated surfaces and up-cast material will be inspected by the Archaeological Contractor. Any finds will be collected and allocated a record number and their position will be logged.

8.8.7 Archaeological features or structures will be examined and/or excavated. A sufficient sample of each layer/feature type will be investigated in order to elucidate the date, character, relationships and function of the feature/structure.

8.8.8 Recording will include written, drawn, and photographic elements as conditions allow.

8.8.9 The results of will be compiled as an Archaeological Report consistent with the Model Clauses on reporting.

9 MONOTORING, REVIEWING AND UPDATING THIS WSI

9.1.1 As stated as the beginning of this document, the final design for Dogger Bank Teesside A & B has yet to be decided and, therefore, this WSI encompasses the wide range of development options under consideration by Forewind for inclusion in the development consent.

9.1.2 Consequently, this document will need to be monitored and updated throughout the consents and post-consent process to ensure that the scheme of investigation is appropriate to the final project design.

9.1.3 At each stage of the project, the Retained Archaeologist will advise Forewind's ECM as to the potential requirements of the specific archaeological investigations as outlined in this document. Appropriate method statements will be prepared as required for each element, in line with the requirements of the WSI, and these will be submitted to the Archaeological Curator for approval. Approval by the Curator will be assumed if no contrary response is received within 30 working days of submission.

9.1.4 These method statements will include provision for the Archaeological Curator to monitor the progress of the archaeological investigations, as appropriate to that element; be that through site visits or meetings with Forewind, the Contractor(s) and the Retained Archaeologist.

9.1.5 Provision will be made for the WSI to be revised as elements of the project change or particular archaeological issues come to light. Any revisions will be prepared by the Retained Archaeologist and submitted to Forewind's ECM who will ensure they are submitted to and approved by the Archaeological Curator. Approval by the Curator will be assumed if no contrary response is received within 30 working days of submission.

9.1.6 The performance of the WSI will be monitored through the provision of a series of archaeological reports prepared to inform on the results of various activities undertaken under its auspices. These will include:

- *a review of pre-construction geotechnical survey;*
- *a review of pre-construction geophysical survey;*
- *the results of intertidal watching brief;*
- *the implementation of ORPAD; and*
- *a review of any monitoring surveys that take place during the project lifetime.*

9.1.7 These reports will be submitted to Forewind's ECM who will ensure their dissemination to the Archaeological Curator. The system for archaeological reporting will be agreed between Forewind and the Retained Archaeologist based upon the guidance outlined above.

9.1.8 The Archaeological Curator will be notified in advance by Forewind of work timetables and the commencement of any work on site that may impact on the archaeology and will be informed at this time of the Retained Archaeologist's key staff.

9.1.9 A programme of monitoring visits (if deemed appropriate) by the Archaeological Curator and Forewind will be agreed in advance of the commencement of work on site.

9.1.10 During any site evaluation/investigation or construction work that has the potential to impact on archaeology the Retained Archaeologist may liaise directly with the Archaeological Curator with regard to site monitoring and reporting. Forewind will be kept informed of all such contact between the Retained Archaeologist and the Archaeological Curator.

9.1.11 Finally, provision for the reassessment of the archaeological baseline will be included as part of any future decommissioning plan. This will ensure the adequate application of the terms of this WSI throughout the life of the project in the light of any new information that may become available and any changes in the physical environment. Reassessment will be proportionate to the decommissioning strategy and will take account of the prior mitigation applied throughout construction and operations phases.

10 HEALTH AND SAFETY

10.1.1 Forewind's ECM will ensure that the Retained Archaeologist is made aware of the relevant requirements of all Health and Safety Plans that are put in place for the project.

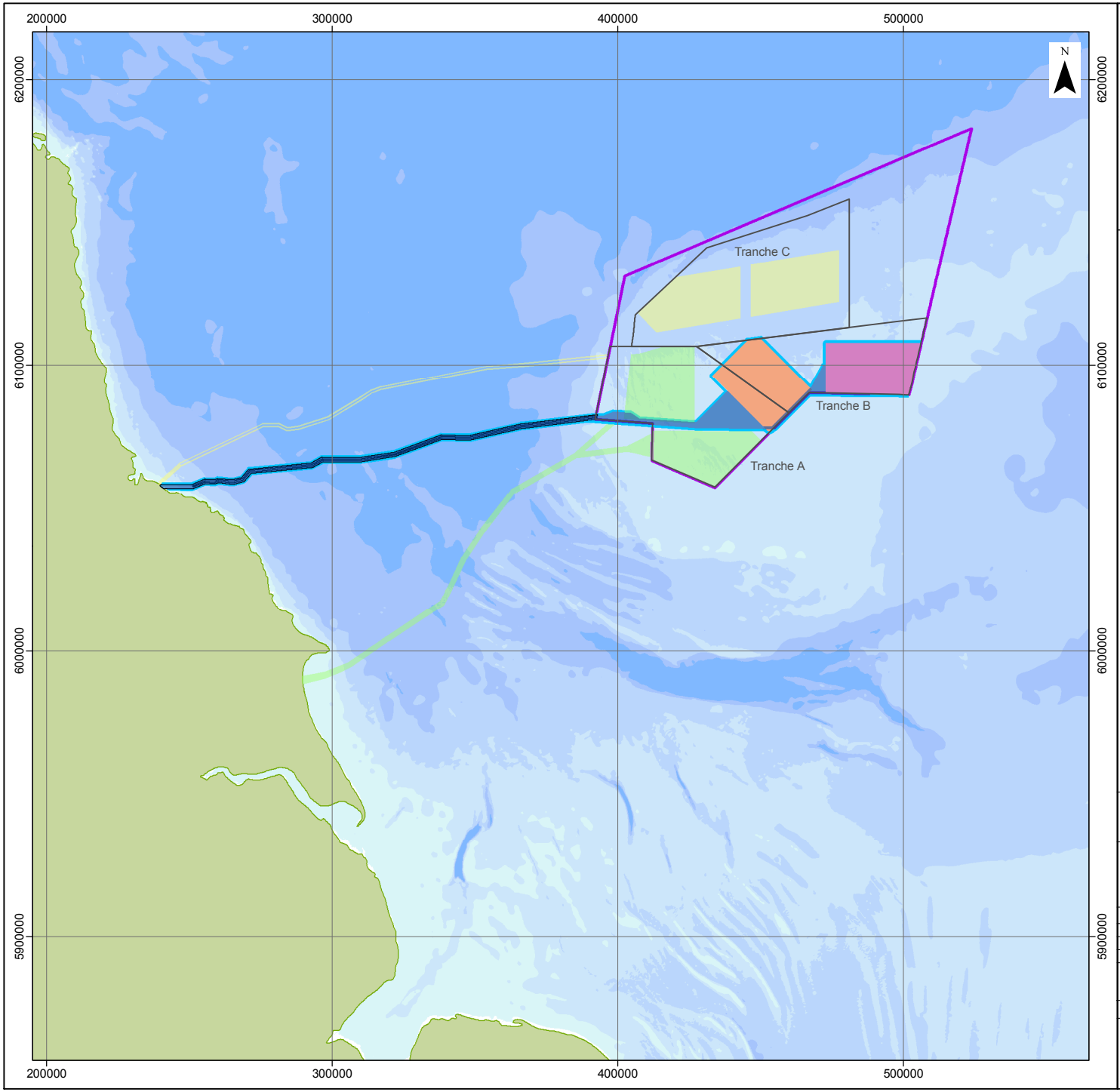
10.1.2 The Retained Archaeologist will ensure that any method statements prepared to meet the requirements of the WSI are compliant with the requirements of Forewind's Health and Safety Plans for the project.

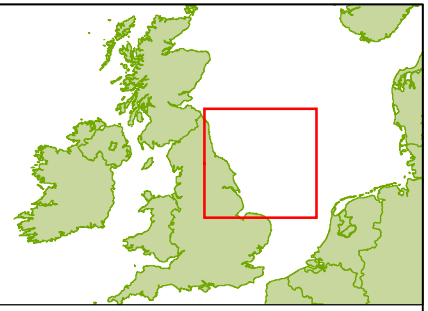
10.1.3 Health and Safety considerations will be of paramount importance in conducting all fieldwork. Safe working practices will override archaeological considerations at all times.

10.1.4 All work will be carried out in accordance with the Health and Safety at Work etc. Act 1974, the Health and Safety Management Regulations 1992, the SCAUM (Standing Conference of Archaeological Unit Managers) health and safety manual, Health and Safety in Field Archaeology (2007), Construction, Design, and Management Regulations 2007, and all other relevant Health and Safety legislation, regulations and codes of practice in force at the time.

10.1.5 The Archaeological Contractor(s) will supply the Retained Archaeologist with Risk Assessments in advance of any work. The Retained Archaeologist will in turn supply Forewind with copies of archaeological Risk Assessments before the commencement of any fieldwork. Risk Assessments will be read and acknowledged by all members of archaeological staff involved in the fieldwork.

10.1.6 Risk Assessments will incorporate an interface document between the Health and Safety system of the Archaeological Contractor(s) and that of the construction/installation contractor/s.





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Teesside Projects C and D
- Creyke Beck Projects A and B
- Temporary Working Areas
- Tranche A/B/C

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

0 20 40 60
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 1: Location Map

VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig01_Teesside-WA-01

SCALE	1:2,000,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND

LEGEND

- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Records of Findspots
- Records of Sites
- Concrete Foundation from Possible Destroyed Pillbox
- Anti-tank Obstacle
- Possible Anti-tank Obstacles

0 500 1,000
Metres

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 2: Archaeology at the Landfall

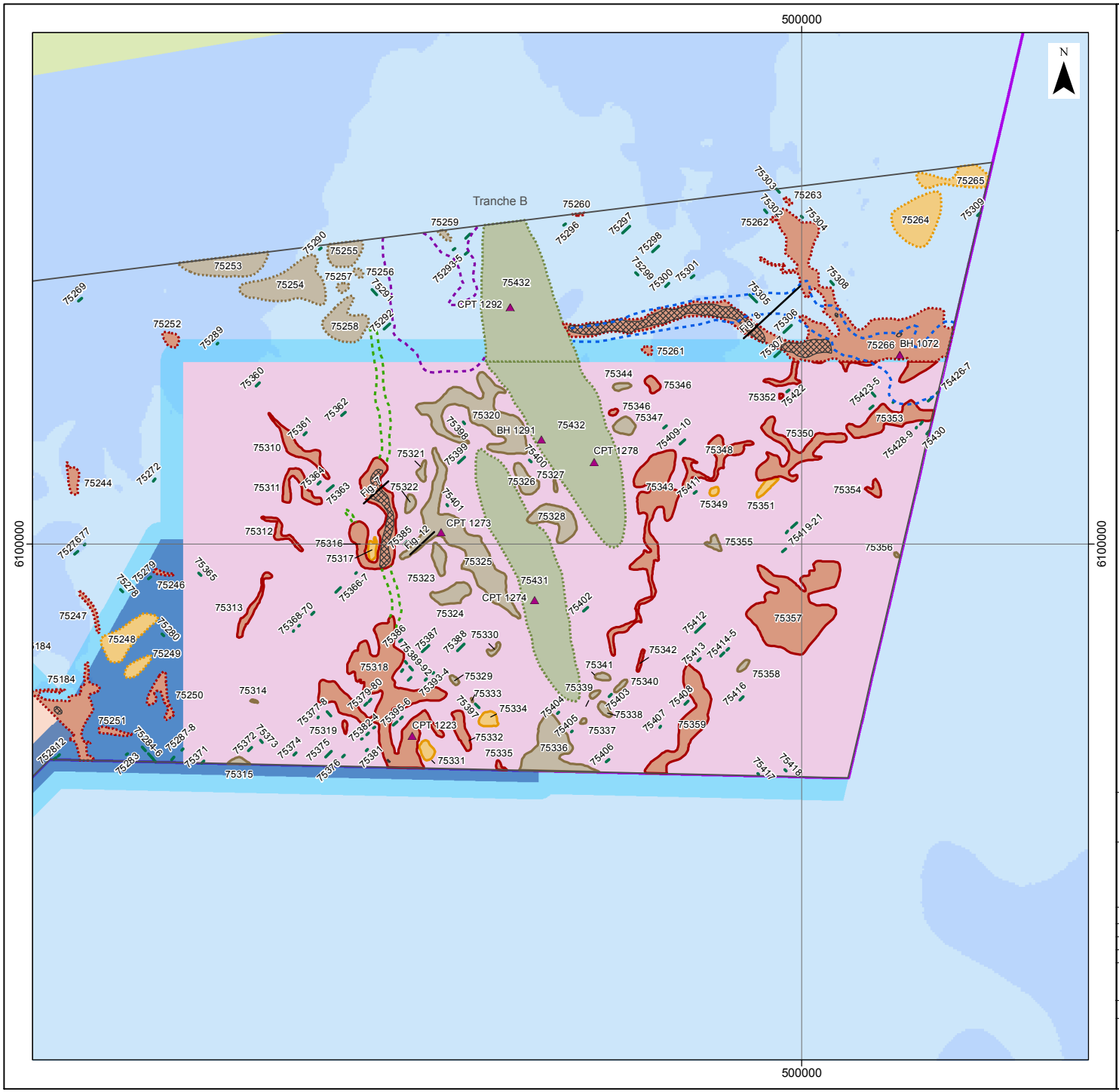
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

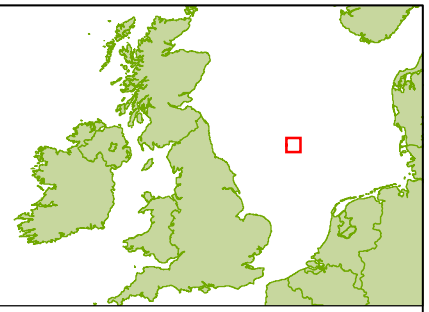
DRAWING NUMBER:

WSI_Fig02_Teesside-WA-01

SCALE	1:25,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Tranche B
- Boreholes
- Transects
- Isolated Cut and Fill Features
- Phase Ia
- Phase Ib
- Phase II
- Gas blanking

Features from RPS Sands Map:

- Possible Lowlands
- Channel 75266 Earlier Phase
- Phase I
- Phase III

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

0 10
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 3: Palaeolandscape Features Identified within Dogger Bank Teesside A

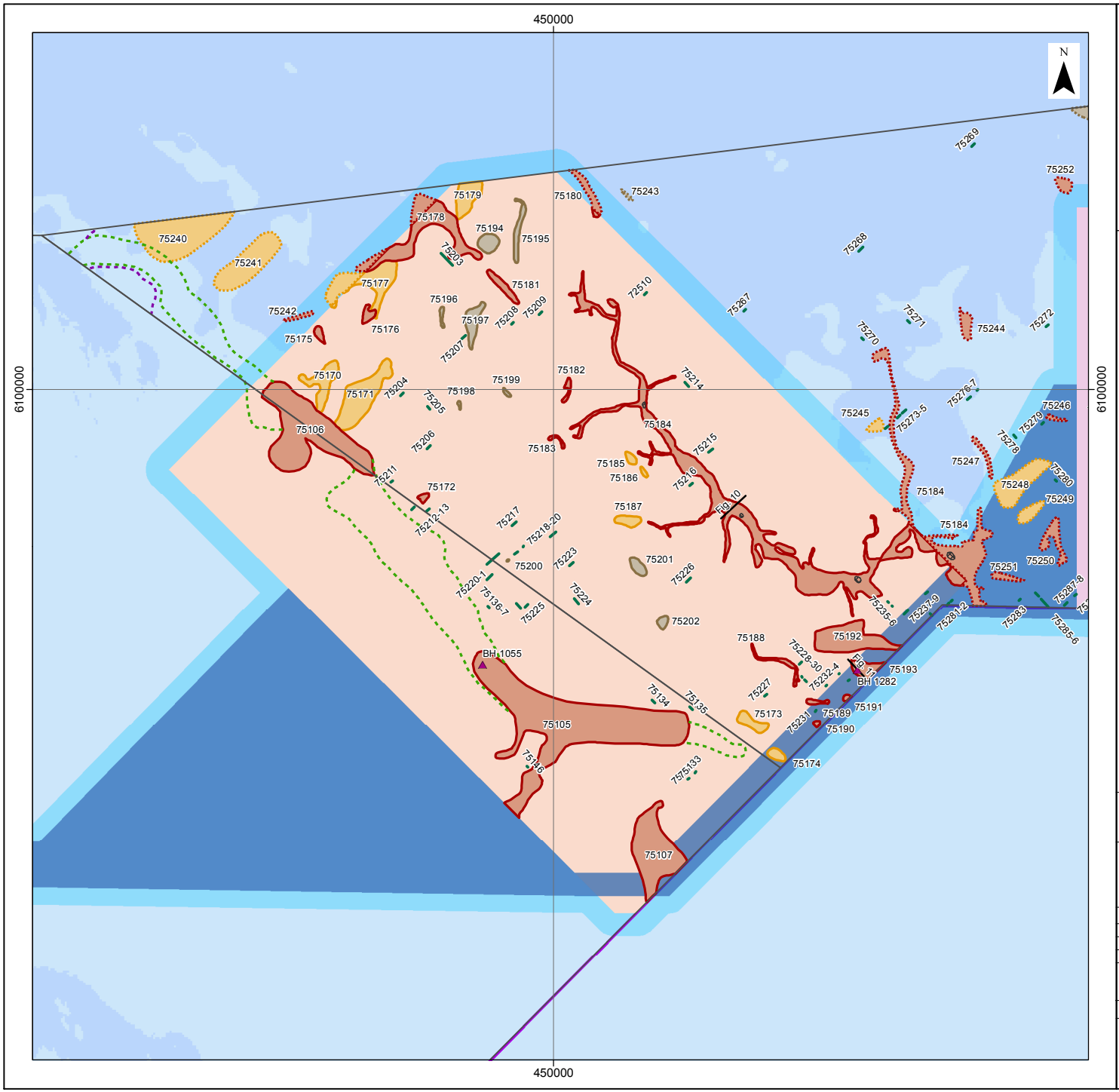
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	DH

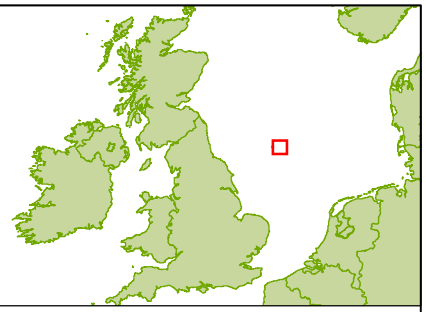
DRAWING NUMBER:

WSI_Fig03_Teesside-WA-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:250,000	A4	WGS84	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Tranche A/B
- Boreholes
- Transects
- Isolated Cut and Fill Features
- Phase Ia
- Phase Ib
- Phase II
- Gas blanking

Features from RPS Sands Map:

- Possible Lowlands
- Channel 75266 Earlier Phase
- Phase I
- Phase III

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 10
Kilometres

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 4: Palaeolandscape Features Identified within Dogger Bank Teesside B

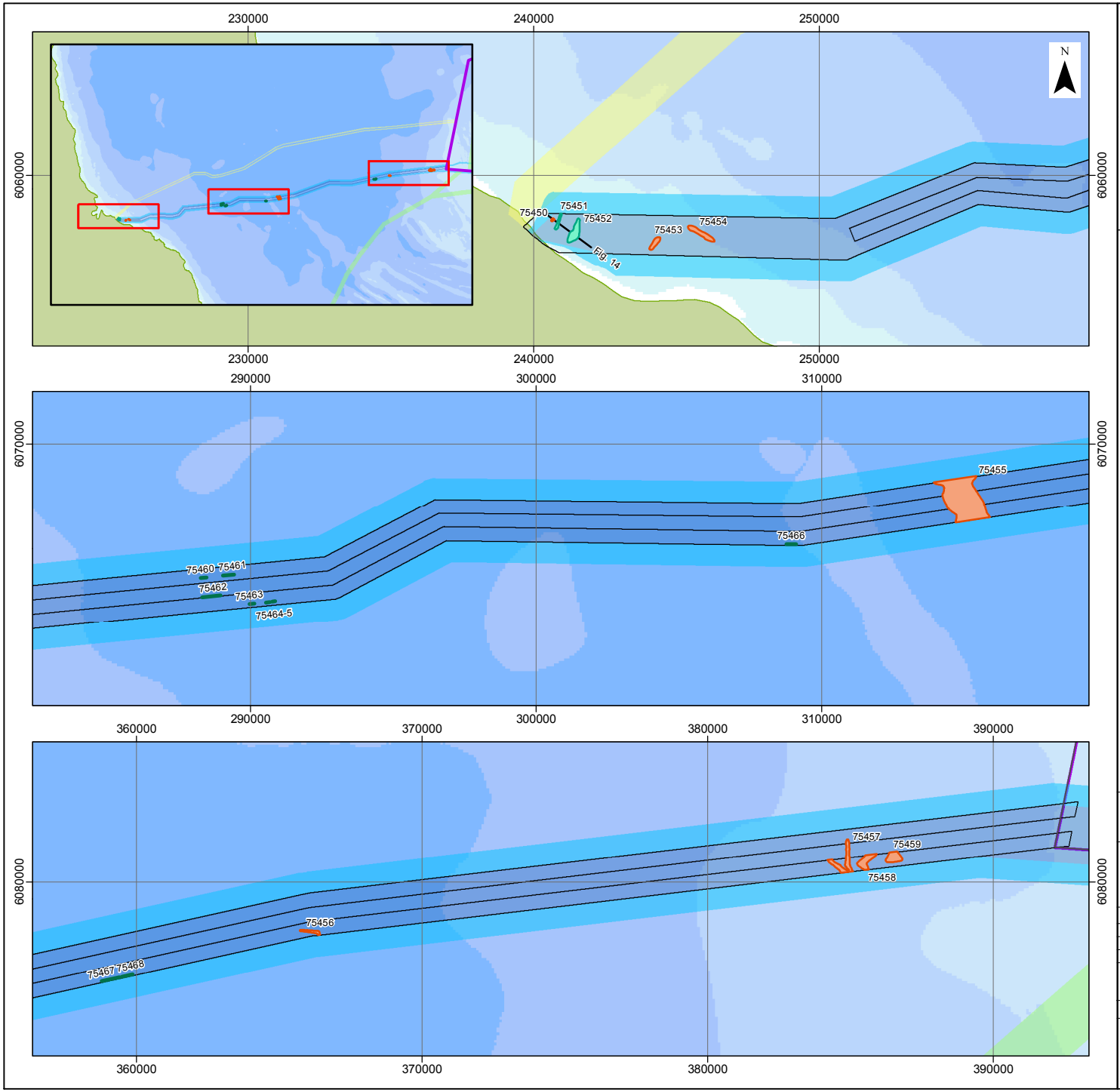
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	DH

DRAWING NUMBER:

WSI_Fig04_Teesside-WA-01

SCALE	1:250,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Transects
- Cuts
- Channel
- Cut & Fill

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

0 5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 5: Palaeolandscape Features Identified along the Cable Route

VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	DH
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig05_Teesside-WA-01

SCALE	1:200,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

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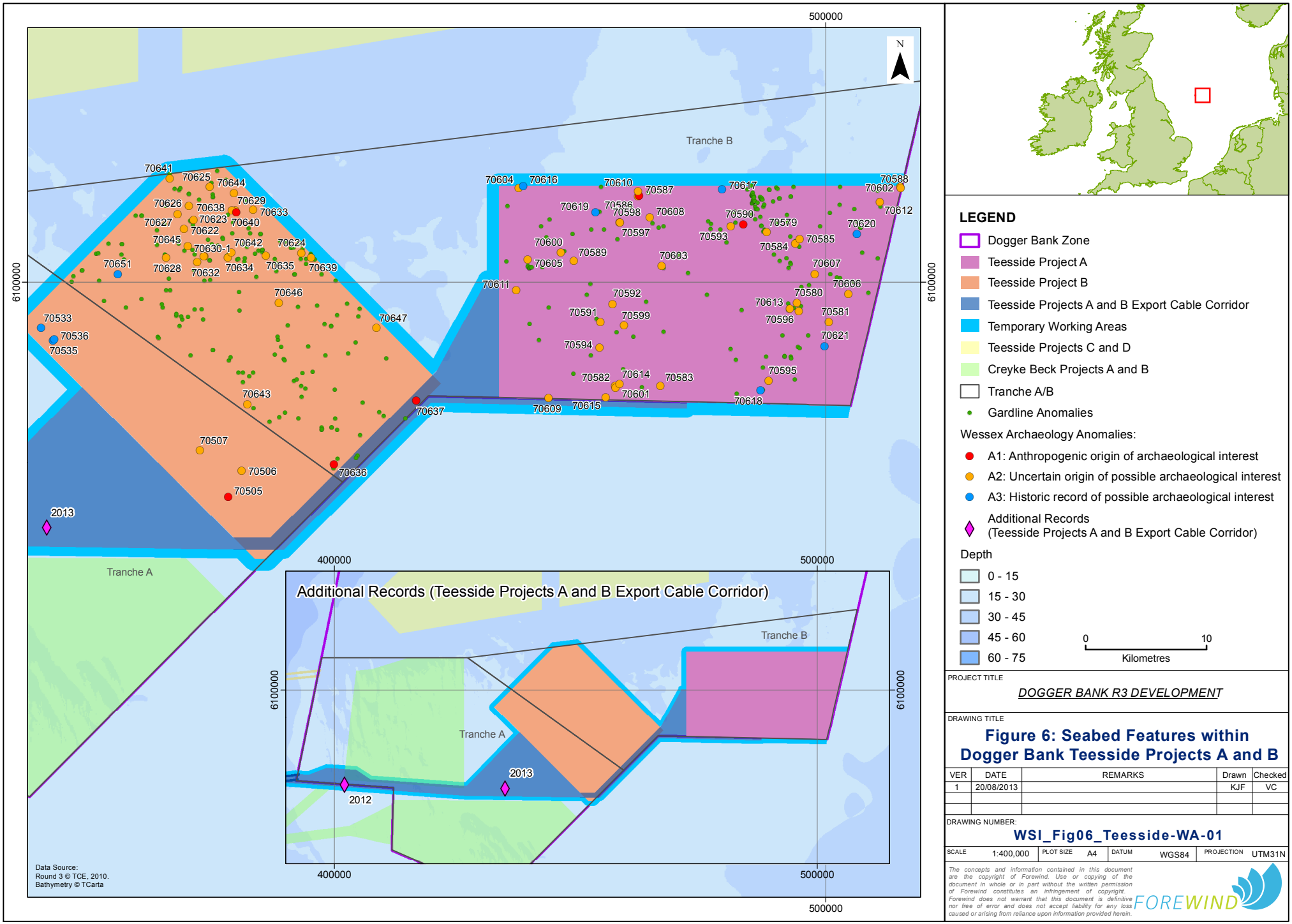


LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Teesside Projects C and D
- Creyke Beck Projects A and B
- Tranche A/B
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records (Teesside Projects A and B Export Cable Corridor)

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 10 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 6: Seabed Features within Dogger Bank Teesside Projects A and B

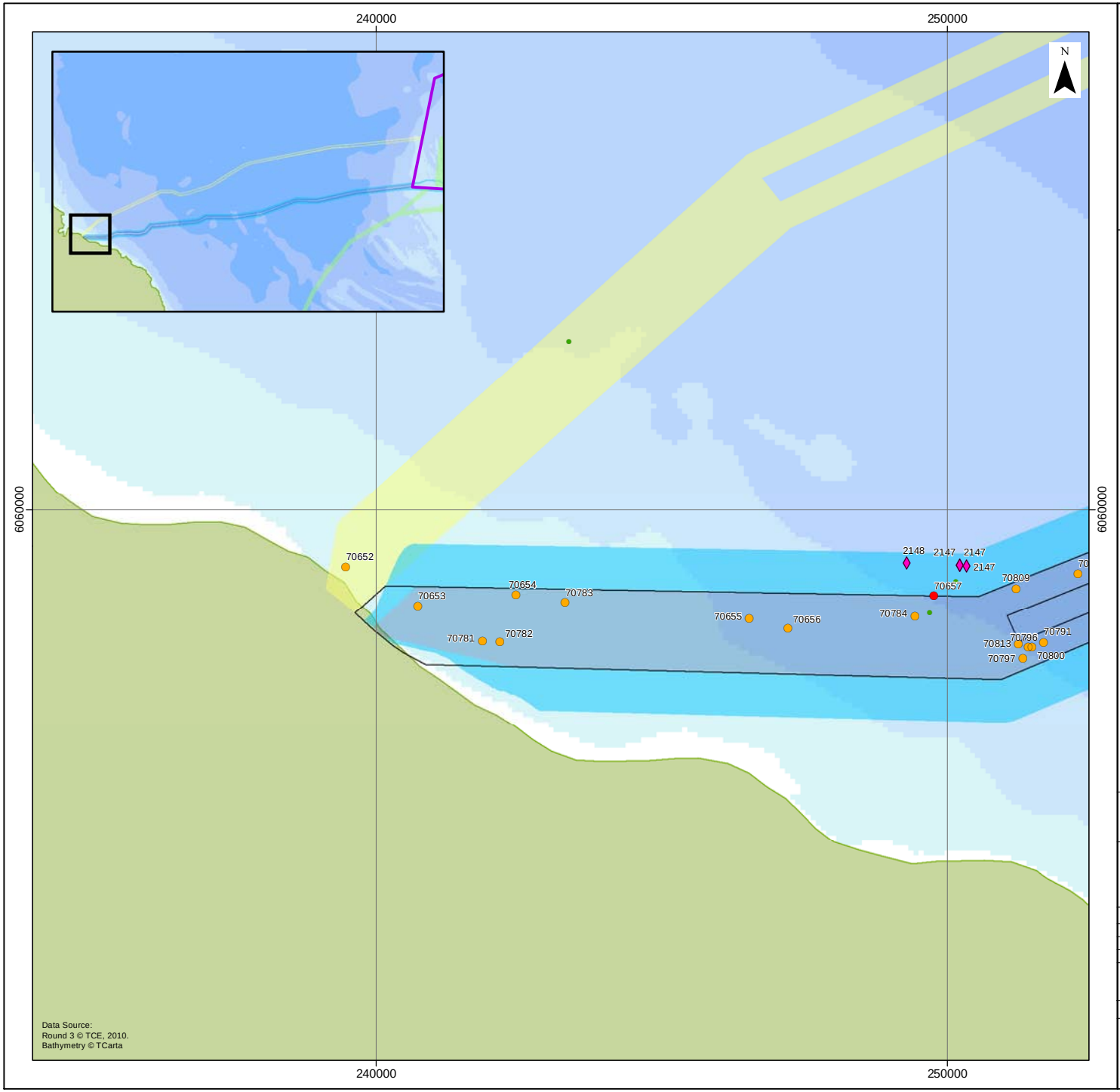
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC

DRAWING NUMBER:

WSI_Fig06_Teesside-WA-01

SCALE	1:400,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7a: Seabed Features within Export Cable Corridor

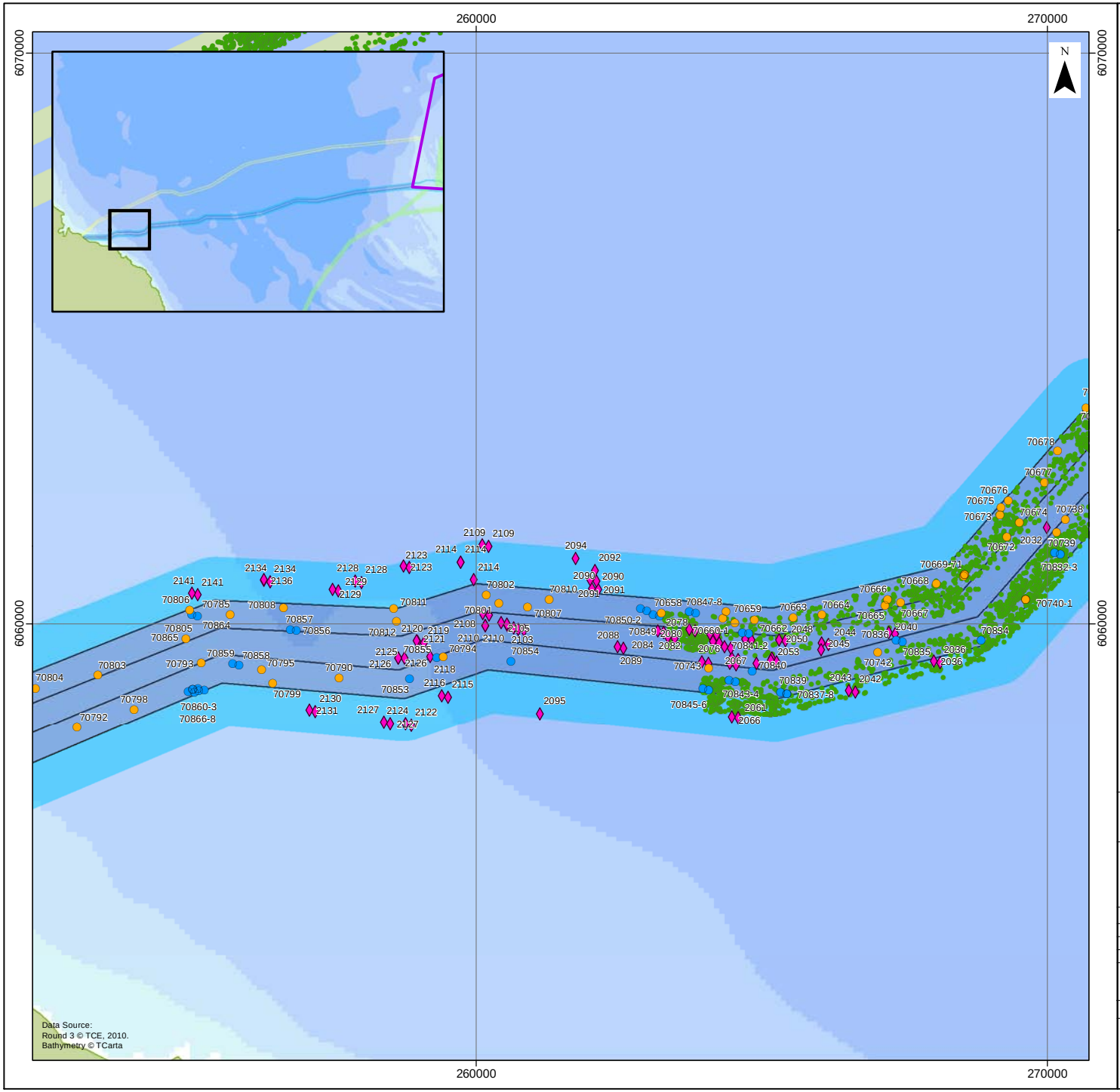
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7b: Seabed Features within Export Cable Corridor

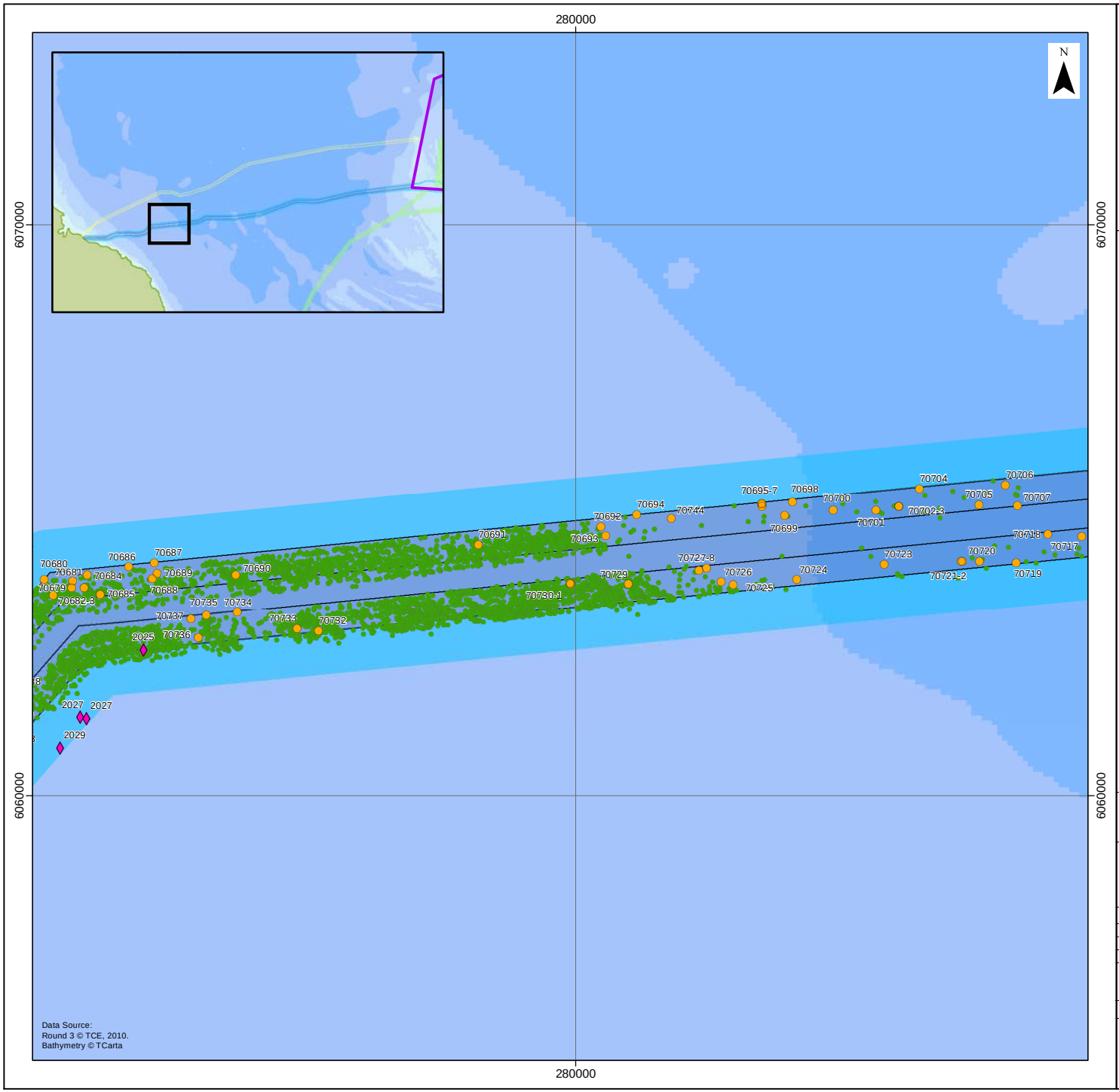
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7c: Seabed Features within Export Cable Corridor

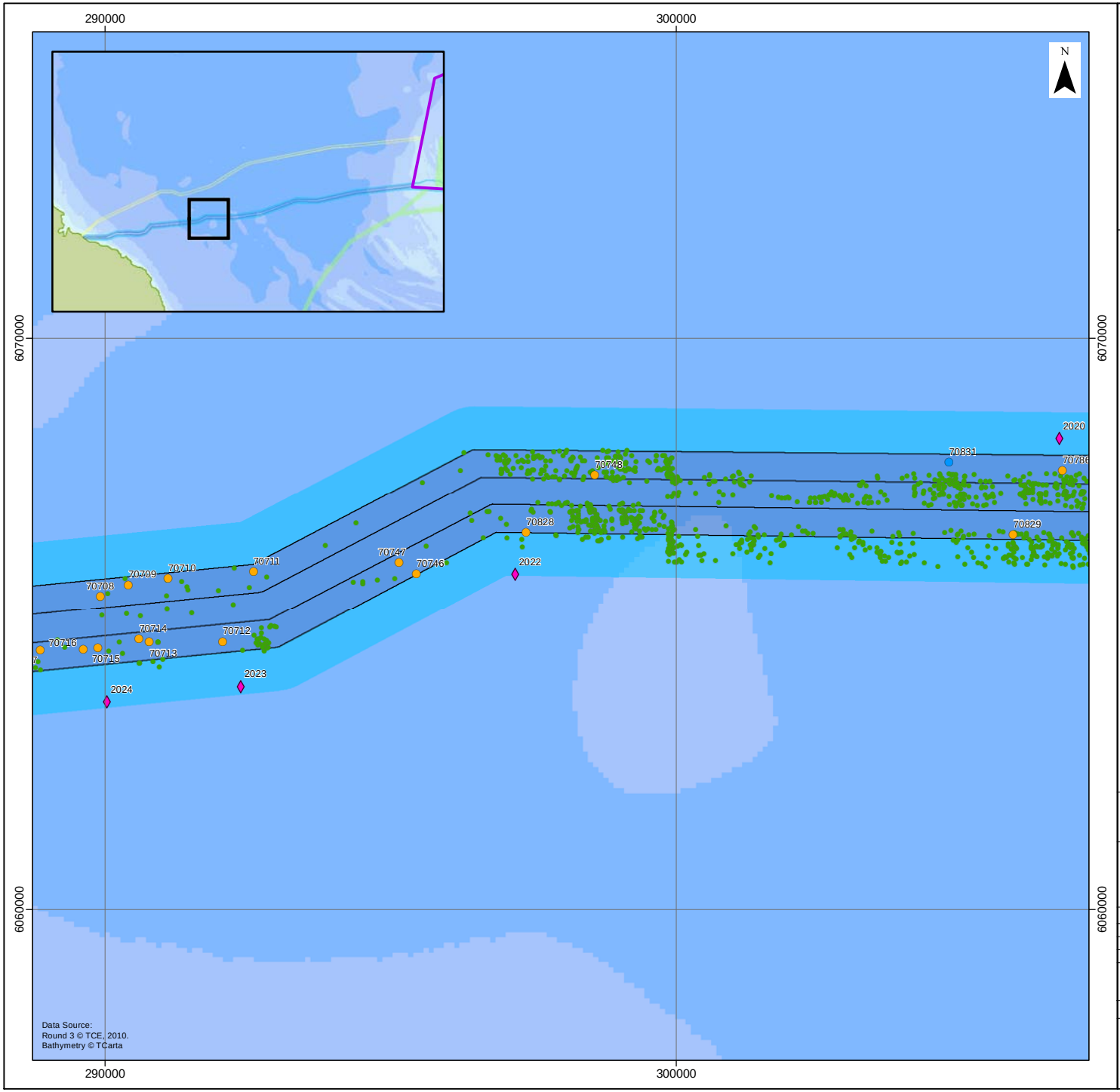
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7d: Seabed Features within Export Cable Corridor

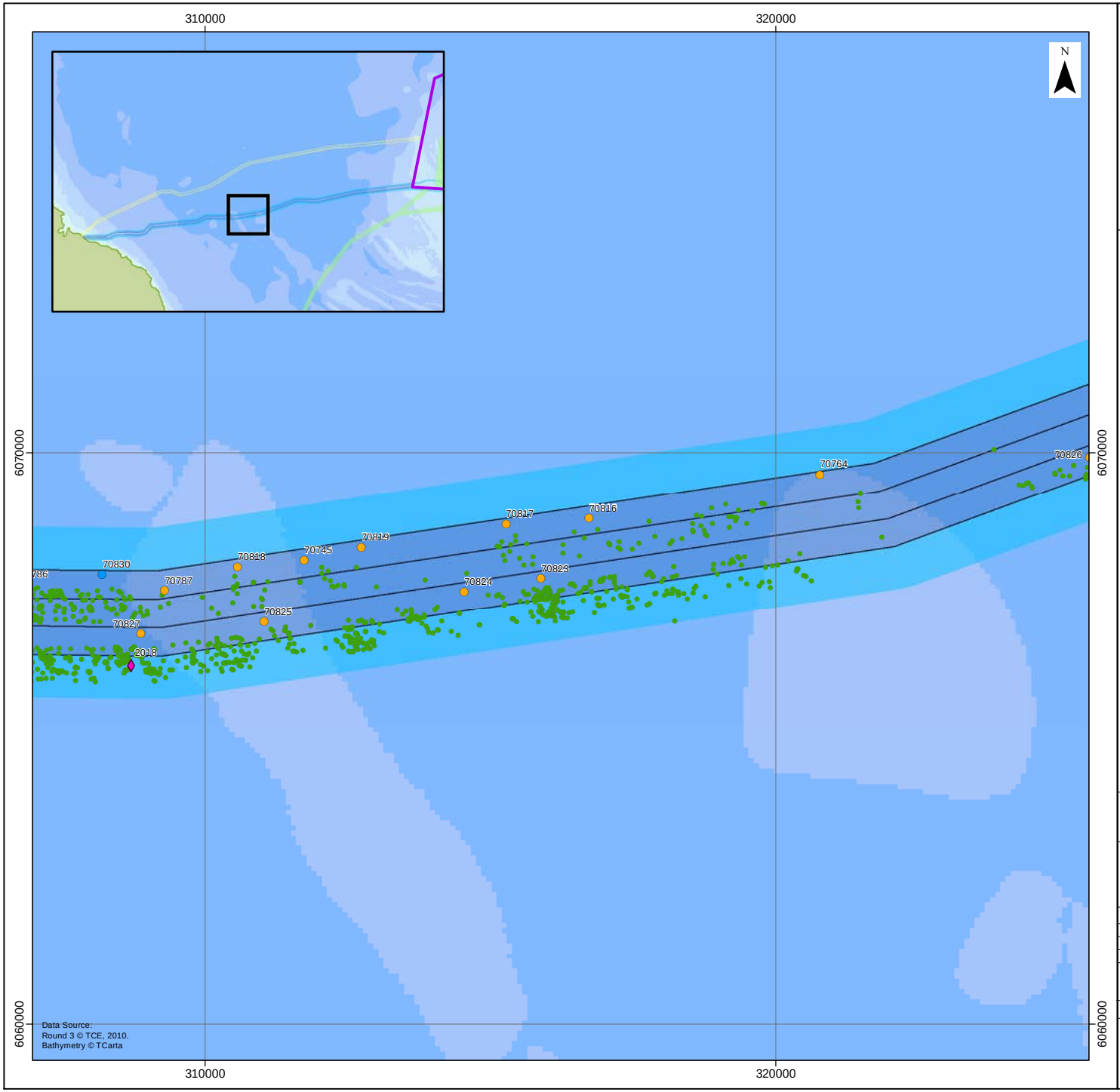
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

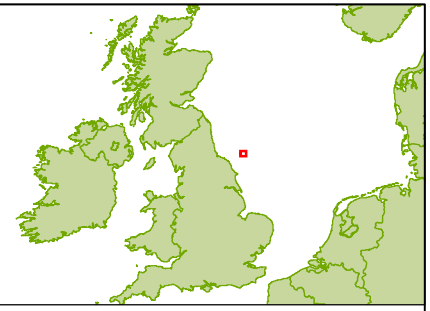
DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7e: Seabed Features within Export Cable Corridor

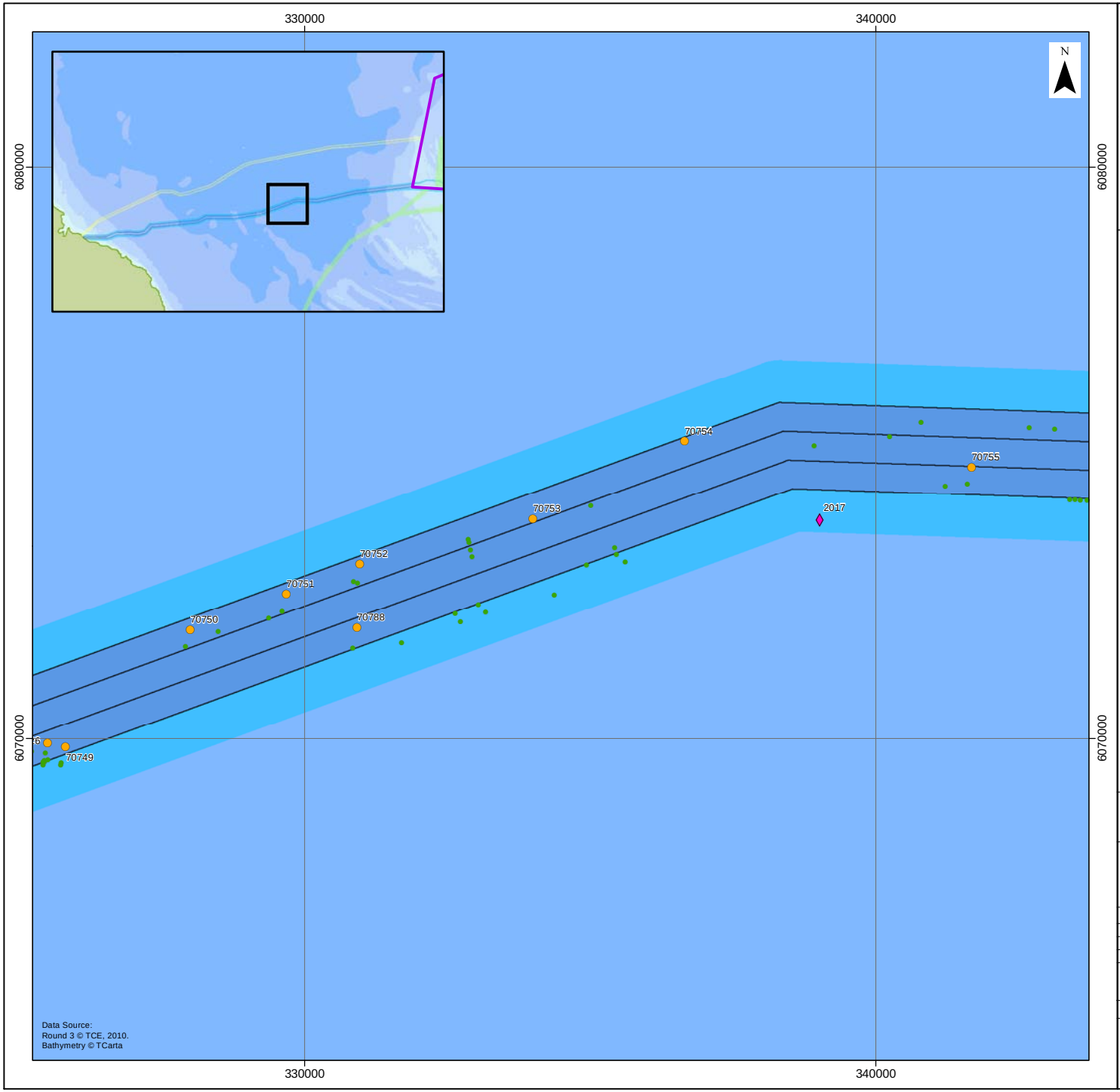
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

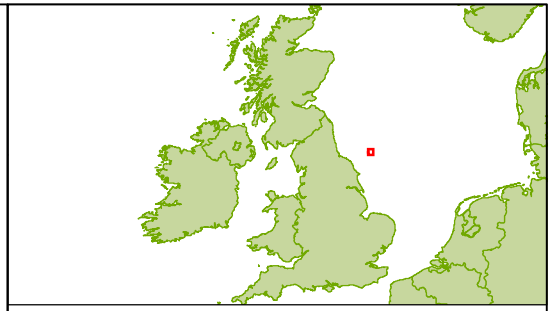
DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 3.5 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7f: Seabed Features within Export Cable Corridor

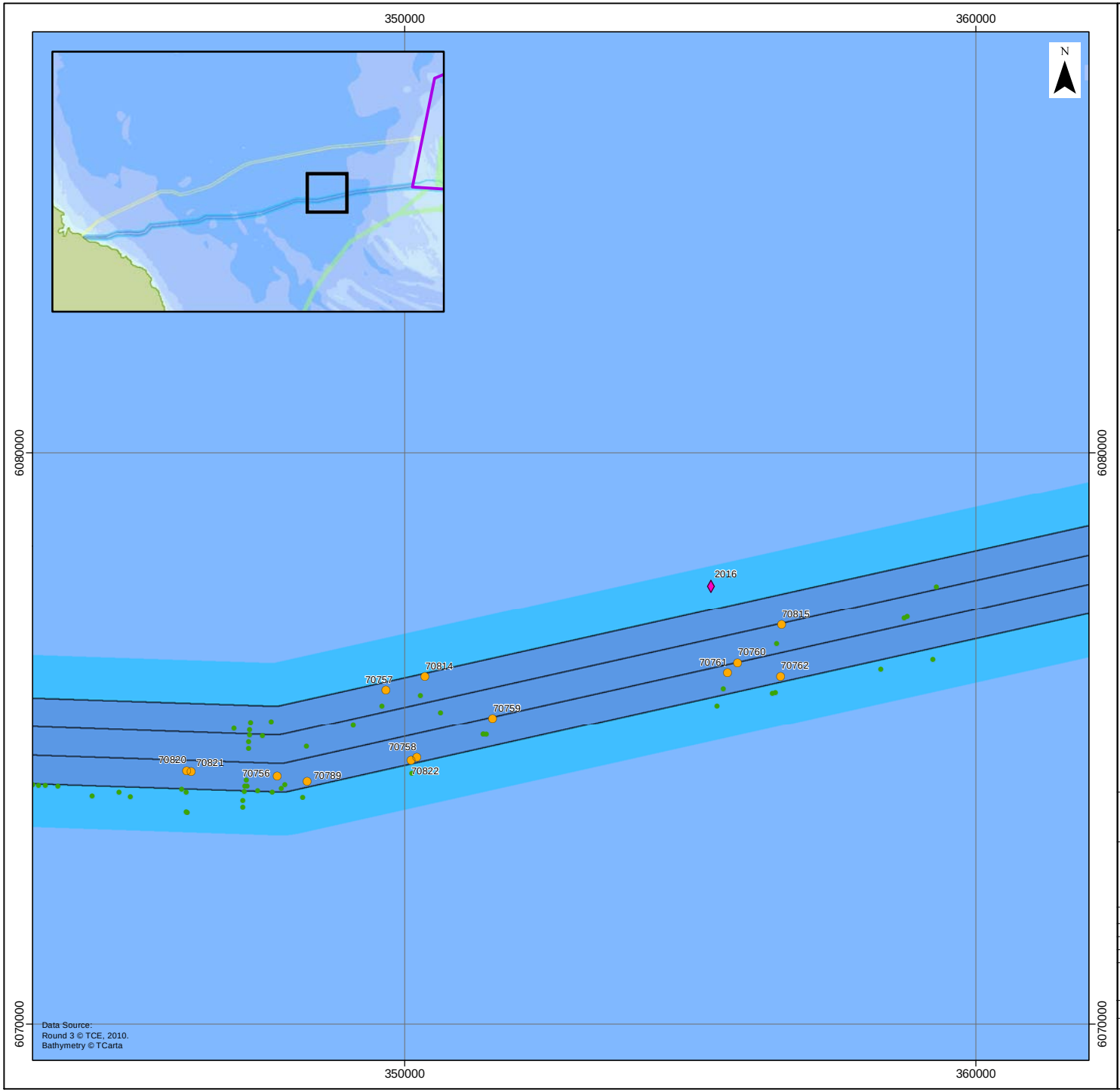
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

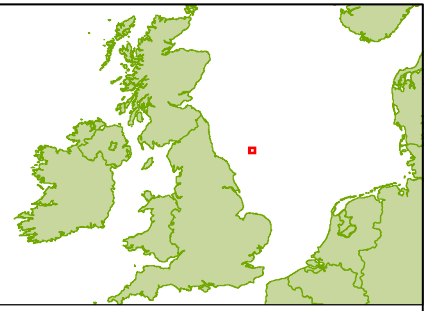
DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 3.5
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7g: Seabed Features within Export Cable Corridor

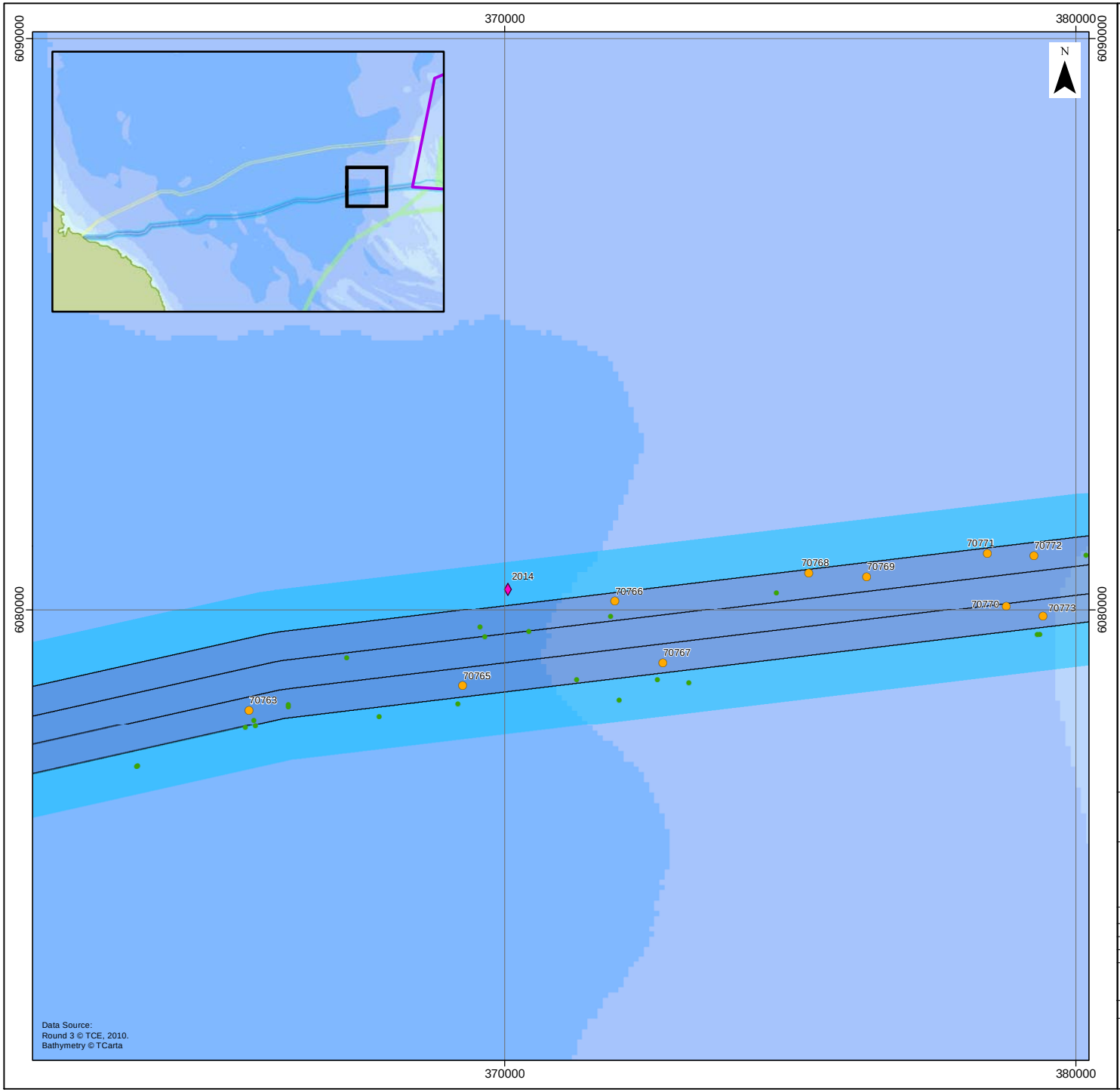
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 3.5 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7h: Seabed Features within Export Cable Corridor

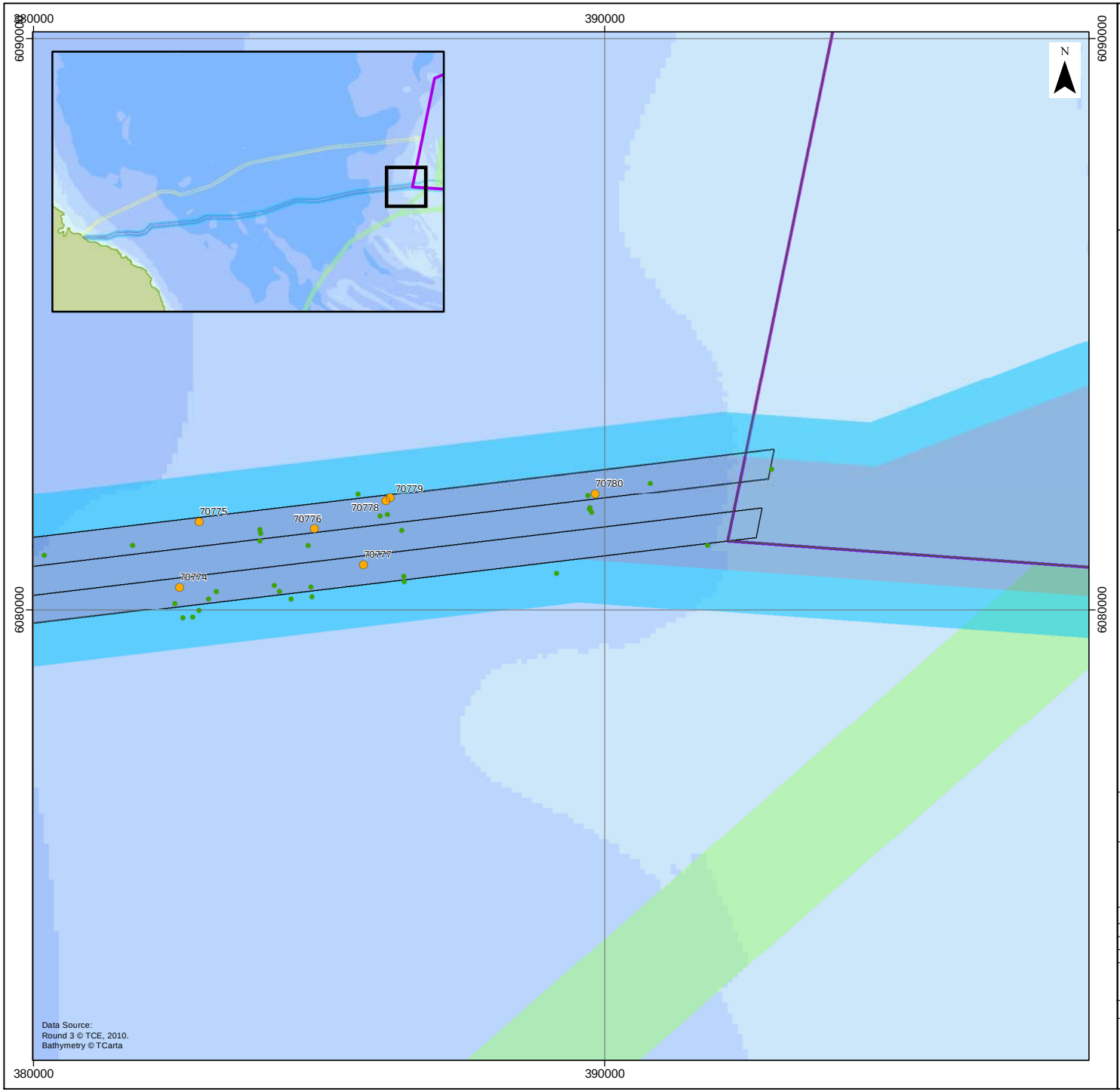
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- Gardline Anomalies

Wessex Archaeology Anomalies:

- A1: Anthropogenic origin of archaeological interest
- A2: Uncertain origin of possible archaeological interest
- A3: Historic record of possible archaeological interest
- Additional Records

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 3.5 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7i: Seabed Features within Export Cable Corridor

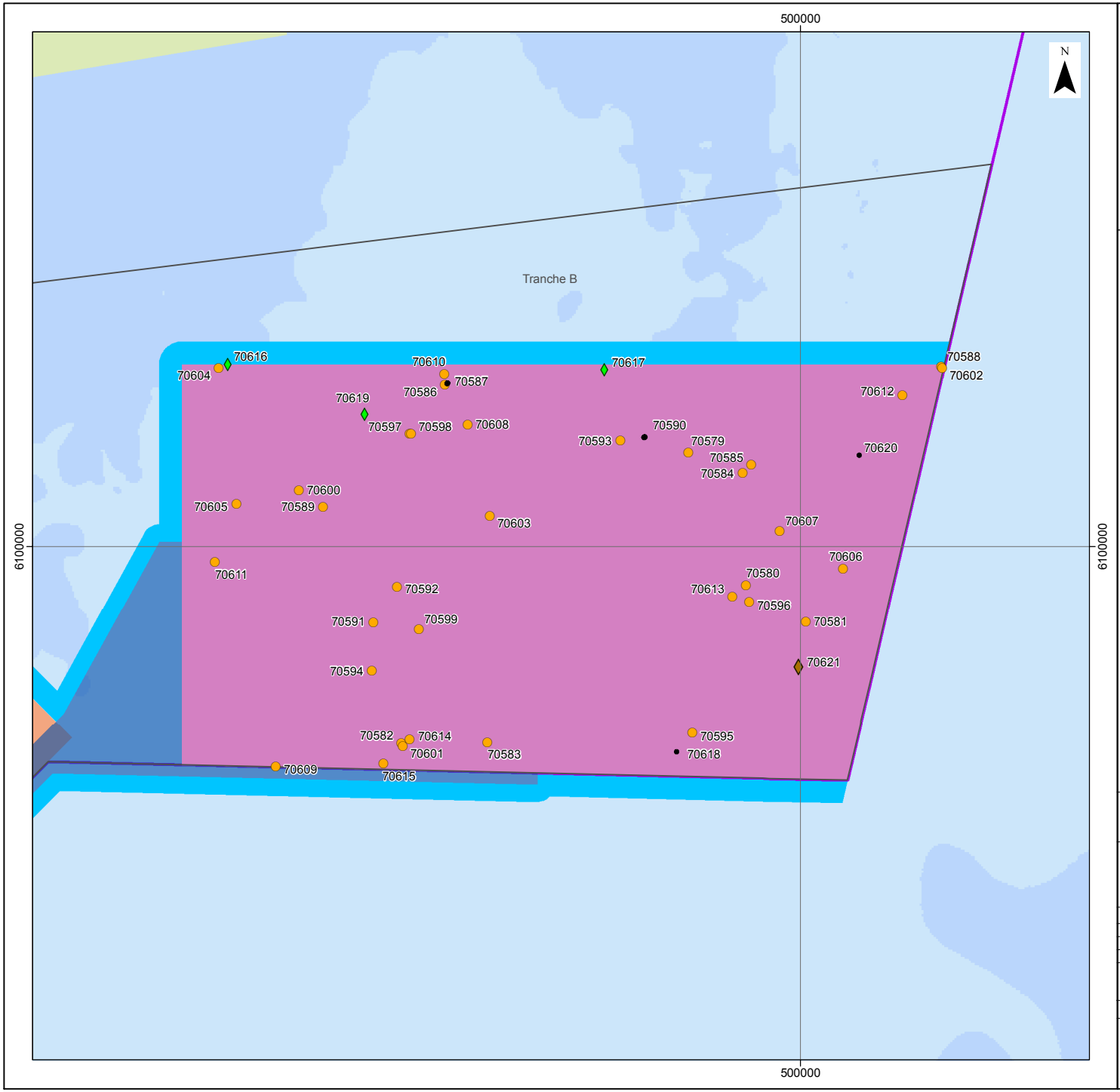
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

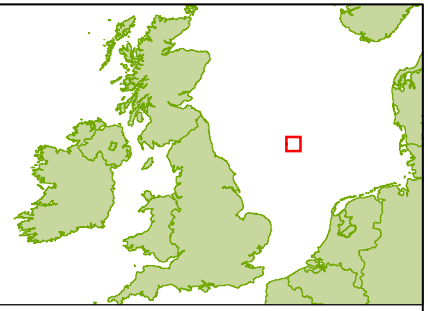
DRAWING NUMBER:

WSI_Fig07_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Tranche B
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- *Membland* Record of Loss
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

0 10
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 8: Dogger BankTeesside Project A Exclusion Zones

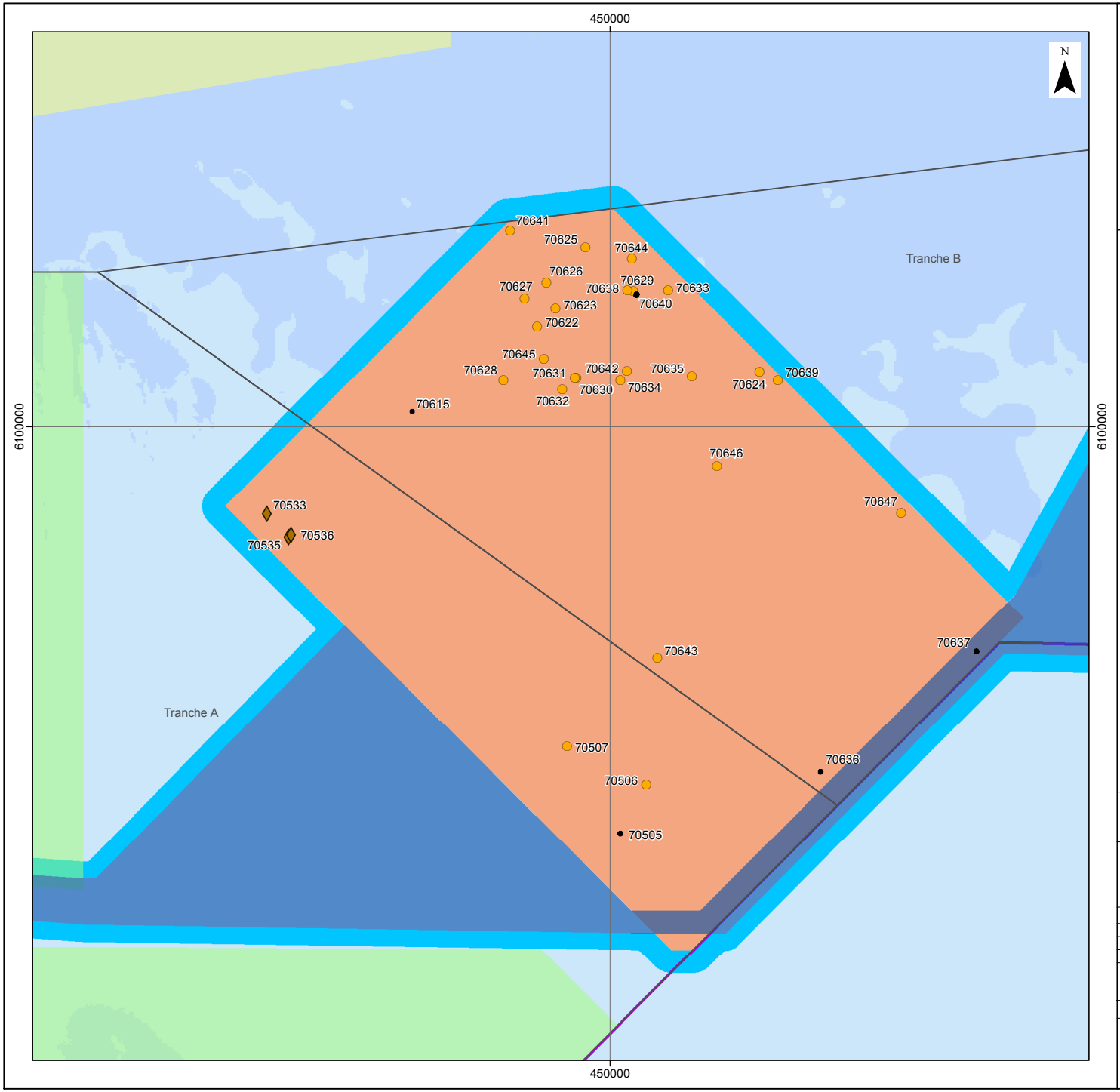
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC

DRAWING NUMBER:

EIA_Fig08_Teesside-WA-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:250,000	A4	WGS84	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Temporary Working Areas
- Creyke Beck Projects A and B
- Tranche A/B
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Proposed Archaeological Exclusion Zones
- Recorded Losses/Dead Wrecks

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

Data Source:
Round 3 © TCE, 2010.
Bathymetry © TCarta

0 10
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 9: Dogger Bank Teesside Project B Exclusion Zones

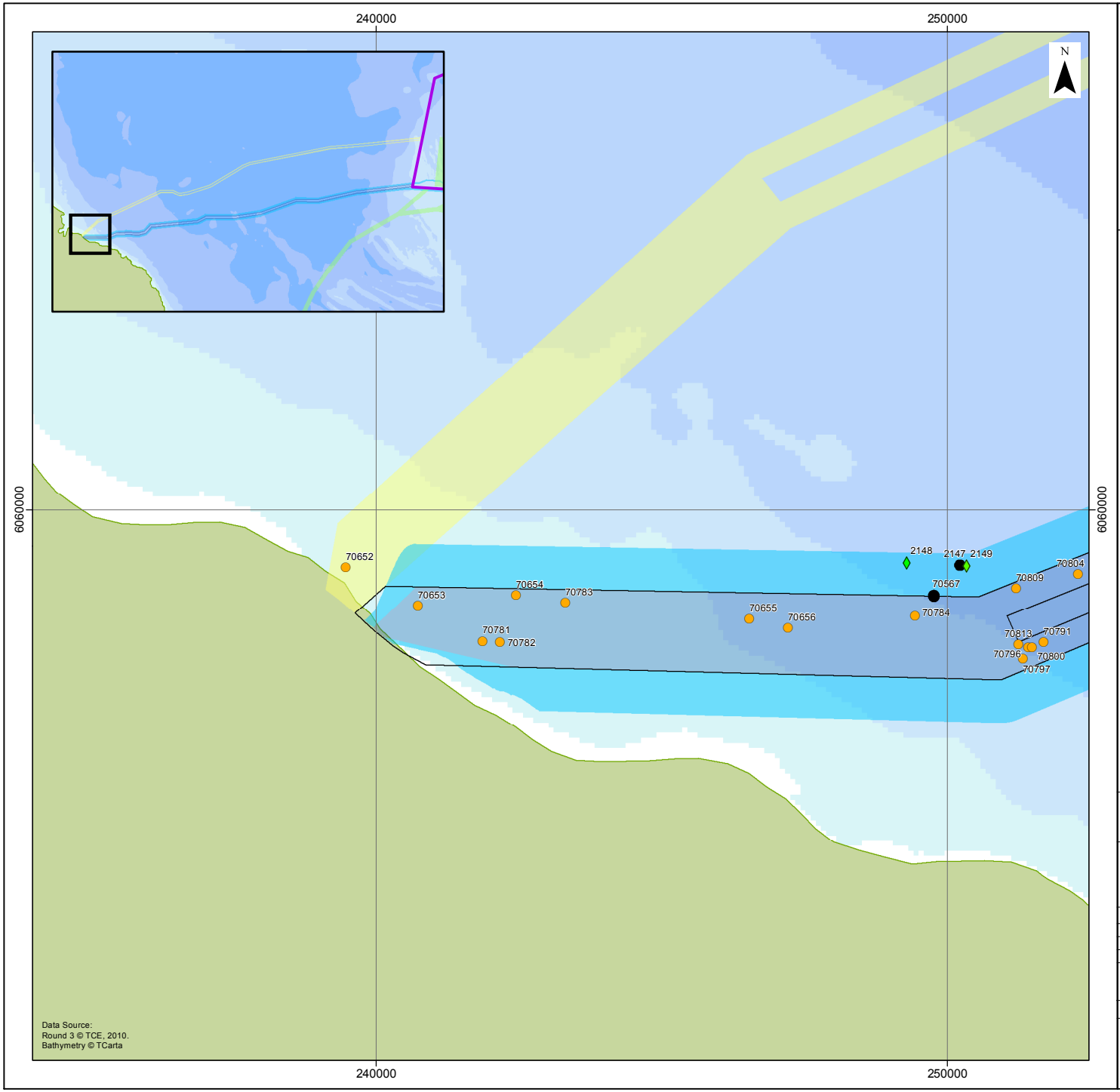
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC

DRAWING NUMBER:

WSI_Fig09_Teesside-WA-01

SCALE	1:250,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10a: Export Cable Corridor Exclusion Zones

VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

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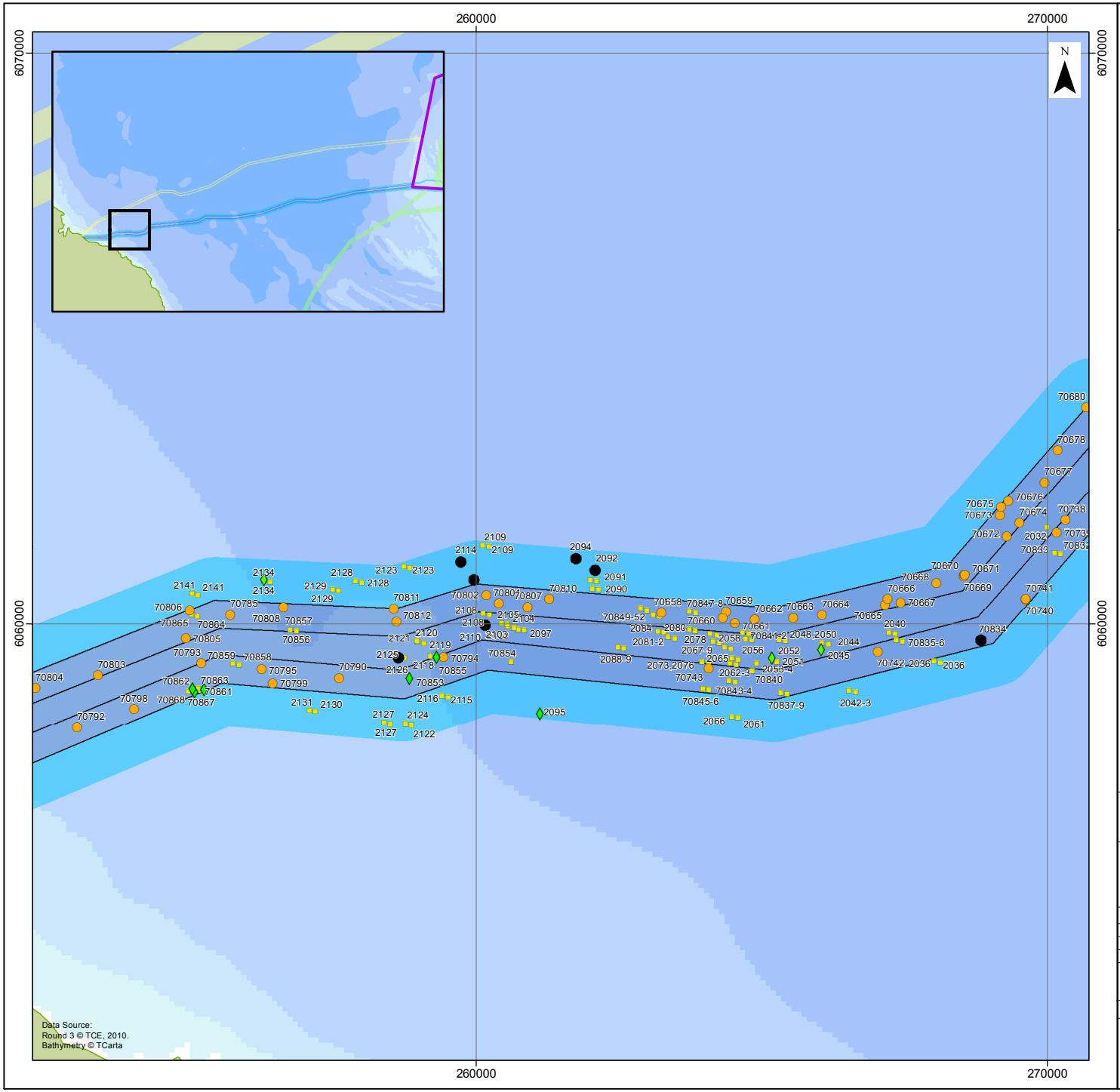
FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10b: Export Cable Corridor Exclusion Zones

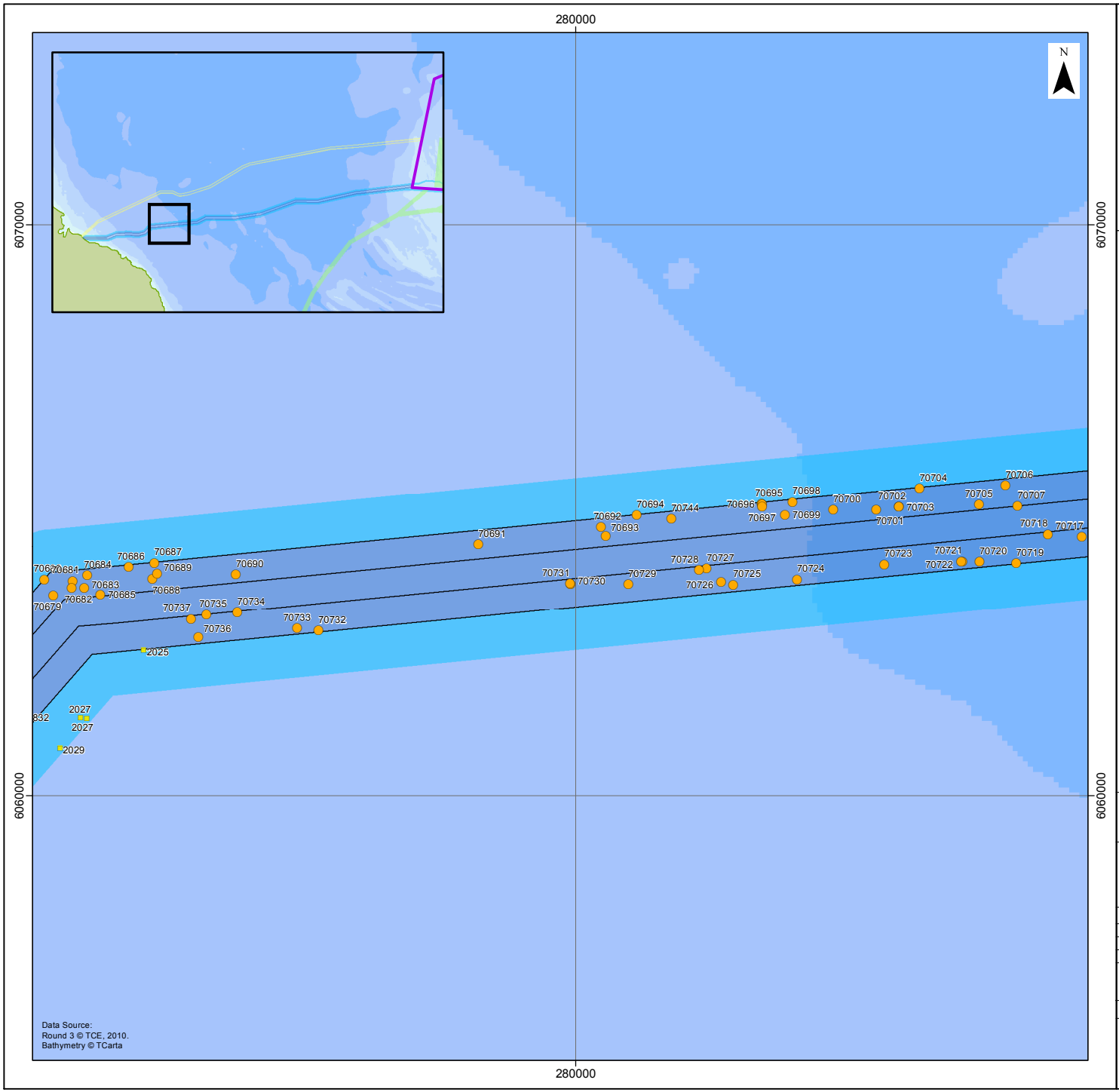
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10c: Export Cable Corridor Exclusion Zones

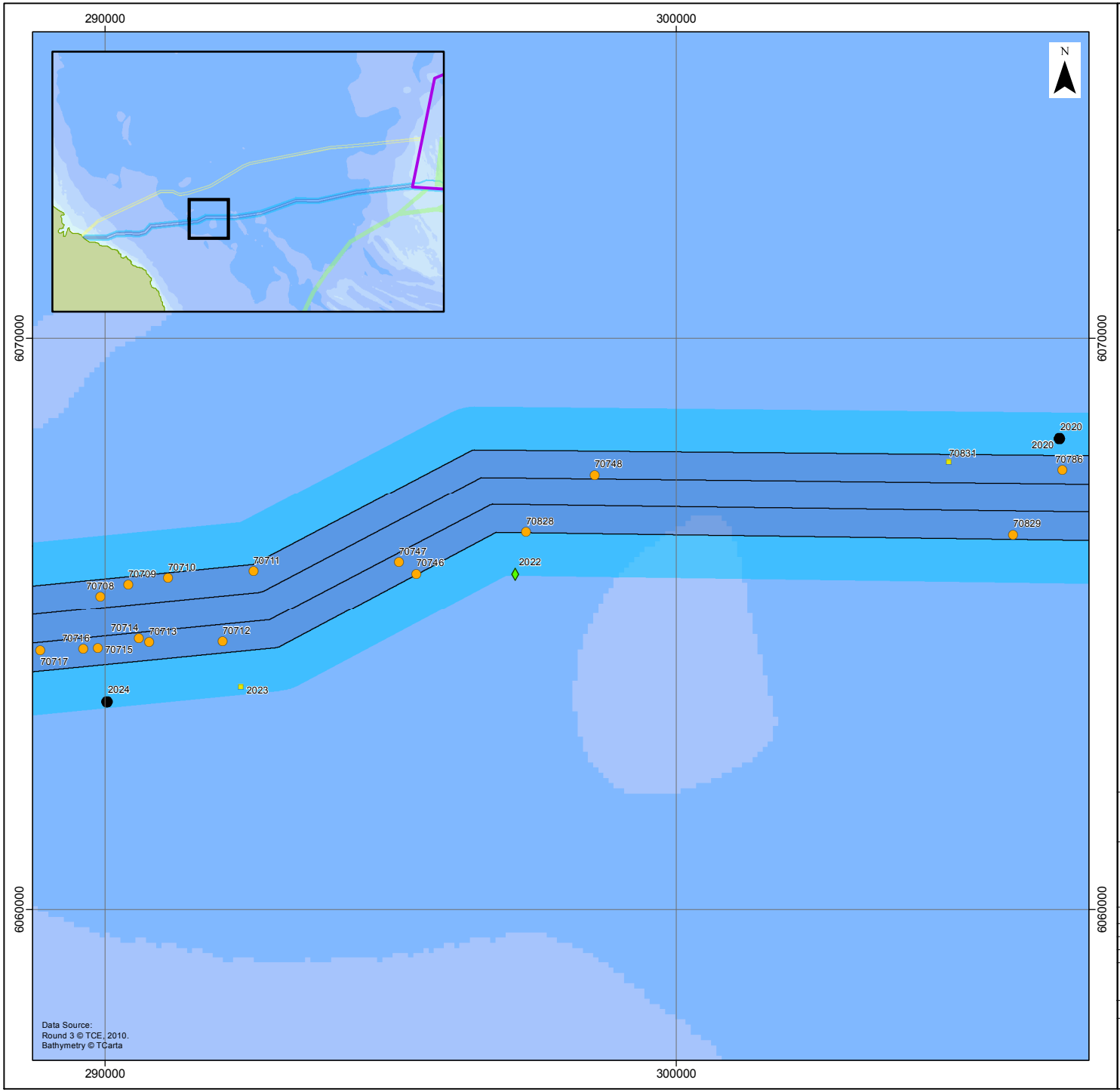
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 4 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10d: Export Cable Corridor Exclusion Zones

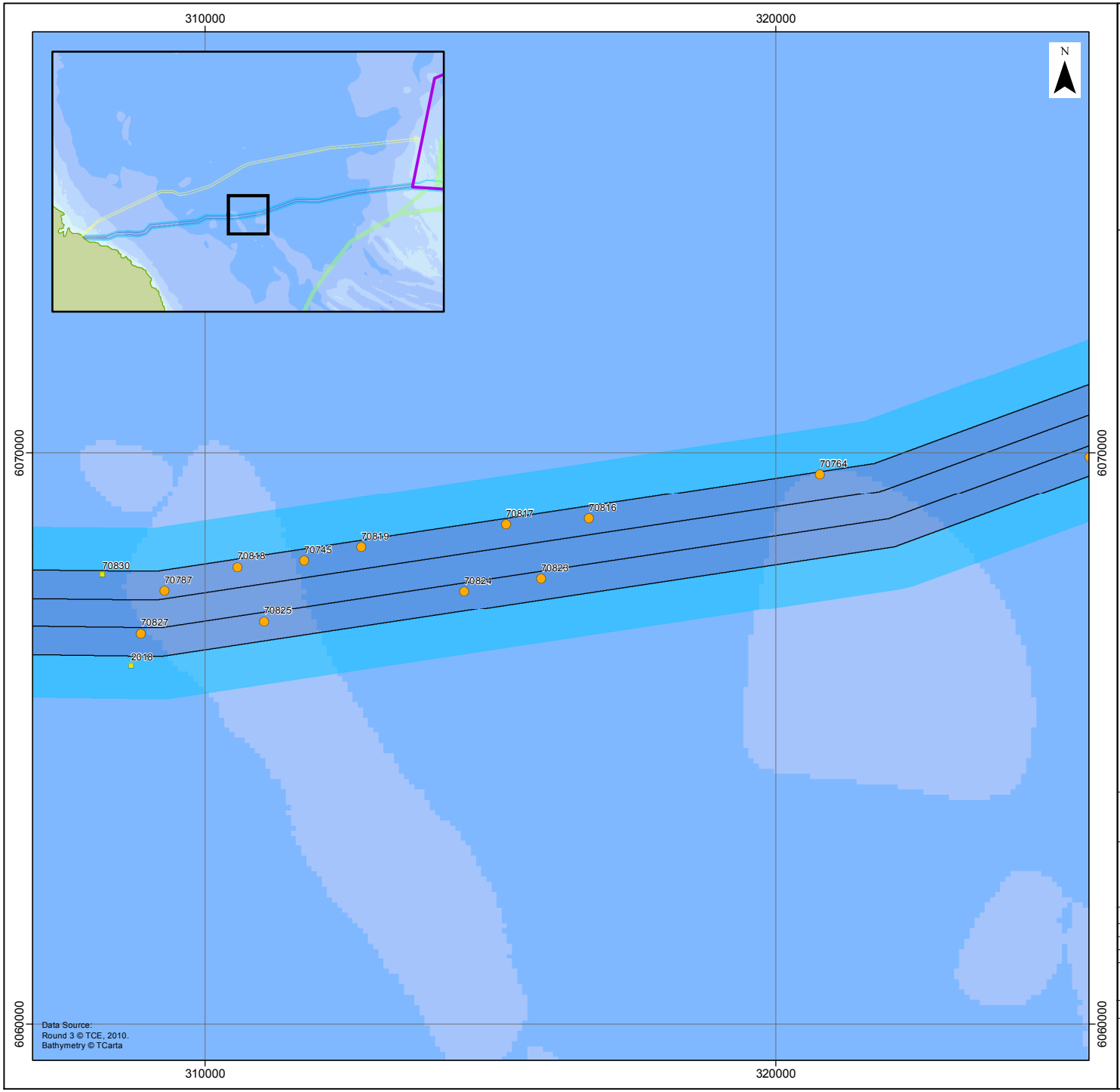
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

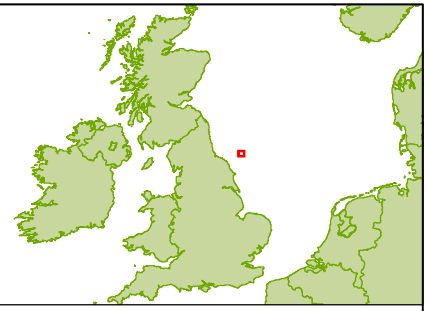
DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10e: Export Cable Corridor Exclusion Zones

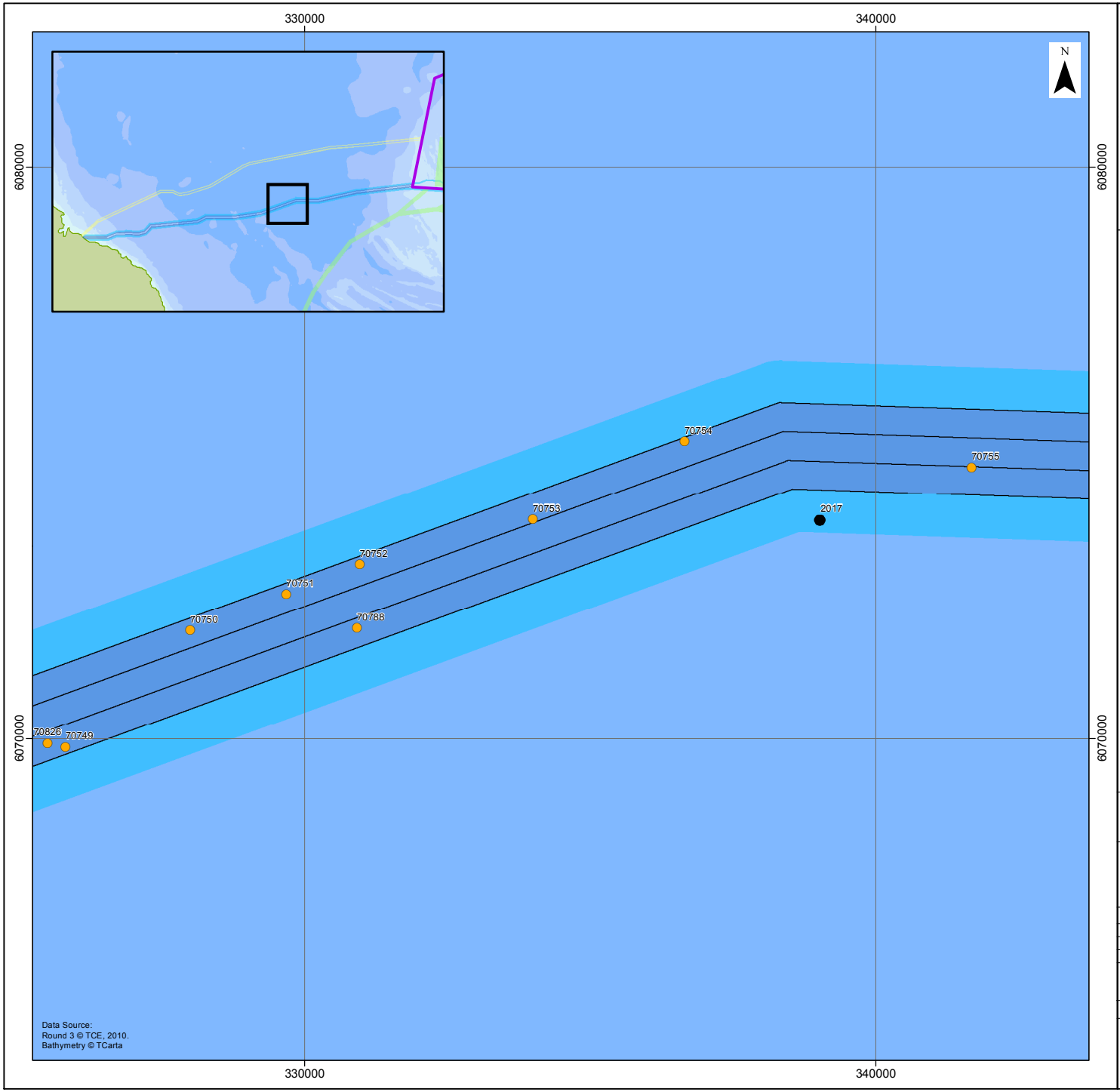
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

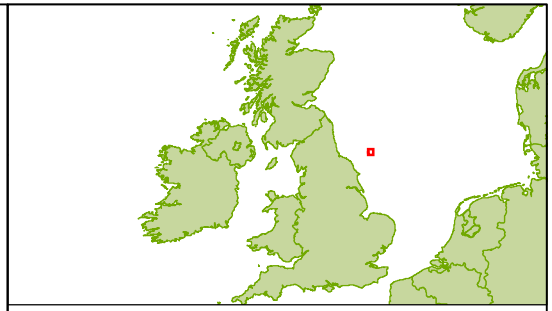
DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 4 Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10f: Export Cable Corridor Exclusion Zones

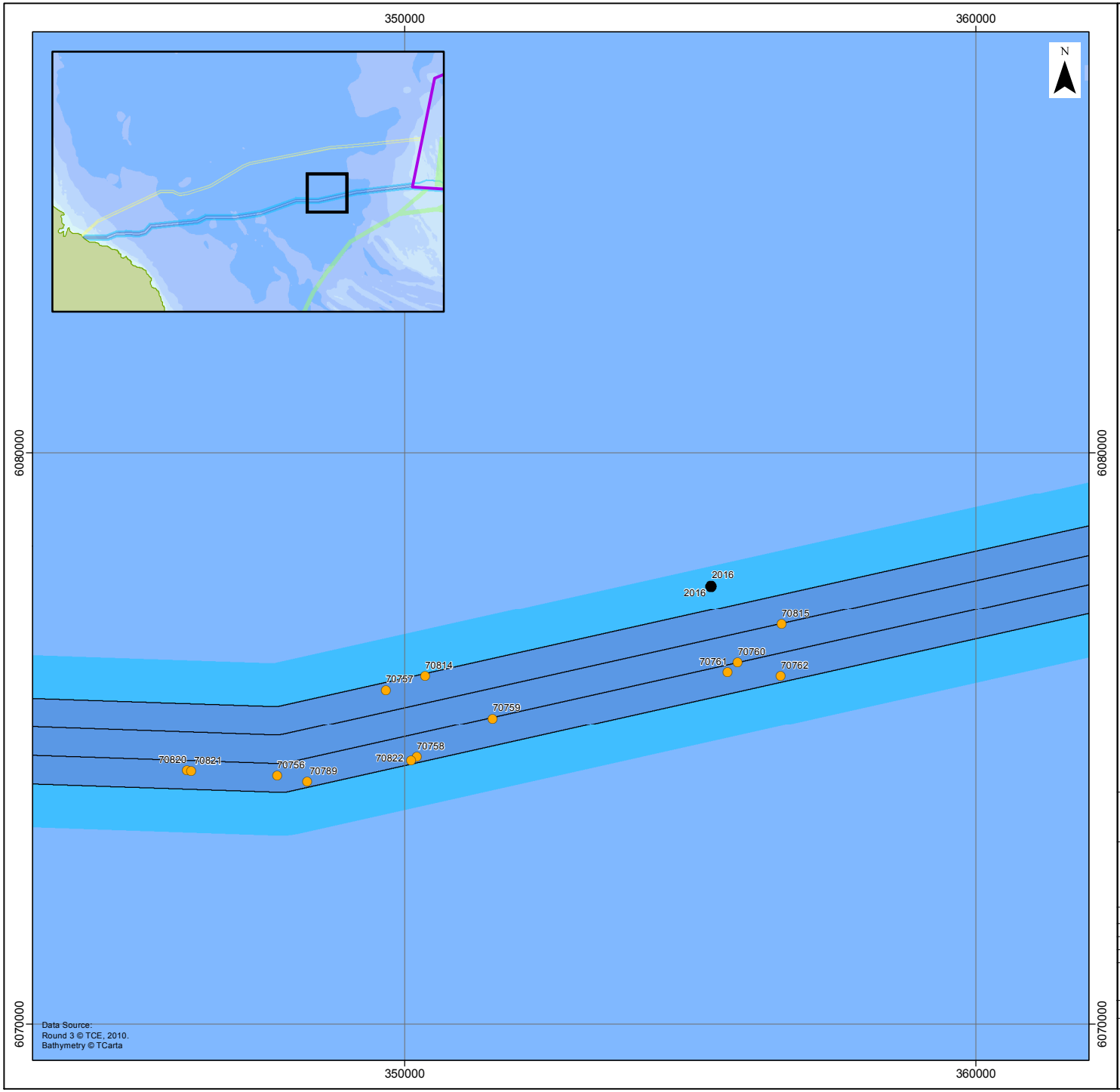
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 — 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10g: Export Cable Corridor Exclusion Zones

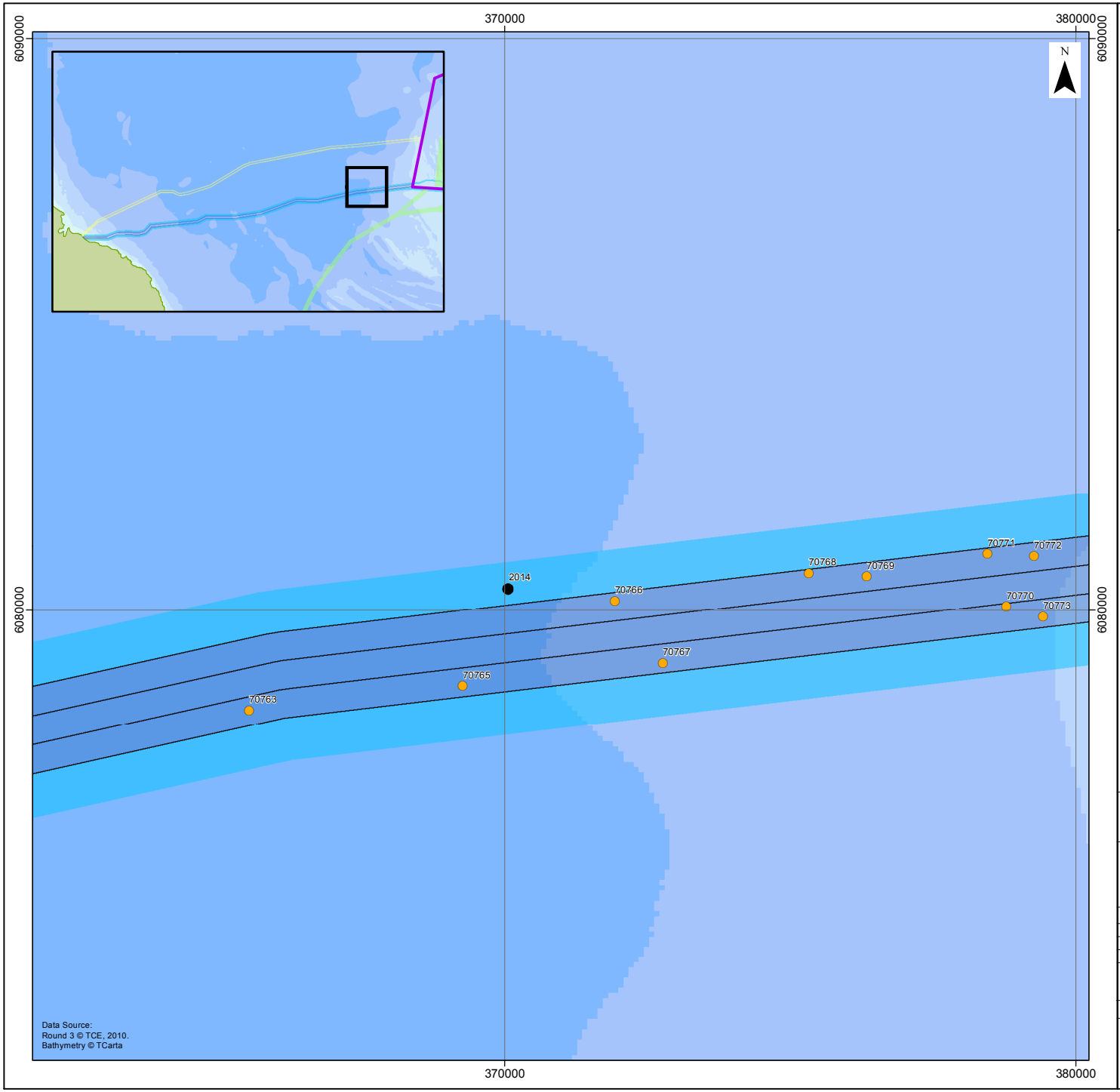
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10h: Export Cable Corridor Exclusion Zones

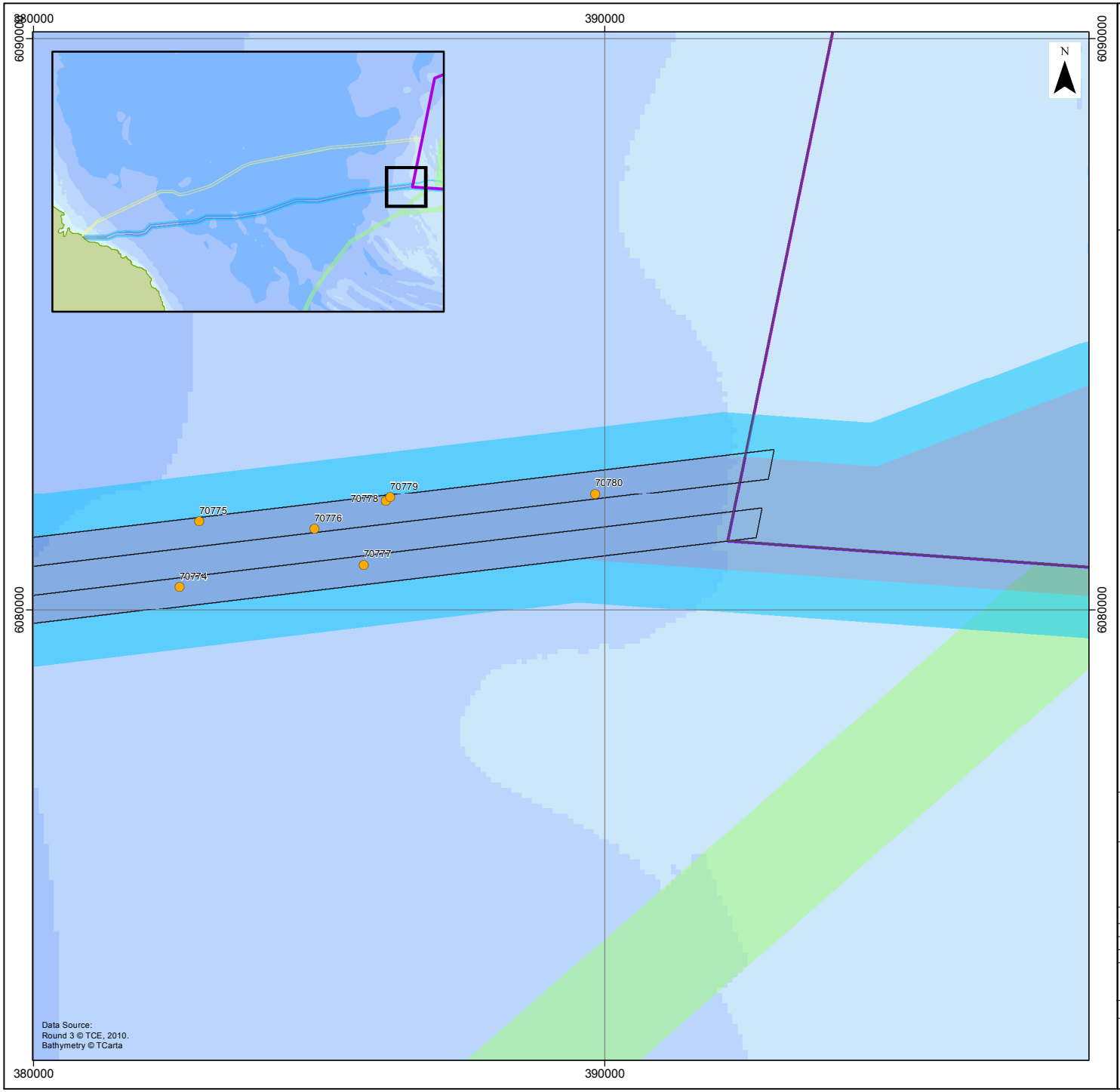
VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

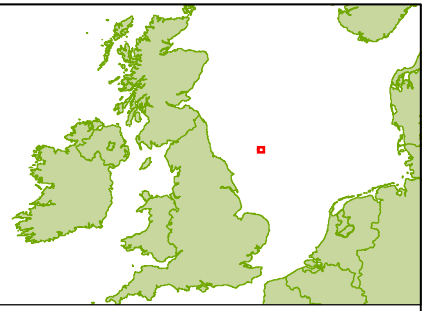
DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND





LEGEND

- Dogger Bank Zone
- Teesside Project A
- Teesside Project B
- Teesside Projects A and B Export Cable Corridor
- Teesside Projects A and B Export Cable Corridor: Geophysical Survey Area
- Temporary Working Areas
- Teesside Projects C and D Export Cable Corridor
- Creyke Beck Projects A and B Export Cable Corridor
- A2 Anomalies to be Avoided in Design Layout (Not to Scale)
- Wrecks and Obstructions (non-archaeological)
- Fishermen's Fasteners (Not to Scale)
- Proposed Archaeological Exclusion Zones

Depth

- 0 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 - 75

0 4
Kilometres

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10i: Export Cable Corridor Exclusion Zones

VER	DATE	REMARKS	Drawn	Checked
1	20/08/2013		KJF	VC
2	14/03/2014		KL	VC

DRAWING NUMBER:

WSI_Fig10_Teesside-WA-01

SCALE	1:100,000	PLOT SIZE	A4	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND