Hornsea Project Four: Environmental Statement (ES)

PINS Document Reference: A4.3.1
APFP Regulation: 5(2)(a)

Volume A4, Annex 3.3: Selection and Refinement of Onshore Infrastructure

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A4.3.3
Version B

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Glossary

Term	Definition
BRAG Assessment	An assessment based on quantitative assessment and expert judgement. The ranking is defined as: • Black: Potential showstopper to development; • Red: High potential to constrain development; • Amber: Intermediate potential to constrain development; and • Green: Low potential to constrain development. Black and red constraints are critical in determining features that should be avoided wherever possible to avoid consenting risk, reduce EIA complexity and reduce the cost of mitigation. Amber and green constraints are those that may be more readily minimised or managed by employing appropriate mitigation measures.
Commitment	A term used interchangeably with mitigation and enhancement measures. The purpose of Commitments is to reduce and/or eliminate Likely Significant Effects (LSEs), in EIA terms. Primary (Design) or Tertiary (Inherent) are both embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, Preliminary Environmental Information Report (PEIR) or ES). Secondary commitments are incorporated to reduce LSE to environmentally acceptable levels following initial assessment i.e. so that residual effects are acceptable.
Design Envelope	A description of the range of possible elements that make up the Hornsea Project Four design options under consideration, as set out in detail in the project description. This envelope is used to define Hornsea Project Four for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known. This is also often referred to as the "Rochdale Envelope" approach.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Electrical Infrastructure Study Area	The study area between the onshore substation and offshore array area.
Energy balancing infrastructure (EBI)	The onshore substation includes energy balancing infrastructure. These provide valuable services to the electrical grid, such as storing energy to meet periods of peak demand and improving overall reliability.
Export cable corridor (ECC)	The specific corridor of seabed (seaward of Mean High Water Springs (MHWS)) and land (landward of MHWS) from the Hornsea Project Four array area to the Creyke Beck National Grid substation, within which the export cables will be located.
Haul Road	The track along the onshore ECC which the construction traffic would use to access work fronts.

Term	Definition
High Voltage Alternating Current (HVAC)	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current (HVDC)	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Hornsea Project Four Offshore Wind Farm	The proposed Hornsea Project Four Offshore Wind Farm project. The term covers all elements within the Development Consent Order (i.e. both the offshore and onshore components). Hereafter referred to as Hornsea Four.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore ECC, intertidal working area and landfall compound. Where the offshore cables come ashore east of Fraisthorpe.
Maximum Design Scenario (MDS)	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
Mitigation	A term used interchangeably with Commitment(s) by Hornsea Four. Mitigation measures (Commitments) are embedded within the assessment at the relevant point in the EIA (e.g. at Scoping, or PEIR or ES).
National Grid Electricity Transmission (NGET) substation	The grid connection location for Hornsea Four.
Onshore export cables	Cables connecting the landfall first to the onshore substation and then on to the NGET substation at Creyke Beck.
Onshore substation (OnSS)	Comprises a compound containing the electrical components for transforming the power supplied from Hornsea Project Four to 400 kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National Grid. If a HVDC system is used the OnSS will also house equipment to convert the power from HVDC to HVAC.
Order Limits	The limits within which Hornsea Project Four (the 'authorised project) may be carried out.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Trenchless Techniques	Also referred to as trenchless crossing techniques or trenchless methods. These techniques include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

Acronyms

Acronym	Definition
AfL	Agreement for Lease
BAP	Biodiversity Action Plan
BRAG	Black, Red, Amber, Green (Assessment Criteria)
Co	Commitment
DBA	Desk Based Assessment
DCO	Development Consent Order
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
EISA	Electrical Infrastructure Study Area
HDD	Horizontal Directional Drilling
HER	Historic Environment Record
MHWS	Mean High Water Springs
MoD	Ministry of Defence
NSIP	Nationally Significant Infrastructure Project
OnSS	Onshore Substation
OS	Ordnance Survey
PEIR	Preliminary Environmental Information Report
RPSS	Route planning and site selection
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Site of Community Importance
SoCC	Statement of Community Consultation
SPA	Special Protected Area
SSSI	Site of Special Scientific Interest
TJB	Transition Joint Bay
UK	United Kingdom

Units

Unit	Definition
km	Kilometre(s)
m	Metre(s)

1 Introduction

1.1 Background

1.1.1 Overview of Hornsea Four Approach

1.1.1.1 Orsted Hornsea Project Four Limited ('the Applicant') is proposing to develop Hornsea Project Four Wind Farm (hereafter 'Hornsea Four'). The route planning and site selection (RPSS) process for Hornsea Four has followed an iterative approach to ensure the most appropriate solution was identified efficiently, with due consideration of environmental, technical and commercial matters. The five key stages are shown in **Table 1**.

Table 1: Hornsea Four Route Planning and Site Selection Stages.

Stage	Associated Document
Stage 1: Identification of the AfL and Grid Connection	**Volume A1, Chapter 3: Site selection and consideration of alternatives**
Stage 2: Identification of an Electrical Infrastructure Study area	**Volume A1, Chapter 3: Site selection and consideration of alternatives**
Stage 3: Identification of the Landfall	**Volume A4, Annex 3.1: Refinement of the Cable Landfall**
Stage 4: Identification of the Onshore Substation (OnSS) site	**Volume A4, Annex 3.3: Selection and Refinement of the Onshore Infrastructure**
Stage 5: Identification of the Offshore and Onshore Export Cable Corridor (ECC)	**Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure** and **Annex 3.3: Selection and Refinement of the Onshore Infrastructure**

1.1.1.2 The Hornsea Four Electrical Infrastructure Study Area (EISA) is largely defined by the AfL (location of the Hornsea Four array) and grid connection point at Creyke Beck (location of the OnSS). These two locations formed the eastern and western extents of the EISA. The EISA has been used to structure the RPSS reporting format, with:

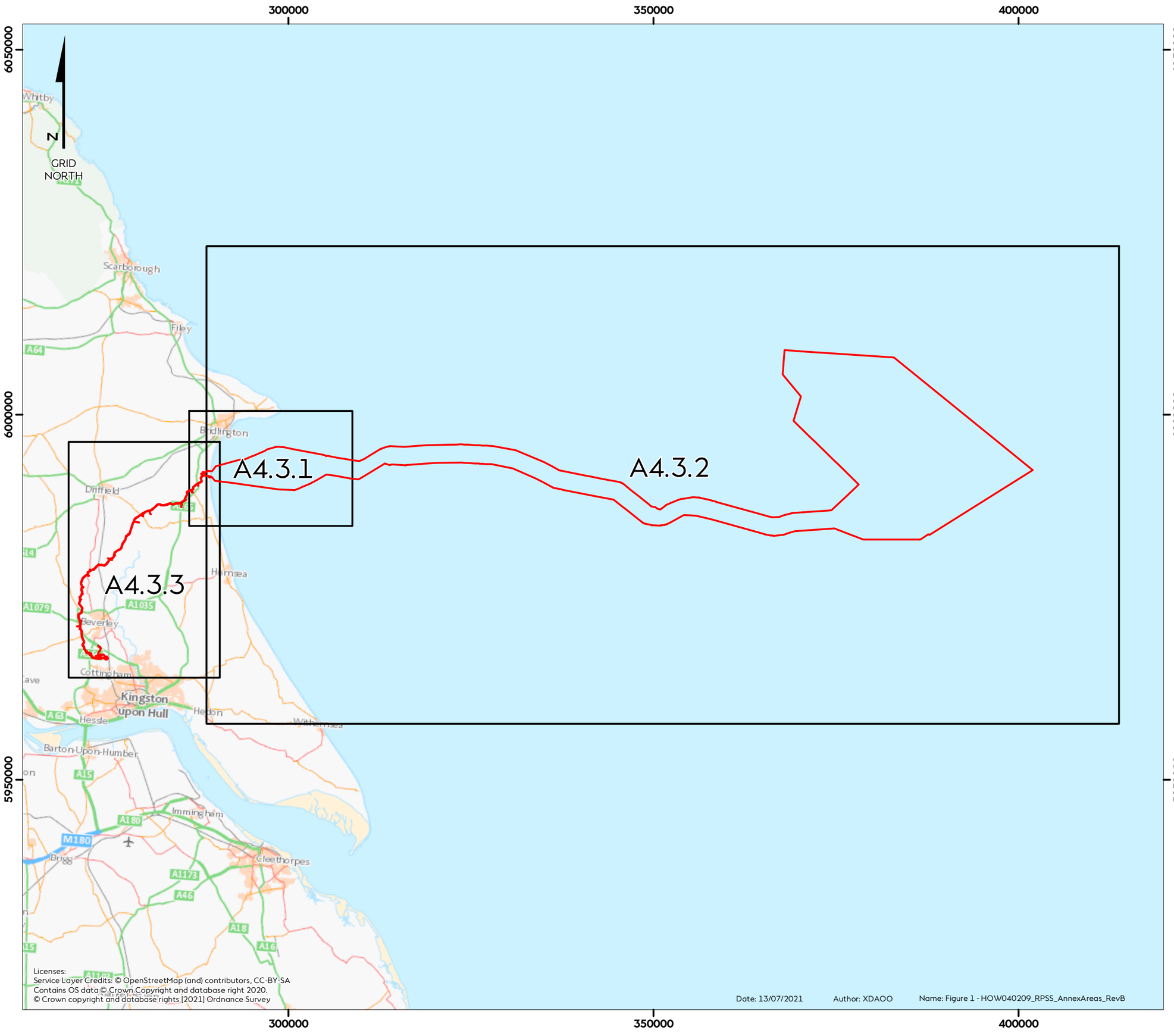
- Landfall covered in **Volume A4, Annex 3.1: Refinement of the Cable Landfall**;
- all Hornsea Four offshore infrastructure east of landfall covered in **Volume A4, Annex 3.2: Selection and Refinement of the Offshore Infrastructure**; and
- all Hornsea Four onshore infrastructure to the west detailed in **Volume A4, Annex 3.3: Selection and Refinement of the Onshore Infrastructure**.

1.1.1.3 This is shown in **Figure 1**.

Hornsea Four

Figure 1

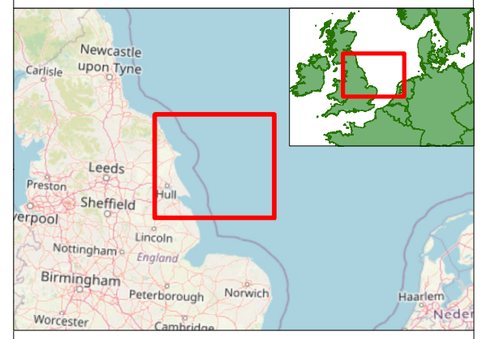
RPSS Annex Areas



Order Limits

Annex Chapters

- A4.3.1 - Landfall area
- A4.3.2 - All infrastructure east of landfall
- A4.3.3 - All infrastructure west of landfall



Coordinate system: ETRS 1989 UTM Zone 31N

Scale@A3: 1:500,000

0 5 10 20 Kilometres

0 2.5 5 10 Nautical Miles

REV	REMARK	DATE
	First issue for PEIR	26/04/2019
A	Updated following PEIR consultations, for DCO	05/08/2020
B	Reduced array area in north west	13/07/2021

Date: 13/07/2021 Author: XDAOO Name: Figure 1 - HOW040209_RPSS_AnnexAreas_RevB

RPSS Annex Areas
Document no: HOW040209
Created by: XDAOO
Checked by: JOHLE
Approved by: WATTS

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1.1.2 Hornsea Four Programme and Timeframes

1.1.2.1 The RPSS process has been structured incrementally, with early and frequent stakeholder engagement prioritised, through public consultation, landowner liaison and regular stakeholder correspondence. This is set out in **Table 2**. The RPSS process specific to onshore infrastructure is shown in **Figure 2**. The figure is split into two, with the OnSS and EBI site selection shown at the top, and the onshore ECC shown at the bottom.

Table 2: Hornsea Four RPSS Programme.

Stage	Description
EIA Scoping October 2018	• 2,000 m onshore ECC scoping boundary and indicative 200 m permanent ECC and 700 m temporary works area. • OnSS search area. • Landfall search area. • 3,000 m offshore ECC scoping boundary.
Scoping – Preliminary Environmental Information Report (PEIR) consultation	• Feedback and comments from informal public consultation events, landowner liaison and stakeholders on the scoping report and scoping boundary.
PEIR July 2019	• 80m onshore ECC inclusive of permanent and temporary works areas with indicative construction access points. • Compounds: logistics, Horizontal Directional Drilling (HDD) and/or storage compounds outside of the permanent cable corridor for auxiliary works. • Access: Area required for access (temporary or permanent) to the construction and/or operation and maintenance activities. • OnSS site. • Two landfall options. • 1,500 offshore permanent ECC with 500m temporary works areas buffer either side of ECC).
Section 42 and 47 consultation	• Feedback from stakeholders and members of the public upon receipt of more detailed environmental assessment work will further inform the RPSS process.
Working groups	• Feedback and comments from organised working groups with nearby stakeholders.
DCO Application Q4 2021	• Onshore ECC (80m) which will contain all permanent (electrical cables and Transition Joint Bays (TJBs)) and temporary works for construction works and soil storage. The details of which will be developed during detailed design. • Compounds: logistics, Horizontal Directional Drilling (HDD) and/or storage compounds outside of the permanent cable corridor for auxiliary works. • Access: Area required for access (temporary or permanent) to the construction and/or operation and maintenance activities. • OnSS: preferred site within the onshore substation search area. • Landfall: preferred site within the landfall search area. • Offshore ECC (1,500 m): the area within which the export cable route and temporary works area (500m buffer either side of ECC) are planned to be located.

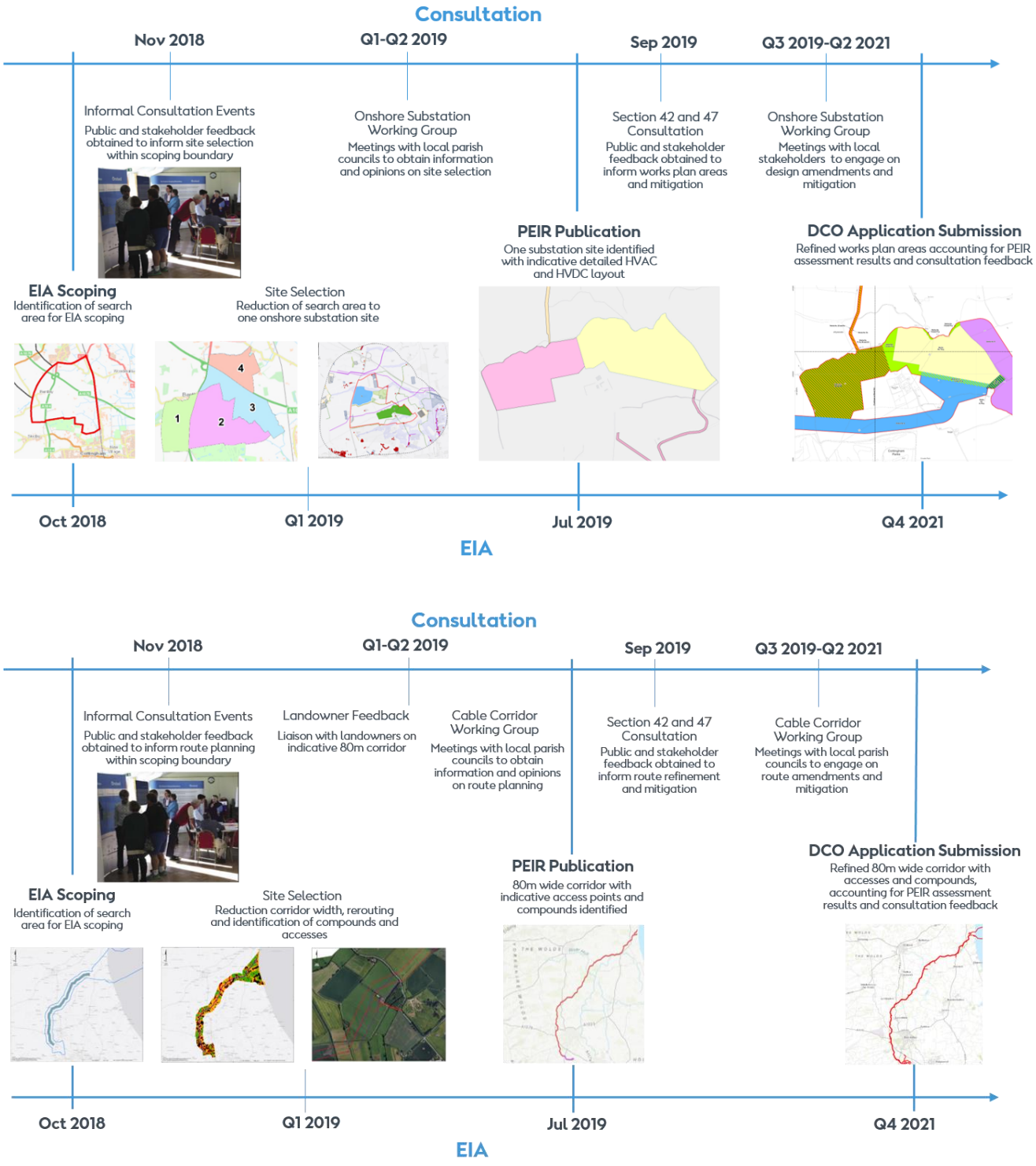


Figure 2: Onshore infrastructure RPSS Timelines.

1.2 Purpose of the Annex

1.2.1.1 This purpose of this annex is to document the decision making behind the refinement of the onshore infrastructure since identification of the EISA up to submission of the Environmental Statement (ES).

1.2.1.2 Prior to submission of the ES, Hornsea Four has engaged with a range of stakeholders with regards to the progress of the project and emerging project design matters. Stakeholders that were consulted as part of the ongoing RPSS process, from project inception to DCO application submission, included:

- The Planning Inspectorate;
- East Riding of Yorkshire Council (ERYC);
- Environment Agency;
- Natural England;
- Highways Agency;
- The Wildlife Trust;
- Landowners;
- Parish Councils; and
- Members of the public at local information events held in East Riding and its surrounds during October 2018 and at formal consultation events held in September 2019 (see **Table 2**).

1.3 Project Elements

1.3.1.1 The onshore project element comprises all infrastructure landward of the landfall (as shown in **Figure 1**). This Annex documents the following project elements:

- Stage 4 – Identification of the OnSS site; and
- Stage 5 – Identification of the onshore ECC.

1.3.1.2 The OnSS site selection was undertaken based on a minimum 155,000 m^2 permanent footprint (inclusive of OnSS and Energy Balancing Infrastructure (EBI)) and landscaping, and a 130,000 m^2 temporary works area.

1.3.1.3 The onshore ECC site selection was undertaken based on incrementally decreasing parameters, from 700 m width (permanent and temporary works) at scoping refined to an 80 m wide onshore ECC (with the exception of the Network Rail Crossing near Beswick and the approach to landfall and the approach to the OnSS, see Commitment (Co) 7 in **Volume A4, Annex 5.2: Commitments Register**) at ES stage, inclusive of permanent and temporary works areas.

2 Onshore Substation Site Selection

2.1 Background

2.1.1.1 The OnSS will contain the electrical components for transforming the power supplied from the offshore wind farm to 400kV and to adjust the power quality and power factor, as required to meet the UK Grid Code for supply to the National grid. If a HVDC system is used it will also house equipment to convert the power from HVDC to HVAC.

2.1.1.2 Hornsea Four will incorporate EBI to provide valuable services to the electrical grid; such as importing, storing and exporting energy to meet the grid needs and improve stability and reliability. All energy balancing equipment will be housed wholly within the footprint of the onshore substation area.

2.1.1.3 This section describes the site selection process for the OnSS undertaken since the identification of the grid connection at the National Grid Energy Transmission (NGET) station at Creyke Beck. The process for identifying the grid connection at Creyke Beck is outlined in Section 3.5 of **Volume A1, Chapter 3: Site Selection and Consideration of Alternatives**, with further detail provided in **Annex 3.1: Selection and Refinement of the Cable Landfall**. The identification and refinement of the OnSS area is detailed, culminating in the selection and refinement of the site for ES submission.

2.2 Substation Search Area

2.2.1 Establishing EIA Scoping Boundary

2.2.1.1 Prior to submission of the EIA Scoping Report, a process of refinement was undertaken to reduce the redline boundary used to inform the EIA scoping process and allow focussed consultation. This process comprised of three versions of the OnSS search area (illustrated in **Figure 3**).

Version 1 – 3km Radius (Panel 1 of Figure 3)

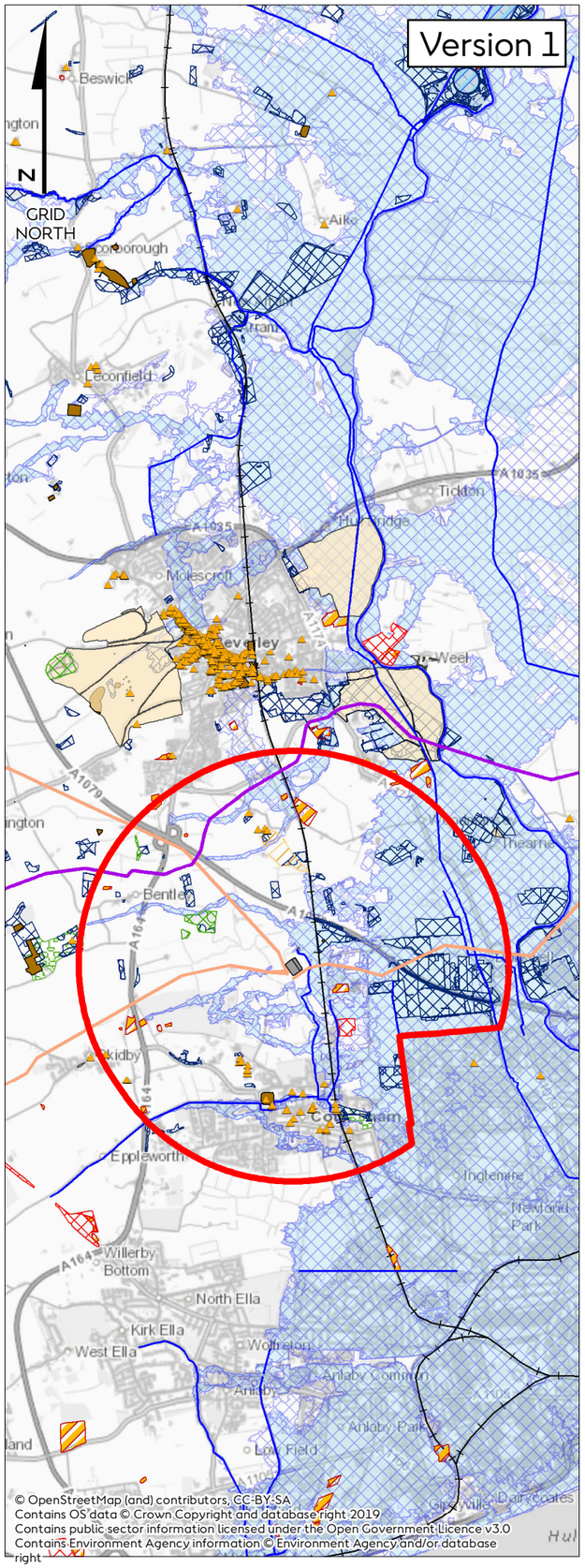
2.2.1.2 To commence site selection, a 3 km radius was drawn surrounding the NGET substation at Creyke Beck. This radius was used to minimise the length of the 400kV AC connection linking the new OnSS and the grid connection point. Minimising this distance is necessary to reduce cable reactive power issues, mitigate transmission losses, and minimise adverse effects on economic efficiency. The 3 km radius was selected based on previous project experience.

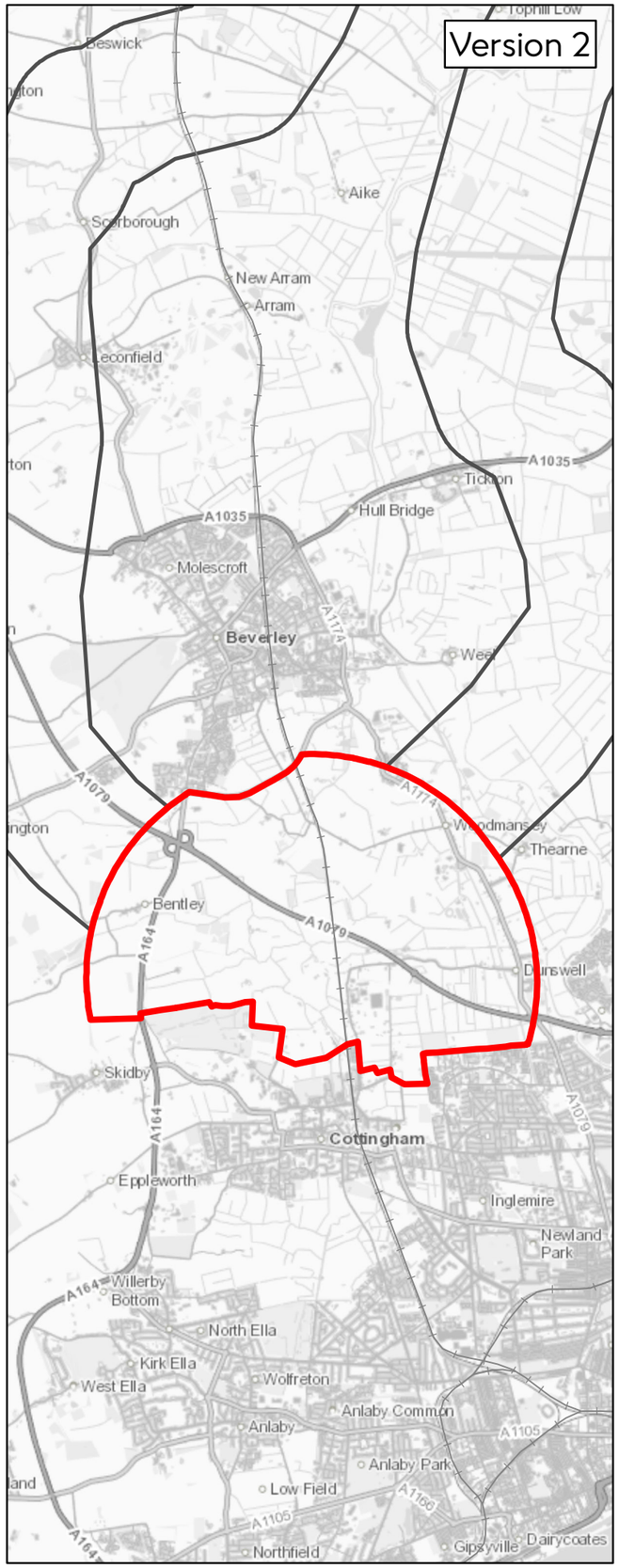
Version 2-3 – EIA Scoping Boundary (Panel 2 and 3 of Figure 3)

2.2.1.3 The 3 km search area was refined to remove heavily constrained areas comprising:

- settlements and other highly or more populated areas (the south of Beverley and north of Cottingham); and
- two golf courses (Cottingham Parks and Skidby Lakes).

2.2.1.4 Further site selection work determined that one of the onshore ECC routes under consideration was unsuitable. The onshore ECC route, which would approach the OnSS search area from the east, lacked a suitable crossing point on the Woodmansey Road that satisfied Hornsea Four's criteria. Further details of the onshore ECC refinement process are provided in **Section 3.4**. As a result, the area to the east of the Hull – Scarborough railway line was removed from the search area, reducing the OnSS search area by approximately 50%.





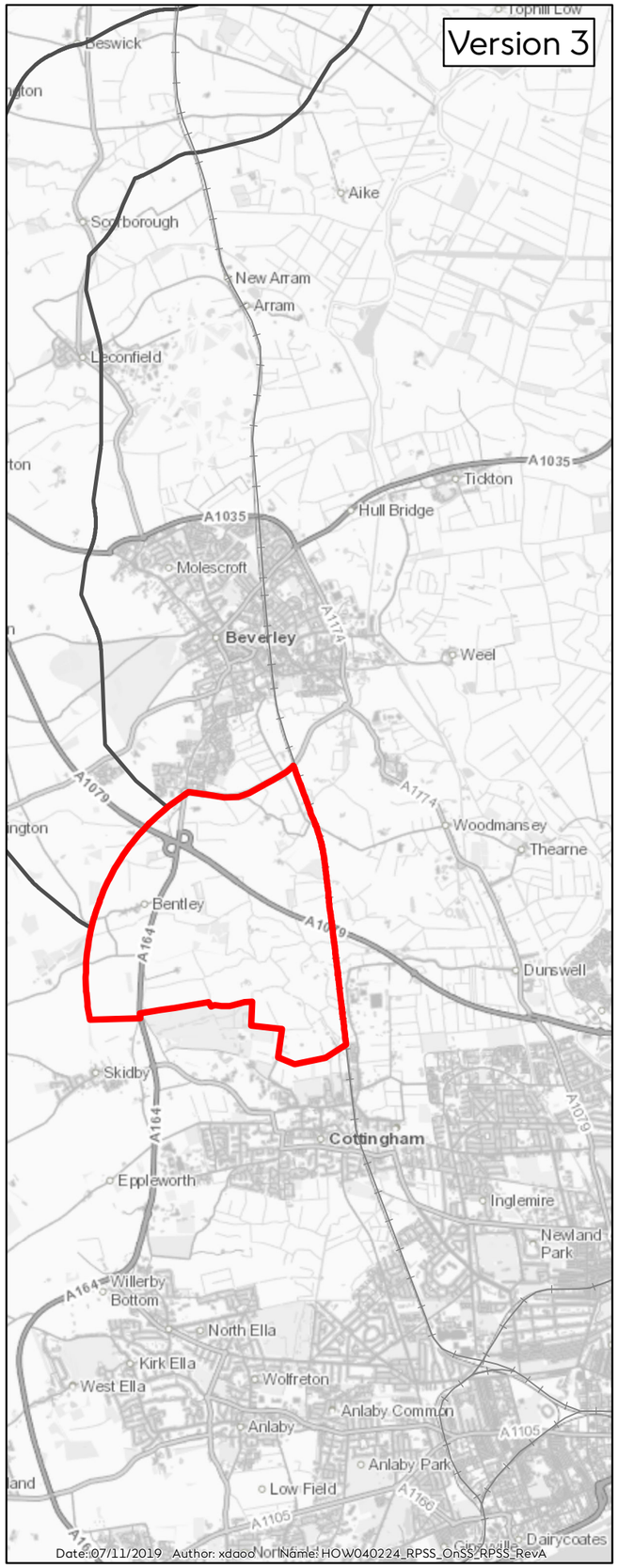


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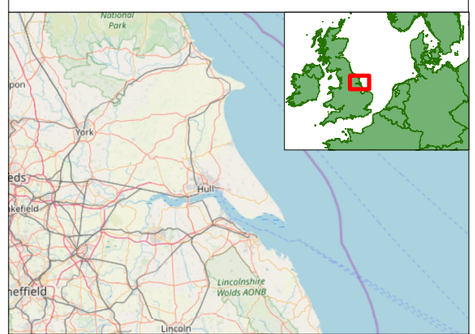
Figure 3

Onshore Substation - Route Planning and Site Selection

Version 1
- Substation Search Area Version 1
- Creyke Beck
- Main River
- National Grid Gas Pipeline
- National Grid Overhead Line
- Listed Building
- Ancient Woodland
- Authorised Landfill Site
- Flood Zone 2
- Flood Zone 3
- Historic Landfill
- Local Nature Reserve
- Priority Habitat
- Registered Common Land
- Registered Park and Garden
- Scheduled Monument
- Site of Special Scientific Interest

Version 2
- Substation Search Area Version 2
- Indicative Cable Corridor

Version 3
- Substation Search Area Version 3
- Indicative Cable Corridor



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Scale@A3: 1:80,000

0 0.75 1.5 3 Kilometres

0 0.5 1 2 Nautical Miles

REV	REMARK	DATE
	First issue for PEIR	26/04/2019
A	Updated designations data, for DCO	07/11/2019

Onshore Substation - Route Planning and Site Selection
Document no: HOW040224
Created by: XDAOO
Checked by: JOHLE
Approved by: WATTS

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2.2.2 Post-Scoping Search Area Refinement

Heat Mapping Exercise

2.2.2.1 After establishing the scoping boundary an initial constraints-based heat mapping exercise utilised the following datasets to identify areas that could be excluded from consideration and/or indicate the least environmentally constrained locations within the search area:

- Residential receptors;
- Utilities;
- Topography;
- Flood Risk Zone 3 areas;
- Proximity from the NGET substation at Creyke Beck;
- Priority Habitat and Ancient Woodland Inventory; and
- Road network.

2.2.2.2 The heat mapping results (shown in Figure 4) were created to provide early context to the OnSS search area and were used to promote dialog at the informal consultation events in October 2018.

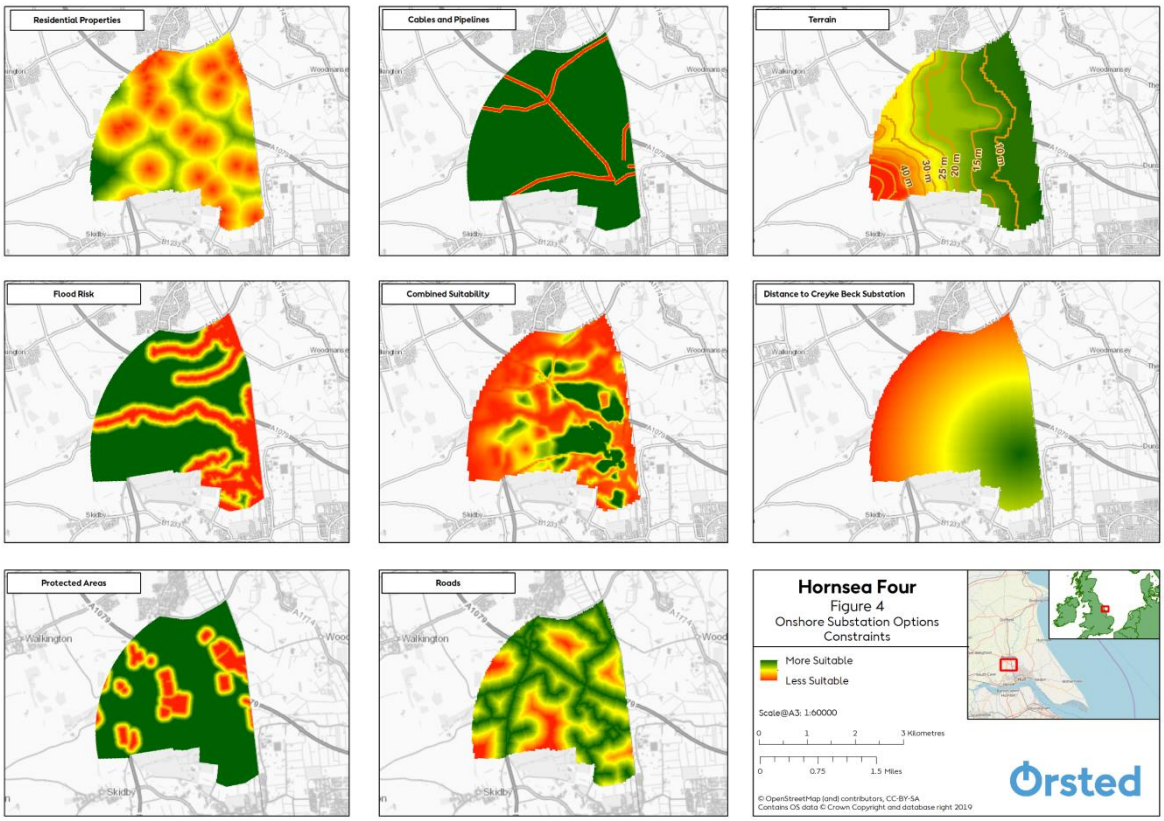


Figure 4: OnSS Scoping Boundary Heatmapping Exercise (not to scale).

Informal Local Information Events

2.2.2.3 Hornsea Four held a series of informal consultation events during the week commencing 22 October 2018. Residents and landowners within the OnSS EIA scoping boundary and an additional 0.5km boundary were notified and invited to an event held on 27 October at Woodmansey Village Hall. The consultation events were supported by information previously outlined within the EIA Scoping Report, in addition to the heat mapping exercise.

2.2.2.4 Feedback from the Woodmansey Village Hall event, which was attended by a focussed group of landowners and local residents, identified that the OnSS should be located:

- as close to the NGET substation at Creyke Beck as possible;
- to the east of the A164; and
- to the south of the A1079.

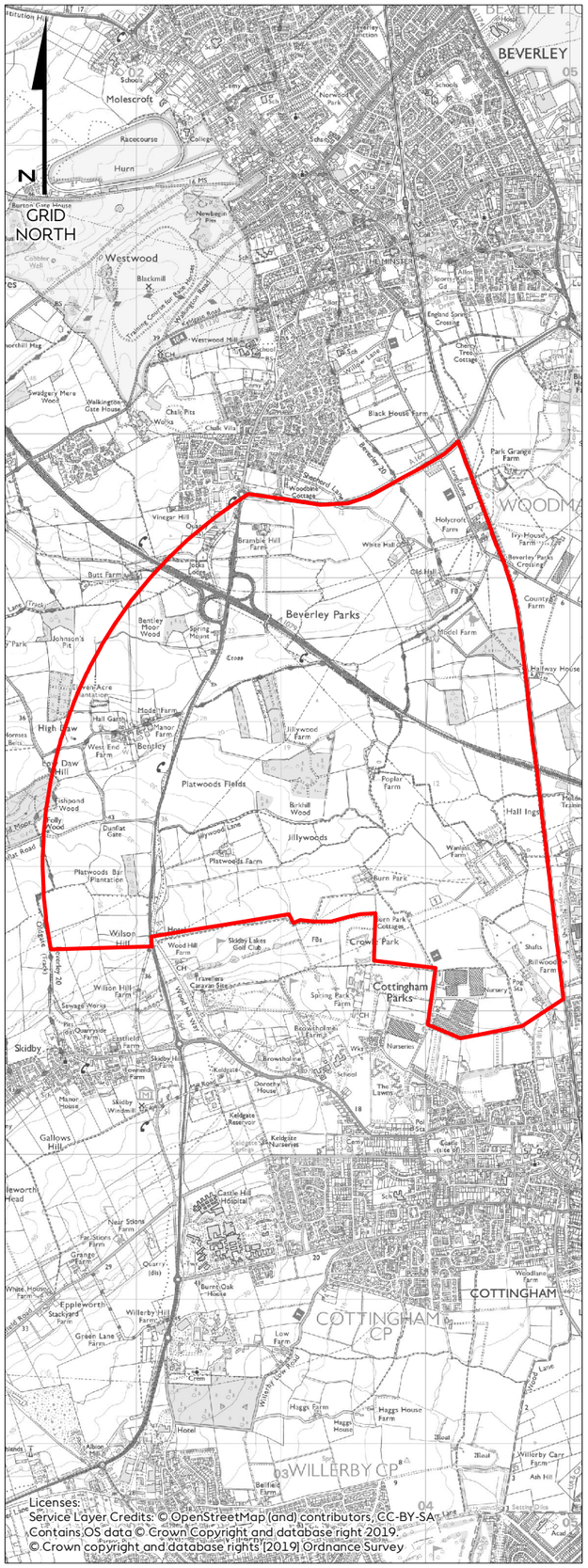
Version 4 - Creation of OnSS Search Zones

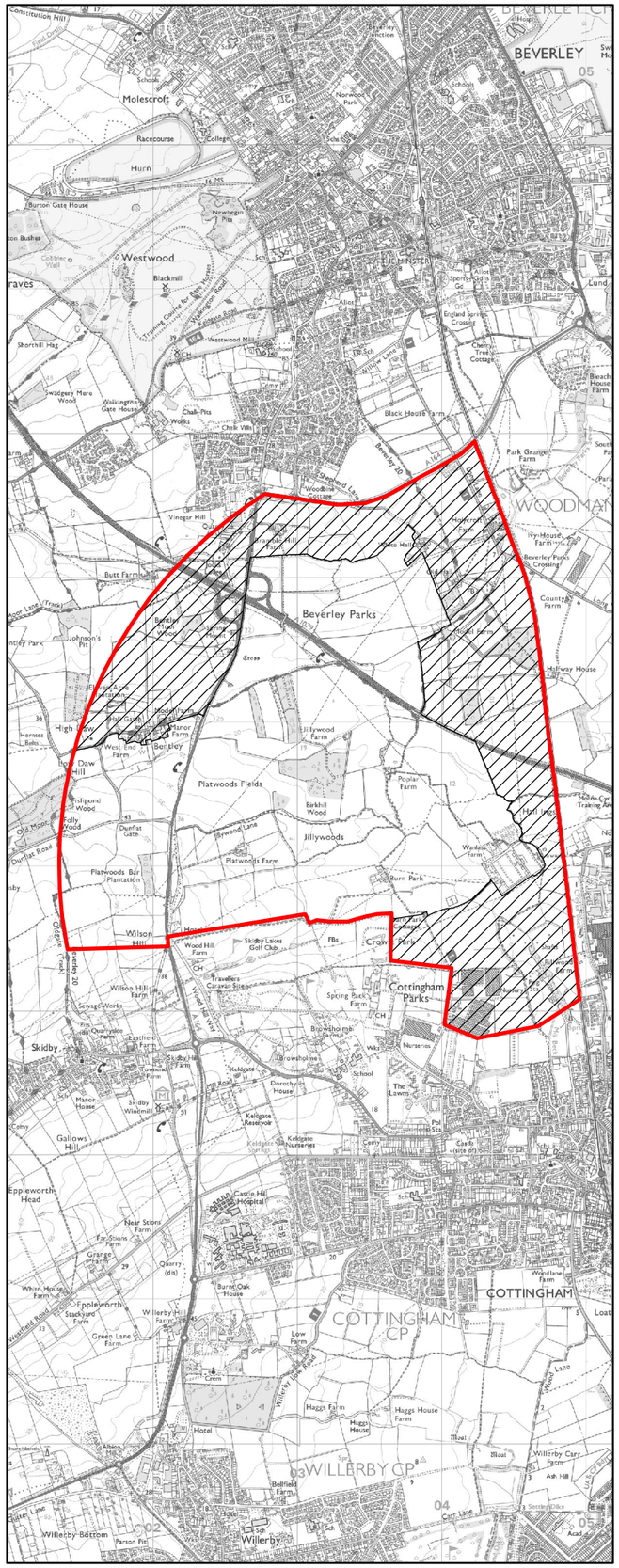
2.2.2.5 The OnSS scoping boundary was reviewed in detail to identify areas without land parcels of a suitable size to accommodate the technical parameters of the OnSS identified within **Section 1.3**. This exercise was also informed by the heatmapping results (**Figure 4**), and removed areas within the north, north-east, east, south-east and north-west (shown in **Figure 5**) of the OnSS scoping boundary.

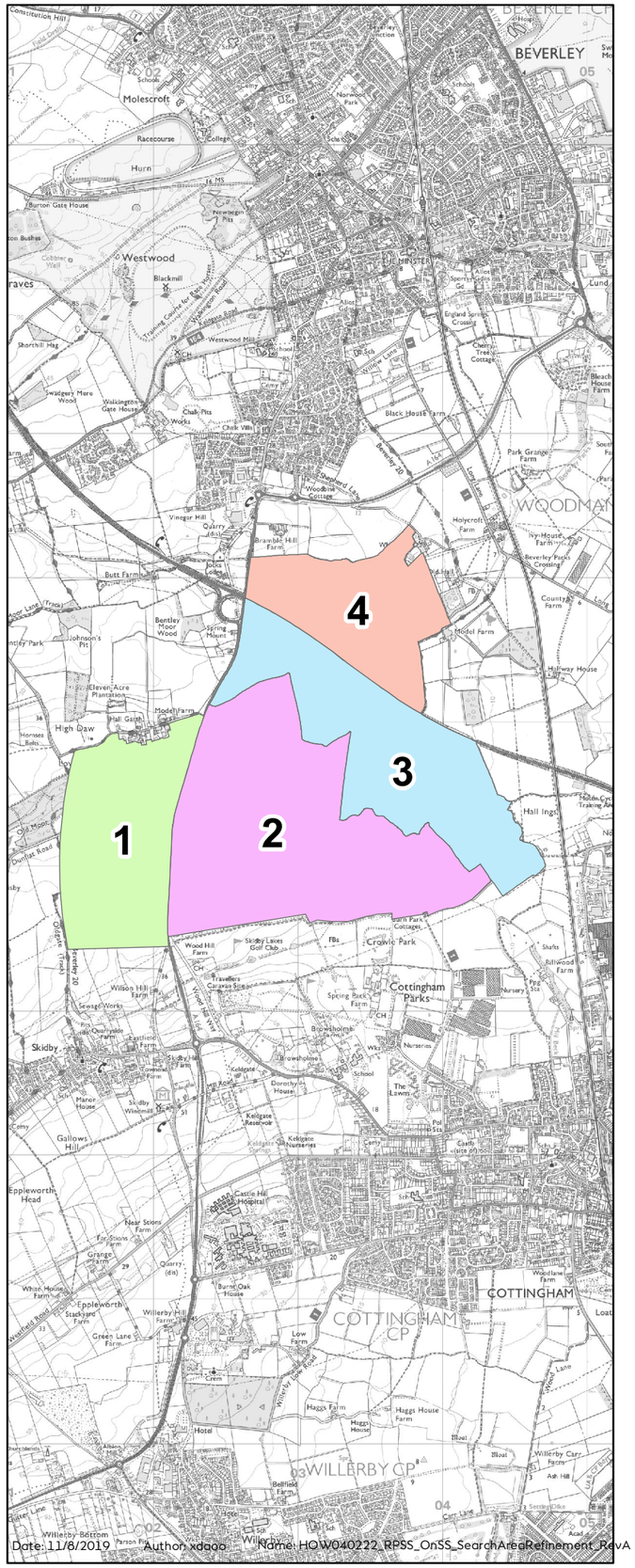
2.2.2.6 The remaining search area was divided into four zones (see **Figure 5**):

- Zone 1 comprises arable land intersected by Dunflat Road, bounded by Bentley and Coppleflat Lane to the north, the A164 to the east, and arable land to the south and west;
- Zones 2 and 3 comprises arable land and a low density of residential dwellings, located between the A1079 to the north, Creyke Beck NGET substation to the east, Cottingham Parks and Skidby Lakes golf clubs to the south, and the A164 to the west; and
- Zone 4 comprises arable land, with small-scale agricultural tracks and highways infrastructure associated with the A1079 in the west. It was bound by arable land to the north and east, the A1079 to the south, and A164 to the west.

2.2.2.7 The zones were devised using established field boundaries and existing highway infrastructure.







Date: 11/8/2019 Author: xdaoo Name: HOW040222_RPSS_OnSS_SearchAreaRefinement_RevA

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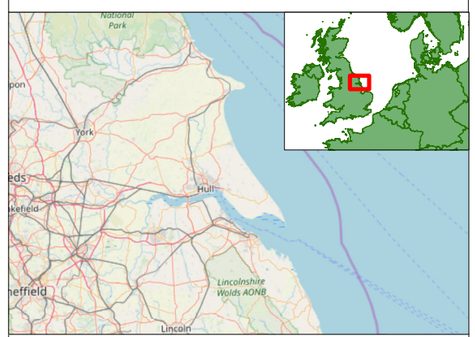
Figure 5

Onshore Substation Search Area Refinement

- Substation Search Area Version 3
- Discarded Search Area

Substation Search Area Version 4

- Zone 1
- Zone 2
- Zone 3
- Zone 4



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0 0.25 0.5 1 Nautical Miles

REV	REMARK	DATE
	First issue for PEIR	26/04/2019
A	Updated following PEIR consultations, for DCO	07/11/2019

Onshore Substation Search Area Refinement
Document no: HOW040222
Created by: XDAOO
Checked by: JOHLE
Approved by: WATTS

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RAG Appraisal of Zones

2.2.2.8 Suitability of zones 1-4 for the siting of the OnSS was determined through a high-level Red, Amber, Green (RAG) appraisal. The RAG appraisal focussed only on environmental considerations and was undertaken based on five key criteria. The datasets used for this appraisal comprised:

- Local planning policy outlined in the ERYC Local Plan, ERYC Policies map, ERYC Allocations Document; and
- Consented developments from the ERYC database.

2.2.2.9 The RAG ratings are defined in **Table 3**.

Table 3: RAG Appraisal Rating.

Rating	Summary
Red	High constraint to development within zone
Amber	Medium constraint to development within zone
Green	Low constraint to development within zone

2.2.2.10 Red constraints are critical in determining whether a zone is appropriate for development and would generally remove a zone from further consideration if identified. Amber and green constraints are those that may be more readily minimised or managed by employing appropriate mitigation measures.

2.2.2.11 Agricultural productivity was originally included within the criteria; however, all land within the OnSS search area is classified as Grade 2 and as such, the criteria was removed as it was not contributing to the appraisal.

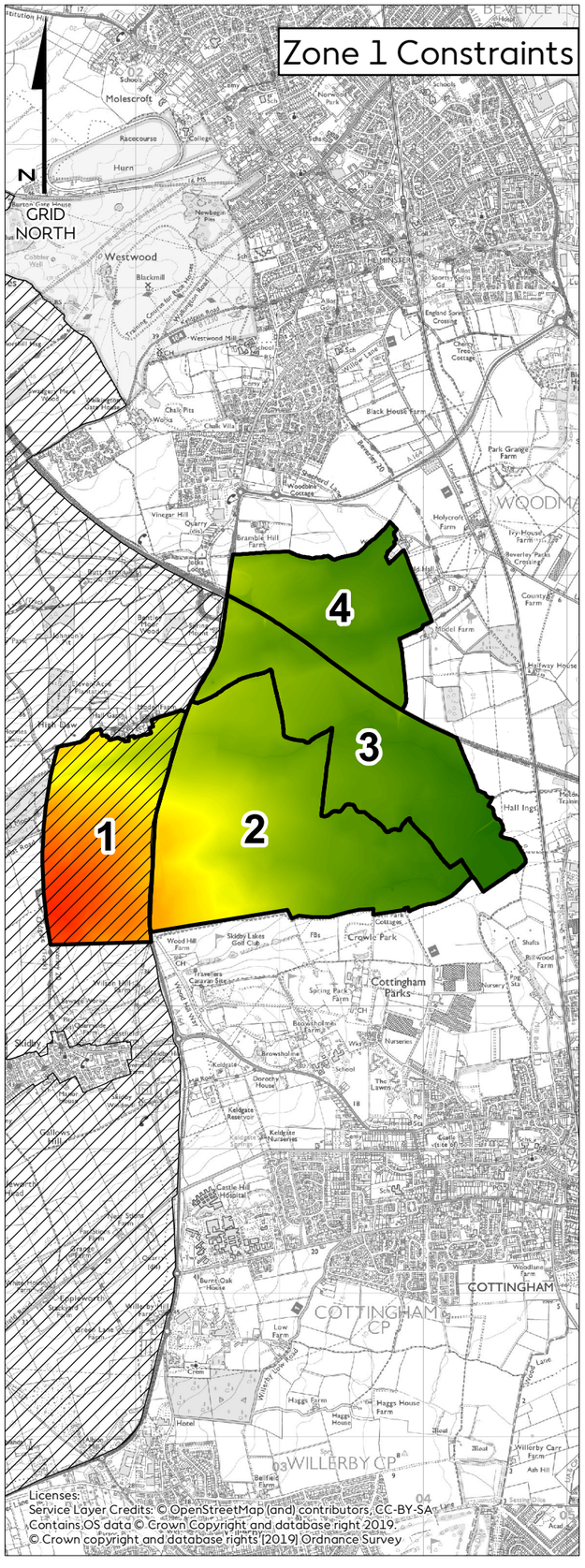
2.2.2.12 As shown in **Table 4** and **Figure 6**, the RAG appraisal identified red constraints within Zone 1, 3 and 4, removing them from further consideration. Zone 2 was considered acceptable based on the RAG appraisal and was retained for a detailed site selection exercise.

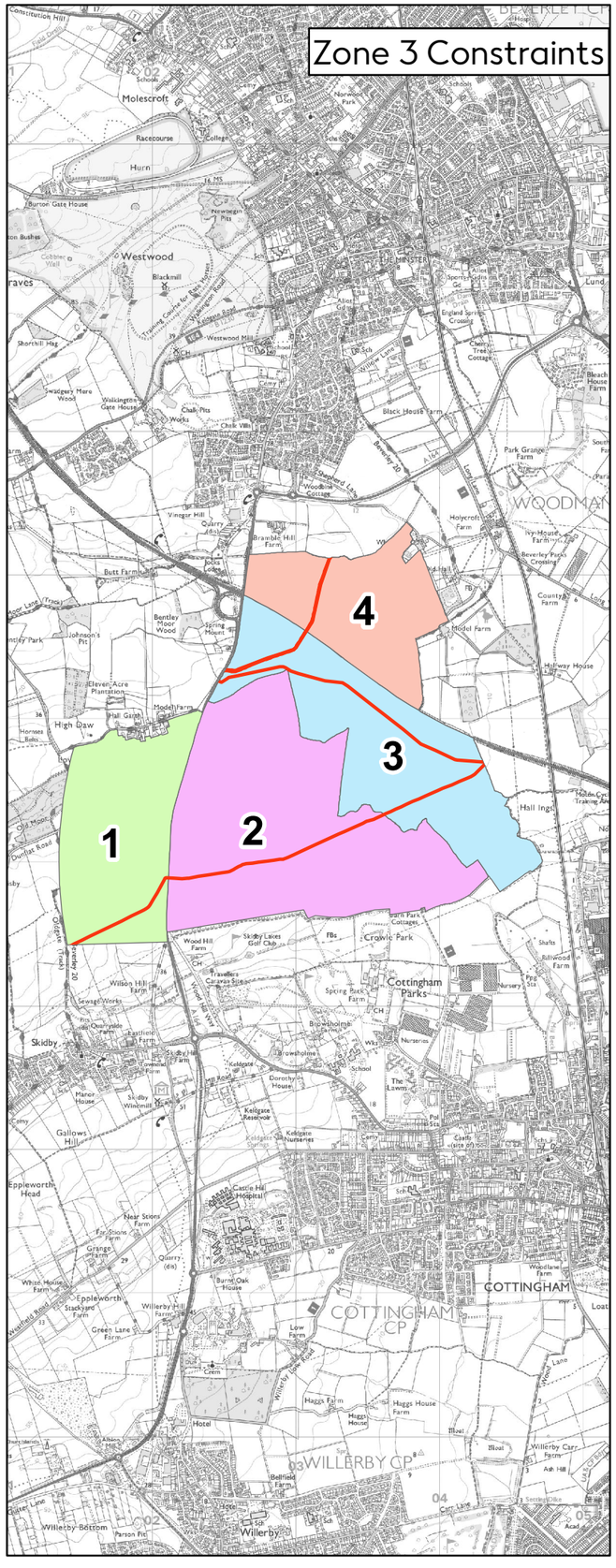
Table 4: RAG Criteria – Zones.

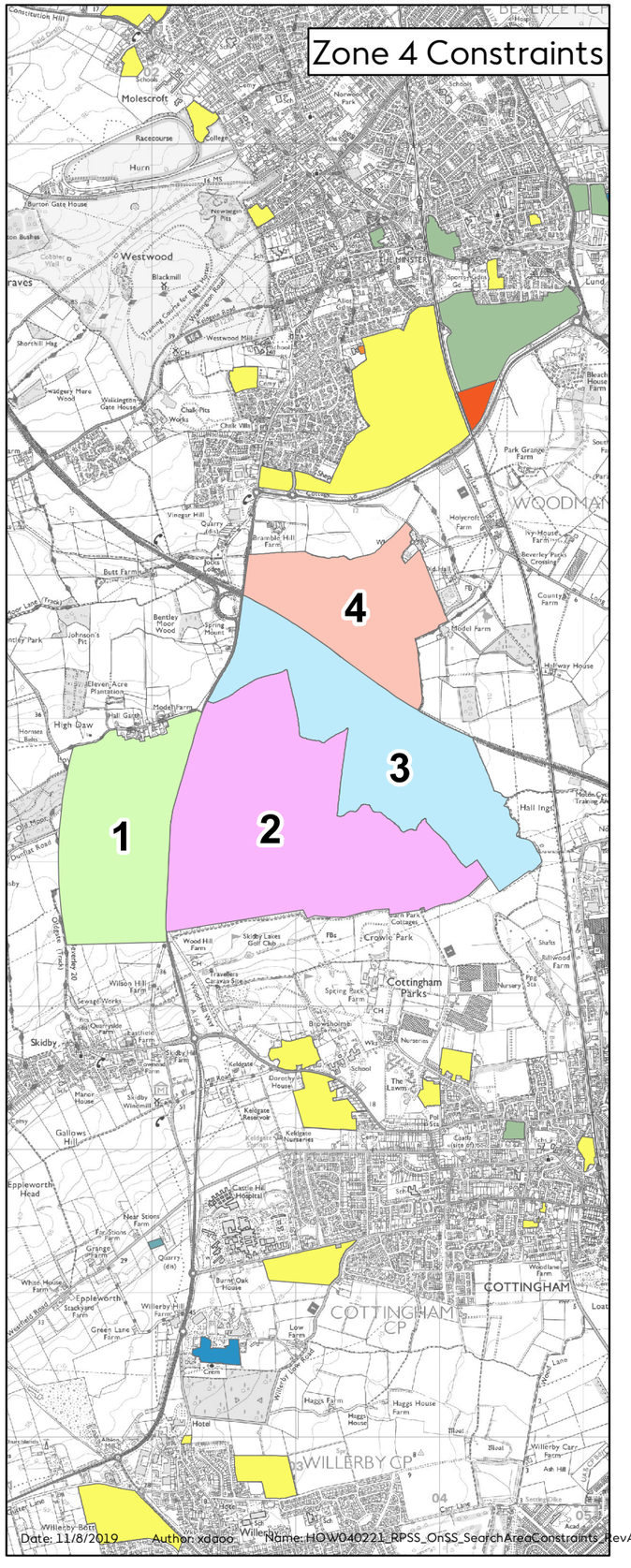
Criteria	Zone 1		Zone 2		Zone 3		Zone 4	
Planning policy and guidance: Red: Existing consented development or site allocations for future development within local policy that would significantly constrain development. Amber: N/A Green: No significant consented development or site allocations for future development that would impact development.	No significant consented development or designated sites within local planning policy.		No significant consented development or designated sites within local planning policy.		No significant consented development or designated sites within local planning policy.		Located within 500-600m of the southern boundary of Beverley, which is anticipated to be further developed to the south, as per local planning policy.	
Landscape and Visual: Red: Located within a landscape designation or a location that is highly visible from settlements in the locality Amber: Not located within a landscape character area, but highly visible from settlements in the locality Green: Not located within a landscape character area or highly visible from settlements in the locality	Set within the eastern extent of the regionally designated Yorkshire Wolds Important Landscape Area. Elevated position of the zone means development would be visible from parts of Beverley and the top of Beverley Minster. The site would also be in close proximity to the Risby Hall Registered Park and Garden.		Not located within a landscape character area or highly visible from settlements in the locality		Not located within a landscape character area or highly visible from settlements in the locality		Closest zone to Beverley with open views towards the site attainable from houses along the settlement edge. Views of development within the site are likely from the top of Beverley Minster.	
Residential: Red: 'Urban area' within 1km (settlement with >10,000 population)	Not located near an urban area.		Northern extent of Cottingham located within 1.5 km.		Not located near an urban area.		Located within 1km of Beverley.	

Table 4: RAG Criteria – Zones.

Criteria	Zone 1		Zone 2		Zone 3		Zone 4	
Amber: 'Urban area 1-1.5km distant (settlement of >10,000 population) Green: Urban area 1.5+km distant (settlement of >10,000 population)								
Biodiversity: Red: Large presence of internationally or nationally designated sites within zone Amber: Medium presence of internationally or nationally designated sites within zone Green: Low presence of internationally or nationally designated sites within zone	One priority habitat located within zone. This comprises a low presence within the zone.		Two areas of priority habitat and a large area of ancient woodland are present. This forms a medium presence within the zone.		One priority habitat located within the zone. This comprises a low presence within the zone.		No designated sites located within the zone.	
Utilities: Red: High pressure gas pipeline or overhead powerlines running through majority of zone leaving no sites of suitable size. Amber: High pressure gas pipeline or overhead powerline present within zone but sites of suitable size available with appropriate buffer Green: No high-pressure gas pipelines or overhead powerlines within zone	No high-pressure gas pipelines or overhead powerlines within zone		Overhead power lines running through zone leaving suitable sites.		High pressure gas pipeline runs through the entirety of zone, resulting in no available sites of an appropriate size.		No high-pressure gas pipelines or overhead powerlines within zone	
Conclusion	**Zone removed from further consideration due to potential impact on local landscape character.**		**Zone retained for further consideration.**		**Zone removed from further consideration due to high pressure gas pipeline.**		**Zone removed from further consideration due to proximity to urban area**	







Hornsea Four

Figure 6

Onshore Substation Search Area Constraints

Zone 1 Constraints

- Yorkshire Wolds Important Landscape Area

Value

- High : 60.48
- Low : 4.92

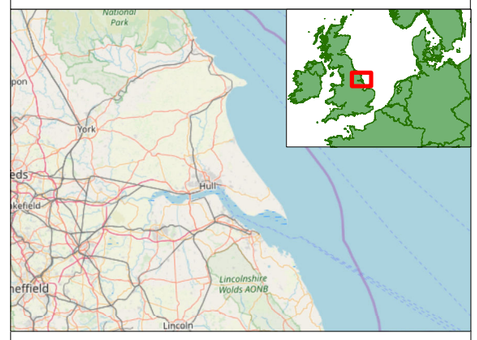
Zone 3 Constraints

- Gas Pipeline

Zone 4 Constraints

East Riding Local Plan Allocation

- Employment allocation
- Gypsy & Traveller Site allocation
- Mixed Use allocation
- Residential allocation
- School Extension allocation
- Transport allocation



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Scale@A3: 1:40,000

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0 0.25 0.5 1 Nautical Miles

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Onshore Substation Search Area Constraints
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OnSS Access Appraisal

2.2.2.13 Alongside the RAG appraisal, Hornsea Four explored OnSS access options. This was undertaken with feedback from the informal local information events, that expressed local concerns associated with construction traffic routing through Cottingham in addition to turning off the A164. A local transport consultancy, Local Transport Projects Ltd (LTP), was appointed to analyse five potential access and egress points, shown in **Figure 7**. LTP's appraisal aimed to establish whether suitable access and egress points existed within the surrounding highway network, and comprised:

- an assessment of the local highway network near the proposed accesses;
- an examination of construction vehicle routing options;
- Swept Path Analysis (SPA) of both construction routes and construction access junctions utilising the largest vehicle likely to be used to support construction activities;
- a Visibility Assessment of the existing access junctions on the A164; and
- a strengths, weaknesses, opportunities, threats (SWOT) analysis of the five access options.

2.2.2.14 The SWOT analysis identified that Access Option 4 (A1079, via the existing northbound layby) provides the most suitable option from those considered for providing construction access to both Zones 2 and 3. It is noted that this access selection facilitates sites within both zones (2 and 3) and was not a determining factor in site selection in subsequent stages.

2.2.2.15 The potential for interaction with the Jocks Lodge / A164 Highways Improvement Scheme was known at this time; however, the road improvement scheme was still in early stages of development with uncertainty regarding the scope of road improvement and timescales. It has been considered throughout the site selection process that an access off the A164 would experience a greater level of interaction with the road improvement scheme when compared to an access from the A1079.

Presentation of OnSS Zone and Access Appraisal to ERYC

2.2.2.16 The OnSS search area refinement methodology and access appraisal were presented and discussed at a meeting with ERYC planning and highways officers on Wednesday 21 November 2018.

2.2.2.17 During the meeting, it was agreed in principle (and based on available information) that Zone 2 was the preferred area to locate the OnSS. It was also agreed that Access Option 4 offered the best overall solution for construction access to Zone 2, through the utilisation of the existing northbound layby on the A1079 (further information is provided in Appendix 1 of **Volume B1.1 Consultation Report, Annex 1: Consultation Report Annex 1 Evidence Plan**). It was noted that there is precedent in taking this approach, with the southbound layby utilised for the construction of Dogger Bank Creyke Beck A and B substations. Concern was

raised by ERYC in respect of taking access from the A164 for OnSS traffic, which experiences high levels of traffic.

OnSS Working Group

2.2.2.18 A OnSS working group was held on 12 March 2019 with parish council representatives from Rowley, Skidby, Walkington, Cottingham and Woodmansey. The principles of the construction access and identification of Zones 2 and 3 were presented and discussed. Feedback from the working group indicated that Access Option 4 was supported and that the OnSS site should be located as close to the NGET substation at Creyke Beck as possible. A second working group was held on 21 May 2019, which confirmed the approach taken was appropriate, with attendees agreeing that Zone 2, as close to Creyke Beck NGET substation was the optimal solution (further information is provided in Appendix 1 of **Volume B1.1 Consultation Report, Annex 1: Consultation Report Annex 1 Evidence Plan**).

Hornsea Four

Figure 7

Onshore Substation Access

Option 1 - Construction and O/M

A164 Bentley utilising the existing farm access located immediately north of the A164/Copplefat Lane

Option 2 - Construction and O/M

A164 via access to the old road alignment some 200m south of the A164/Dunflat road junction

Option 3 - O/M Only

Via Dunswell Road and Park Lane adjacent to the Creyke Beck Electricity Substation located approximately 1 mile north of

Option 4 - Construction and O/M

A1079 via the existing northbound layby located 700m south-east of the A164/A1079, Jocks Lodge grade separated junction

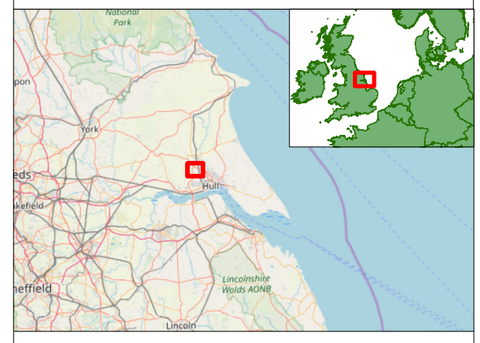
Option 5 - O/M Only

Via Long Lane and Park Lane utilising the existing A1079 overbridge located approximately 1-mile south-east of the A164/A1079, Jocks Lodge grade separated junction

Potential Access Location

Substation Search Area

- Zone 2
- Zone 3



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Scale@A3: 1:20,000

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0 0.125 0.25 0.5 Nautical Miles

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2.3 Site Selection

2.3.1.1 Once Zone 2 had been identified as the most suitable area for OnSS siting and a feasible access point had been established, the search area was suitably refined to enable a detailed site selection exercise. This section outlines the design assumptions and parameters used when conducting the search, the methodology for appraising potential sites once identified, and the results of the appraisal and subsequent selection of the preferred site identified within the ES.

2.3.2 Version 5 - Identification of Potential Sites

2.3.2.1 Following the initial constraints exercise, access appraisal, consultation with ERYC, OnSS working groups, and feedback from informal consultation events, Hornsea Four undertook an exercise to identify potential sites within Zone 2. The specific design principles used in identifying the potential site options are shown in **Table 5** (noting all are associated with the siting of the OnSS site itself, and not the required access road).

2.3.2.2 Two potential site options were identified within Zone 2, which had due consideration for the mandatory and preferred parameters where practical. These options are shown in **Figure 8**.

Table 5: OnSS Design Principals for site selection.

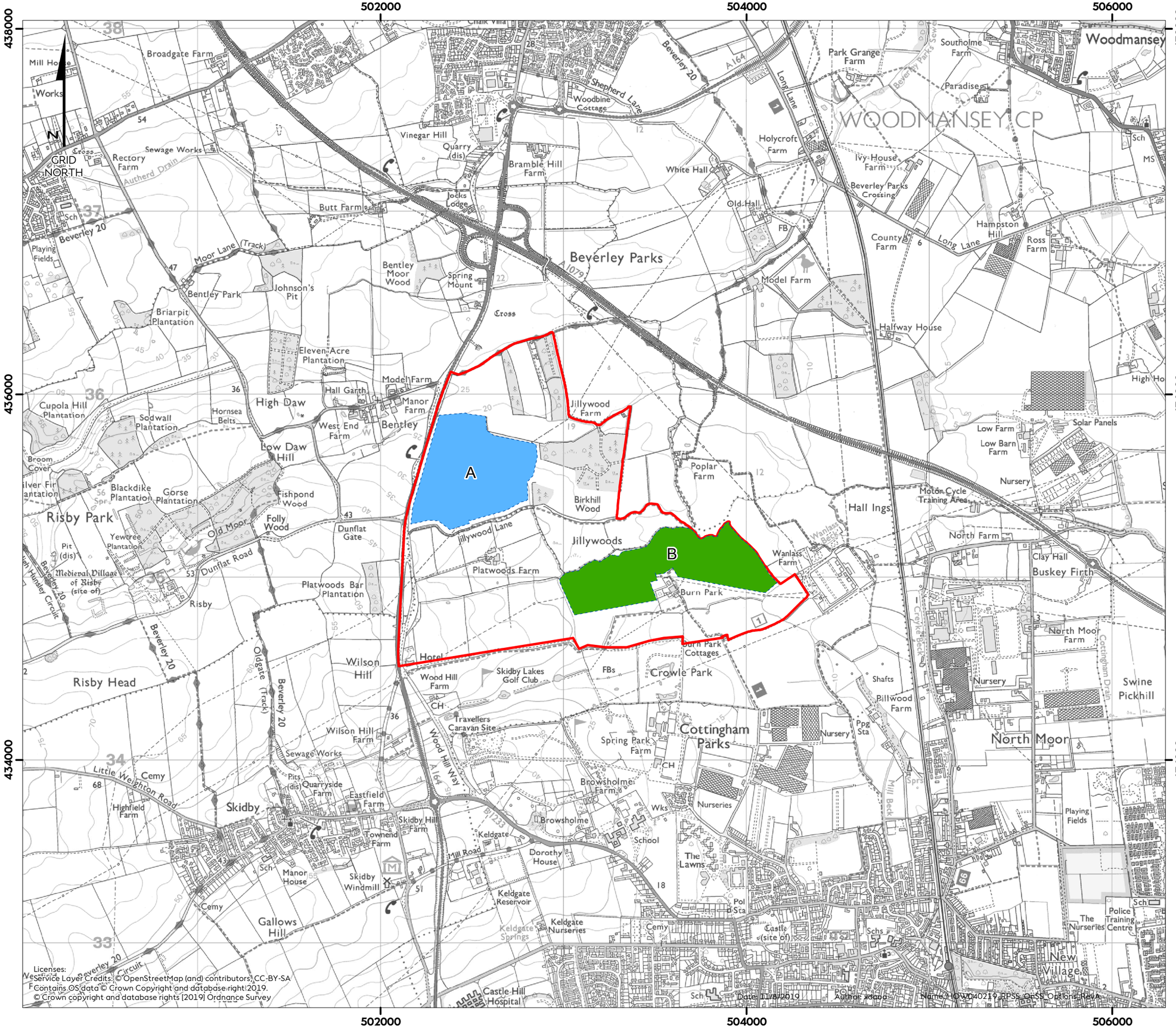
	OnSS site selection principle
Mandatory	Permanent land uptake of at least 155,000 m^2
	Temporary land uptake of 130,000 to support construction works
	Access from the A1079 during construction (noting access can be achieved throughout zone 2 from this access location)
Preferred	Use established field boundaries to establish site boundaries
	Avoid siting under 400kV overhead lines
	Locate as close to the NGET substation at Creyke Beck and other nearby industrial infrastructure as possible
	Use existing natural screening, where feasible
	Avoid nationally or international designated ecological receptors, where possible
	Avoid residential properties

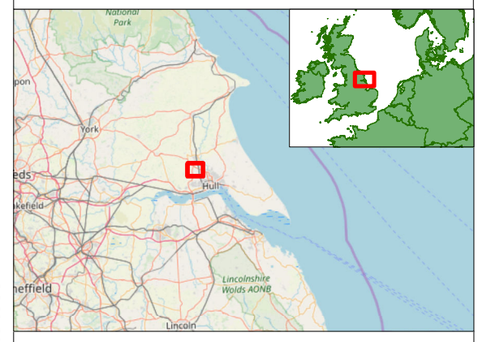
Hornsea Four

Figure 8

Onshore Substation Options

- Substation Search Area
- Onshore Substation Option A
- Onshore Substation Option B





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Ørsted

2.3.3 Aim and Methodology

2.3.3.1 The two identified sites within Zone 2 were rated against a Black, Red, Amber and Green (BRAG) criteria, which has been applied based on a qualitative assessment and expert judgement. The ranking is defined in Table 6:

Table 6: OnSS BRAG Rating.

Rating	Summary
Black	Potential showstopper to development
Red	High potential to constrain development
Amber	Intermediate potential to constrain development
Green	Low potential to constrain development

2.3.3.2 Black and red constraints are critical in determining features that should be avoided wherever possible to avoid consenting risk, reduce EIA complexity and reduce the cost of mitigation. Amber and green constraints are those that may be more readily minimised or managed by employing appropriate mitigation measures. The BRAG criteria was developed by the Applicant based on experience, with the definitions applied to black, red, amber and green applied consistently for both offshore and onshore infrastructure.

2.3.3.3 The BRAG criteria identified key technical, consenting and commercial constraints based on available information. These are outlined below:

2.3.4 Version 6 - BRAG Appraisal Results

2.3.4.1 The BRAG appraisal for both potential sites is presented in Table 7. Key constraints identified of relevance are presented in Figure 9. The following criteria was considered during the BRAG appraisal but omitted from the final version presented in this annex due to a tied score and no differentiation between the two sites:

- **Geotechnical conditions** – no intrusive investigations have been undertaken to inform site selection;
- **Prior land use** – Both sites have a similar recent history of agricultural use;
- **Land owners** – Both sites are under the ownership of the same land owner;
- **Construction access** – Both sites would utilise the same access from the A1079 during construction and would require a similar junction and access road;
- **Operational access** – Both sites have similar operational access options;
- **Surrounding utilities** – Both sites contain small-scale overhead lines, neither are disrupted by larger utilities;
- **Flood risk** – Majority of both sites is within Flood Zone 1, with a small percentage of both within Flood Zone 3 (2.3% of site A and 1% of site B); and
- **Cultural heritage** – no known receptors (Listed Building, HER / Scheduled Monument, Registered Park and Garden, World Heritage Site) are located within 500m of either site.

Table 7: OnSS Site Selection BRAG Appraisal.

Criteria	Site A		Site B	
Technical				
Variation in topography **Black**: Level variations of the site of 15m+ (between highest and lowest points) which would significantly affect the inter-link between electrical HV- equipment. **Red**: Level variations of the site of 10-15m that requires significant earth movements and three+ level platforms to facilitate interlink between electrical HV-equipment. **Amber**: Level variations of the site of up to 10m that requires minor earth movements and two-level platforms to facilitate interlink between electrical HV-equipment. **Green**: Level variations (0-1m) of the site that requires minor earth movements and /or one level platform	Topographic variation within the site is 10-15m. Overall site slope is less than 2 degrees. Significant earthworks and potential for retaining walls.		Topographic variation within the site is up to 10m. Site slope is less than 1 degree. Medium earthworks required.	
Spoil generation **Black**: N/A **Red**: 40,000 m^3+ of spoil to be produced with significant removal off-site and associated vehicle movements. **Amber**: 20,000-40,000 m^3 of spoil produced due to earthworks with minimal to be removed off-site. **Green**: 0-20,000 m^3 of spoil produced due to earthworks with the potential for the majority to be retained on-site.	Estimated 60,000-70,000 m^3 of earthworks required - either moved, graded, taken from site. This will result in high levels of traffic movements.		Estimated 30,000 m^3 of earthworks required - either moved, graded, taken from site. This will result in low levels of traffic movements.	
Environmental / Consenting				
Nature conservation **Black**: Located on Internationally or nationally protected sites (SPA/SAC/SCI, RAMSARs, Priority Habitats, BAP habitats, SSSI Units (dependent upon condition), National Parks, Ancient woodland)	Located within 20-250 m of ancient woodland and 150m of priority habitat.		250m+ of Ancient Woodland and Priority Habitat woodland.	

Criteria	Site A		Site B	
Red: Within 0-20m of Internationally or nationally protected sites (listed within the 'Black' criteria) **Amber**: Within 20-250m of Internationally or nationally protected sites (listed within the 'Black' criteria) **Green**: Located 250+m from Internationally or nationally protected sites (listed within the 'Black' criteria)				
Proximity to residential receptors **Black**: Neighbouring or abutting (0-50m) residential properties **Red**: Residential properties within close proximity (50-200m) **Amber**: Residential properties within proximity (200-500m) **Green**: Closest Residential properties 500m+ distant	Nearest residential property located within 200-500m.		Nearest residential property within 50-200 m.	
Proximity to residential settlement **Black**: Hamlet or village located within 200m **Red**: Hamlet or village located within 200-500m **Amber**: Hamlet or village located within 500m-750m **Green**: Closest hamlet village located 750m+ distant	Bentley is located within 200-500m		No hamlets or villages located within 750m	
Association with existing built development **Black**: N/A **Red**: No similar industrial development in the surrounding area **Amber**: Limited industrial development (considered to be limited in number and not characteristic of the immediate surrounding area) **Green**: Industrial development (considered to be generally characteristic of the immediate surrounding area)	No existing industrial infrastructure nearby.		Existing industrial infrastructure characterises the area to the east and south-east of the site. This includes Creyke Beck substation and a gas fired energy reserve facility. 400kV overhead lines cross parallel to the site.	
Landscape and visual **Black**: High potential for significant effects on designated landscapes, landscape character, visual effects on settlement clusters (including views to and from Beverley Minster), with no potential for mitigation. **Red**: High potential for significant effects on designated landscapes, landscape character, visual effects on settlement clusters (including views to and from Beverley Minster), with limited potential for mitigation.	Within 250m of The Yorkshire Wolds Important Landscape Area (ILA) local landscape designation. Located in a relatively intact landscape of gently undulating arable fields, lying adjacent to Brinkhill Wood and a small copse of		Over 1km to the east of The Yorkshire Wolds ILA. and partially screened by intervening hedgerows and tree belts. Located within a relatively degraded landscape of large flat arable fields delineated with hedgerows. Large electricity pylons crossing agricultural land and	

Criteria	Site A		Site B	
Amber: Medium potential for significant effects on designated landscapes, landscape character, visual effects on settlement clusters (including views to and from Beverley Minster), with potential for mitigation. **Green**: low potential for significant effects on designated landscapes, landscape character, visual effects on settlement clusters (including views to and from Beverley Minster).	matures trees designated as ancient woodland. Nearby woodland will act as an effective visual screen to the development in most views from Beverley, but views towards the site are attainable from the southern edge of a housing estate located along Broadgate. Mature woodland will screen lower-lying infrastructure from Cottingham. Views are also attainable from the small hamlet of Bentley.		terminating at the large Creyke Beck Substation substantially detracts from the rural character of the local landscape. Largely screened from the edge of Beverley by intervening blocks of mature woodland. These also screen views of the site from Beverley Minster. Views towards the site from the settlement edge of Cottingham are screened by intervening large green houses, plant nurseries and the existing Creyke Beck Substation.	
Noise and vibration **Black**: High potential for significant effects with no potential for mitigation. **Red**: High potential for significant effects with limited potential for mitigation. **Amber**: Medium potential for significant effects with large potential for mitigation. **Green:** Low potential for significant effects.	Noise sensitive receptors, including the hamlet of Bentley, are located within 200-500m of the site.		Noise sensitive receptors (individual residential properties) are located within 50-200m of the site.	
Amenity and recreation **Black**: N/A **Red**: Located on public sports and recreation facilities, public right of way (PRoW) network, National cycle network **Amber**: Located within 0-50 m of public sports and recreation facilities, PRoW network, National cycle network **Green**: Located within 50 m+ from public sports and recreation facilities, PRoW network, National cycle network	PROW located immediately adjacent to the south of the site.		PRoW goes through the site.	

Hornsea Four

Figure 9

Onshore Substation Options Constraints

502000

504000

436000

434000

N

GRID NORTH

A

B

Substation Search Area

Substation Search Area 1km Buffer

Onshore Substation Option A

Onshore Substation Option B

Constraints

Creyke Beck NGET Substation

Listed Building

Public Right of Way

Gas Pipeline

Ancient Woodland

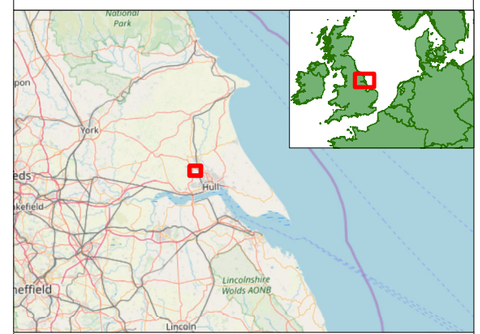
Local Nature Reserve

Priority Habitat

Local Wildlife Site

Flood Zone 2

Residential Receptor



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2.3.5 OnSS Site Selection Conclusions

2.3.5.1 The process of OnSS site selection, which began with the identification of the initial search area, with multiple phases of refinement, inclusive of community feedback, a high-level RAG appraisal of zones, access appraisal, and a detail BRAG appraisal of specific potential sites, has culminated in the identification of the preferred site to locate the Hornsea Four OnSS, which is **Site B** located within Zone 2. The refinement process is summarised in **Figure 10**. This option is preferred due to:

- Lower variation in topography, resulting in a reduction in potential spoil due to ground works;
- Greater distance from ecological designations;
- Natural screening to the north from intervening blocks of mature woodland, which screen the site from Beverley Minster. Other existing screening minimises views from other urban settlements;
- Fewer existing overhead lines running through site;
- Proximity to existing industrial infrastructure;
- Reduced length of 400 kV ECC;
- Greater proximity to settlements and lower density of residential receptors in the surrounding area; and
- Support from the OnSS Working Group comprised of parish council representatives.

2.3.5.2 Risks associated with the preferred option include:

- Proximity of nearest residential receptor and associated effects during construction and operation; and
- Requirement to divert existing PRoW running through the site.

Hornsea Four

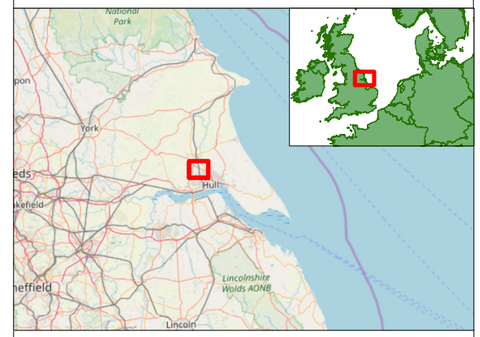
Figure 10

Onshore Substation Site Selection

- Substation Search Area Version 1
- Version 1 Dropped Areas
- Substation Search Area Version 2
- Version 2 Dropped Areas
- Substation Search Area Version 3
- Substation Search Area Version 3
- Version 3 Dropped Areas

Substation Search Area Version 4

- Zone 1
- Zone 3
- Zone 4
- Substation Search Area Version 5
- Onshore Substation Option A
- Onshore Substation Option B



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Scale@A3: 1:25,000

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2.4 OnSS Refinement – PEIR to ES

2.4.1.1 The formal consultation period for Hornsea Four (13 August 2019 to 23 September 2019, further details provided in **Volume B1.1: Consultation Report**) provided the opportunity for statutory stakeholders, landowners, nearby residents and members of the public to comment on the site selected for the OnSS. Notable comments received are summarised in **Table 8**, with a description of the resulting amendment, if required.

Table 8: OnSS Formal Consultation

Formal Consultation Response	Hornsea Four Amendment
Numerous members of the public, including nearby residents, requested that the permanent access to the OnSS is removed from the south of the site.	The permanent OnSS access road identified at PEIR has been removed from the south of the site. As such, the access identified for construction use from the A1079 will be retained throughout the lifetime of Hornsea Four.
Natural England requested that the OnSS construction access road should be located further away from Birkhill Wood, which is designated Ancient Woodland.	The OnSS access road has been moved to the east by approximately 15m (as shown in **Figure 11**) to be located outside of the Red BRAG criteria associated with Birkhill Wood ancient woodland (identified in **Table 9**). The amended route allows for the impacted agricultural land to be farmed, by avoiding severing a small area land.
Nearby residents requested that the temporary works area was amended to be located further from their property.	The temporary works area has been modified (as shown in **Figure 11**) to be located a minimum of 150 m to the north and 250m west from the nearest residential property. It was determined that no suitable location for the temporary works area is identifiable further to the north of the Order Limits due to technical requirements, a high pressure gas pipeline, and additional sensitive receptors.

2.4.1.2 Changes were also influenced by the OnSS working group drop-in session undertaken on 24 September 2019, and the Onshore Local Interest Group on 26 November 2019 (further information is provided in Appendix 1 of **Volume B1.1: Consultation Report, Annex 1 Evidence Plan**). These sessions also influenced the specific design aspects outlined in **Volume F2, Chapter 13: Outline Design Plan**, which are not covered in this report.

2.4.1.3 In response to consultation with ERYC and nearby residents, the location of the OnSS access off the A1079 was moved, upon receipt of detailed design information for the A164 / Jocks Lodge Highways Improvement scheme. The change moved the access point to the south-east and extended the existing layby, as per recommendations made by ERYC. This changed removed direct overlap / interaction between the two projects (**Figure 11**).

2.4.1.4 The Applicant has been in regular discussions with the landowner of the OnSS site (and surrounding land) since the identification on the preferred site for the OnSS. The landowner informed the Applicant of its intention to develop land near to the OnSS / OnSS temporary works area and onshore ECC as a solar park. The Applicant considers that the solar park and

the onshore ECC can co-exist and this proposal has not therefore impacted the principles of the site selection or refinement of the onshore ECC approach to the OnSS. Discussions with the landowner regarding cooperation / colocation between the two development projects during construction and operation are ongoing.

2.4.1.5 In addition to the amendments made to Hornsea Four in response to stakeholder feedback, the following OnSS amendments have also occurred between PEIR and ES (as shown in **Figure 11**):

- **A1079 Access Junction** – To account for swept path analysis and high-level design options (accounting for required bunding to facilitate the change in topography and PRoW diversion), the width of the junction has been increased and reflected in the Order Limits.
- **Permanent OnSS site** – In a continued effort to maximise the design quality of the OnSS, the permanent site has been divided into the following areas:
  - 130,000m^2 permanent infrastructure (inclusive of internal access roads and site fencing) (Works Number 7, **Volume D1, Annex 4.2: Works Plan - Onshore**);
  - 27,909.1 m^2 additional landscape mitigation within the south and west of the site (Works Number 7(f), **Volume D1, Annex 4.2: Works Plan – Onshore**);
  - 1,897.8 m^2 existing landscaping within the north of the site, to be retained (Works Number 7(f), **Volume D1, Annex 4.2: Works Plan – Onshore**); and
  - 4,000 m^2 attenuation area in the south-east, to allow for a natural sustainable drainage feature (Works Number 7(e), **Volume D1, Annex 4.2: Works Plan – Onshore**).

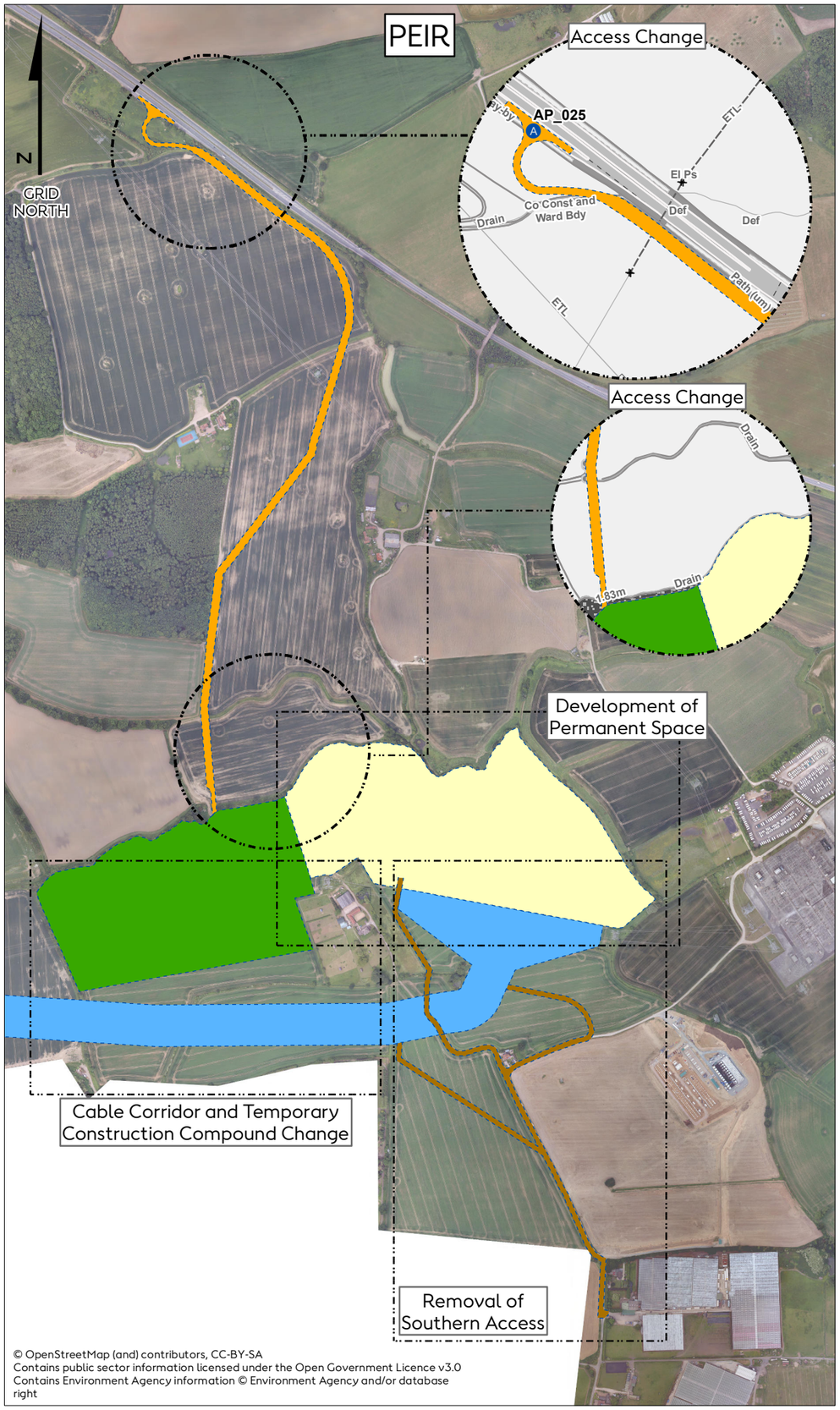
2.4.1.6 It is noted that the total area within the Order Limits for the OnSS is therefore 163,806.9 m^2, larger than the initial search criteria of 155,000 m^2 (noting that all areas are within the redline boundary submitted for the PEIR). When considering the areas of existing landscaping identified, and the significant area identified for additional landscaping and natural attenuation, the increase in area is necessary to mitigate the impacts of the OnSS and beneficial. Opportunities to enhance the area surrounding the OnSS are identified in **Volume A4, Annex 4.6: Outline Design Vision Statement**.

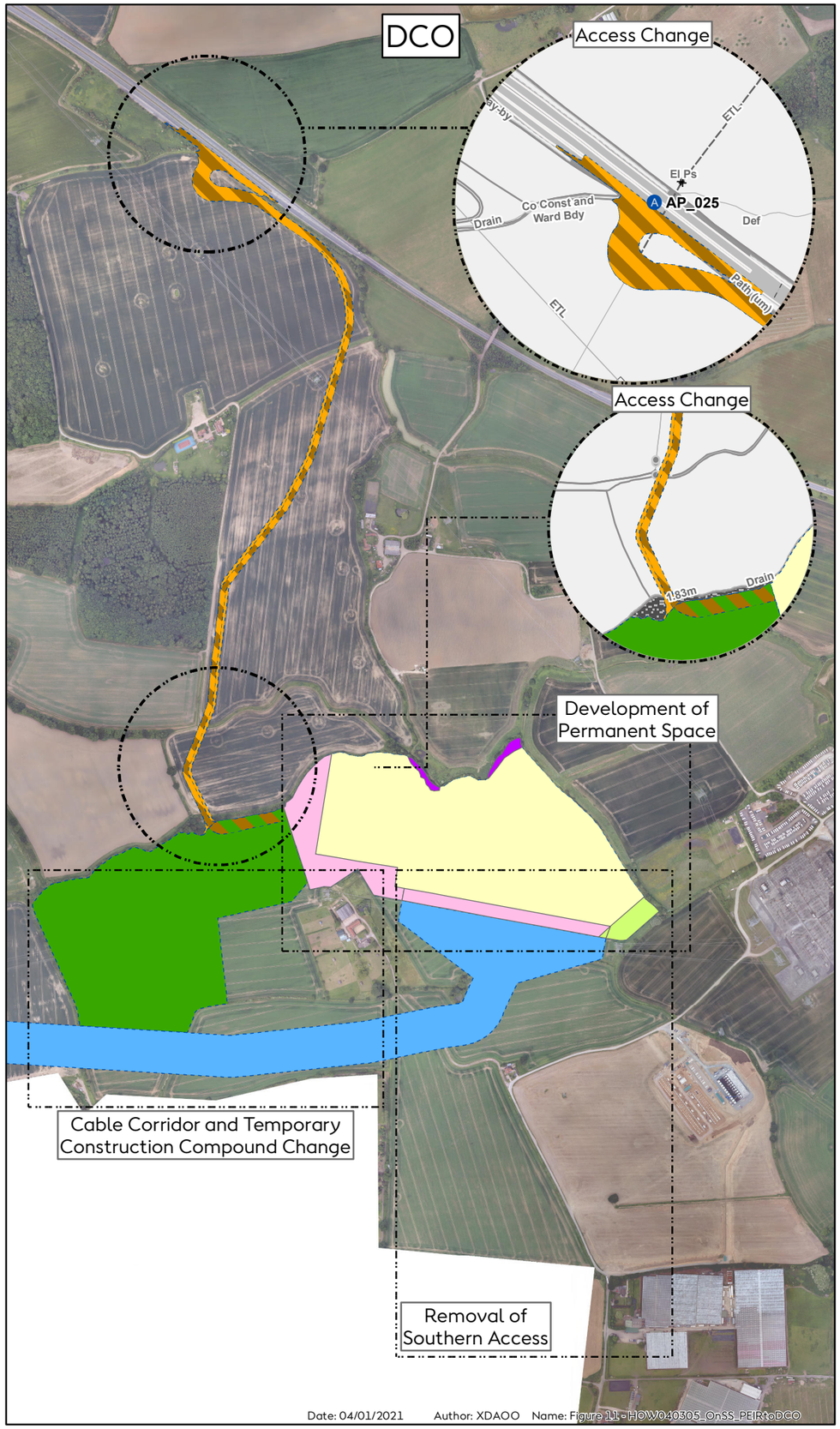
Hornsea Four

Figure 11

Onshore Substation

PEIR to DCO Design Evolution



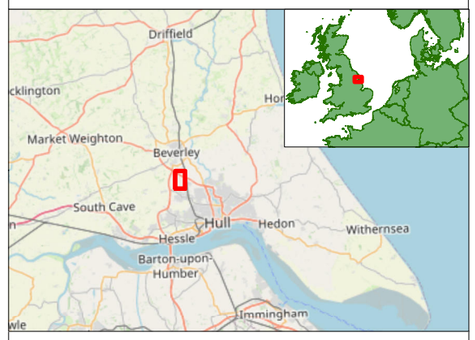


Date: 04/01/2021 Author: XDAOO Name: Figure 11 - HOW040305_OnSS_PEIRtoDCO

- Onshore Export Cable Corridor
- Onshore Substation (Permanent Space)
- Onshore Substation (Temporary Works)
- Temporary and Permanent Access Tracks
- Temporary Access Works and PRoW Diversion Works
- Temporary Access Track

Substation Mitigation & Attenuation

- Attenuation Area
- Existing Landscaping
- Landscape Mitigation Area
- Substation Permanent Space



Coordinate system: British National Grid

Scale@A3: 1:10,000

0 125 250 500 Meters

0 500 1,000 2,000 Feet

REV	REMARK	DATE
	First issue for DCO	04/01/2021

Onshore Substation PEIR to DCO Design Evolution
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3 Initial Selection of Onshore Export Cable Corridor (ECC) Study Area

3.1 Background

3.1.1.1 The onshore ECC will house the onshore export cables connecting the location where the offshore export cables make landfall to the OnSS. The location of the onshore ECC is therefore influenced by the landfall (**Volume A4, Annex 3.1: Selection and Refinement of the Cable Landfall**) and OnSS site selection (**Section 2**).

3.1.1.2 During construction trenching will generally take place in sections of approximately between 750 and 3 000 m at a time, each requiring access. Jointing bays will be used to connect successive sections of the cable. The location of the link boxes will only be finalised during the construction phase of the project once the onshore ECC is being installed. For further details on the activities to **Volume A1, Chapter 4: Project Description**.

3.2 Version 1 – Developing route options

3.2.1.1 The location of the initial onshore ECC route options was driven by the prospective landfall zones (**Volume A4, Annex 3.1**) and OnSS search area (**Section 2.2**). Using a comparative BRAG assessment, the original 23 landfall zones were reduced to 7 landfall zones, situated within the original landfall zones A and B (**Volume A4, Annex 3.1**).

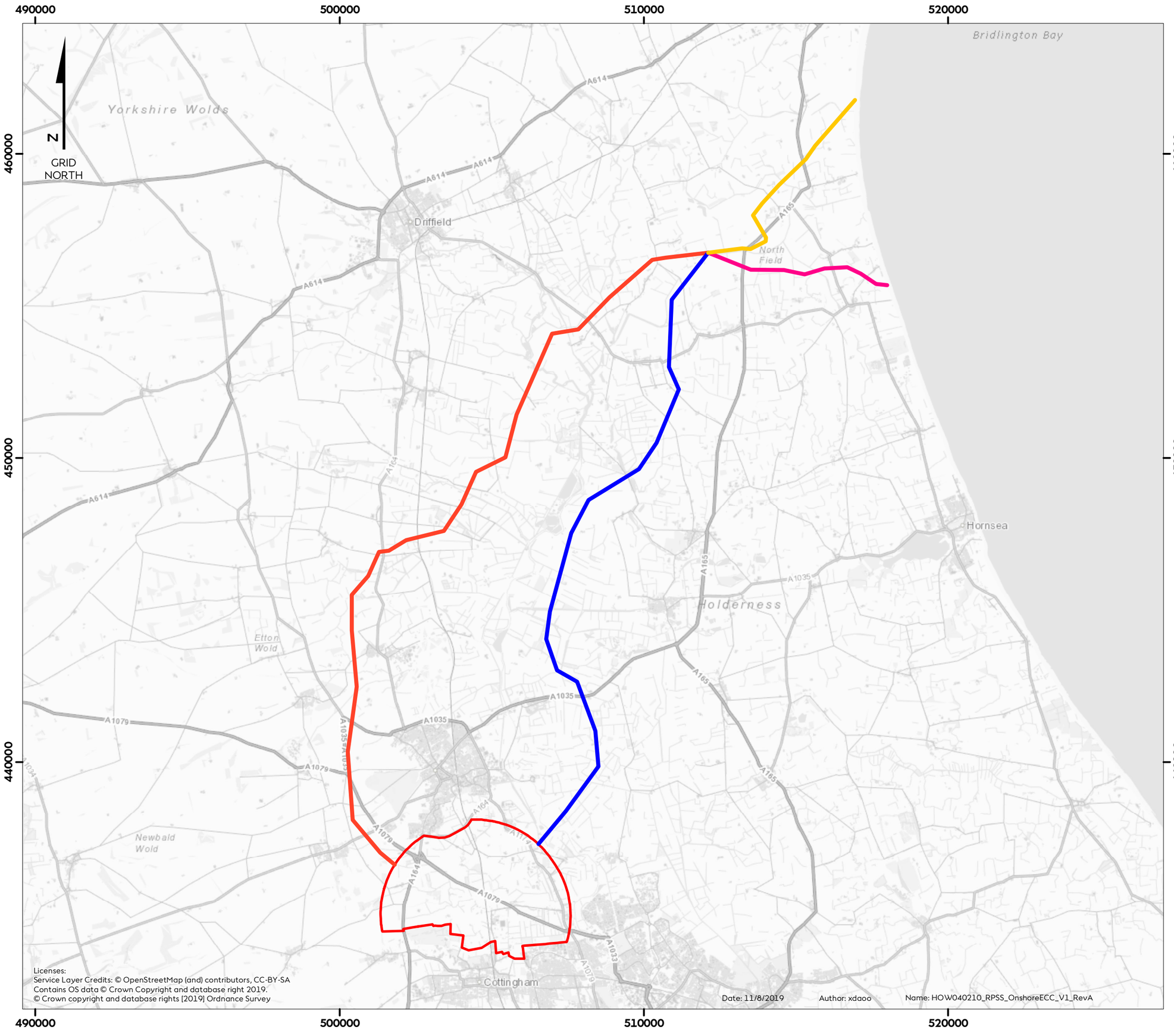
3.2.1.2 Two onshore ECC routes were drawn from landfall zones A and B (**Volume A4, Annex 3.1**) to OnSS search area Version 2 (**Figure 3**). The first onshore ECC route was drawn from the middle of landfall B2 (onshore ECC B1), in zone B before routing east of Beverley (onshore ECC B2), as the expedient route option (**Figure 12**). Landfall zone B2 was the preferred option as it was understood that the Dogger Bank Creyke Beck cable would be making landfall somewhere in a 2km wide area in the region of landfall zone B1. Further detail on the exact location of the Dogger Bank Creyke Beck landfall was not known.

3.2.1.3 The second onshore ECC option started at the middle of landfall zone A (onshore ECC A1) and routed west of Beverley (onshore ECC A2) providing an alternative option around Beverley (**Figure 12**).

Hornsea Four

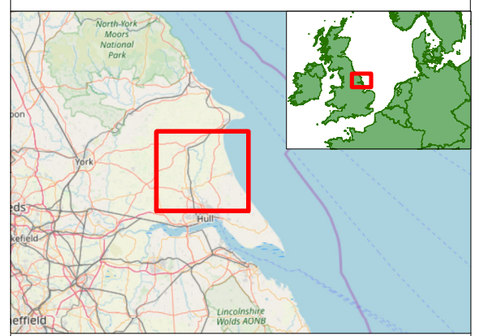
Figure 12

Onshore Export Cable Corridor Version 1



Onshore Export Cable Version 1

- Option A1
- Option A2
- Option B1
- Option B2
- Substation Search Area Version 2



Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1.25 2.5 5 Kilometres

0 0.5 1 2 Nautical Miles

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Date: 11/8/2019 Author: xdaoo Name: HOW040210_RPSS_OnshoreECC_V1_RevA

3.2.1.4 The initial onshore ECC options (**Figure 12**) were routed at a low resolution around the east and west of Beverley using Ordnance Survey Open Data base mapping and the constraints data available at the time. These data sets included:

- Ancient woodland;
- RSPB Important Bird Areas;
- Special Areas of Conservation (SACs);
- Special Protection Areas (SPAs);
- Sites of Special Scientific Interest (SSSIs);
- Country Parks;
- National Parks;
- Authorised and Historic Landfill sites;
- Environment Agency (EA) Main Rivers;
- Flood Zone 1, 2 and 3 areas;
- Local Nature Reserves;
- Priority Habitats;
- Ramsar sites;
- Registered common land (CROW Act);
- National Grid gas pipelines, underground cables and substations;
- (Humber) Historic Environment Record (HER) Listed buildings;
- Scheduled monuments;
- Registered parks and gardens; and
- Registered battlefields.

3.2.1.5 The centre line of both onshore ECCs was routed with the following guiding principles:

- Routed through open agricultural land where possible to avoid towns, villages, residential areas and buildings;
- Shortest possible connection between the start and end points would be preferable where no other constraints were apparent; and
- Major existing infrastructure (i.e. roads and National Grid infrastructure) would be crossed perpendicular to the existing infrastructure, as the optimal approach angle for HDD crossings.

3.2.1.6 Using these routing principles, the centreline of both onshore ECC options were diverted around the various constraints. The 'Change Points' shown in **Figure 13** show the locations at which the onshore ECC options were diverted around constraints.

Hornsea Four

Figure 13

Onshore Export Cable Corridor Version 1 Constraints

490000 500000 510000 520000

460000 450000 440000

Yorkshire Wolds

Bridlington Bay

Driffield

Hornsea

Holderness

Newbald Wold

Etton Wold

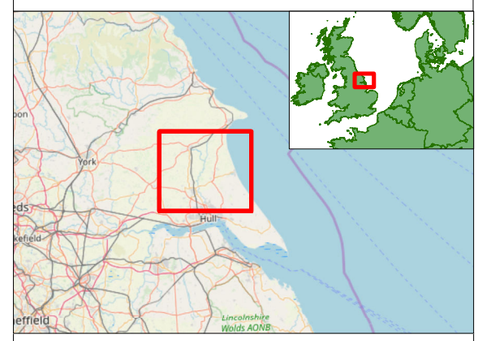
North Field

A614 A1035 A1079 A165

N

GRID NORTH

Onshore Export Cable Version 1
- Option A1
- Option A2
- Option B1
- Option B2
- Substation Search Area Version 2
- Landfall Zone A
- Landfall Zone B
- Gas Pipeline
- Listed Building
- Overhead Line
- Ancient Woodland
- Authorised Landfill Site
- Country Park
- CRoW Access Land
- Historic Landfill
- RSPB Important Bird Areas
- Local Nature Reserve
- Priority Habitat
- Registered Park and Garden
- Scheduled Monument
- Site of Special Scientific Interest
- Change Point



Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1 2 4 Kilometres

0 0.5 1 2 Nautical Miles

REV	REMARK	DATE
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Onshore Export Cable Corridor Version 1 Constraints
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Date: 17/02/2020 Author: xdaoo Name: Figure 13 - HOW040211_RPSS_OnshoreECC_V1_Constraints_RevA

3.3 Version 2 – Choosing one route option

3.3.1.1 Once two onshore ECC options had been established, a single preferred option was required to take forward for inclusion in the DCO Application.

3.3.2 Methodology

3.3.2.1 To choose a single onshore ECC option a BRAG appraisal was undertaken and applied to a 2000m buffer applied to both onshore export cable corridors. The ranking is defined in **Table 9** and the constraints are ranked in **Table 10**. The BRAG criteria was developed by the Applicant based on experience, with the definitions applied to black, red, amber and green applied consistently for both offshore and onshore infrastructure.

Table 9: Onshore ECC Version 2 BRAG criteria.

Rating	Summary
Black	Potential showstopper to development
Red	High potential to constrain development
Amber	Intermediate potential to constrain development
Green	Low potential to constrain development

Table 10: Onshore ECC used for Version 2.

Type of constraint	Category	Black	Red	Amber	Green
Environmental/ Consenting	Nature Conservation	Route centreline directly intersecting: SSSI Units Ancient woodland National Parks SPAs/ SACs Ramsar sites Country Parks For the following sites there are not considered to be any show stopping constraints to development: UK BAP Priority Habitats (Natural England) Woodland pasture Locally designated sites e.g. Local Wildlife Sites	Route centreline within 0 - 100m of: SPAs /SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks Or directly intersecting: UK BAP Priority Habitats Woodland pasture Locally designated sites e.g. Local Wildlife Sites	Route centreline within 100m - 500m of: SPAs /SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks Or between 0 - 100m of: UK BAP Priority Habitats Woodland pasture Locally designated sites e.g. Local Wildlife Sites	Route centreline more than 500m from: SPAs /SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks Or more than 100m from: UK BAP Priority Habitats Woodland pasture Locally designated sites e.g. Local Wildlife Sites
	Surface Water and Flood Zones	There are no flood zone constraints considered to be showstoppers to development	Route centreline intersecting a Flood Zone 3 area	Route centreline intersecting a Flood Zone 2 area	Route centreline intersecting a Flood Zone 1 area
	Other infrastructure and development	Route centreline directly intersecting: Any land allocated for development in the ERYC Local Plan; Any area of Historic Landfill; Any area of Authorised Landfill	Route centreline within 0m - 100m of: Any relevant land allocated for development in the ERYC Local Plan; Any area of Historic Landfill; Any area of Authorised Landfill	Route centreline within 100m - 200m of: Any relevant land allocated for development in the ERYC Local Plan; Any area of Historic Landfill; Any area of Authorised Landfill	Route centreline more than 200m from: Any relevant land allocated for development in the ERYC Local Plan; Any area of Historic Landfill; Any area of Authorised Landfill
	Proximity to sensitive stakeholders	Route centreline directly intersecting: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)	Route centreline within 0m – 100m of: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)	Route centreline within 100m - 200m of: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)	Route centreline more than 200m from: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)
	Residential receptors	Route corridor within 0m – 50m of any residential receptor	Route corridor within 50m - 100m of any residential receptor	Route corridor within 100m - 150m of any residential receptor	Route corridor more than 150m from any residential receptor

Type of constraint	Category	Black	Red	Amber	Green
	Cultural heritage	Route centreline directly intersecting: Listed Buildings; Scheduled Monuments boundaries; Registered parks and gardens; Registered battlefields	Route centreline within 0m - 50m of: Listed Buildings; Scheduled Monuments boundaries; Registered parks and gardens; Registered battlefields	Route centreline within 50m - 200m of: Listed Buildings; Scheduled Monuments boundaries; Registered parks and gardens; Registered battlefields	Route centreline 200m+ from: Listed Buildings; Scheduled Monuments boundaries; Registered parks and gardens; Registered battlefields

3.4 Comparative appraisal

3.4.1.1 A BRAG assessment and comparative appraisal was undertaken based on the BRAG constraints in **Table 10** which listed all constraints within the 2000 m buffer around onshore ECC options A1 and B1. The comparative appraisal for the landfall sections (A1 and B1) showed no significant difference. As a result, it became clear that the exact location of the onshore ECC option in the vicinity of A1 or B1 would be driven by the preferred landfall site (**Volume A4, Annex 3.1**).

3.4.1.2 A similar comparative appraisal was also carried out on the 2000 m buffer area applied to A2 and B2 (**Table 11**).

Table 11: Onshore ECC A2 and B2 Comparative appraisal.

Type of Constraint	Category	Onshore ECC A2		Onshore ECC B2	
Environmental and Consenting	Nature Conservation	Local Wildlife Sites: • Gembling Common; • Old Howe House; • Skerne Wetlands (Yorkshire Wildlife Trust Site); • Barff Hill Causeway; • Lockington (candidate); • Bealey's Beck, Lockington (candidate); • Bealey's Lane; • Old Lane, Leconfield; • Leconfield Castle; • Raventhorpe Embankment; • Lambfold Wood (historic); • Killingwold Graves Plantation; • Newbald Road; • Beverley Westwood; • Beverley Barracks; • A164 Bypass; • Moor Lane; and • Risby Corner; Priority habitats: • x 1 semi-improved grassland; • x 16 deciduous woodlands; • x 3 coastal and floodplain grazing marsh; • x 6 traditional orchards; and • x1 reeds bed Ancient Woodland and Priority habitat: • x 1 deciduous woodland		Local Wildlife Site: • Old Howe House; and • Long Lane, Dunswell Priority Habitat: • x 2 traditional orchards • x 9 coastal and floodplain grazing marsh; and • x 1 deciduous woodland SSSI, Local Wildlife Site and Priority Habitat: • Tophill Low SSSI and Priority Habitat: • Leven Canal	

Type of Constraint	Category	Onshore ECC A2		Onshore ECC B2	
		Ancient woodland, SSSI, Local Wildlife Site and woodland pasture: • Burton Bushes Ancient woodland, Local Wildlife Site and Priority Habitat: • Bentley Moor Wood Local Wildlife site and Priority Habitat: • Acre Plantation (deciduous woodland); • Swadgery Mere Wood (deciduous woodland); • Shorthill Hag (deciduous woodland); • Cranswick Common (deciduous woodland); and • Fox Covert (deciduous woodland). SSSI: • River Hull Headwaters			
	Surface Water and Flood Zones	The length of onshore ECC centreline that crosses Flood zone 2 and 3: Approximately 8km.		The length of onshore ECC centreline that crosses Flood zone 2 and 3: Approximately 15km	
	Other infrastructure and development	Historic landfills: • Land off Cruckley Lane; • Cosalt Quarry landfill site; and • West End Farm		Historic landfills: • Top Hill Low • Woodmansey Grange sites A-D	
	Proximity to sensitive stakeholders	None		None	
	Residential receptors	Residential receptors include: • Foston on the Wolds (village); • Carr House Farm;		Residential receptors include: • Northpasture Farm; • Carr House;	

Type of Constraint	Category	Onshore ECC A2		Onshore ECC B2	
		• Brigham Farm; • Corpslanding; • Throstlenest Farm; • Low Farm Carr house; • Gonary Hall Farm; • Rose Cottage Farm; • Haven House Farm; • Ashfield Farm; • Mount Pleasant. Settlements include villages of: • Foston on the Wolds; and • Bentley.		• Southfield Inn; • Carr Farm; • Low Besick Farm; • Linley Bungalow; • Field House Farm; • Wood House. Settlements include: • Lissett Village; • The outer edge of North Frodingham Town; and • A high concentration of residential receptors at Woodmansey Road (A1174). Construction activities would potentially be within 50m of the closest residential receptor with no other alternatives.	
	Cultural heritage	Conservation Areas: • Foston; • Beswick; • Lockington • Cherry Burton; and • Walkington. Scheduled monuments: • Rotsea medieval settlement and field system; • Cemetery and medieval settlement at Scorborough; • Moated site of Leconfield Castle; • Moated site south west of Parkhouse Farm; • Moated site north of Parkhouse Farm; • Romano-British enclosure, Burton Bushes, Westwood Common; and • A heavy anti-aircraft gunsite, 350m west of Butt Farm.		Conservation Area: • Tickton Scheduled monuments: • Meaux duck decoy, south west of Meaux Decoy Farm; • Site of Meaux Cistercian Abbey Listed Buildings: • Grade II Woodhouse Farmhouse, Beeford • Grade II Tickton Grange • Grade II Abbey Cottage, Tippett Lane	

Type of Constraint	Category	Onshore ECC A2		Onshore ECC B2	
		Listed Buildings: • Grade II Church of Saint Andrew; • Grade II Mill Farmhouse; • Grade II Former Lockington Railway Station; • Grade II Rectory Farmhouse and Wing Walls • Grade II White House Farm • Grade II Killingwoldgraves; and • Grade II Bishop Burton			

3.4.1.3 The comparative appraisal identified that the western route (A2) was the preferred option due to the greater number of constraints encountered by B2, east of Beverley.

3.4.1.4 In addition, a major pinch point was identified on Woodmansey Road (A1174) on the approach to the OnSS search area. The indicative Dogger Bank Creyke Beck export cable corridor crossed the road within the only available gap between residential properties (also bringing the onshore ECC within 50 m of residential receptors) making it an unfeasible route option.

3.4.1.5 The decision to remove the ECC option to the east of Beverley was also influenced by the reduction in the search area used for the OnSS (**Section 2.2**) leaving the A1, B1 and A2 onshore ECC routes shown in **Figure 14**.

3.5 Version 3 – Onshore ECC refinement

3.5.1.1 Once a single onshore ECC option had been chosen a flyover survey was undertaken to obtain high resolution imagery. The imagery was used to identify possible constraints in greater detail, resulting in the further refinement of the onshore ECC route (**Figure 14**).

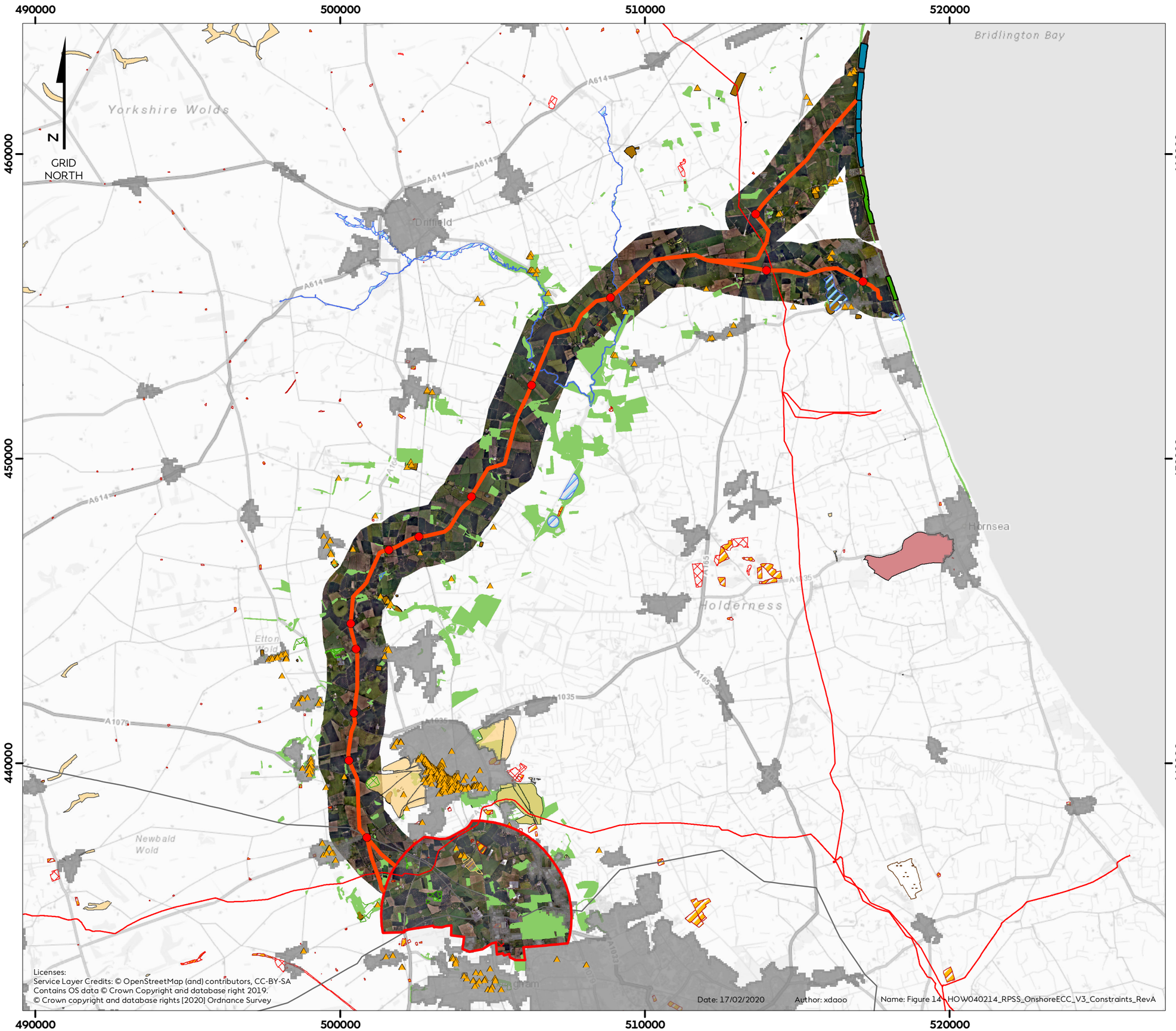
3.5.1.2 For example, the imagery identified hedgerows and ponds in greater detail and the centreline of the ECC was moved to avoid them. Similarly, further re-routing to cross existing infrastructure at 90 degrees was undertaken.

3.5.1.3 The onshore ECC was diverted at the points shown in by the 'Change Points' on **Figure 14**.

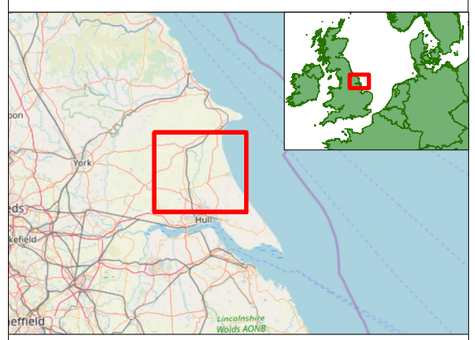
Hornsea Four

Figure 14

Onshore Export Cable Corridor Version 3 Constraints



- Onshore Export Cable Version 3
- Change Point
- Substation Search Area Version 2
- Landfall Zone A
- Landfall Zone B
- Gas Pipeline
- Listed Building
- Overhead Line
- Ancient Woodland
- Authorised Landfill Site
- CRoW Access Land
- Historic Landfill
- RSPB Important Bird Areas
- Local Nature Reserve
- Priority Habitat
- Registered Park and Garden
- Scheduled Monument
- Site of Special Scientific Interest
- Country Park



Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1 2 4 Kilometres

0 0.5 1 2 Nautical Miles

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Date: 17/02/2020 Author: xdaoo Name: Figure 14 - HOW040214_RPSS_OnshoreECC_V3_Constraints_RevA

3.5.1.4 Once this had been completed, buffers were applied to the onshore ECC A1 as follows (**Figure 15**):

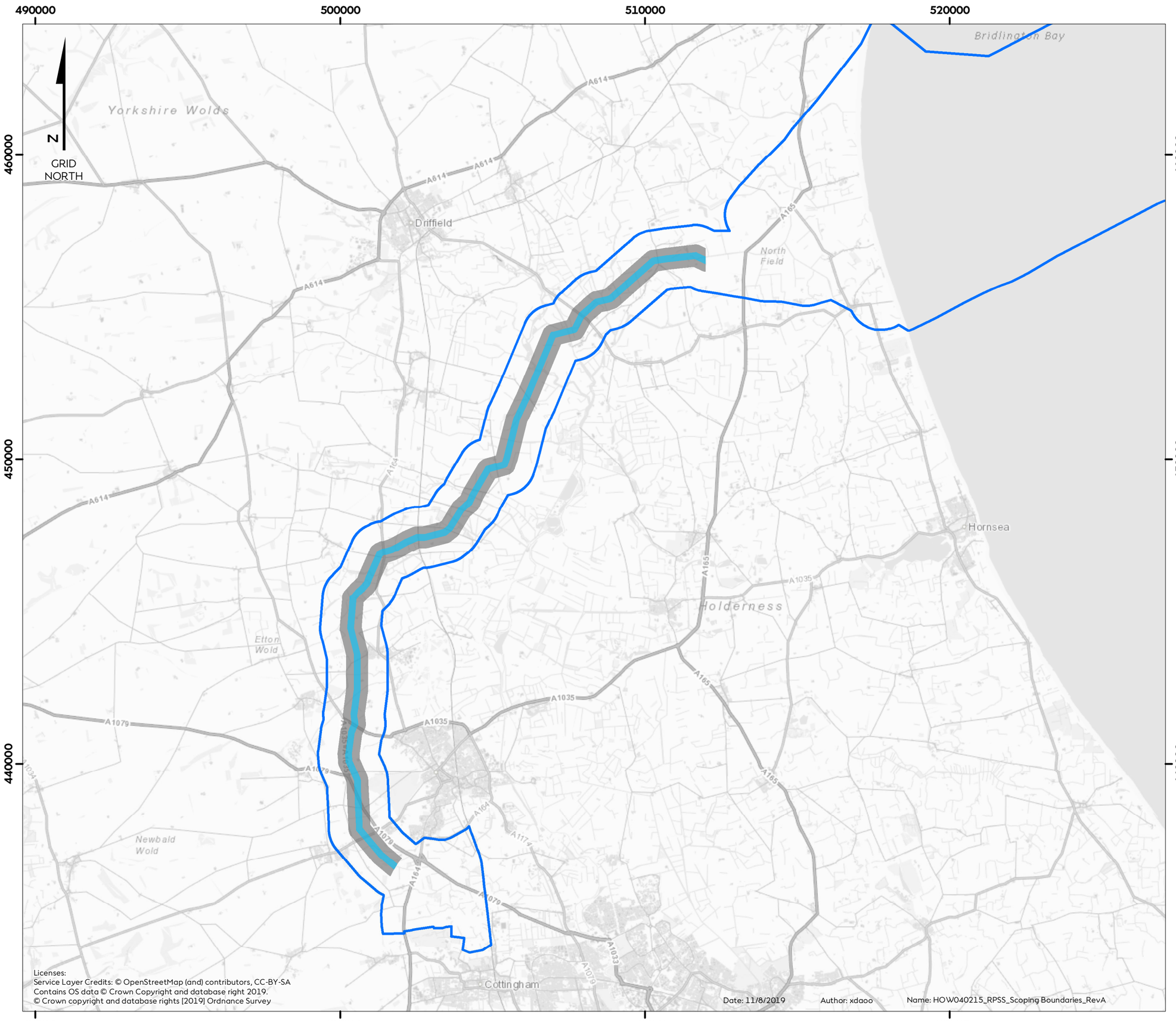
- 200m – for the Indicative Permanent Cable Area
- 700m – for the Indicative Temporary Works Area
- 2000m – for the Scoping Boundary. The area within which the Indicative Permanent and Temporary Cable Areas may be deviated.

3.5.1.5 The buffered areas would allow for micro-siting of the 80 m onshore ECC (comprised of a 60 m permanent corridor width and an 80 m temporary corridor width; see **Volume A1, Chapter 4: Project Description** for further details) to be developed after the Scoping report was submitted. The definition of the 60 m permanent easement excludes the Network Rail crossing, the approach to landfall and the approach to the OnSS. As the exact landfall location was yet to be decided the entire area between onshore ECC options A1 and B1 were included for possible landfall cable routing as the landfall sites were still undergoing the refinement process (**Volume A4, Annex 3.1**).

Hornsea Four

Figure 15

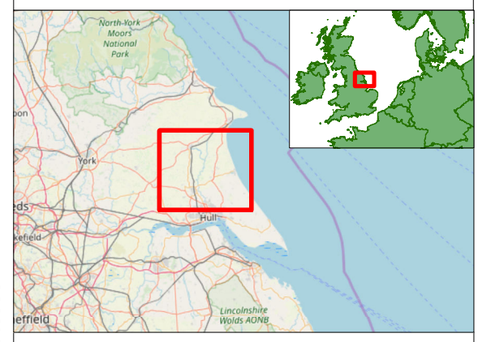
Scoping Boundaries



200m Indicative Permanent Cable Area

700m Indicative Temporary Works Area

Scoping Boundary



Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1.25 2.5 5 Kilometres

0 0.5 1 2 Nautical Miles

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Scoping Boundaries
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4 Refinement of Onshore ECC

4.1 Background

4.1.1.1 After the Scoping report was submitted the 80 m onshore ECC was refined in stages, identifying and incorporating potential accesses and logistics compounds. This refinement was based on any newly received third party data and by updating the BRAG criteria. The refinement of the 80 m onshore ECC was carried out with the aim of keeping the majority of the 80 m onshore ECC within the 200 m Indicative Permanent Cable Area and 700 m Indicative Temporary Works Area. The area outside of the 700 m Indicative Temporary Works Area would only be used if routing within it was not possible.

4.2 Version 4 – Refined Indicative 80m onshore Export Cable Corridor (Version 1)

4.2.1 Methodology

4.2.1.1 Using the 200 m Indicative Permanent Cable Area and the 700 m Indicative Temporary Works Areas as the starting point, the 'Refined Indicative 80m onshore Export Cable Corridor (Version 1)' (referred to as the 'refined 80m onshore ECC v1' here) was developed. This involved two main stages:

1. Field Boundary alignment - The refined 80 m onshore ECC v1 was aligned as closely as possible to field boundaries in order to minimise the land severance and disruption. All field boundary alignments considered adjacent landowners aiming to identify the best route for all. Where the refined onshore 80 m onshore ECC v1 was moved in parallel with field boundaries a 10 m buffer was maintained from hedgerows to account for any potential Root Protection Zones.

2. Updated BRAG criteria – The definitions for the BRAG criteria were updated to aid onshore ECC routing (Table 12) and updated with new information acquired since the Scoping report was submitted (Table 13).

Table 12: Onshore ECC Version 4 BRAG criteria definitions.

Criteria	Summary	Cable corridor route implications
Black	Considered to be a showstopper to development	The onshore ECC should not intersect any 'Black' constraints where open cut is required. Where crossing these constraints is unavoidable, Hornsea Four will seek to use HDD (or other trenchless techniques).
Red	Considered to carry high risk or have a high potential to constrain development	The onshore ECC should only intersect the 'red' areas when necessary due to other constraints. Where crossing these constraints is unavoidable, Hornsea Four will seek to use HDD (or other trenchless techniques),
Amber	Considered to carry a medium level of risk or have an	Intersecting 'Amber' areas is not preferable, and 'Green' areas should be used as a preferred alternative where possible.

Criteria	Summary	Cable corridor route implications
	intermediate potential to constrain development	
Green	Considered to carry low risk or have a low potential to constrain development	Intersecting 'Green' areas is preferable.

4.2.1.2 The new information received and incorporated into the new BRAG criteria is as follows:

- ERYC Conservation Areas;
- Humber Historic Environment Record (HER) event and monument data;
- Local Wildlife Sites;
- Tree Preservation Orders;
- Utilities Data (excluding National Grid datasets which had already been obtained); and
- Yorkshire Wildlife Sites.

4.2.1.3 Elements of the BRAG criteria which were developed further are:

- ERYC Local Plan Allocations.

4.2.1.4 While creating the refined indicative 80m ECC the following areas were avoided altogether:

- (Humber) Historic Environment Record sites (apart from one roman settlement);
- Golf courses;
- Registered common land (CROW Act);
- Land owned by government departments, National Trust, Forestry Commission and the Ministry of Defence; and
- The 50m buffer around residential receptors.

4.2.1.5 Planning applications were also considered and avoided using a similar BRAG criterion. This can be found in **Volume A4, Annex 5.5**.

Table 13: Onshore Export Cable Corridor Version 4 BRAG criteria.

Type of constraint	Category	Black	Red	Amber	Green
Environmental and Consenting	Nature Conservation	Route corridor directly intersecting: SPAs/ SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks *Tree Preservation Order (TPOs)* *Sites of Community Interest (SCIs)* For the following sites there are *not* considered to be any showstopper constraints to development: UK BAP Priority Habitats Woodland pasture Locally designated sites e.g. Local Wildlife Sites *Conservation areas (ERYC)* *Local Wildlife Sites* *Yorkshire Ecological Centre – Candidate & Designated)* *Yorkshire Wildlife Sites*	Route corridor within 0m – 100m of: SPAs/ SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks *TPOs* *SCIs* Or directly intersecting: UK BAP Priority Habitats Woodland pasture Locally designated sites *Conservation areas (ERYC)* *Local Wildlife Sites* *Yorkshire Ecological Centre – Candidate & Designated)* *Yorkshire Wildlife Sites*	Route corridor within 100m - 500m of: SPAs /SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks *TPOs* *SCIs* Or between 0 - 100m of: UK BAP Priority Habitats Woodland pasture Locally designated sites *Conservation areas (ERYC)* *Local Wildlife Sites (NE)* *Yorkshire Ecological Centre – Candidate & Designated)* *Yorkshire Wildlife Sites (NE Yorkshire Ecological Centre)*	Route corridor more than 500m from: SPAs /SACs SSSI Units National Parks Ancient woodland Ramsar sites Country Parks *TPOs* *SCIs* Or more than100m from: UK BAP Priority Habitats Woodland pasture Locally designated sites *Conservation areas (ERYC)* *Local Wildlife Sites (NE* *Yorkshire Ecological Centre – Candidate & Designated)* *Yorkshire Wildlife Sites (NE Yorkshire Ecological Centre)*
	Surface Water and Flood Zones	*There are no pond or body of water constraints considered to be showstoppers to development* There are no flood zone constraints considered to be showstoppers to development	*A known pond of body of water within the 80m corridor is considered to have a high potential to constraint development* There are no flood zone constraints considered to have a high potential to constrain development	*Route corridor 0 – 50m from a known pond or body of water is considered to have an intermediate potential to constrain development* Route corridor intersecting a Flood Zone 2 or Flood Zone 3 area	*Route corridor more than 50m from a known pond or body of water is considered to have a low potential to constrain development* Route corridor intersecting a Flood Zone 1 area
	Other infrastructure and development	Route corridor directly intersecting: Any land allocated for development in the ERYC Local Plan Any area of Historic Landfill	Route corridor within 0m - 100m of: Any relevant land allocated for development in the ERYC Local Plan Any area of Historic Landfill	Route corridor within 100m - 200m of: Any relevant land allocated for development in the ERYC Local Plan Any area of Historic Landfill	Route corridor more than 200m from: Any relevant land allocated for development in the ERYC Local Plan consented

Type of constraint	Category	Black	Red	Amber	Green
		Any area of Authorised Landfill	Any area of Authorised Landfill	Any area of Authorised Landfill	development Any area of Historic Landfill Any area of Authorised Landfill
	Proximity to sensitive stakeholders	Route corridor directly intersecting: RSPB Reserves**;** National Trust Land; MoD Exercise Area (inclusive of any buffer zone)	Route corridor within 0m – 100m of: RSPB Reserves; National Trust Land MoD Exercise Area (inclusive of any buffer zone)	Route corridor within 100m - 200m of: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)	Route corridor more than 200m from: RSPB Reserves; National Trust Land; MoD Exercise Area (inclusive of any buffer zone)
	Cultural heritage	Route corridor directly intersecting: Listed Buildings Scheduled Monuments boundaries Registered parks and gardens Registered battlefields *HER Event & Monument Data (Humber record centre)*	Route corridor within 0m - 50m of: Listed Buildings Scheduled Monuments boundaries Registered parks and gardens Registered battlefields *HER Event & Monument Data (Humber record centre)*	Route corridor within 50m - 200m of: Listed Buildings Scheduled Monuments boundaries Registered parks and gardens Registered battlefields *HER Event & Monument Data (Humber record centre)*	Route corridor more than 200m from: Listed Buildings Scheduled Monuments boundaries Registered parks and gardens Registered battlefields *HER Event & Monument Data (Humber record centre)*
Technical	Gas and Water underground pipelines	*Placing the onshore ECC less than 40 m from the edge of the gas pipeline*	*Placing the onshore ECC 40 m – 60 m from the edge of the gas pipeline*	*Placing the onshore ECC 60 m – 80 m from the edge of the gas pipeline*	*Placing the onshore ECC more than 80 m from the edge of the gas pipeline*
	Overhead lines	*A 400 kV tower within the ECC is considered to be a showstopper to development*	*A 400 kV tower 0 m – 20 m from the outer most edge of the 80 m corridor*	*A 400 kV tower 20 m – 40 m from the outer most edge of the 80m corridor*	*A 400 kV tower more than 40m from the outer most edge of the 80 m corridor*
Land and Property	Land ownership status	*There are no land owner survey access status constraints considered to be showstoppers to development*	*Land owners with a red survey access status*	*Land owners with an amber survey access*	*Land owners with a green survey access*

N.B. All text criteria in *Underlined italic* was developed or incorporated only for the 'Refined Indicative 80m Export Cable Corridor (Version 1)'.

*NE – Natural England

4.2.1.6 Constraints which the RPSS process was unable to avoid included:

- Mineral Safeguarding Areas;
- East Riding of Yorkshire Important Landscape Area – However, Hornsea Four would seek to minimise and mitigate any effects from the construction of the onshore ECC (see Co 69, Co124 and Co158 in Volume A4, Annex 5.2);
- PRoWs and the Sustrans Cycle Network - Any PRoWs or cycleways would be diverted for the minimum required time or crossed using HDD methods where necessary (see Co165, in **Volume A4, Annex 5.2**).

4.2.1.7 In addition to the BRAG criteria, various other cable routing considerations were employed:

1. Land and Property considerations
   - Landholdings – Where possible small landholdings likely to be within private ownership were avoided as potentially being proportionally more disruptive to land owners and tenants.

2. Technical considerations
   - Concentration of utilities – If multiple utilities were present in the same area but not in sufficiently close proximity to be crossed using a single HDD they were avoided;
   - Overhead electrical infrastructure – Where 11 kV, 33 kV and 132 kV electrical pylons and poles were visible in the utilities data and aerial imagery they were avoided in the first instance. If unavoidable the onshore ECC was routed so that the pylons/ poles sat as close to the edge of the onshore ECC as possible. This was to limit a potential 10 m+ width reduction to the permanent working width as generally enforced by asset owners through a 5m diameter exclusion zone; and
   - Railway crossings – where the onshore ECC crosses railways, the cable corridor is required to be a minimum of 120 m wide. This is because Hornsea Four may be required to HDD each cable separately by the railway track owner, creating 6 single circuits. This is an example of a 'complex' HDD crossing.
   - Crossing angles – Where 'simple' HDD crossings were anticipated the onshore ECC was angled to cross the obstacle at 75 – 90 degrees as the optimal technical crossing angle. For example, when crossing standard gas pipelines.

3. Environmental and Consenting
   - For the purposes of developing the 80 m onshore ECC distances were measured from the closest outermost edge of the onshore ECC to the constraint.

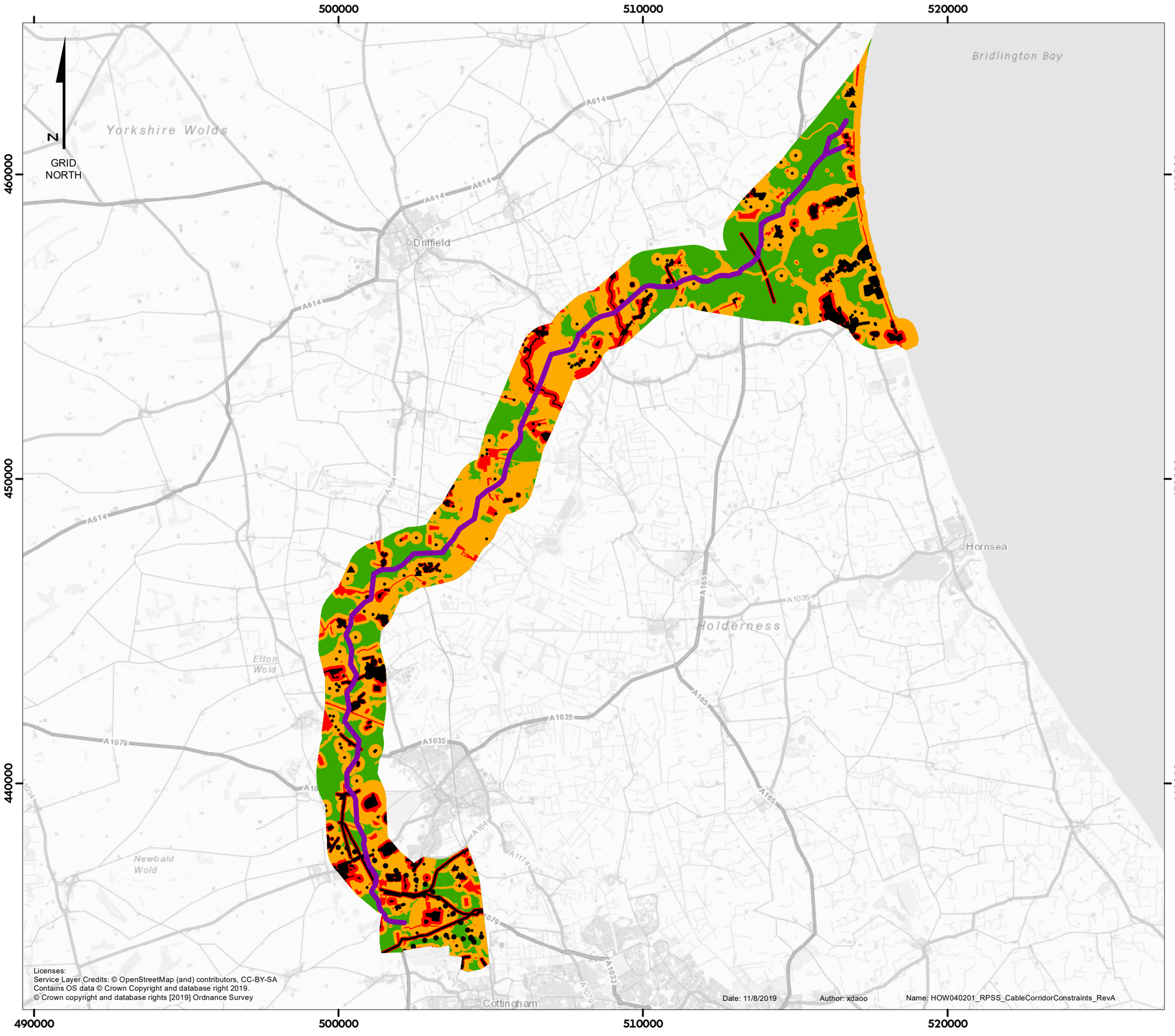
4.2.2 Constraints mapping

4.2.2.1 Constraints were mapped up using the BRAG criteria. This, along with the routing principles allowed the refined onshore 80 m ECC v1 to be routed from the landfall search area (**Volume A4, Annex 3.1**) to the OnSS search area (**Figure 16**).

Hornsea Four

Figure 16

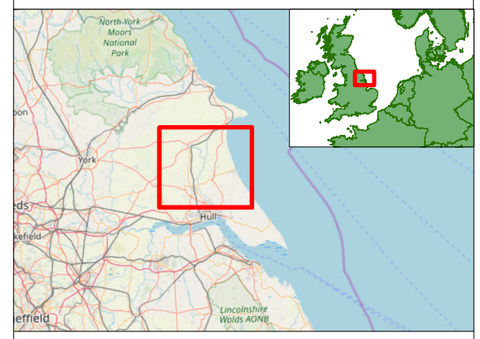
Refined Indicative 80m Export Cable Corridor Constraints



Refined Indicative 80m Export Cable Corridor (Version 1)

BRAG Assessment

- Black BRAG Constraint
- Red BRAG Constraint
- Amber BRAG Constraint
- Unconstrained for Routing



Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1.25 2.5 5 Kilometres

0 0.5 1 2 Nautical Miles

	REMARK	DATE
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Refined Indicative 80m Export Cable Corridor Constraints
Document no: HOW040201
Created by: XDAOO
Checked by: JOHLE
Approved by: JULCA

Ørsted

4.2.3 Version 4 – Refined Indicative 80m Export Cable Corridor (Version 1) – Landfall

4.2.3.1 Based on the remaining preferred landfall zones, A3 and A4 an onshore ECC option was developed from the middle of each of the zones as the exact location of the landfall was undergoing refinement (**Volume A4, Annex 3.1**). The only requirements for these sections of the onshore ECC were that:

- 'The Earl's Dike' south of landfall A3 was to be crossed at an angle of 75 – 90 degrees; and
- Both sections of the onshore ECC also adhered to the updated BRAG criteria (**Table 13**).

4.3 Version 5 – Refined Indicative 80 m onshore Export Cable Corridor (Version 1) – Accesses and Compounds

4.3.1 Temporary access requirements for the onshore ECC

4.3.1.1 Based on the assumption that the onshore ECC will be installed in sections approximately 1.6 km in length, the ideal placement of accesses would coincide with the joint bays and permanent subsurface link box structures which would be located between sections. Any jointing bays and subsequent link boxes are indicative until construction. However, their indicative placement has been used to inform the location of the indicative accesses and compounds. As such the Technical requirements for the accesses are as follows:

- Distance: There should be a temporary access to the onshore ECC approximately every 1.6 km; and
- Width: Each temporary access should be 6 m in width (10 m including hard standing, soil storage and fencing) as the maximum design scenario for construction vehicles (see **Volume A1, Chapter 4: Project Description**).

4.3.1.2 The Land and Property requirements involved:

- Using existing openings in trees and hedgerows, gates and field access points where possible;
- Aligning accesses additional to the 80 m onshore ECC with field boundaries to minimise disruption to fields and limit the areas of severed land; and
- Taking accesses across fields already containing the permanent footprint of the onshore ECC, as opposed to using 'virgin' fields.

4.3.1.3 The Environmental and Consenting requirements dictated that all temporary accesses and access points adhered to the BRAG criteria used to route the onshore ECC v1 (80 m) (**Table 13**).

4.3.2 Logistics compound requirements for the onshore ECC

4.3.2.1 Based on experience from previous projects the following Technical requirements were established for the onshore ECC logistics compounds:

- There should be a logistics compound located approximately every 4km along the onshore ECC with a maximum area of 150m x 150m.
- Each compound should be located immediately adjacent to the onshore ECC for logistical ease, preferably with an existing road or identified access point in close proximity.

4.3.2.2 The Land and Property requirements involved ensuring that logistics compounds were located in areas which would already be severed by the temporary construction area of the onshore ECC.

4.3.2.3 Similar to the onshore ECC temporary accesses, the Environmental and Consenting requirements also dictated that all logistics compounds adhered to the BRAG criteria used to route the onshore ECC v1 (80m) (**Table 13**).

4.3.3 Development of accesses and logistics compounds for the onshore ECC

4.3.3.1 Using the various requirements, the indicative temporary accesses and logistics compounds were placed using Ordnance Survey Mastermap and the high-resolution flyover aerial imagery. As the aerial imagery was taken in June 2018, it was used as the most up-to-date data set for routing through or around physical features. Where possible, alternative indicative accesses and logistics compounds were identified. Alternative options were provided for some logistics compounds, for example where there may have been two areas of severed land, on opposite sides of the same road. Similarly, although use of a highway access point within the working width may have been preferred by Hornsea Four, if aerial imagery showed existing farm track gates and hedgerow openings on both sides of the main road, alternative temporary access tracks were provided for landowner and tenant feedback.

4.3.3.2 Once this first version of the accesses and compounds was completed for the entire refined onshore 80m ECC v1, the indicative joint bay locations were then tweaked and moved closer to roads and temporary accesses, and further away from watercourses and flood zones where possible. An average distance of 1.6 km between joint bays was always maintained.

5 Onshore ECC Red Line Boundary (RLB) for PEIR

5.1.1.1 Letters and plans showing the 'Refined Indicative 80m Export Cable Corridor (Version 1)', indicative logistics compounds and temporary accesses were sent to landowners and tenants in November 2018 (see Chapter 5 of **Volume B1, Chapter 1: Consultation Report**, and **Volume B1, Annex 1.32**). Landowners and tenants who responded to correspondence

from Hornsea Four were engaged with as a part of the informal consultation with a view to receiving feedback and comments on:

- The indicative 80m onshore ECC, logistics compounds and temporary accesses, including to receive landowner preferences where more than one compound and/or access track option had been provided;
- Any questions raised on features of the land throughout the route planning and site selection process; and
- Any other local knowledge landowners and tenants wanted to share. For example, local knowledge relating to environmental features, drainage, and man-made features not discernible from aerial imagery.

5.2 Landowner feedback

5.2.1.1 The Applicant requested feedback from landowners and tenants, who subsequently provided feedback which ranged from the identification of undesignated historic environment sites, areas of particularly wet ground, evidence of historic badger setts and land drainage information.

5.2.1.2 The Applicant accepted requests for amendments to the onshore ECC, temporary accesses and logistics compounds, from landowners and tenants, where it was feasible to do so. Examples of these change requests included moving the onshore ECC off of a paddock at Carr House Farm, and an area earmarked for the storage of silage north west of Brigham Quarry. Additional changes to the cable involve removing and moving proposed access tracks and logistics compounds according to landowner preferences, moving the onshore ECC off of natural springs, field drainage, and to align closer to field boundaries.

5.2.1.3 Similarly, the Applicant received landowner feedback that if any of the temporary access tracks involved taking a route through the nearby village of Fraisthorpe it would not be favoured by local residents. As such, a proposed access track to be used for both landfall A1 (**Volume A4, Annex 3.1**) and an adjoining section of the onshore ECC was moved to take access from the public highway further south, despite being a less favourable access from a technical perspective as it would involve routeing HVGs over a small bridge which would potentially require upgrade works pre-construction.

5.3 Preliminary traffic and transport assessments

5.3.1.1 In response to feedback from local information events in October and November 2018 and subsequently through landowner consultation, online and via postal feedback forms, the Applicant enlisted a local transport consultant (Local Transport Projects Limited) to assess the viability of access tracks and local road networks for the construction of the project. The local transport consultants assessed the following:

- The likely sensitivity of local roads based on the proposed preliminary access points from local highways. This included possible upgrade and improvement works (and therefore potential disruption) which might result; and

- The likely safety of all proposed access points from local highways, including proposed access tracks; and
- Structural integrity of specific bridges.

5.3.1.2 This work broadly involved assessing aspects of local road networks, such as road width, local and national speed limits, and visibility, with the likely vehicles and loads which would be required during construction. Techniques such as 'swept path' analyses were used to calculate the likely paths which would be taken by constructions vehicles, feeding into a SWOT analysis of the local road networks.

5.3.1.3 These assessments resulted in the following changes along the onshore ECC:

1. The removal of haul road crossing access points – these were removed as safer alternatives, either in the form of access tracks or highway access points had already been identified, which were recommended to be used instead. If not already identified, they were then subsequently identified in response to the removal of the haul road crossing points;
2. The removal of highway access points – these were also removed either as a result of existing access points having the potential to be unsafe, where alternative safer access points could be used, or where new access tracks were subsequently drawn up;
3. The addition or moving of access tracks – for the aforementioned reasons in points 1 and 2;
4. The removal of temporary access tracks – removed as multiple options had been provided in the first place, until a preliminary assessment on safety and landowner feedback back been received; and
5. The moving of logistics compounds to align better with the existing road networks and safety and sensitivity these and other Hornsea Four temporary access tracks.

5.3.2 Removal and update of highway access points, haul road crossing points and logistics compounds

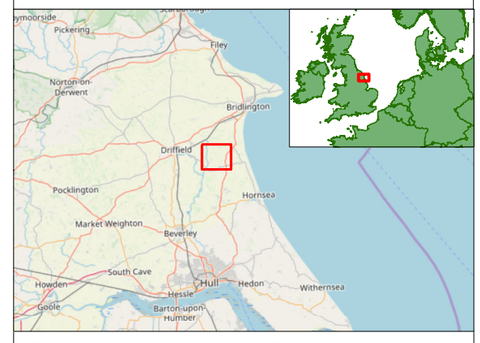
5.3.2.1 In order to minimise the effect on local roads and in response to feedback received from LIEs, highway access points were removed from the main road through Foston on the Wolds (see Public Commitment (PCo) 16 in Volume A4, Annex 5,2). As such this highway access point would be used as haul road crossings only. Highway access points east of Lissett Windfarm (off Lissett Lane), and off Out Gates (south of Gembling Lane) were identified as being preferable (**Figure 17**). In response to this change the logistics compound originally located east of Foston, was instead moved south east of Lissett Windfarm as being located closest to a main road (Lissett Lane). See *ECC Change 1.12*; **Table 15** and **Figure 21** for subsequent updates to this change.

Hornsea Four

Figure 17

Preliminary Traffic and Transport Assessments.
Removal and update of access points,
haul road crossings and logistics compounds

- Onshore Export Cable Corridor (80m)
- Temporary Access Tracks
- Access Points, Haul Road Crossing
- Removed: Logistics Compounds
- Added: Logistics Compounds
- Removed: Access Points, Haul Road Crossing
- Added: Access Points, Public Highway



Coordinate system: British National Grid

Scale@A3: 1:20,000

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0 1,000 2,000 4,000 Feet

REV	REMARK	DATE
	First issue for PEIR	26/04/2019
A	Updated for DCO	07/11/2019

Traffic and Transport. Removal and update of access points,
haul road crossings and logistics compounds
Document no: HOW040192
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Approved by: ANTSA

Ørsted

Date: 11/8/2019 Author: xdaoo Name: HOW040192_RPSS_Traffic&Transport_AccessHaulRoadsCompounds_RevA

5.3.3 Removal of unsafe accesses and highway access points

5.3.3.1 Figure 18 shows the three preliminary temporary access tracks east of Cherry Burton Golf Club were removed in favour of using the temporary access track and highway access point off Constitution Hill to the south. This was because the section of Miles Lane directly to the east of Cherry Burton Golf Club was deemed to have fast traffic and insufficient visibility in its current state. As a result, the temporary access track off Constitution Hill was retained, and a highway access point within the onshore ECC was added.

5.3.4 Addition / moving of temporary access tracks

5.3.4.1 Figure 19 shows the highway access point south of Mount Pleasant (on York Road) was removed in favour of adding temporary access tracks to the east of the roundabout. The preliminary traffic and transport assessment found that the further the distance of the highway access points from the roundabout, the safer they are likely to be. The highway access point within the onshore ECC was therefore removed and two temporary access tracks, one to access each side of the HDD across York Road, to the north and south were added using existing entry points in to the adjacent fields. Existing entry points were used where possible to limit the removal of hedgerows (see *ECC Change 1.11*; Table 15 and Figure 21 for subsequent updates to this change).

5.3.4.2 Similarly, the preliminary traffic and transport assessment found that the A1079 and Newbald Road, south of Killingwoldgraves should not be used for haul road crossings if possible. As a result the haul road crossings were removed from these roads (Figure 19) in favour of using the new temporary access track from the south side of York Road, and adding two new access tracks off Newbald Road. The new temporary access tracks off Newbald Road are likely to be safer as the access from the existing highway is further away from the bridge over the A1079 (to the east).The new temporary access track off the south side of York Road would be used to access the north side of the HDD across the A1079, and the temporary access track on the north side of the Newbald Road would be used to the access both the south side of the HDD across the A1079 and the north side of the HDD across Newbald Road. The temporary access track to the south side of the Newbald Road would then be used for the south side of the HDD across Newbald Road. See *ECC Change 1.19*; Table 15 and Figure 21 for subsequent updates to this change).

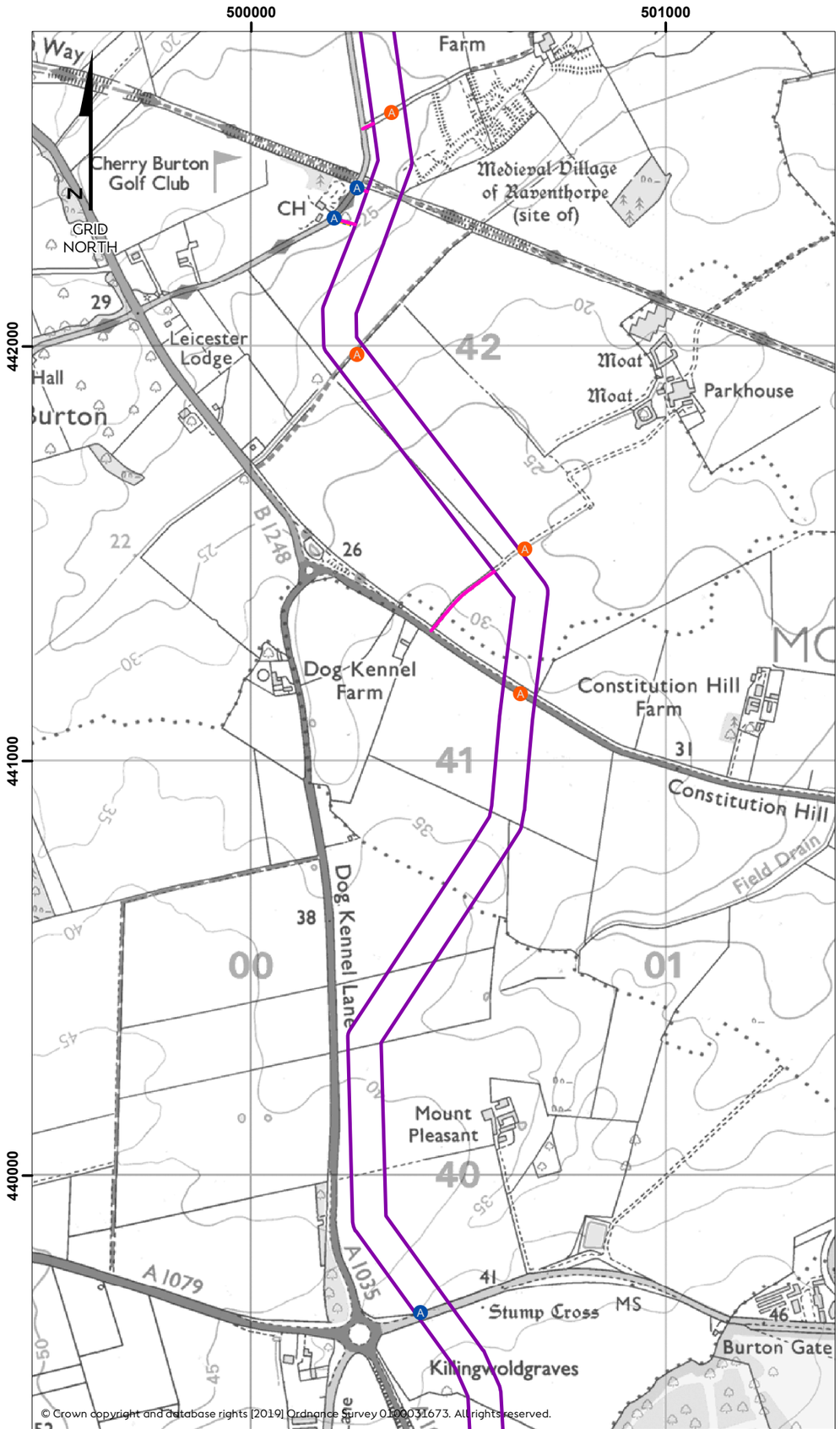
5.4 Onshore ECC approach to landfall

5.4.1.1 As the exact location of the landfall compound within the final landfall (Volume A4, Annex 3.1) area is not known, it was decided that the onshore ECC on the landward side should be widened to create a funnel on the approach to the landfall. This would allow greater flexibility for pulling the cables in to the onshore ECC, depending on where the final compound may be located.

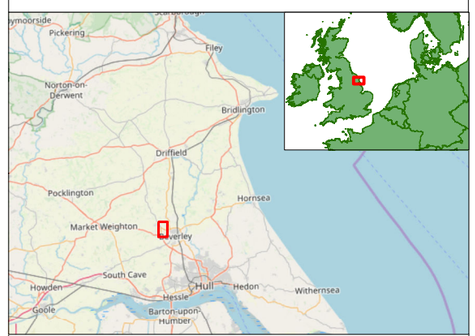
Hornsea Four

Figure 18

Preliminary Traffic and Transport Assessments
Removal of Unsafe Accesses



Refined Indicative 80m Export Cable Corridor (Version 1)
Access Tracks (Version 1)
Access Points, Public Highway
Access Points, Haul Road Crossing
PEIR Boundary
Access Tracks (PEIR)



Coordinate system: British National Grid
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0 487.5 975 1,950 Feet

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Approved by: ANTSA

Ørsted

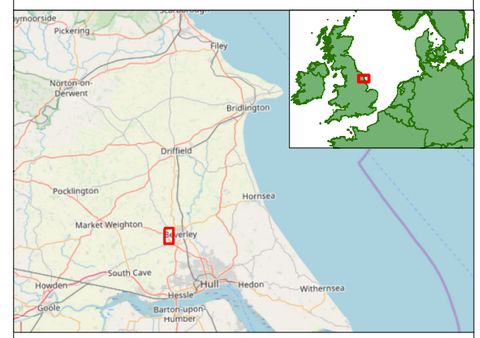
Date: 11/8/2019 Author: xdaoo Name: HOW040193_RPSS_Traffic&Transport_UnsafeAccessRemoval_RevA

Hornsea Four

Figure 19

Preliminary Traffic and Transport Assessments Inclusion of New Access for Safety

- Refined Indicative 80m Export Cable Corridor (Version 1)
- Access Tracks (Version 1)
- Access Points, Public Highway
- Access Points, Haul Road Crossing
- PEIR Boundary
- Access Tracks (PEIR)



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0 500 1,000 2,000 Feet

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5.5 ECC approach to the OnSS

5.5.1.1 Once a final OnSS site had been chosen (**Section 2.3.4**), an onshore ECC route to the site needed to be developed within the refined OnSS search area. Until this point the onshore ECC had only been developed up to the OnSS search area (**Figure 3**) as the exact location of the site was not known. Due to the high number of constraints in this area, a more refined BRAG criteria was established (**Table 14**). This BRAG criteria was mapped up and used to route the last onshore ECC section to the OnSS.

Table 14: Onshore ECC approach to OnSS option B BRAG Criteria.

Type of constraint	Constraint	Black	Red	Amber	Green
Technical	HDD Cable Crossing angle	*Less than 45 Degree Crossing Angle*	*Between 45-60 Degree Crossing Angle*	*Between 60 - 80 Degree Crossing Angle*	*Between 80 – 90 Degree angle as possible*
	Gas pipelines	Placing the onshore ECC parallel to and less than 40m from the edge of the gas pipeline	Placing the onshore ECC parallel to and between 40m – 60m from the edge of the gas pipeline	Placing the onshore ECC parallel to and between 60m – 80m from the edge of the gas pipeline	Placing the onshore ECC more than 80m from the edge of the gas pipeline
	Pylons and towers 11kV &33kV)	*There are no 11kV or 33kV pylon constraints considered to be a showstopper to development*	*An 11kV or 33kV pylon 0 – 5m from the outer most edge of the 80m corridor*	*An 11kV or 33kV pylon 5m – 15m from the outer most edge of the 80m corridor*	*An 11kV or 33kV pylon more than 15m from the outer most edge of the 80m corridor*
	Interface with temporary or permanent OnSS works areas	*Onshore ECC directly intersecting with the planned temporary works areas for the OnSS*	*Onshore ECC 0m – 20m from the planned temporary works areas for the OnSS*	*Onshore ECC 20m – 30m from the planned temporary works areas for the OnSS*	*Onshore ECC 30m – 40m from the planned temporary works areas for the OnSS*
Environmental and Consenting	Nature Conservation – Ancient woodland	Route corridor directly intersecting: Ancient woodland	Route corridor within 0m – 100m of: Ancient woodland	Route corridor within 100m – 500m of: Ancient woodland	Route corridor more than 500m from: Ancient woodland
	Nature Conservation – UK BAP Priority Habitats	For the following sites there are not considered to be any showstopper constraints to development: UK BAP Priority Habitats	Route corridor directly intersecting: UK BAP Priority Habitats	Route corridor between 0 - 100m of: UK BAP Priority Habitats	Route corridor more than 100m from: UK BAP Priority Habitats
	Surface Water	*There are no pond or body of water constraints considered to be showstoppers to development*	*A known pond of body of water within the 80m corridor is considered to have a high potential to constraint development*	*Route corridor 0 – 50m from a known pond or body of water is considered to have an intermediate potential to constrain development*	*Route corridor more than 50m from a known pond or body of water is considered to have a low potential to constrain development*
	Flood Zones	There are no flood zone constraints considered to be showstoppers to development.	There are no flood zone constraints considered to have a high potential to constrain development	Route corridor intersecting a Flood Zone 2 or Flood Zone 3 area	Route corridor intersecting a Flood Zone 1 area
	Residential (and out-building*) receptors	*Route corridor within 0m – 50m of any residential property or out-building*	*Route corridor within 50m - 100m of any residential property or out-building*	*Route corridor within 100m - 150m of any residential property or out-building*	*Route corridor more than 150m from any residential property or out-building*

N.B. All text criteria in *Underlined italic* was developed or incorporated only for the onshore ECC section from the Beverley Road to the OnSS site

* Also a Land and Property constraint

5.6 National Grid Creyke Beck Substation Connection

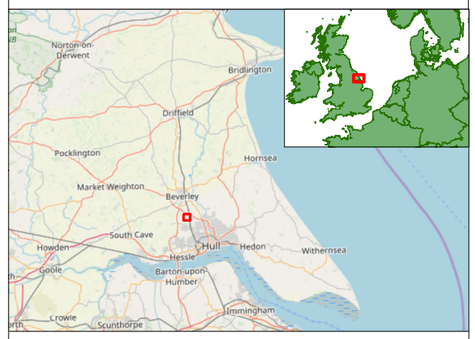
5.6.1.1 In order to distribute the power produced by Hornsea Four to UK homes, the project will need to connect into the National Grid at the National Grid Creyke Beck Substation (**Volume A4, Annex 3.1**). National Grid plc is not required to work to the same timescales as Hornsea Four and so an exact grid connection point has not been formally offered and agreed with the project. As a result, the fields directly adjacent to the Creyke Beck Substation (denoted by the '400 kV export cable corridor' area in **Figure 20**) were included in the PEIR redline boundary. Discussions with National Grid plc, as the operator and owner of the transmission system, are ongoing. The Applicant submitted the PEIR with the intention of refining the project boundary in this area when a connection point or multiple connection points agreed with them.

Hornsea Four

Figure 20

400kV Connection to National Grid Creyke Beck Substation

- PEIR Boundary
- Onshore Substation Option B
- Onshore Export Cable Corridor
- 400kV Export Cable Corridor
- Area within which connection works maybe required, but where compulsory powers will not be sought.



Coordinate system: British National Grid

Scale@A3: 1:5,000

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0 125 250 500 Feet

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400kV Connection to National Grid Creyke Beck Substation
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6 Further Refinement of onshore ECC from PEIR to DCO

6.1 Background

6.1.1.1 Following feedback from stakeholders and members of the public following Section 42 and 47 consultation on the PEIR, Hornsea Four has further refined the onshore ECC, taking this feedback into consideration. The drivers for changes to the onshore ECC can broadly be split into the following categories:

- PEIR impact assessments – (preliminary findings from the impact assessments undertaken to inform the PEIR resulted in some recommendations being made for changes to the onshore ECC)
    - Flood Risk assessment; and
    - Traffic and Transport assessment.
- Review of baseline survey data – (review of both third party and Hornsea Four baseline survey data)
    - Archaeology; and
    - Ecology.
- Section 42 / Section 47 feedback; and
- Third Party Planning Applications.

6.1.1.2 Examples of refinements to the onshore ECC are presented in Table 15.

Table 15: PEIR to DCO refinement of onshore ECC.

Change request ID (see Figure 21)	Change request	Description of Change
1.18	Re-route of onshore ECC due to ecologically sensitive receptor (east of Bridlington Road).	**Ecology baseline survey data** The onshore ECC has been re-routed to avoid ecologically sensitive receptor (please refer to Volume A6, Annex 3.10: (confidential)) by 110 m. **Section 42 landowner feedback** Furthermore, the new route also accommodates a tenant request to follow preferred field boundaries, in order to limit the amount of severed land and reduce the impact on agricultural activities.
1.2	Adjusted onshore ECC and access track over Selected Heritage Inventory for Natural England (SHINE) site at Gembling.	**Archaeology baseline survey data & Section 42 landowner feedback** A landowner requested that the onshore ECC should avoid an undesignated SHINE site. Hornsea Four therefore committed to use HDD at this site in order to avoid any direct impacts. The onshore ECC in this location was also straightened to technically facilitate the HDD. Similarly, the haul road has been re-routed outside of the onshore ECC and 58 m south to avoid this field to avoid any direct

Change request ID (see Figure 21)	Change request	Description of Change
		impacts as result of constructing and using a haul road over the SHINE site. **Section 42 landowner feedback & Traffic and Transport PEIR Impact assessment** A further change that was made was the removal of the access track AP_005 south-east of Gembling. This is due to a request from the landowner, as this could potentially mean removing large areas of hedgerows if the existing road were to need widening during construction. Furthermore, this change ensured that construction traffic is not taken through Gembling, therefore avoiding the need to take construction traffic close to a school in this area. The highways access points AP_005 and AP_039 (see Volume A4, Annex 4.2: Onshore Crossing Schedule) were relocated to Old Howe Lane as it is likely that construction traffic would need to use the road to access the old AP_005 on Out Gates, Gembling. **Ecology baseline survey data** Furthermore, there was also a Great Crested Newt (GCN) pond within 250 m of this access track. Removing the access track (AP_005) means that Hornsea Four has reduced potential impacts, therefore removing the need to mitigate a pond which received a positive result for containing GCN. Having removed AP_005 the closest constituent of Hornsea Four is the onshore ECC which is now 460 m away from the pond. Please refer to Volume A6, Annex 3.5: Great Crested Newt Environmental DNA (eDNA) Survey Report for further information.
LC.1.10	Movement of logistics compound north of the B1249	**Section 42 landowner feedback** Logistics compound moved north of the B1249 to mitigate impact of the project on a smallholding.
1.11	Adjustment of onshore ECC due to proposed petrol station planning application, a Section 42 landowner change request, and to mitigate surface water flood risk	**Planning Application** The onshore ECC, logistics compound and access tracks were moved further east from the Killingwoldgraves / York Road roundabout, to avoid a proposed petrol station planning application within the pre-DCO boundary (submitted at PEIR). Although the planning application was initially refused, through consultation with the landowner it emerged that the application would be re-submitted and extended into the proposed onshore ECC area. It is noted that the planning application was refused; however; liaison with the landowner indicated that development at the location would be pursued.

Change request ID (see Figure 21)	Change request	Description of Change
		Flood Risk PEIR impact Assessment and Section 42 landowner feedback The compound (originally north of York Road) was moved south of the York Road, and away from any surface water flood risk areas. The access track (AP_021) which previously took access from the north side of York Road was also moved further north off of the A1035 in response to a landowner request for Hornsea Four not to share the existing farm access during construction. This also resulted in the access track being moved away from an area at risk from surface water flooding, as described in the Environment Agency Risk of Surface Water Flooding data.
1.10	Adjustment of the onshore ECC and access track due to presence of archaeological 'barrow', A164/Jock's Lodge improvement scheme and Section 42 landowner request.	**Site Visit** The logistics compound previously situated north and east of Dunflat Road, has been moved west of Dunflat road. A post PEIR site visit was undertaken, through which it was noted that the pre-DCO (PEIR) logistics compound was located on higher ground. The land west of Dunflat Road is situated on lower ground, and is also behind tall hedgerows. Therefore, it is likely to be less visible from the surrounding area. **Archaeology baseline survey data and Section 42 landowner feedback** The onshore ECC was adjusted to avoid an archaeological 'barrow' (identified in the LiDAR Assessment in Volume A6, Annex 5.2) previously within the pre-DCO boundary (submitted at PEIR). This adjustment also reduced the amount of the severed land (a request made by a landowner) in the southwest corner of the field to the east of the current A164. **Planning application and Section 42 Consultation** After consideration and liaison with ERYC on the proposed A164/Jock's Lodge Improvement Scheme, the onshore ECC was adjusted. The updated onshore ECC crosses what will be a wider dual carriageway once the Jock's Lodge Improvement Scheme has been constructed, at closer to 90 degrees. This was identified as a Hornsea Four technical requirement. Furthermore, the access track off the A164 was shortened significantly to make it safer, when considering the traffic flowing south on what will be using the new dual carriageway. The revised access track has been moved as far away as possible from potentially fast-flowing traffic which would be heading

Change request ID (see Figure 21)	Change request	Description of Change
		south. However, keeps a sufficient distance from Dunflat Road, as this road may still be in use after the Jock's Lodge Improvement Scheme has been completed. The revised access track is also shorter minimising the amount of severed land, as requested by the landowner.
1.17	Removal of the construction access tracks south of the OnSS, off Park Lane	**Section 42 landowner feedback & S47 community feedback** The temporary construction access tracks off Park Lane, previously included in the pre-DCO boundary (submitted at PEIR) to facilitate the construction of the onshore ECC sections (including the 400 kV NGET connection works) east of the A164, were removed in response to consultation feedback from the local community and local parish councils. As a result Hornsea Four will now use the single access track off of the A1079, for the construction of the onshore ECC, and the construction and operation of the OnSS. This access off the A1079 is also preferred by ERYC. Please refer to **Volume D1, Annex 4.2: Works Plan – Onshore**.
1.19	Removal of access track and movement of access point on Newbald Road	**Section 42 landowner feedback** A landowner requested that the Applicant removes the temporary access track associated with AP_024 (see **Volume A4, Annex 4.2: Onshore Crossing Schedule**). After further consultation with ERYC the access track was removed and AP_024 was moved further east to within the onshore ECC. This area may be subject to traffic management measures, to be developed and agreed in consultation with ERYC prior to construction.

6.1.1.3 As a result of the number of changes accepted by Hornsea Four after formal Section 42 consultation, a further targeted consultation was undertaken on the 39 proposed minor onshore route amendments, including:

- 15 proposed changes to the onshore ECC;
- Seven changes to logistics compounds;
- 17changes to access tracks and highway access points; and
- The inclusion of permanent access rights for 27 additional operational access points in the event that access is required during operation for the inspection of link boxes.

6.1.1.4 After the targeted consultation took place, a further change was made to the onshore ECC and associated logistics compound and access track at Killingwoldsgrave (off York Road). The Applicant received feedback from the landowner that a previously refused planning application for a petrol station on their land was to be resubmitted with a larger footprint.

As such, Hornsea Four responded to this feedback and moved the onshore route further east to accommodate future development

6.1.1.5 Additionally, the Applicant utilised an extension to the DCO application submission in 2021 to undertake the following changes:

- The onshore ECC was marginally rerouted to account for a landowner request, to the south of Low Farm (change i.d ECC.1.21);
- Logistics compound (LG_006) amended to avoid interaction with Leconfield Bridleway Number 12 (change i.d LC.1.12);
- 400kv ECC search area marginally receded to avoid interaction with Skidby Footpath Number 12 (change i.d GCS.1.2); and
- Change to a temporary construction access point off the A164 (AP_026) (change i.d TAT.1.12). As the detailed design of the Jock's Lodge Scheme has developed it became apparent that the Jock's Lodge Scheme works would potentially conflict with Hornsea Four's previous construction access. A workshop was organised with ERYC to discuss the access point from the A164 to the Hornsea Four cable corridor and the interaction between the Jock's Lodge Scheme and Hornsea Four. This workshop discussed the potential conflicts and suitable alternatives. At the workshop ERYC requested that the existing Hornsea Four construction access point was moved to the south, to utilise the proposed non-motorised user (NMU) / agricultural track for Hornsea Four construction traffic, for the construction of a short section of the Hornsea Four onshore export cable corridor (approximately 200m). This request was made to reduce the overall construction activity and the number of accesses taken off the A164. This change was subject to targeted consultation under Section 42(1) of the Planning Act 2008 between 30 June 2021 and 30 July 2021. Comments received in relation to this access change were primarily based on necessary management measures, with no comments requiring a change to the Order Limits or access design.

6.1.1.6 Additionally, it is noted that between PEIR and DCO application submission, an additional onshore ECC and primary logistics compound option was added to the Order Limits due to feedback from the landowner and occupiers. After the delay to the DCO application submission date in 2021, the Applicant undertook an appraisal between the two options and dropped the additional option added between PEIR and DCO submission (the 'northern route'). This decision was primarily based on the BMV land classification of the northern route and traffic and transport related matters (including the potential for construction vehicles to cross a footpath on the north of Station Road to access the primary logistics compound, and the increased distance of the potential road widening at that location (with the associated construction access of the northern option located further to the west).

Hornsea Four

Figure 21

Material Changes to Onshore Export Cable Corridor for DCO

490000 500000 510000 520000

460000 450000 440000

N GRID NORTH

Yorkshire Wolds

Driffield

North Field

Hornsea

Holderness

Etton Wold

Cottingham

A165 A164 A1035 A1079 A1033

PEIR

Badger Sett

DCO

Straighten ECC and move further west to reduce impact

Reroute Onshore ECC due to Badger sett

ECC adjustment for SHINE site

ECC.1.2

ECC.1.19

ECC.1.20

ECC.1.11
TAT.1.6

ECC.1.10
TAT.1.17

GCS.1.1
GCS.1.2

HC_025 HC_070

HC_060 HC_016

Approximate location of SHINE site at Gembling

AP_021 AP_022

Adjust ECC due to proposed Petrol Station within corridor

HC_043 AP_015 AP_014 HC_044 AP_034

Removed haul road crossing and moved AP_014 into the corridor.

AP_028 AP_030 AP_026

Possible Archaeological Barrow

Adjust ECC due to archeological 'barrow' and move AP_026 due to A164 road scheme

AP_023 AP_024

Relocate AP_24 into cable corridor and move AP_023

Reduce scope of 400kV connection area into the Creyke Beck National Grid Substation and set back from PRoW in south east corner

- DCO Order Limits
- Export Cable Corridor
- Permanent Access Track
- Temporary Access Track
- Landfall Connection Works
- Landfall Compound Search Area
- Logistics Compound
- 400kV Grid Connection Works
- Onshore Substation (Temporary Works)
- Onshore Substation (Permanent Space)
- PEIR Boundary
- Access Point, Public Highway
- Access Point, Haul Road Crossing

Newcastle upon Tyne, Sunderland, Durham, Great Britain, Ripon, Leeds, York, Hull, Wakefield, Manchester, Sheffield, Lincoln, Nottingham

Coordinate system: British National Grid

Scale@A3: 1:120,000

0 1.25 2.5 5 Kilometres

0 0.5 1 2 Nautical Miles

REV	REMARK	DATE
	First Issue for DCO	04/01/2021
A	Additional A164 access change	13/07/2021

Material Changes to Onshore Export Cable Corridor for DCO
Document no: HOW040314
Created by: XDAOO
Checked by: JOHLE
Approved by: JULCA

Ørsted

Name: Figure 21 - HOW040314_ECC_Changes_RevA

6.2 PEIR to DCO National Grid Creyke Beck Substation Connection

6.2.1.1 Between PEIR and DCO discussions with National Grid progressed sufficiently, enabling the grid connection area to be reduced considerably to include the west, south and south-west of the NGET Creyke Beck substation and the Creyke Beck substation itself (see Change ID GCS.1.1 on **Figure 21**). This was informed by ongoing discussions with National Grid.

6.2.1.2 Dogger Bank Creyke Beck's DCO permitted the installation of cables (including Compulsory Acquisition powers for the construction and maintenance of connection bays) over land to the south and south east of the NGET Creyke Beck substation. The Applicant understands that Dogger Bank Creyke Beck will be connecting to the north and north east of the NGET Creyke Beck substation, thereby supporting the reduction in the 400 kV area. Discussions are ongoing with Dogger Bank Creyke Beck in respect of the overlapping Order limits.

6.2.1.3 It is within this area that a maximum 40 m permanent easement will be taken within a 60 m temporary working cable corridor. The 40 m permanent easement will house a maximum of four circuits and 12 400 kV onshore export cables. For further details see Section 4 of **Volume A1, Chapter 4: Project Description**.