FOREWIND

DOGGER BANK
TEESSIDE

December 2012

Teesside Offshore Cable Corridor Selection Report

Teesside Offshore Cable Corridor Selection Report

Document no. :	Contract no. (if applicable):	Project:
F-OFL-RP-002		Dogger Bank Teesside

Classification:	Distribution:
	External
Expiry date (if applicable):	Status:
	Final
Date:	Issue no.:
December 2012	1

Overview:

This report justifies the selection of the offshore export cable corridors for the Dogger Bank Teesside projects within the Round 3 Dogger Bank Zone. The relevant environmental, engineering, commercial and consenting considerations that Forewind has taken into account in the selection of these corridors are explained.

Prepared by:	Date:	Signature:
Michael Stephenson	12/12/2012	

Approved by:	Date:	Signature / Approval meeting ref:
Gareth Lewis		

Contents

Table of tables

Table of figures

Glossary of abbreviations

ES – Environmental Statement

GW – Gigawatts

HVDC – High Voltage Direct Current

NM – Nautical Mile

PEI - Preliminary Environmental Information

rMCZ – recommended Marine Conservation Zone

SQSS – System Quality and Security of Supply

1 Introduction

Background

1.1 Forewind is a consortium comprising four leading international energy companies – RWE, SSE, Statkraft and Statoil. In January 2010, following a competitive tender process, the Crown Estate awarded the development rights for the Dogger Bank Zone to Forewind.

1.2 Dogger Bank Teesside, the subject of this report, is the second stage of Forewind's development of the Dogger Bank Zone. The Dogger Bank Teesside projects will comprise of four wind farms, each with a generating capacity of up to 1.2 gigawatts (GW), which will connect into the national grid just south of the Tees Estuary. The Dogger Bank Teesside projects will have a total generating capacity of up to 4.8GW.

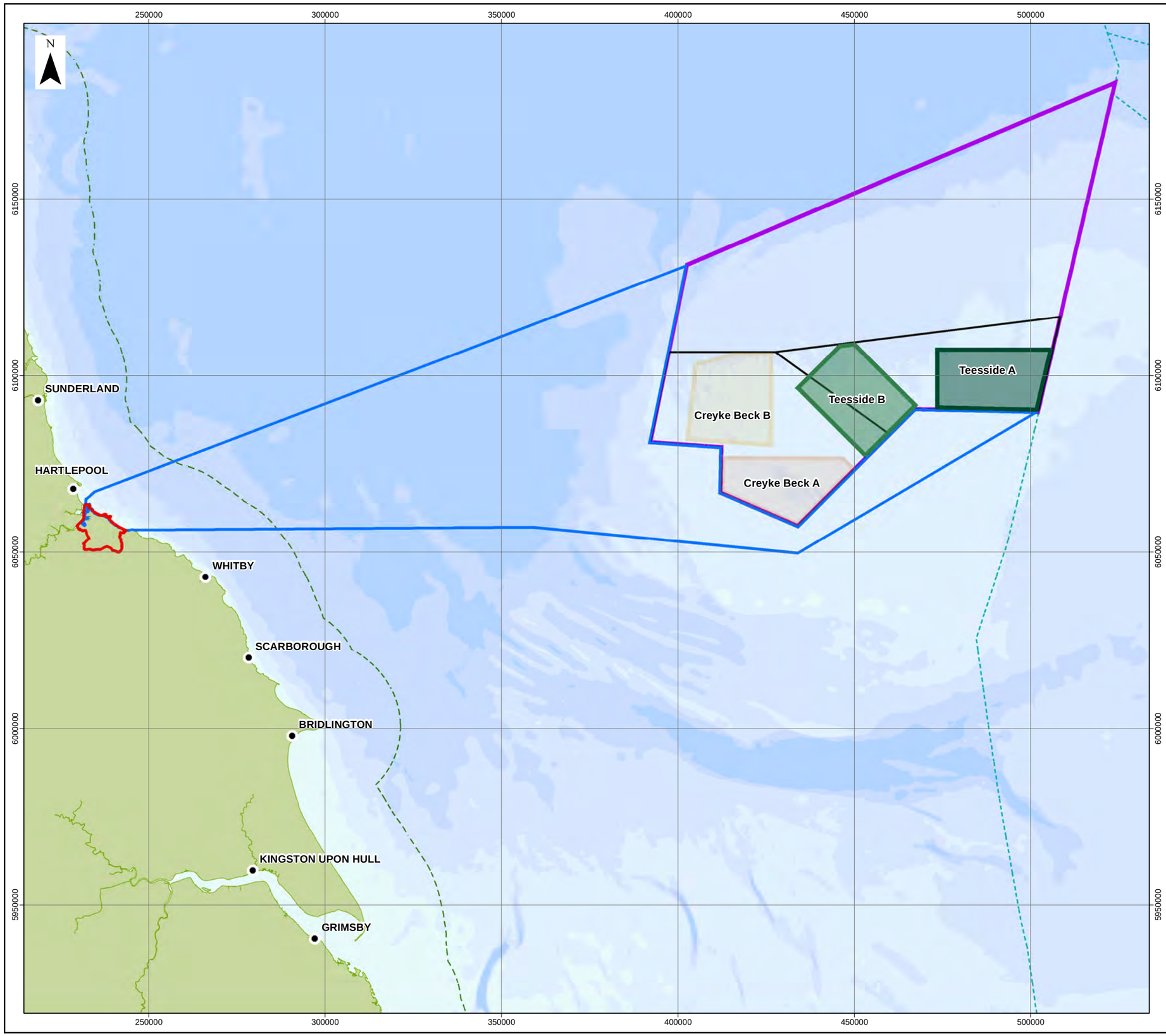
1.3 Forewind has identified the locations of the first two Dogger Bank Teesside projects (Dogger Bank Teesside A and B) within the Dogger Bank Zone, shown in Figure 1 (Forewind, 2012). Further, the landfall for all four Teesside projects has been identified between Redcar and Marske-by-the-Sea. The rationale for the selection of the landfall was set out in the Preliminary Environmental Information 1 (PEI1) suite of documents that Forewind (2012) consulted on in May 2012. The report also identified the Offshore Cable Route Study Area, within which the export cables for the four Dogger Bank Teesside projects would be sited. The location of the landfall is shown in Figure 2.

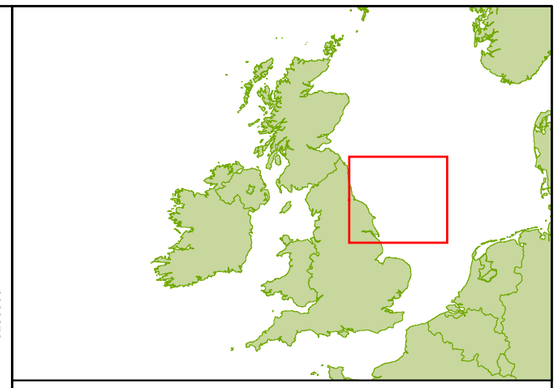
1.4 Dogger Bank Teesside A and B will connect into the existing National Grid Lackenby substation near Eston and Dogger Bank Teesside C and D will connect into a new substation in the Teesside area. The location of the new substation is yet to be finalised, but is also likely to be in the industrial area south of the Tees Estuary.

Aim of this report

1.5 As explained above, Forewind has identified the locations of the first two Dogger Bank Teesside projects (Dogger Bank Teesside A and B). Whilst the locations of the further two Dogger Bank Teesside projects have yet to be determined (Dogger Bank Teesside C and D), it is known that they will be located to the north of tranches A and B. As such, Forewind has identified the exit points from the zone and the offshore cable corridors for all four Dogger Bank Teesside projects.

1.6 This report explains the process that Forewind has undertaken in order to identify the offshore cable corridors for the Dogger Bank Teesside projects from the Dogger Bank Zone to the selected landfall between Redcar and Marske-by-the-Sea on the Teesside coastline.





LEGEND

- Tranche boundary
- Dogger Bank Round 3 Zone
- Onshore study area
- Offshore cable route study area
- 12nm Territorial boundary
- International boundary

Project boundaries

- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Creyke Beck A
- Dogger Bank Creyke Beck B

0 20 40

Kilometres

Data Source:
Round 3 © TCE, 2010
International boundary © UKDeal, 2010.
Background bathymetry image derived in part from TCarta data © 2009
Contains UKHO Law of the Sea data © Crown copyright and database right
Ordnance Survey data © Crown copyright and database right, 2010

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 1
Dogger Bank Teesside Export Cable Corridor Study Area

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0082-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100,000	A3	WGS84	UTM31N

FOREWIND

460000
470000
530000
520000
N
HARTLEPOOL
See main image for details
Forewind's preferred landfall
REDCAR
MARSKE BY-THE-SEA
New Marske
SALTBURN BY-THE-SEA
Lazenby
Lackenby
MIDDLESBROUGH
Brotton
LOFTUS
GUISBOROUGH
TEES BAY
CLEVELAND
0 2 4
Kilometres

LEGEND (Inset map)

- Tranche boundary
- Dogger Bank Round 3 Zone
- Onshore study area
- Offshore cable route study area
- 12nm territorial boundary
- International boundary

Project boundaries

- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Creyke Beck A
- Dogger Bank Creyke Beck B

LEGEND (Main map)

- Lackenby National Grid substation
- Forewind's preferred landfall
- Onshore study area
- Offshore cable route study area

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 2
Dogger Bank
Teesside Preferred Landfall

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER: **T-DES-0117-01**

SCALE	PLOT SIZE	DATUM	PROJECTION
1:100,000	A3	OSGB	BNG

FOREWIND

2 Teesside offshore cable corridor identification strategy

2.1 Forewind proposes to have two separate corridors, and two separate exit points from the zone, for the four Teesside projects. One corridor for Teesside A and B, and one corridor for Teesside C and D. The difference in locations of the two pairs of projects guided the decision to have two separate exit points. It was then decided to have two separate corridors in order to minimise energy security risk. There is a remote, but high impact, risk that a large vessel may drag its anchor and sever high voltage direct current (HVDC) offshore export cables laid on the seabed. National Grid has an obligation to maintain UK transmission system security. Instantaneous loss of large generation capacity on the network can cause large fluctuations in the operating frequency of the system. Should these frequency excursions become too extreme, National Grid would be forced to shed demand from the system, meaning the disconnection of customers. To prevent this occurrence, National Grid maintains reserve capacity on the network, and in addition ensures that the maximum instantaneous loss is kept at an agreed limit, as set by the System Quality and Security of Supply (SQSS) standard.

2.2 Further to the loss of a single large generator from the network, there is an additional risk from the loss of multiple generation infeeds in a short period of time.

2.3 If project cables are placed too close together, this could result in a loss of multiple gigawatts of generation onto the UK's transmission system and may breach the SQSS standard and could lead to consumers being forcibly cut off. Forewind identified that, to mitigate this risk, the spacing between cables should be maximised.

2.4 Forewind has also identified that it is important to minimise any potential sterilisation of the seabed. Therefore, a strategy was developed to cluster two pairs of HVDC cables together into one corridor, and have the two corridors separated by a large distance. This distance is not applicable to the nearshore area where convergence is necessary as the cables approach the landfall.

2.5 To determine the nominal distance between corridors, Forewind used a precautionary approach. Informal guidance from National Grid was that a loss of multiple infeeds to the transmission network should not occur less than 10 minutes apart. A large commercial vessel dragging its anchor without realising (a situation that has been recorded and has led to damage of assets on the seabed) would travel at speeds of up to 20 – 30 knots (nautical miles per hour). This equates to 55km per hour, meaning a separation distance of 9.25km would be required to ensure a vessel could not cause such an issue. A 50% precautionary factor was then applied. The judgement was further based upon ensuring that the distance was large enough to be deemed to not sterilise the seabed and was also balanced with the cost

implications of lengthening the cable corridors through increasing the separation distance. An aspirational 15km separation distance was therefore established to increase the overall cable length by only 1.5km and as such was deemed appropriate for the export cable corridor selection process.

2.6 Within each of these two corridors, it is proposed that two 500m channels are surveyed, separated by a 500m strip. This is in-line with the maximum width agreed with the Crown Estate.

2.7 Figure 3 shows a diagram of the Teesside offshore cable corridor identification strategy.

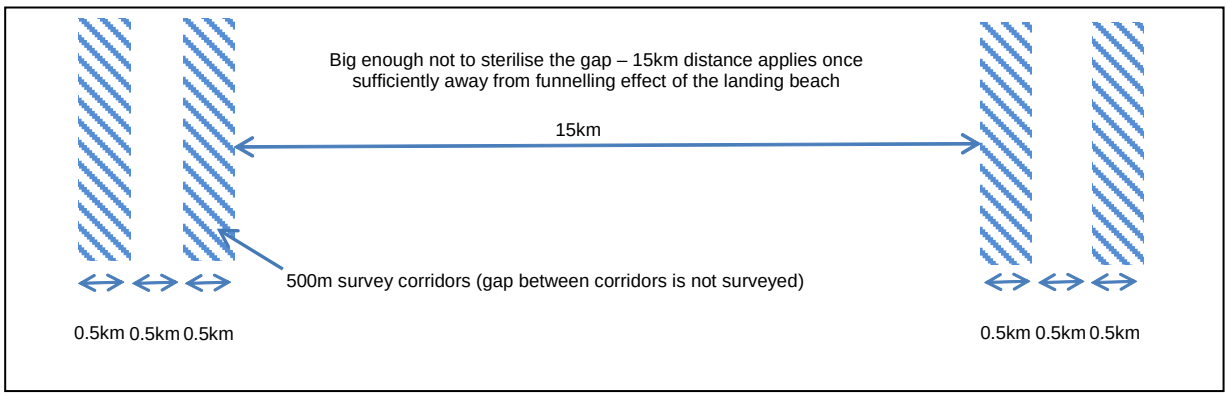


Figure 3 Teesside offshore cable corridor identification strategy

3 Corridor selection

Introduction

3.1 As set out in Chapter 2, Forewind determined that two separate corridors, each with two channels, are required to accommodate the export cables for the four Dogger Bank Teesside projects.

3.2 In identifying the two proposed cable corridors for Dogger Bank Teesside, Forewind aimed to minimise the potential impacts of the cable on:

- Other existing and planned offshore infrastructure including cables and pipelines;
- Benthic ecology;
- Navigational safety; and
- Commercial fishing operations.

3.3 Further, it was also important to minimise the total length of the proposed corridors in order to minimise cost and installation time. Forewind also aims to bury the cable wherever reasonably feasible and in doing so to restrict the amount of area where cable protection would need to be deployed. Burying cables is the most secure way of installing them, and minimises the probability of snagging fishing gear.

3.4 Having identified the relevant development considerations, Forewind undertook a staged process to select a final export cable corridor: This process comprised:

- Step 1 – Identification of hard constraints
- Step 2 – Identification of seabed characteristics
- Step 3 – Identification of exit points from Tranche B and the Dogger Bank Zone
- Step 4 – Precise cable corridor identification

These steps are described below.

Detailed corridor selection

STEP ONE: Identification of hard and soft constraints

3.5 The identification of hard and soft constraints was the first stage in the identification of an offshore cable corridor. The table below sets out the buffers that were applied to the constraints. These were discussed in a workshop during initial consultation, and based upon the experience and knowledge of the attendees.

3.6 Some buffers, applied to telecommunication cables and pipelines, could be reduced as the corridor approached the landfall and entered the nearshore area. For the purposes of routing the offshore export cable corridor, nearshore was defined as any area within a 12NM radius of the landfall that had a water depth of 20m or less.

Constraint	Buffer
Telecommunication cables	250m definite no-go for telecommunication cables in parallel (not applicable for crossings) At landfall and nearshore, this can be reduced.
Pipelines	500m definite no-go for cable in parallel (not applicable for crossings) At landfall and nearshore, this can be reduced.
Oil and gas wells (plugged and abandoned)	200m buffer during geophysical survey based on Statoil good practice
Wrecks or obstructions	Owing to the lack of positional accuracy for some of the wrecks within the SeaZone data, a temporary buffer of 500m was applied for the purposes of identifying a route, although this was revisited on a wreck by wreck basis during detailed small scale routing.

Table 1 Establishment of constraint buffers for the purpose of route identification

3.7 The buffers in Table 1 were considered when carrying out the initial routing of the Teesside offshore export cable corridor, as described in this report. However, more definite buffers are evolving through current discussion with the operators of assets within the export cable corridor scoping area. To further aid this process, a recent publication produced by Subsea Cables UK, in partnership with the Renewable Energy Association, The Crown Estate and RenewableUK, (2012) has also been reviewed.

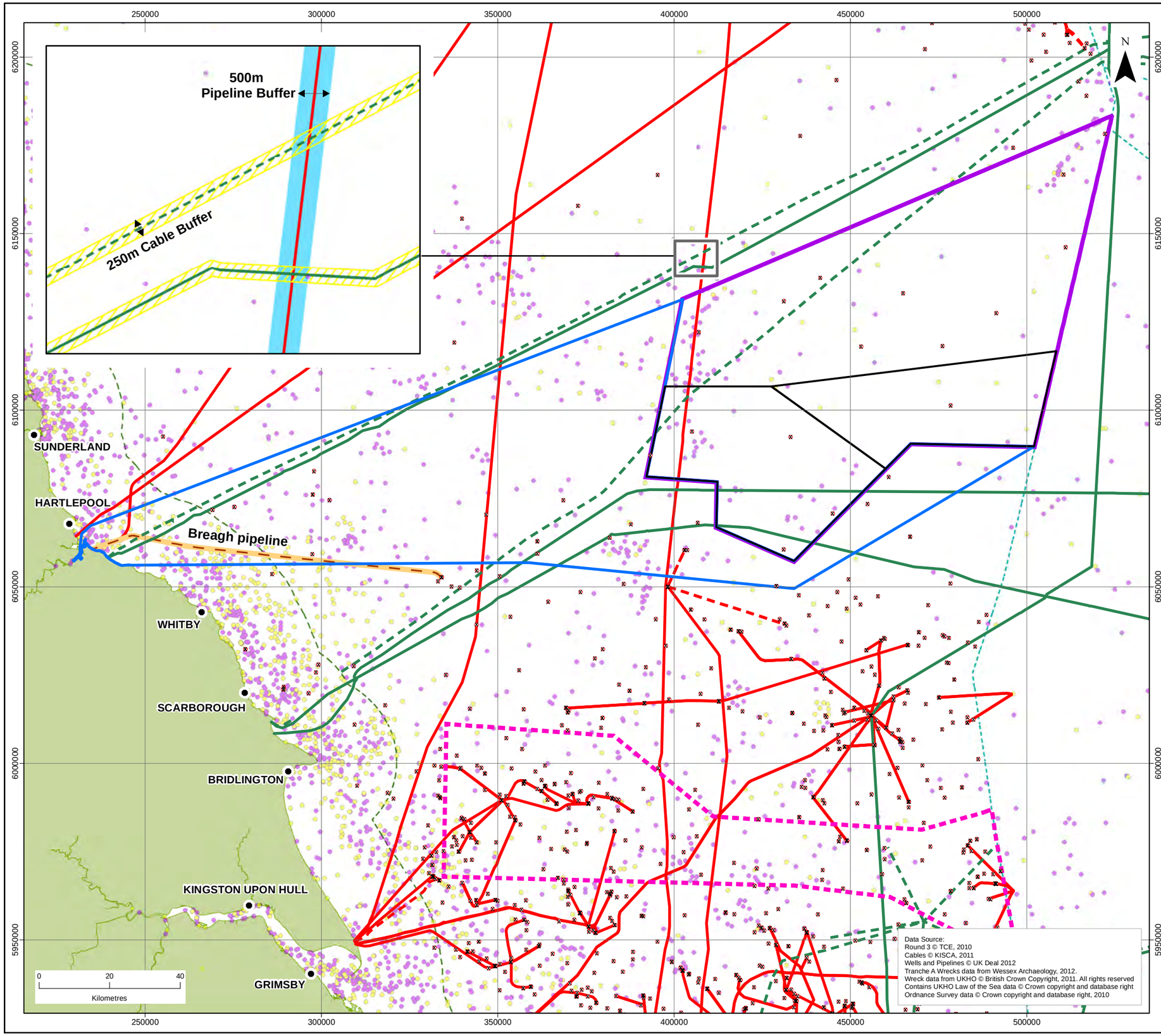
3.8 Table 2 lists the pipelines and cables that crossed the export cable corridor scoping area.

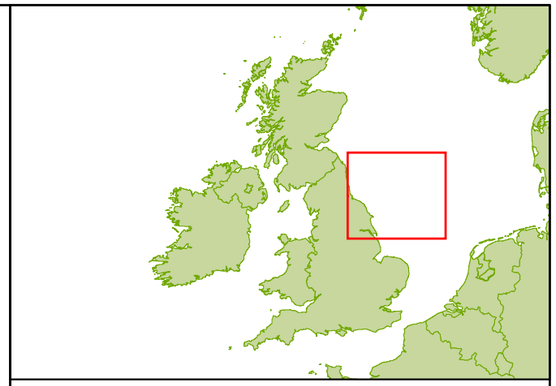
3.9 Figure 4 shows a map of the buffers around the constraints, found in the export cable corridor scoping area.

TC/PC/ P*	Name	Status	Route	Operator or other
TC	UK – Denmark 4	Out of service	Scarborough (N Yorks) to Blaabjerg (Denmark)	BT, TDC Denmark
TC	VSNL North Europe	Active	Hummamby (Filey, N Yorks) to Eemshaven (Netherlands)	TATA Communication
TC	UK- Germany 6	Active	Filey (N Yorks) to Norden (Germany)	BT, Deutsche Telekom AG
TC	CANTAT 3 F4	Out of service	Redcar (N Yorks) to CANTAT 3 F3C/F5 splice (Danish Continental Shelf)	BT, TDC Denmark, Deutsche Telekom AG
TC	Pangea North UK/DMK	Active	Redcar (N Yorks) to FanØ (Denmark)	Alcatel-Lucent (ASN)
P	Shearwater Elgin Area Line (SEAL)	Active	Shearwater and Elgin gas platforms to Bacton (Norfolk)	Shell UK
P	Everest to Teesside Central Area Transmission service (CATS)	Active	Everest gas field (North Sea) to Teesside	BP Exploration
P	Ekofisk 2/4J	Active	Ekofisk oil field to Teesside	ConocoPhillips
P	Langeled pipeline	Active	Nyhmana (Norway) to Easington (Yorks)	Gassco
P	Breagh pipeline	Consented but not yet deconstructed	TGPP (N Yorks) to Breagh gas field NUI 50km off the N Yorks coast	RWE Dea UKSNS Ltd (RDUK)
P	Eston Grange Power Project	Early stages of development. No ES produced to date	Implied route will be leaving the coast at Coatham Sands, Redcar but offshore route unclear.	Progressive Energy

*TC = telecom cable, PC = power cable and P = pipeline

Table 2 Pipelines and cables crossing the export cable corridor scoping area





LEGEND

- Wells
- 500m buffer around wells
- Tranche Boundary
- Offshore cable route study area
- Dogger Bank Round 3 Zone
- Hornsea Round 3 Zone
- International boundary
- 12nm Territorial boundary

Wrecks (UKHO data)

- Wreck or obstruction where position is approximate/unreliable/unsurveyed
- Wreck or obstruction where position is precisely known or surveyed

Cables

- Out of Service Cables
- Active Cables

Pipelines

- Not In Use Pipelines
- Active Pipelines
- Breagh Pipeline (under construction)

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 4
Teesside Buffers for Hard Constraints

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0083-01

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100,000	A3	WGS84	UTM31N

FOREWIND

STEP TWO: Identification of no-go areas

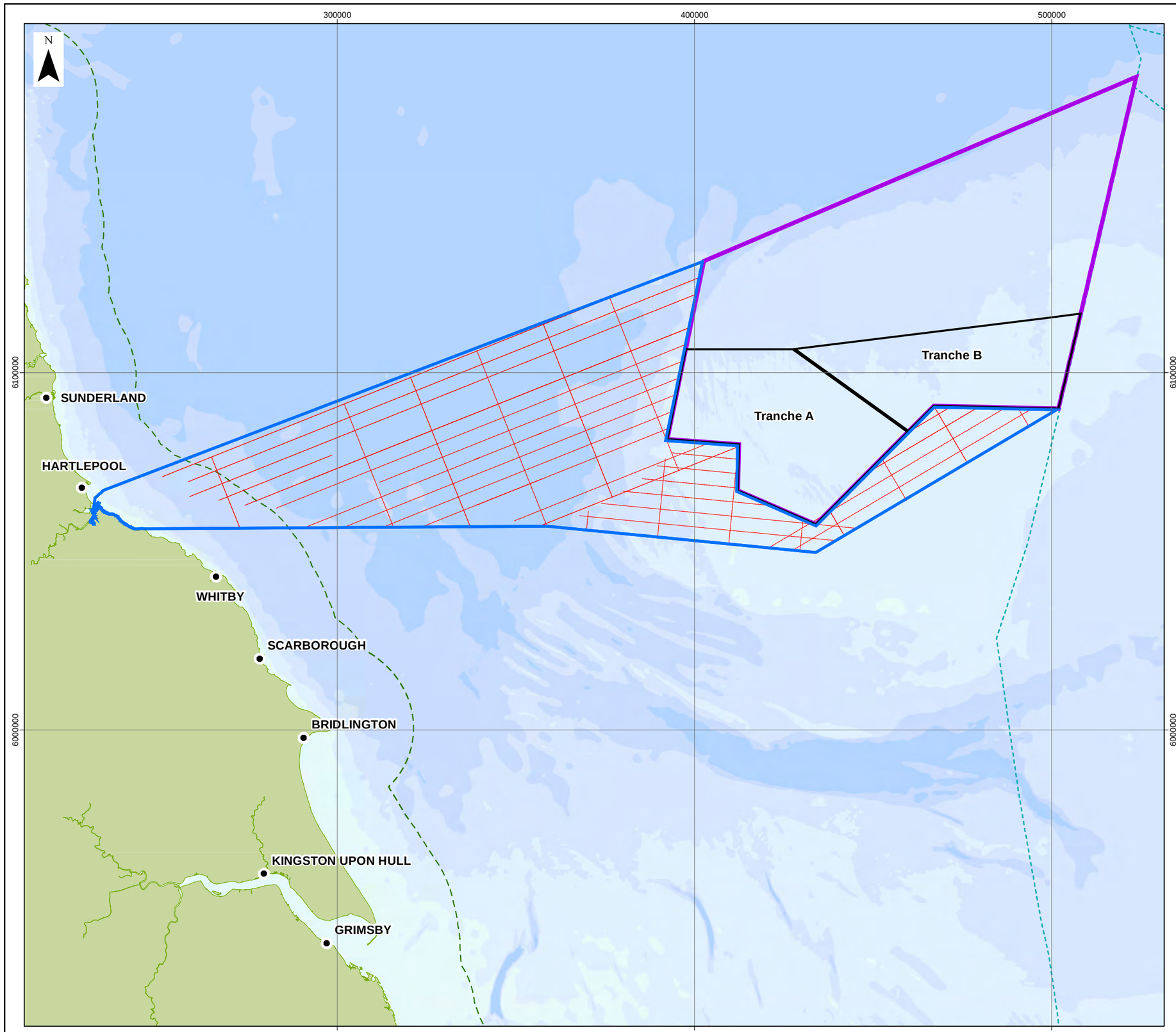
3.11 The second phase was the identification of areas within the Offshore Cable Study Area that are no-go and less preferred areas for cabling. One of the important elements that enabled the identification of these areas was the reconnaissance data that was collected within the Offshore Cable Study Area in a survey undertaken in Autumn 2011. Figure 5 shows the achieved lines of the reconnaissance survey.

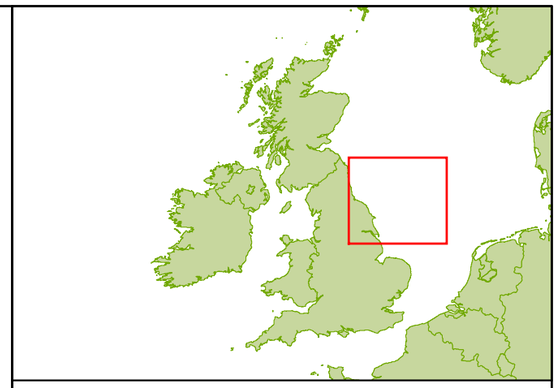
3.12 This survey was undertaken by Gardline Environmental Ltd. and the data was analysed and interpreted by Intertek METOC (2011) in a subsequent report. This report informed the Teesside export cable corridor selection process by identifying sensitive/less preferred areas. Figure 6 shows the results of the survey, displaying the sensitive areas within the Offshore Cable Study Area.

3.13 As part of the identification of less preferred areas, geological and seabed constraints were considered. These constraints consisted of areas where sand is expected to be less than 1m thick and areas where bedrock outcrop is within 2m of the seabed surface. These are highlighted in Figure 6, shaded orange and yellow respectively, and were used in 'STEP FOUR: Precise cable corridor identification'.

3.14 The reason to avoid areas where sand is expected to be less than 1m thick stems from the preference to bury the HVDC offshore export cables wherever reasonably practical. If the sand depth is less than 1m thick then it is more susceptible to sediment transfer caused by extreme weather conditions such as winter storms. As the design for cable installation stipulates a burial of between 0.7-2.5m, many of these areas will not be suitable for cable burial. Therefore, if a cable corridor is to be routed across one of these shallower sediment areas, cable protection is more likely to be required, increasing the time and cost of installation. As such, one of the guiding principles of routing the offshore export cable corridor was to minimise the length of the corridor that crossed areas where sand depth is expected to be less than 1m thick.

3.15 Further, Forewind is seeking to avoid areas where bedrock outcrop is within 2m of the seabed surface again because of the preference to bury the HVDC cables wherever practical. The installation equipment that will be used to bury the cables is designed for use on softer surfaces, rather than rock, as such cable burial is unsuitable for these areas meaning that cable protection measures have to be used. Consequently, the complexity, cost and time of installation all increase. In addition, where bedrock outcrop is within 2m of the seabed surface, it has a greater influence on the profile of the seabed, causing a greater variation in height and a rougher seabed surface. This can lead to the cable 'free spanning' across two higher points in the rocks which increases the probability of the cable snagging fishing gear and severance of the cable by dragged anchor. Finally, areas of bedrock outcrop also provide a more habitable environment for marine ecology than sand, due to their stability, and as such avoidance of these areas minimises the environmental impact of the cable installation.





LEGEND

- Teesside reconnaissance survey lines
- Tranche boundary
- Dogger Bank Round 3 Zone
- Offshore cable route study area
- 12nm Territorial boundary
- International boundary

0 20 40

Kilometres

Data Source:
Round 3 © TCE, 2010
International boundary © UKDeal, 2010.
Teesside Reconnaissance Survey Line Plan from Gardline 2011
Ordnance Survey data © Crown copyright and database right, 2010
Contains Sea Zone Data © SeaZone Solutions Limited, 2012, Licence number 032011.009

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 5
Dogger Bank Teesside Survey Areas

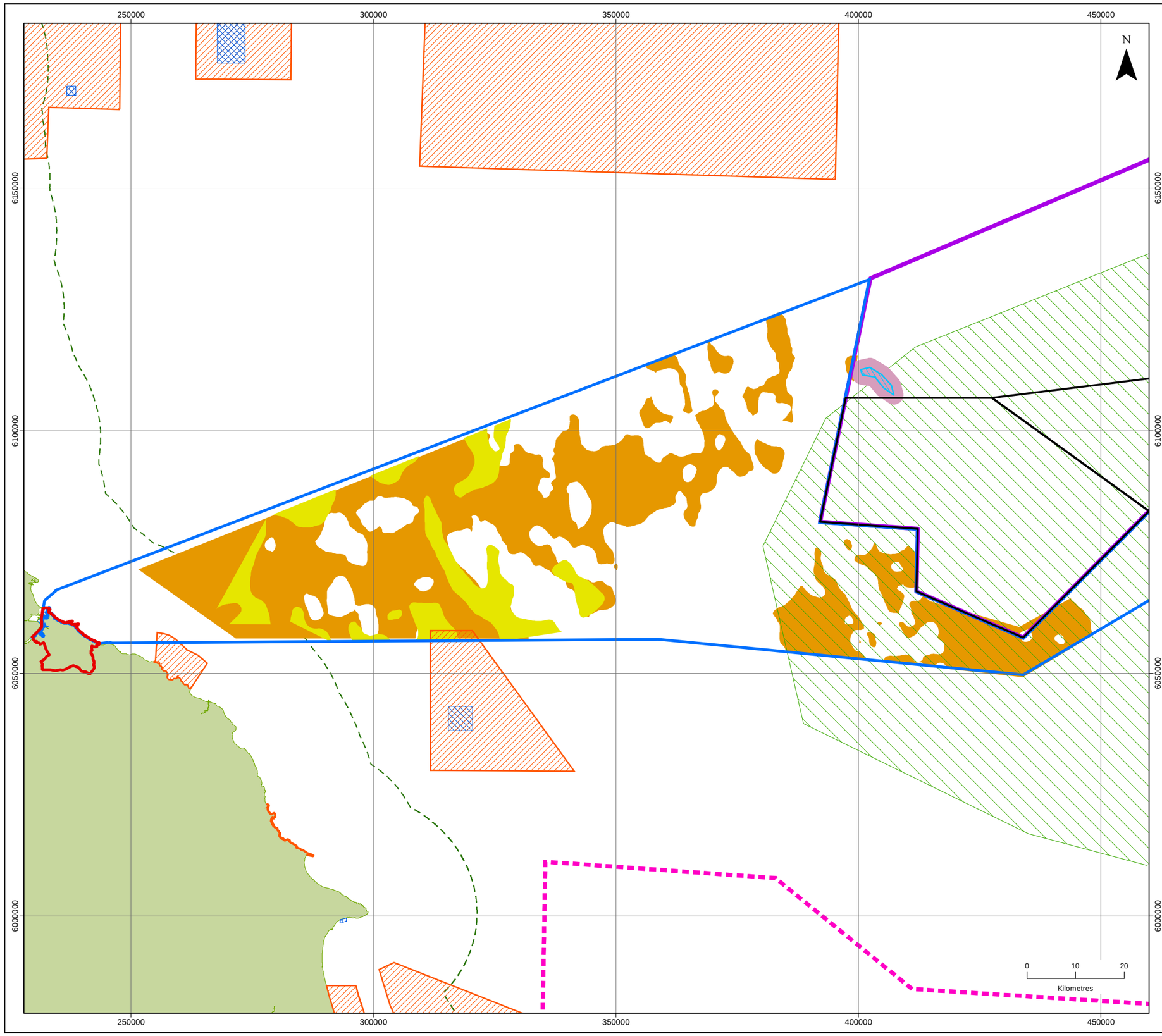
VER	DATE	REMARKS	Drawn	Checked
1	-----	Draft not issued	AJ	##
2	20/11/2012	Teesside survey line plan added	AJ	MS

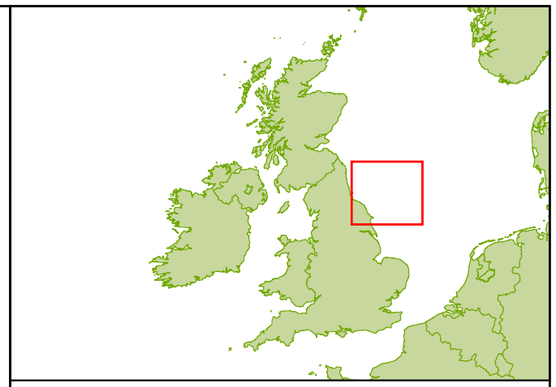
DRAWING NUMBER:

M-DES-0084-02

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100,000	A3	WGS84	UTM31N

FOREWIND





LEGEND

- Tranche boundary
- Dogger Bank Round 3 Zone
- Onshore study area
- Offshore cable route study area
- Hornsea Round 3 Zone
- 12nm Territorial boundary

Aggregate Areas

- Dredging application area
- 2km buffer around dredging application area

Marine Conservation Zones

- Recommended MCZ reference area
- Recommended Marine Conservation Zone
- Candidate Special Areas of Conservation (cSAC)

Seabed Surface

- Bedrock outcrop within 2m of seabed surface
- Area where sand is expected to be 1m or less thick
- Sand depth expected to be greater than 1m (no colour in mapping)

Data Source:
Round 3 © TCE, 2010
Candidate Special Areas of Conservation (cSAC) © JNCC, 2011
Marine Conservation Zones data supplied by Netgain,2011
Ordnance Survey © Crown copyright and database right, 2010
Seabed Surface data provided by Metoc, 2012 interpreted from Gardline recon survey data
Contains UKHO Law of the Sea data © Crown copyright and database right

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 6
Teesside - Areas of Sensitivity within the Offshore Cable Route Study Area

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0085-01

SCALE	1:800,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND

STEP THREE: Identification of Exit Points

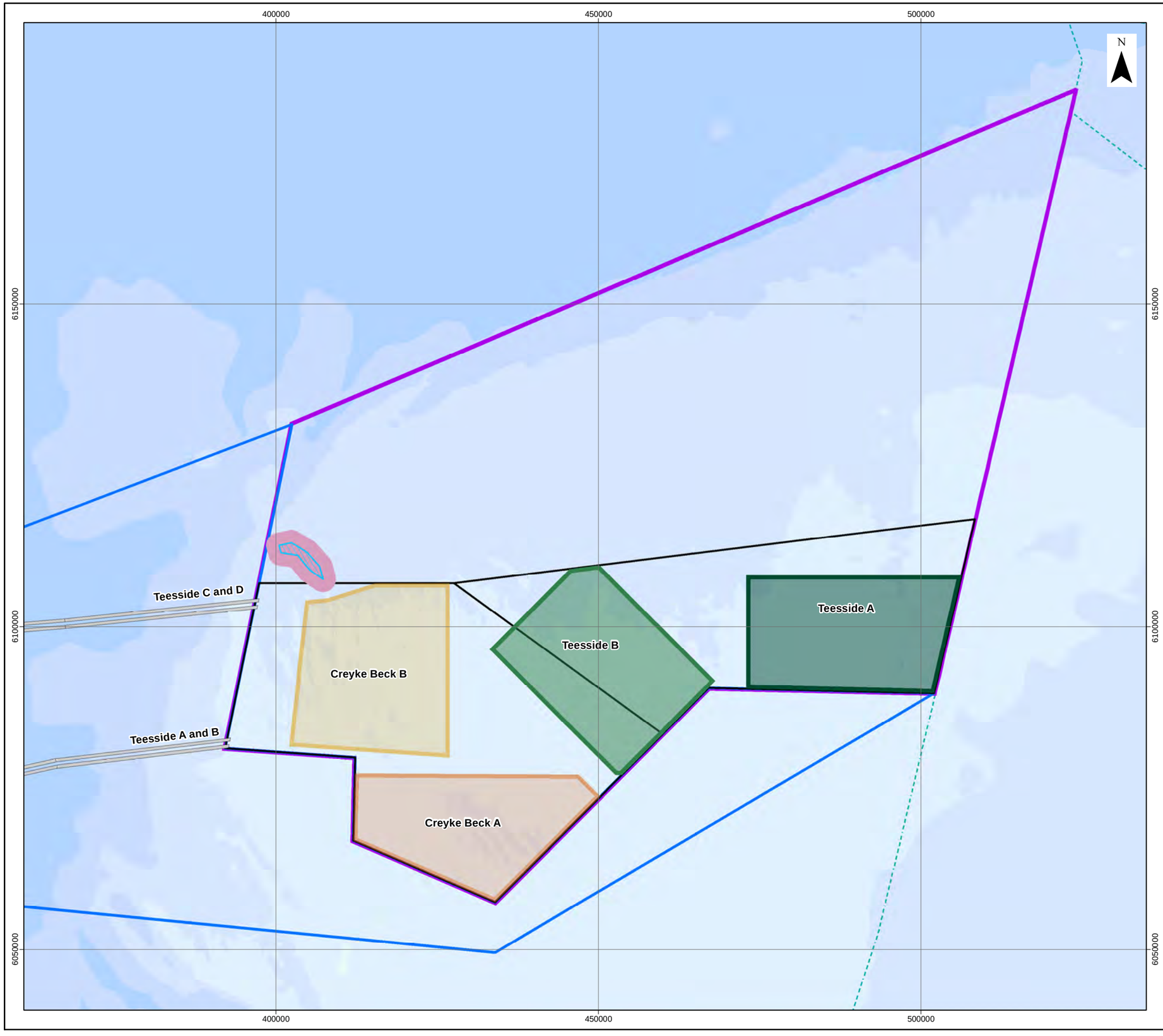
3.16 To identify the exit points from the zone, it was important to find the simplest path to the point on the zone boundary that allows the most direct route to the landfall. It was also important to minimise pipeline and cable crossings wherever possible. Consideration was also given to further development within the Dogger Bank Zone that Forewind may proceed with in the future.

Teesside A and B Exit Point

3.17 Forewind has identified the locations and project boundaries of Creyke Beck A and B and Teesside A and B, in the south of the Dogger Bank Zone. As Creyke Beck A and B are located between Teesside A and B and the landfall, the most direct route for the export cable corridor is between the two Creyke Beck projects. This leads to a natural exit point on the zone boundary as displayed in Figure 7.

Teesside C and D Exit Point

3.18 Whilst project boundaries have not yet been identified, it is known that Teesside C and D will be located north of tranches A and B. An aggregates application area (466/1) is located just north of Creyke Beck B, and a 2km buffer has been applied to this area. It was also recognised that that exit points and export cable corridors will need to be identified in the future for additional projects in the north of the Dogger Bank Zone. Forewind made the decision to rule out the exit points for Teesside C and D being located north of the aggregates application area, to leave space for possible exit points for future projects. Therefore, the most suitable route for the export cable corridor for Teesside C and D is between the aggregates application area buffer and Creyke Beck B. This leads to a natural exit point on the zone boundary as displayed in Figure 7.



LEGEND

- Indicative export cable corridor
- Tranche Boundary
- Offshore cable route study area
- Dogger Bank Round 3 Zone
- Hornsea Round 3 Zone
- International boundary
- 12nm Territorial boundary

Aggregate Areas

- Dredging application area
- 2km buffer around dredging application area

Project boundaries

- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Creyke Beck A
- Dogger Bank Creyke Beck B

0 10 20

Kilometres

Data Source:
Round 3 © TCE, 2010
International boundary © UKDeal, 2010.
Ordnance Survey data © Crown copyright and database right, 2010
Background bathymetry image derived in part from TCarta data 2009

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 7
Teesside Export Cable Corridor Exit Points from the Dogger Bank Zone

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0105-01

SCALE	1:600,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND

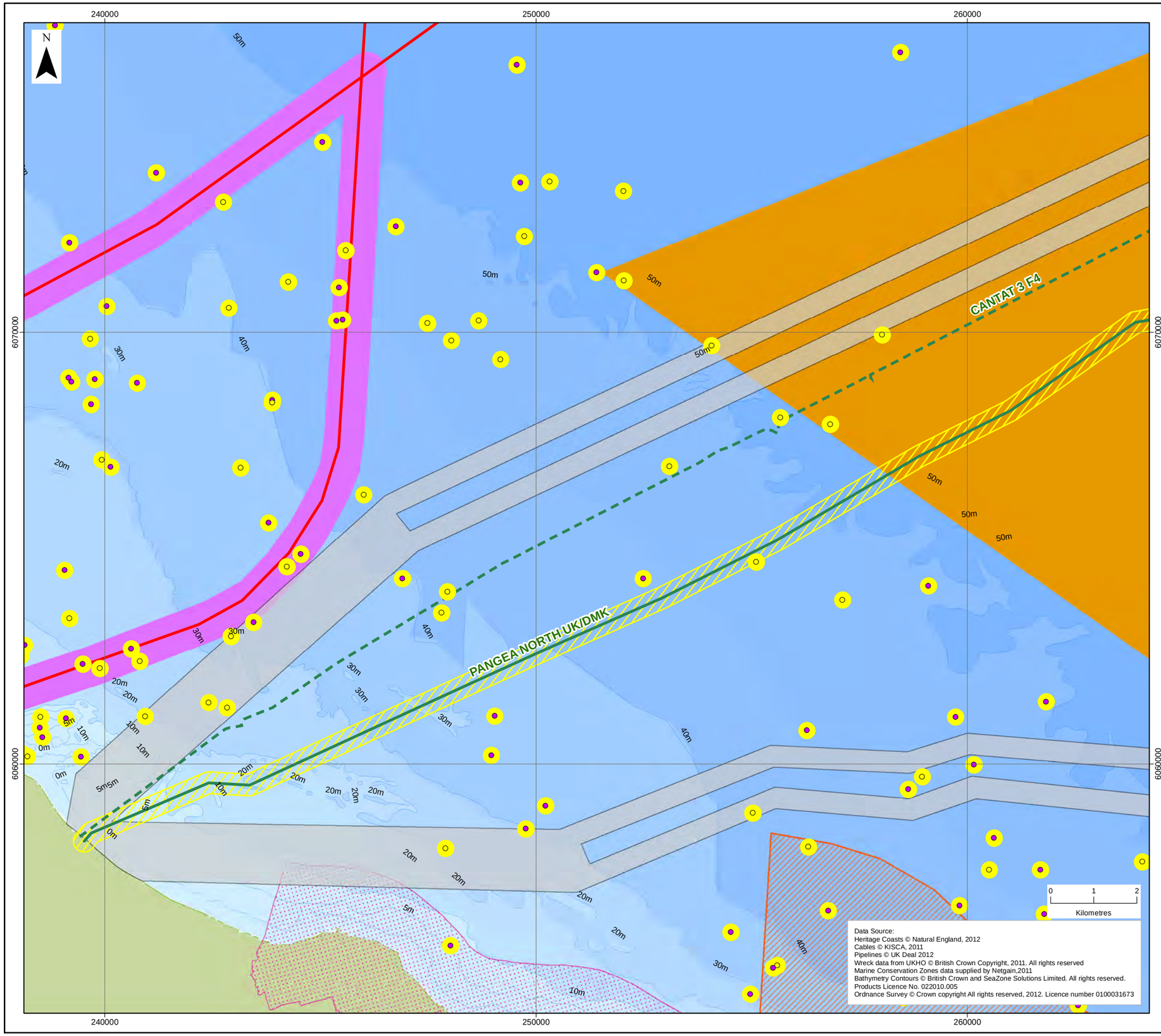
STEP FOUR: Precise cable corridor identification

3.19 A large area adjacent to the entrance of the Tees Estuary is frequently used for anchoring of vessels that use Teesport. The area is bounded by a designated "no-anchorage" area that follows the line of existing pipelines (marked in purple in Figure 8. This area has been avoided to minimise the risk of damage to export cables. The proposed routing of the offshore corridors (and undertaking a full coverage geophysical survey as proposed), would allow for the two northerly pairs of cables to cross the RWE Breagh pipeline (currently under construction) close to 90˚ and in water depths of over 30m. As shown in Figure 8, the two southerly pairs of cables will cross the Breagh pipeline in water depths of around 50m. The cable corridor has been designed to avoid the recommended Marine Conservation Zone (rMCZ), displayed using red hatching. The route has also taken into account wrecks where the positions are precisely known, applying a 200m buffer as shown. Where the location of a wreck is not precisely known, the wreck has not been taken into account for the routing of the cable corridor.

3.20 As can be seen in Figure 9, the crossings of the Alcatel Lucent cable and the Breagh pipeline have been made as close to 90˚ as possible. The routing of the corridor further seeks to minimise the crossing of the area where there is known to be bedrock within 2m of the surface of the seabed (shaded yellow), and avoids known wrecks.

3.21 Using the same principles, Figure 10 shows the routing of the cable corridor. It should be noted that the Langeled gas pipeline can be seen in the eastern side of this figure, and again, a crossing as close to 90˚ has been designed.

3.22 Figure 11 shows the proposed cable corridors in relation to the edge of the zone (shown in purple). Again, the same principles have been applied, avoiding known wrecks and minimising crossing of the area where there is known to be bedrock within 2m of the surface of the seabed (shaded yellow).



LEGEND

- Teesside export cable corridor
- Heritage Coasts
- Anchoring prohibited region

Wrecks (UKHO data)

- Wreck where position is approximate/unreliable/unsurveyed
- Wreck where position is precisely known or surveyed
- 200m buffer around wrecks position

Marine Conservation Zones

- Recommended Marine Conservation Zone

Cables

- Active cables
- Out of Service cables
- 250m buffer around active cable

Pipelines

- Not In Use Pipelines
- Active Pipelines

Seabed Surface

- Area where sand is expected to be 1m or less thick

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 8
Teesside Nearshore Cable Corridor Selection

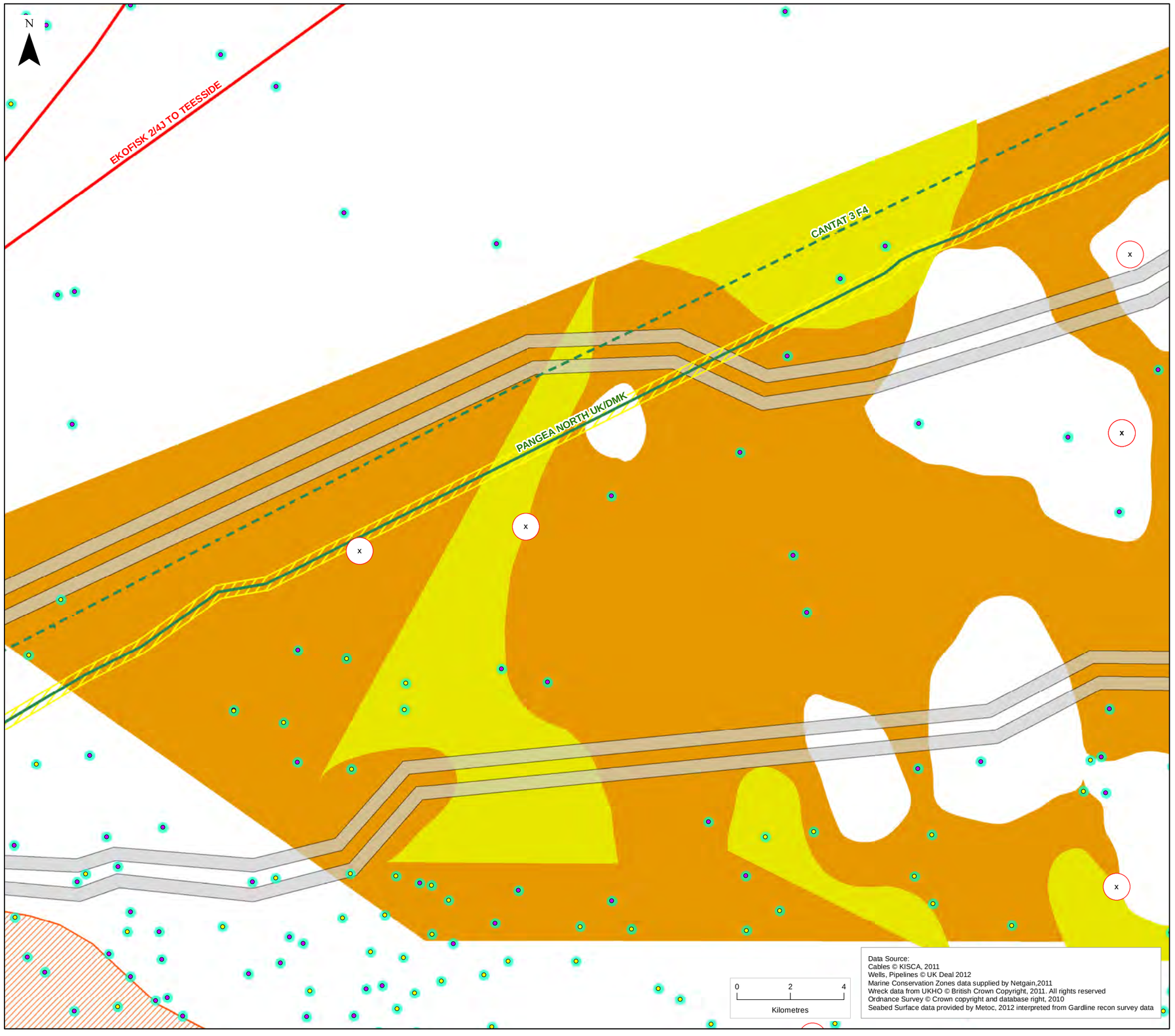
VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0086-01

SCALE	1:90,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Indicative export cable corridor
- x Wells
- 500m buffer around well

Wrecks (UKHO Data)

- Wreck or obstruction where position is approximate/unreliable/unsurveyed
- Wreck or obstruction where position is precisely known or surveyed
- 200m buffer around wreck or obstruction position

Marine Conservation Zones

- Recommended Marine Conservation Zone

Cables

- Active cables
- Out of Service cables
- 250m buffer around active cable

Pipelines

- Active Pipelines

Seabed Surface

- Bedrock outcrop within 2m of seabed surface
- Area where sand is expected to be 1m or less thick
- Sand depth expected to be greater than 1m (no colour in mapping)

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 9
Teesside offshore cable corridor selection 1

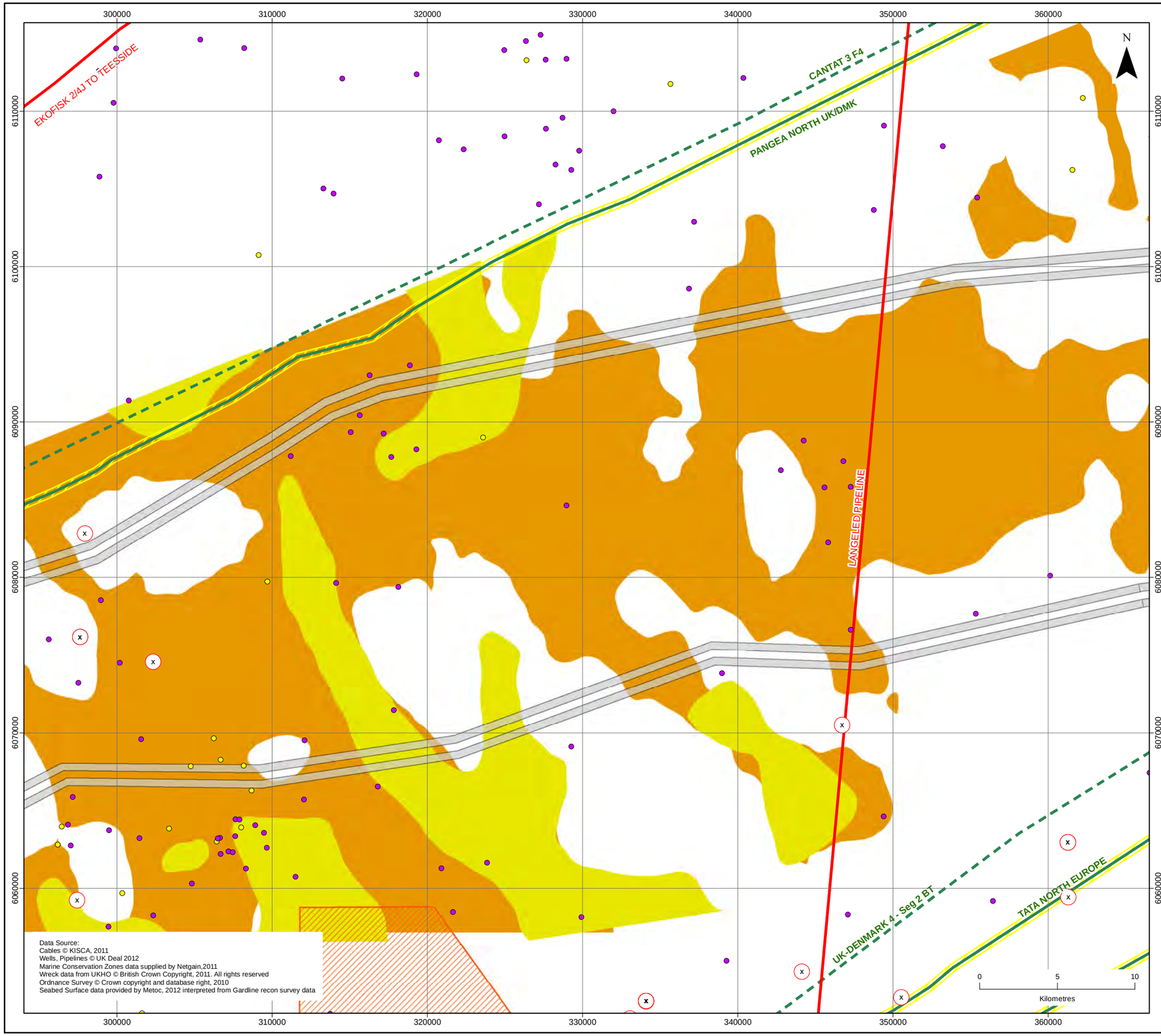
VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0087-01

SCALE	1:150,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Indicative export cable corridor
- Wells
- 500m buffer around well

Marine Conservation Zones

- Recommended Marine Conservation Zone

Wrecks (UKHO Data)

- Wreck or obstruction where position is approximate/unreliable/unsurveyed
- Wreck or obstruction where position is precisely known or surveyed

Cables

- Active cables
- Out of Service cables
- 250m buffer around active cable

Pipelines

- Active Pipelines

Seabed Surface

- Bedrock outcrop within 2m of seabed surface
- Area where sand is expected to be 1m or less thick
- Sand depth expected to be greater than 1m (no colour in mapping)

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 10
Teesside Offshore Cable Corridor Selection 2

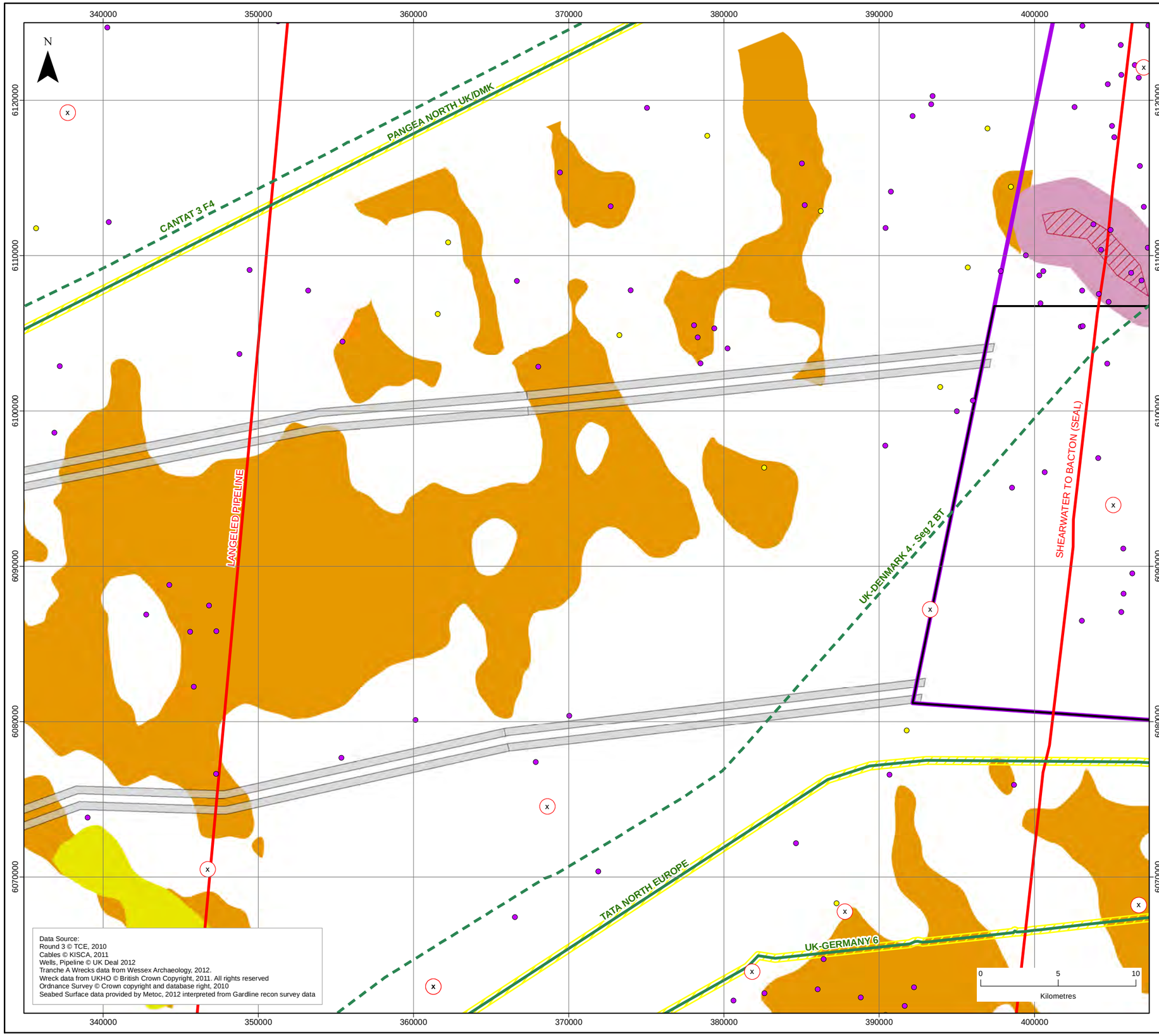
VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0088-01

SCALE	1:250,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

FOREWIND



LEGEND

- Tranche boundary
- Dogger Bank Round 3 Zone
- Indicative export cable corridor
- Wells
- 500m buffer around well

Aggregate Areas

- Dredging application area
- 2km buffer around dredging application area

Wrecks (UKHO Data)

- Wreck or obstruction where position is approximate/unreliable/unsurveyed
- Wreck or obstruction where position is precisely known or surveyed

Cables

- Active cables
- Out of Service cables
- 250m buffer around active cable

Pipelines

- Active Pipelines

Seabed Surface

- Bedrock outcrop within 2m of seabed surface
- Area where sand is expected to be 1m or less thick
- Sand depth expected to be greater than 1m (no colour in mapping)

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 11
Teesside Offshore Cable Corridor Selection 3

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0089-01

SCALE	1:250,000	PLOT SIZE	A3	DATUM	WGS84	PROJECTION	UTM31N

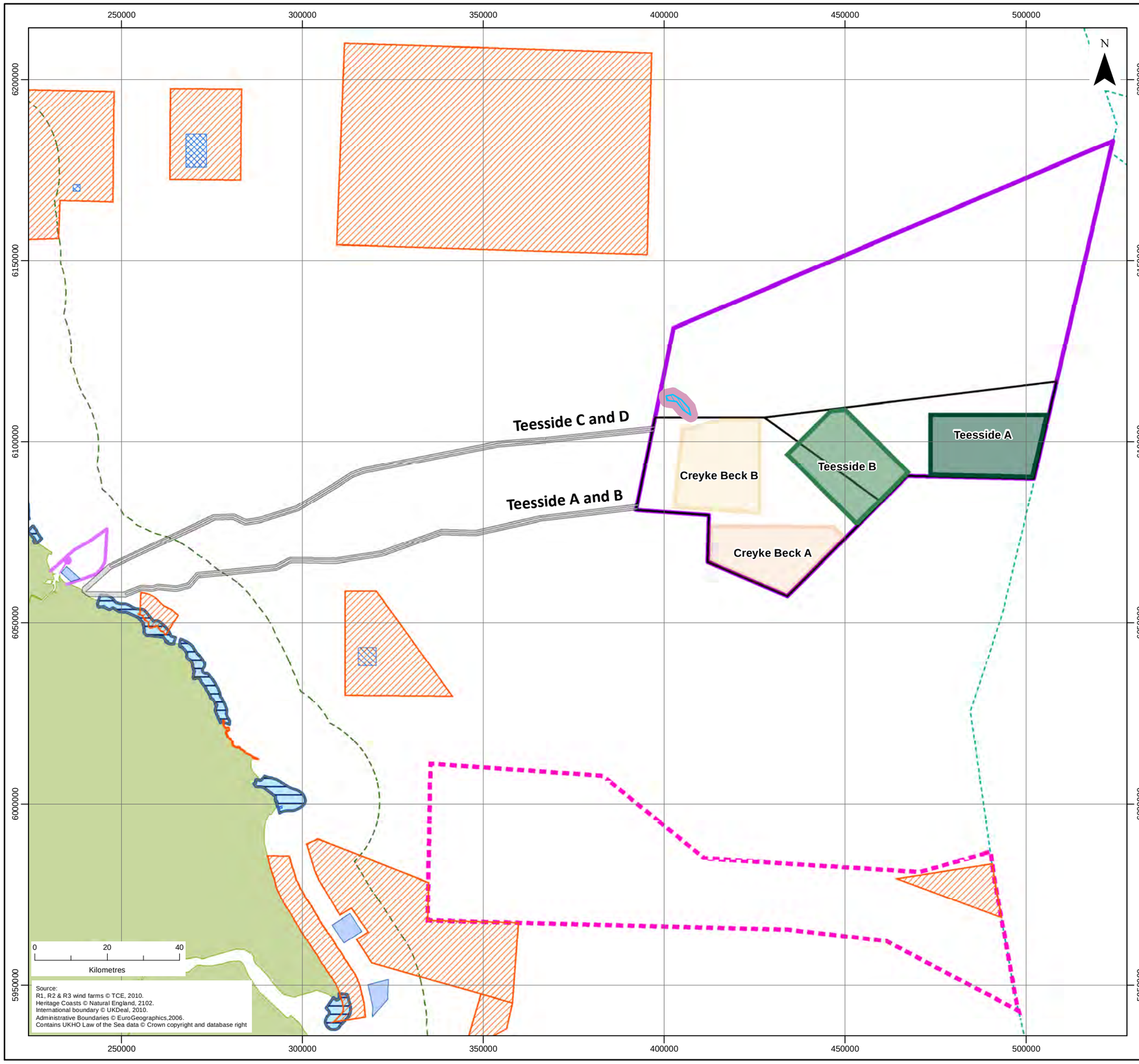
FOREWIND

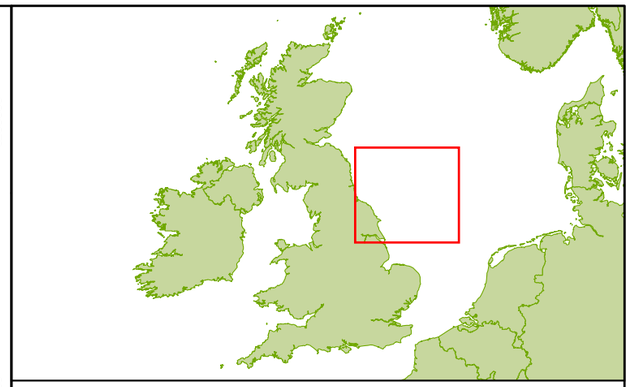
4 Conclusion

4.1 The selected offshore export cable corridor for the Dogger Bank Teesside projects is shown in Figure 12.

4.2 The selected corridor comprises two separate corridors for the four Teesside projects running east to west from two exit points on the Dogger Bank Zone. The southerly corridor is for Dogger Bank Teesside A and B, and the northerly corridor is for Dogger Bank Teesside C and D.

4.3 The corridor selection has utilised both desk-based and specific survey data in order to identify an appropriate corridor, as well as relying upon the expertise of technical specialists.





LEGEND

- Dogger Bank Round 3 Zone
- Tranche Boundary
- Hornsea Round 3 Zone
- Rounds 1 or 2 offshore wind farm
- Indicative export cable corridor
- 12nm Territorial boundary
- International boundary

Shipping

- Area of Prohibited Anchoring

Project boundaries

- Dogger Bank Teesside A
- Dogger Bank Teesside B
- Dogger Bank Creyke Beck A
- Dogger Bank Creyke Beck B

Aggregate areas

- Dredging application area
- 2km buffer around dredging application area

Marine Conservation Zones

- Recommended MCZ Reference Area
- Recommended Marine Conservation Zone
- Heritage coasts

PROJECT TITLE

DOGGER BANK R3 DEVELOPMENT

DRAWING TITLE

Figure 12
Teesside Proposed Export Cable Corridor

VER	DATE	REMARKS	Drawn	Checked
1	20/11/2012	First Issue	AJ	MS

DRAWING NUMBER:

M-DES-0090-02

SCALE	PLOT SIZE	DATUM	PROJECTION
1:1,100,000	A3	WGS84	UTM31N

FOREWIND

5 References

Forewind, 2012. *Offshore Project Boundary Selection Report.*

Forewind, 2012. *PEI1 Appendix C - Site Selection Report.*

Intertek METOC, 2011. *Dogger Bank Cable Area Data Review.*

Subsea Cables UK, 2012. *Subsea Cables UK Guideline No 6 - The Proximity of Offshore Renewable Energy Installations & Submarine Cable Infrastructure.*

For more information

Visit **www.forewind.co.uk**

Forewind Ltd
Davidson House
Forbury Square
Reading
RG1 3EU