NORTH FALLS

Offshore Wind Farm

Appendix to Applicant's Response to Written Questions (ExQ1)

Document Reference:	9.19.1
Volume:	9
Date:	March 2025
Revision:	0

NORTH FALLS
Offshore Wind Farm

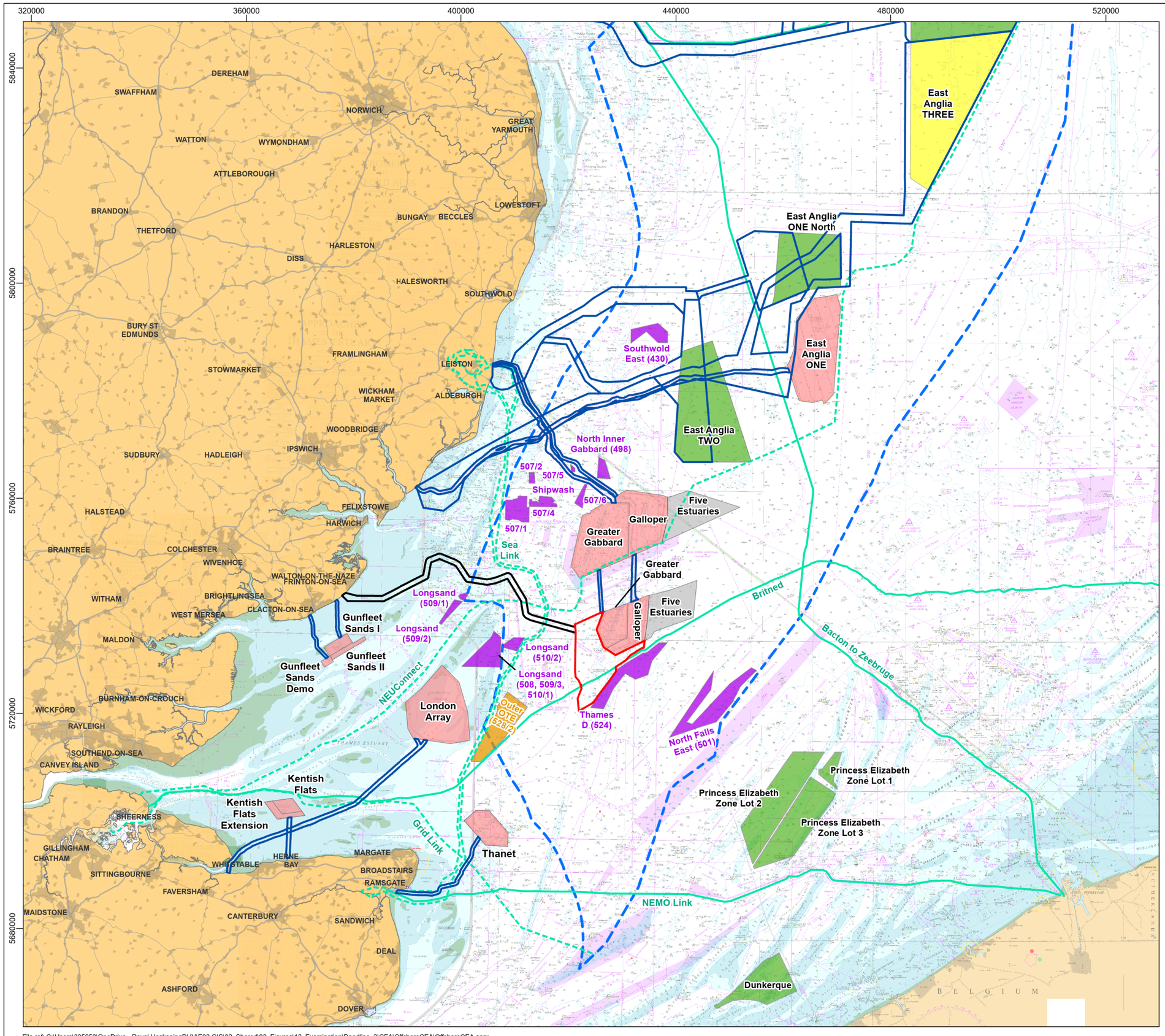
Project	North Falls Offshore Wind Farm
Document Title	Appendix to Applicant's Response to Written Questions
Document Reference	9.19.1
Supplier	Royal HaskoningDHV
Supplier Document ID	PB2944-RHD-ZZ-ON-RP-0349

Revision	Date	Status/Reason for Issue	Originator	Checked	Approved
0	March 2025	Deadline 2	RHDHV	NFOW	NFOW

Table of Contents

This appendix has been produced to support the Applicant's Response to Written Questions and should be read alongside the Applicant's Response to Written Questions (ExQ1) (Rev 0) **(Document Reference: 9.19)**.

Q1.2.1a OFFSHORE CUMULATIVE EFFECTS ASSESSMENT PLAN



Legend

- North Falls Array Area
- North Falls Offshore Cable Corridor
- East Anglia Shipping Waters Marine Character Area (SCA04)
- Offshore Wind Farm Cable Agreement

Offshore Wind Farm Sites

- Active/In Operation
- Consented
- Under Construction
- In Planning

Interconnectors

- Existing
- Proposed (Indicative)

Minerals Aggregates

- Exploration and Option Area
- Production Agreement Area

0 5 10 20 nm

0 10 20 40 km

N

Drawing Title

Offshore Cumulative Effects Assessment Plan

Rev	Date	Remarks	Drwn	Chkd
01	28/02/2025	First issue	FC	GK

Drawing Number	Figure Number
PB9244-RHD-ZZ-ON-DR-GS-0644	Q1.2.1a

Scale	Plot Size	Datum	Projection
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NORTH FALLS
Offshore Wind Farm

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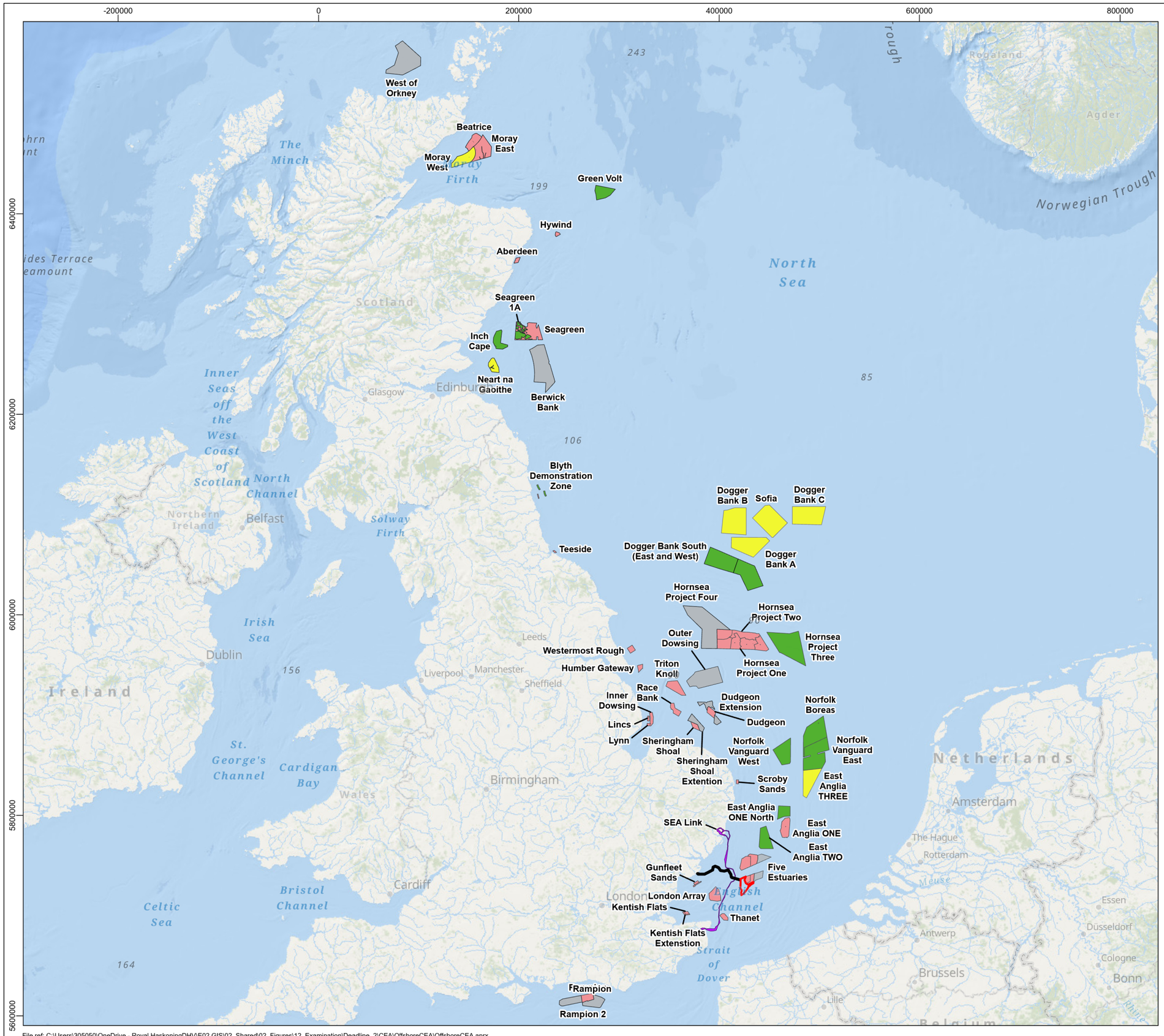
Q1.2.1b OFFSHORE ORNITHOLOGY CUMULATIVE EFFECTS ASSESSMENT PLAN



Legend

- North Falls Array Area
- North Falls Offshore Cable Corridor
- South & East Anglia (SEA) Link

Offshore Wind Farm Sites

- Active/In Operation
- Under Construction
- Consented
- In Planning

0 25 50 100 nm

0 50 100 200 km

N

Drawing Title

Offshore Ornithology Cumulative Effects Assessment Plan

Rev	Date	Remarks	Drwn	Chkd
01	28/02/2025	First issue	FC	GK

Drawing Number	Figure Number
PB9244-RHD-ZZ-ON-DR-GS-0645	Q1.2.1.b

Scale	Plot Size	Datum	Projection
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Offshore Wind Farm

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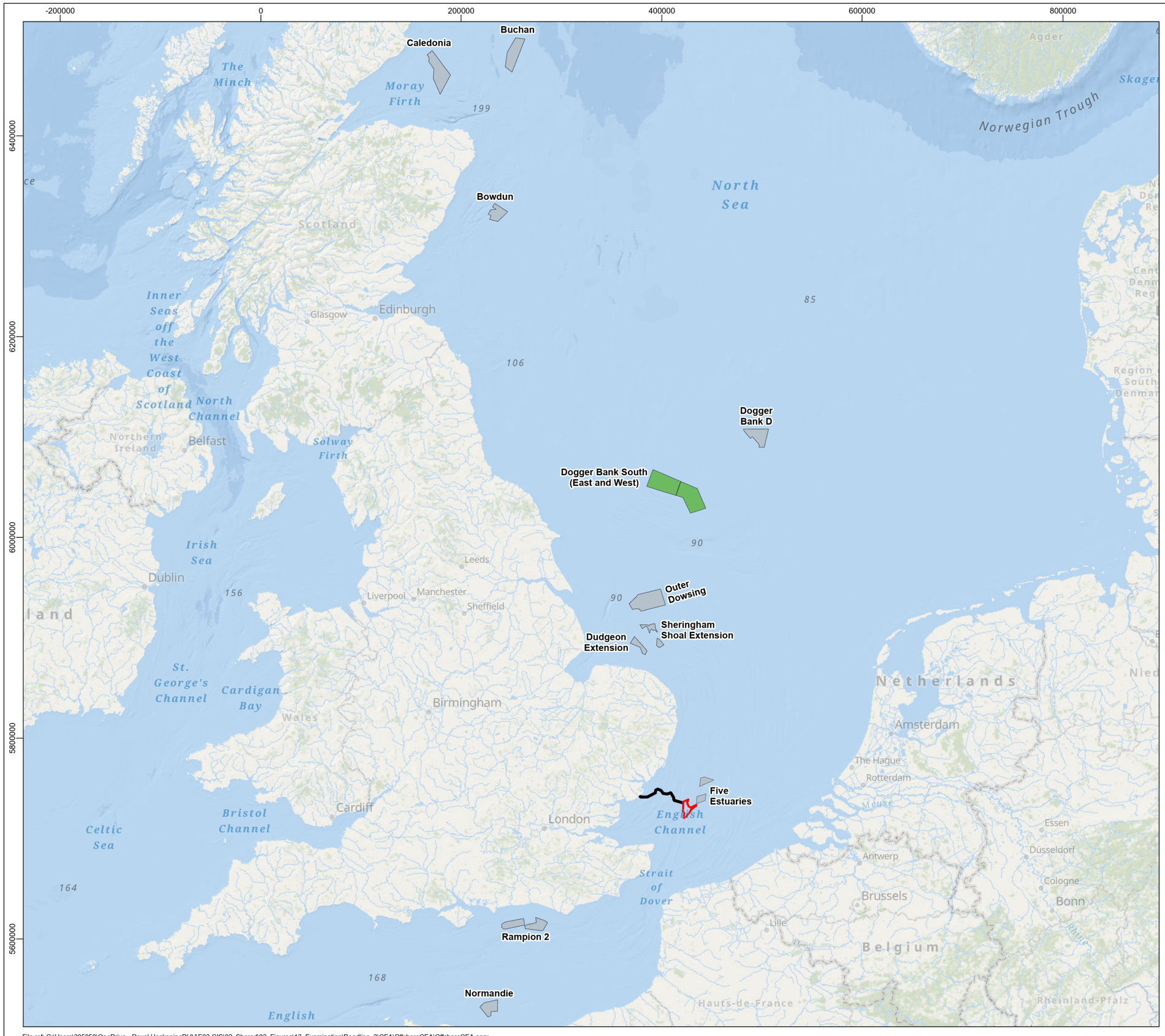
Q1.2.1c MARINE MAMMALS CUMULATIVE EFFECTS ASSESSMENT PLAN



Legend

- North Falls Array Area
- North Falls Offshore Cable Corridor

Offshore Wind Farm Sites

- Consented
- In Planning

0 25 50 100 nm

0 50 100 200 km

N

Drawing Title

Marine Mammals Cumulative Effects Assessment Plan

Rev	Date	Remarks	Drwn	Chkd
01	28/02/2025	First issue	FC	GK

Drawing Number	Figure Number
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Offshore Wind Farm

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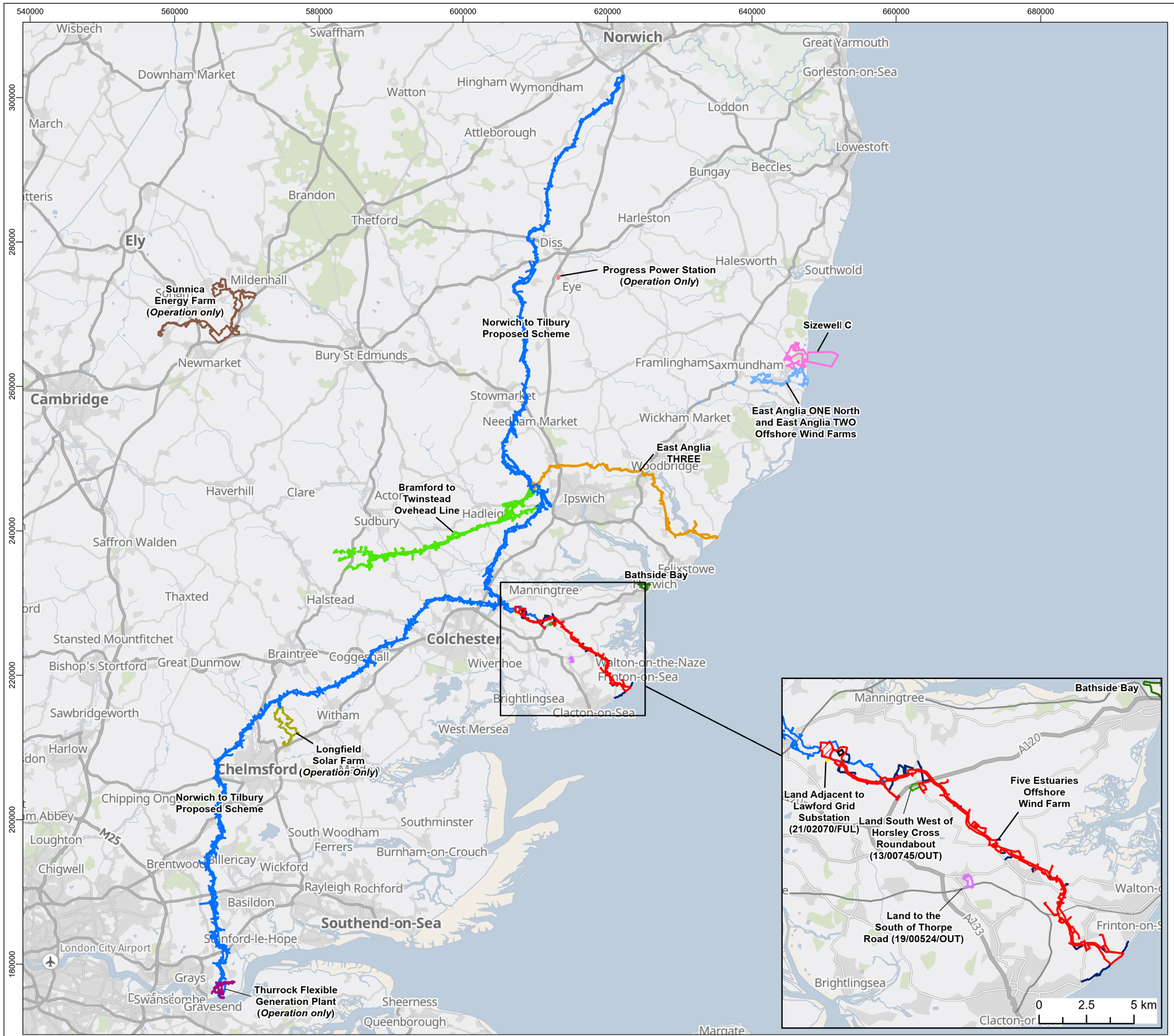
Q1.2.1d ONSHORE CUMULATIVE EFFECTS ASSESSMENT PLAN



Legend

- Onshore Project Area
- Onshore Substation
- East Anglia Connection Node (EACN)

Onshore Developments Screened into Cumulative Assessment

- Five Estuaries Offshore Wind Farm
- Land South West of Horsley Cross Roundabout (13/00745/OUT)
- Land to the South of Thorpe Road (19/00524/OUT)
- Land Adjacent to Lawford Grid Substation (21/02070/FUL)
- Bramford to Twinstead Overhead Line
- Bathside Bay
- East Anglia ONE North and East Anglia TWO Offshore Wind Farms
- East Anglia THREE
- Longfield Solar Farm (*Operation only*)
- Norwich to Tilbury Proposed Scheme
- Progress Power Station (*Operation only*)
- Sunnica Energy Farm (*Operation only*)
- Thurrock Flexible Generation Plant (*Operation only*)
- Sizewell C

0 5 10 20 km

N

Drawing Title

Onshore Cumulative Effects Assessment Plan

Rev	Date	Remarks	Drwn	Chkd
01	14/02/2025	First issue	FC	GC

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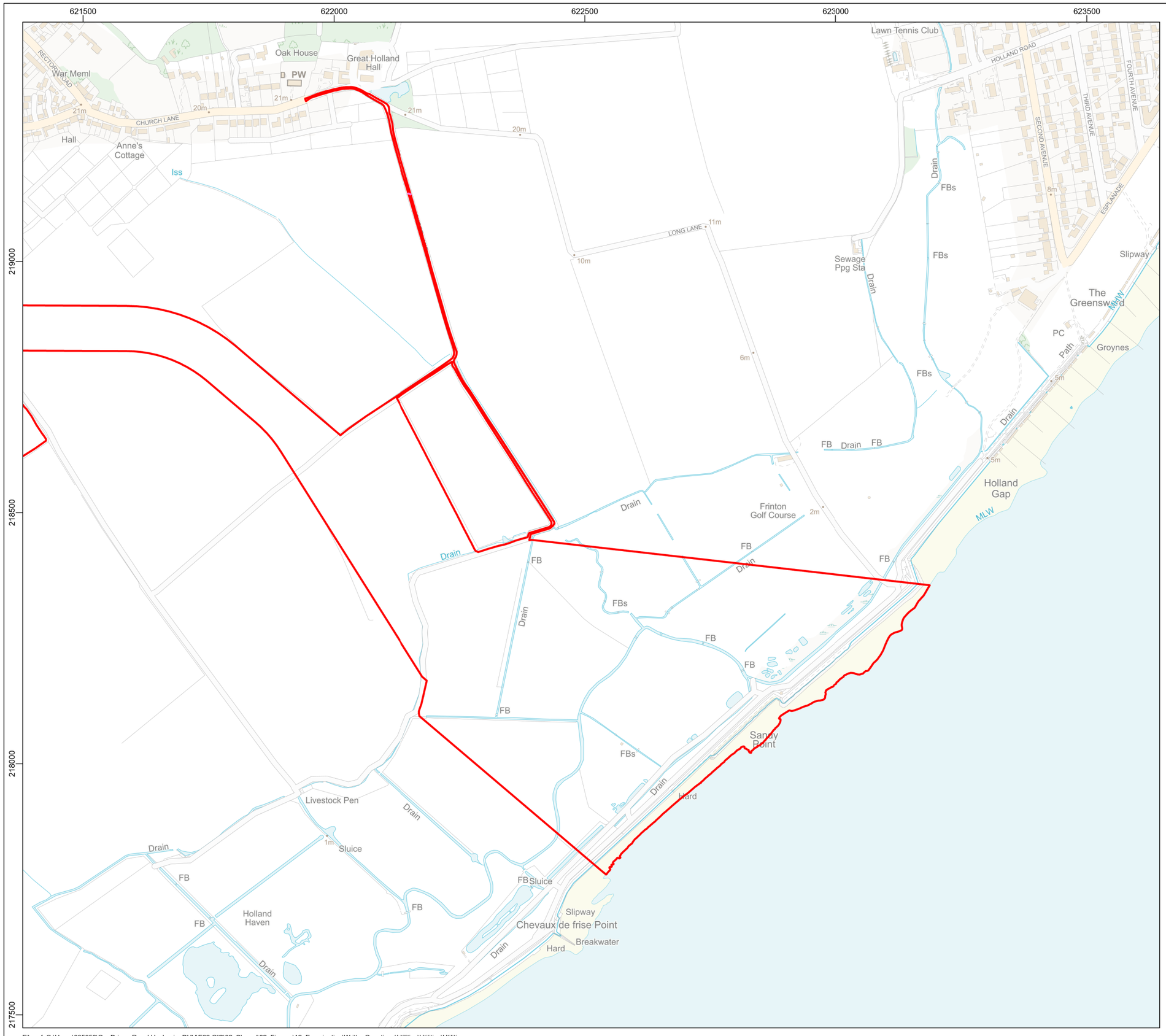
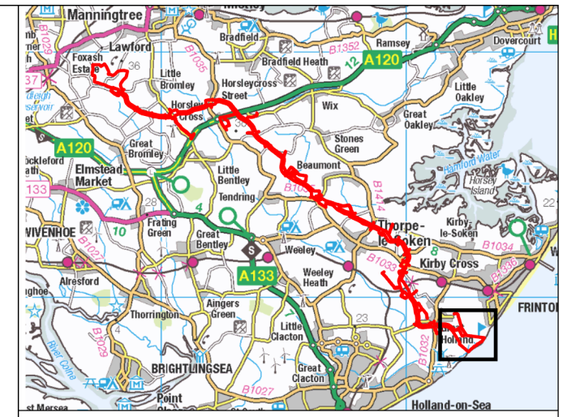
Q2.1.6 UTILITIES CROSSING PLAN





Legend

Onshore Project Area

Utilities

Sewerage - Anglian Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 1 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

Drawing Number	Figure Number
PB9244-RHD-ZZ-ON-DR-GS-0639	Q2.1.6

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Offshore Wind Farm

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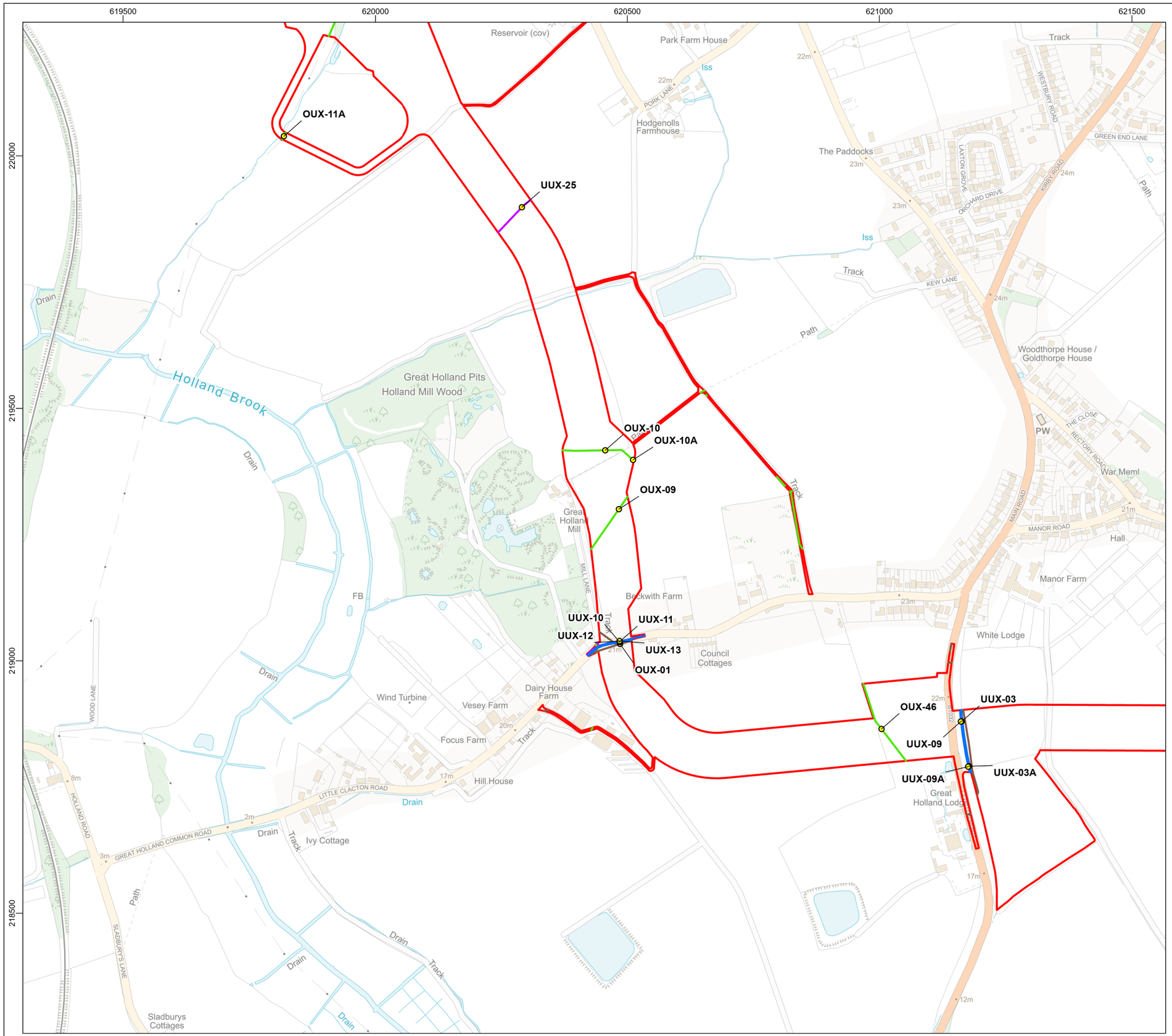

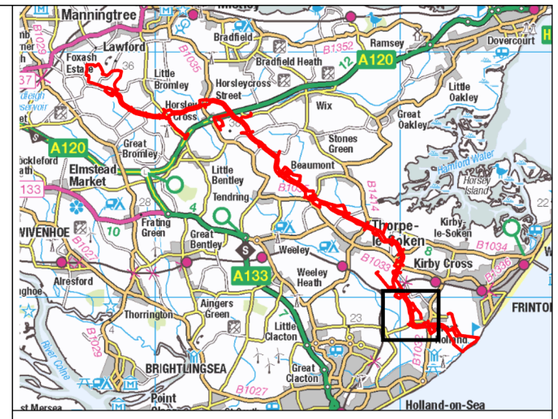

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Gas - Cadent
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 2 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

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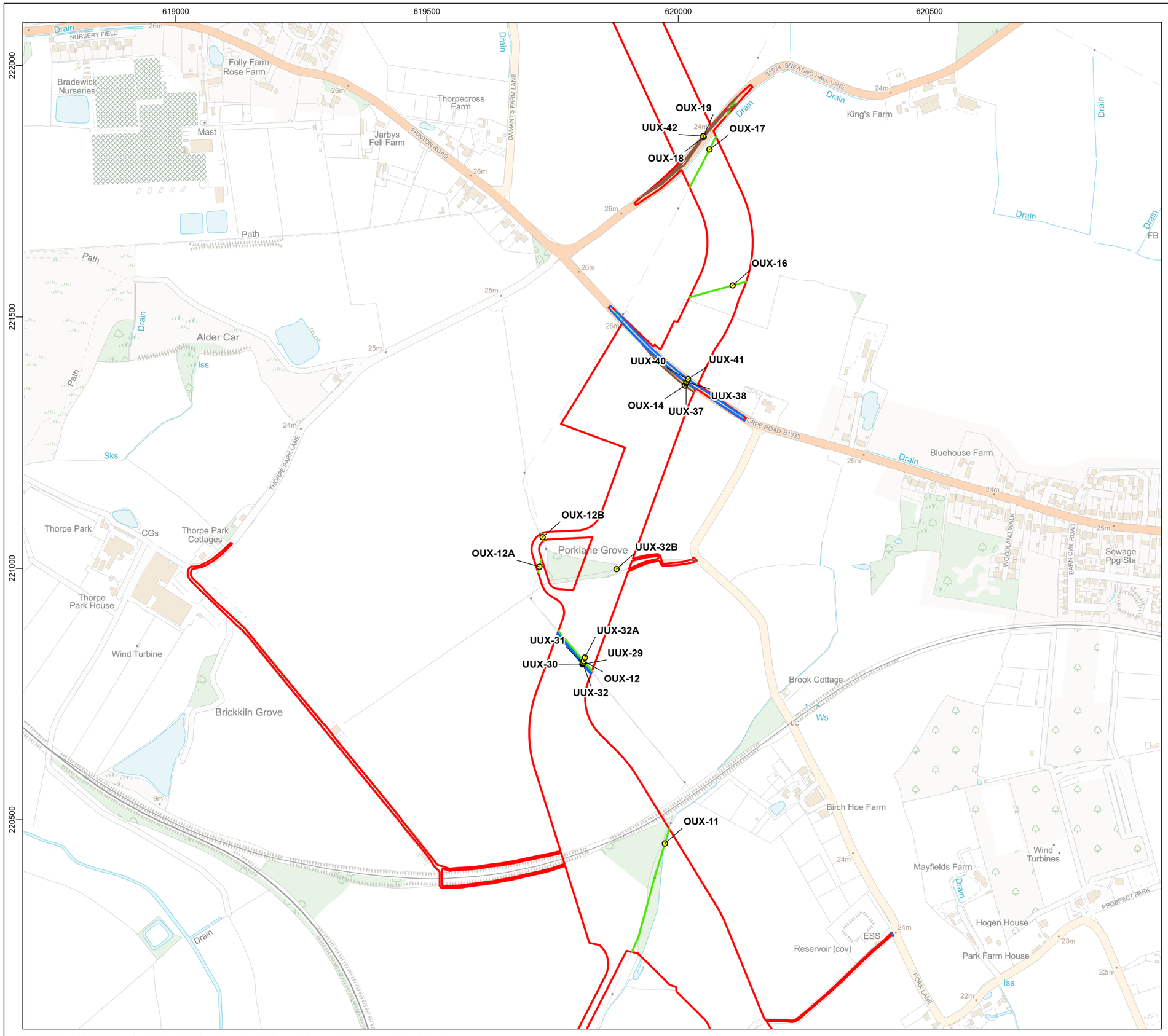

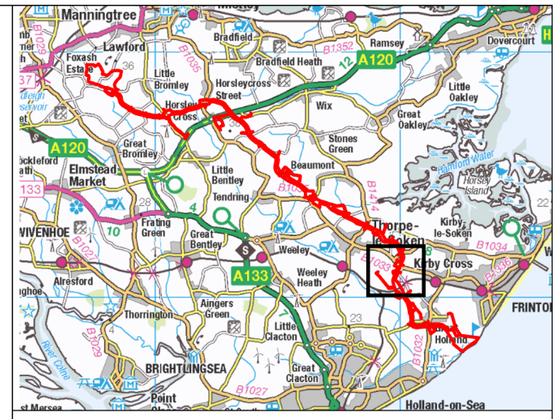

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 3 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

Drawing Number	Figure Number
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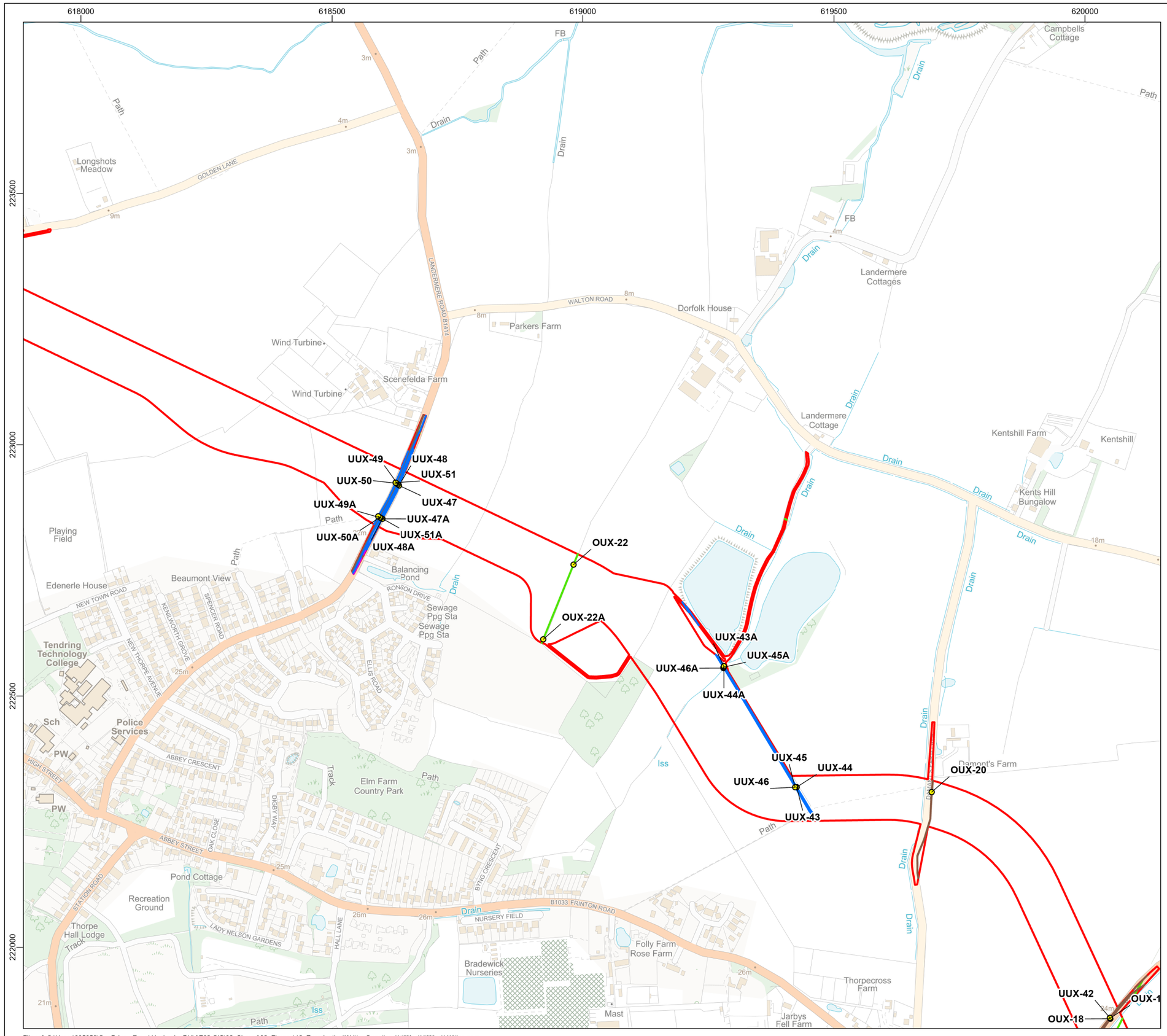

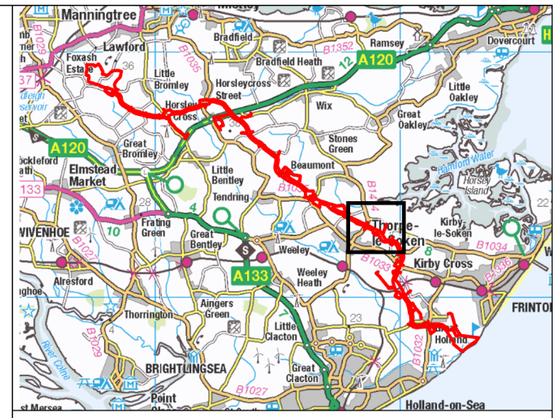

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Gas - Cadent
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 4 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

Drawing Number	Figure Number
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Offshore Wind Farm

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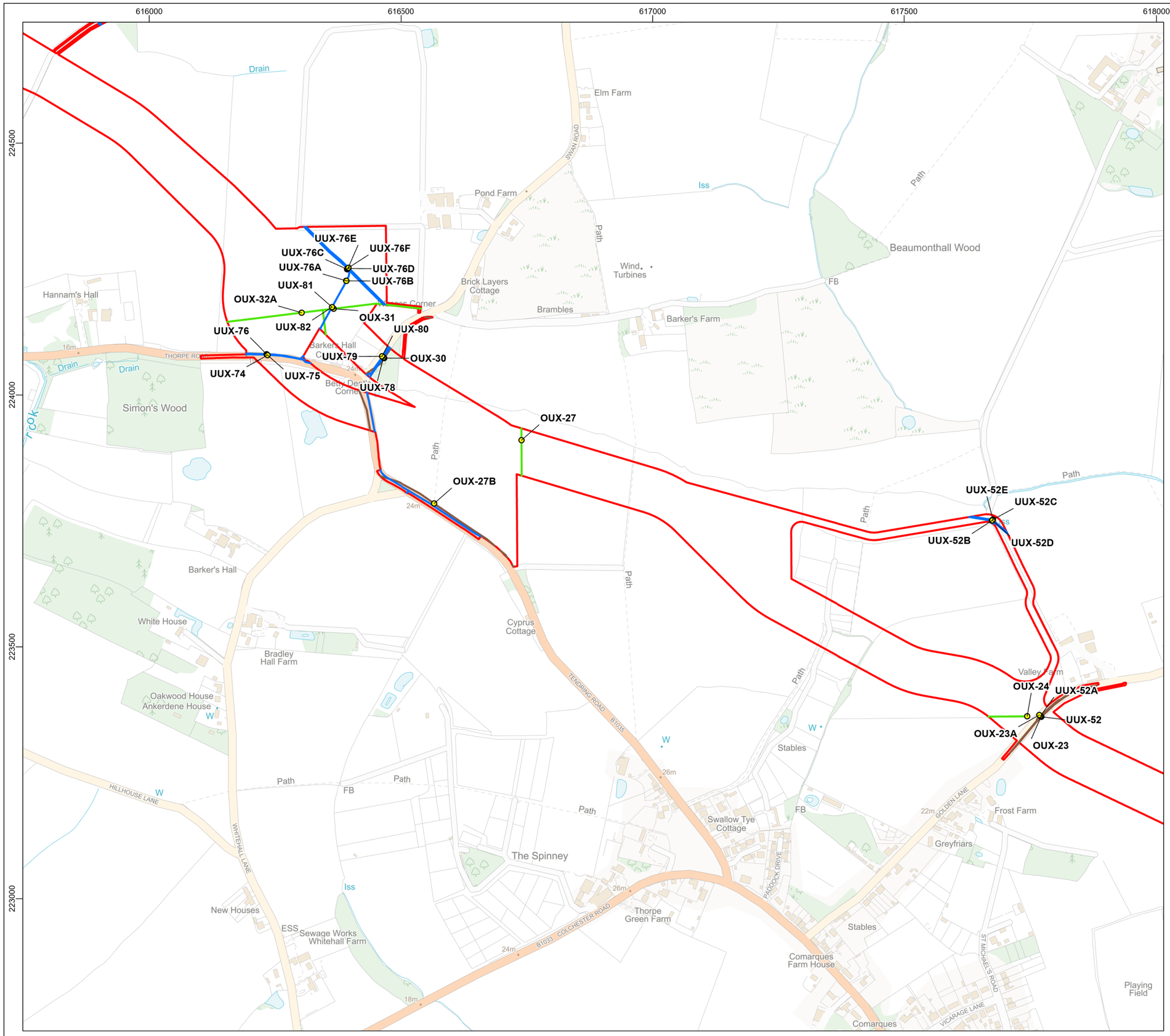

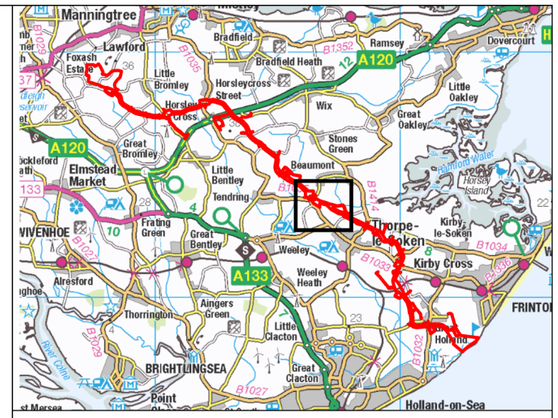

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 5 of 10

Rev	Date	Remarks	Drwn	Chkd
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Drawing Number	Figure Number
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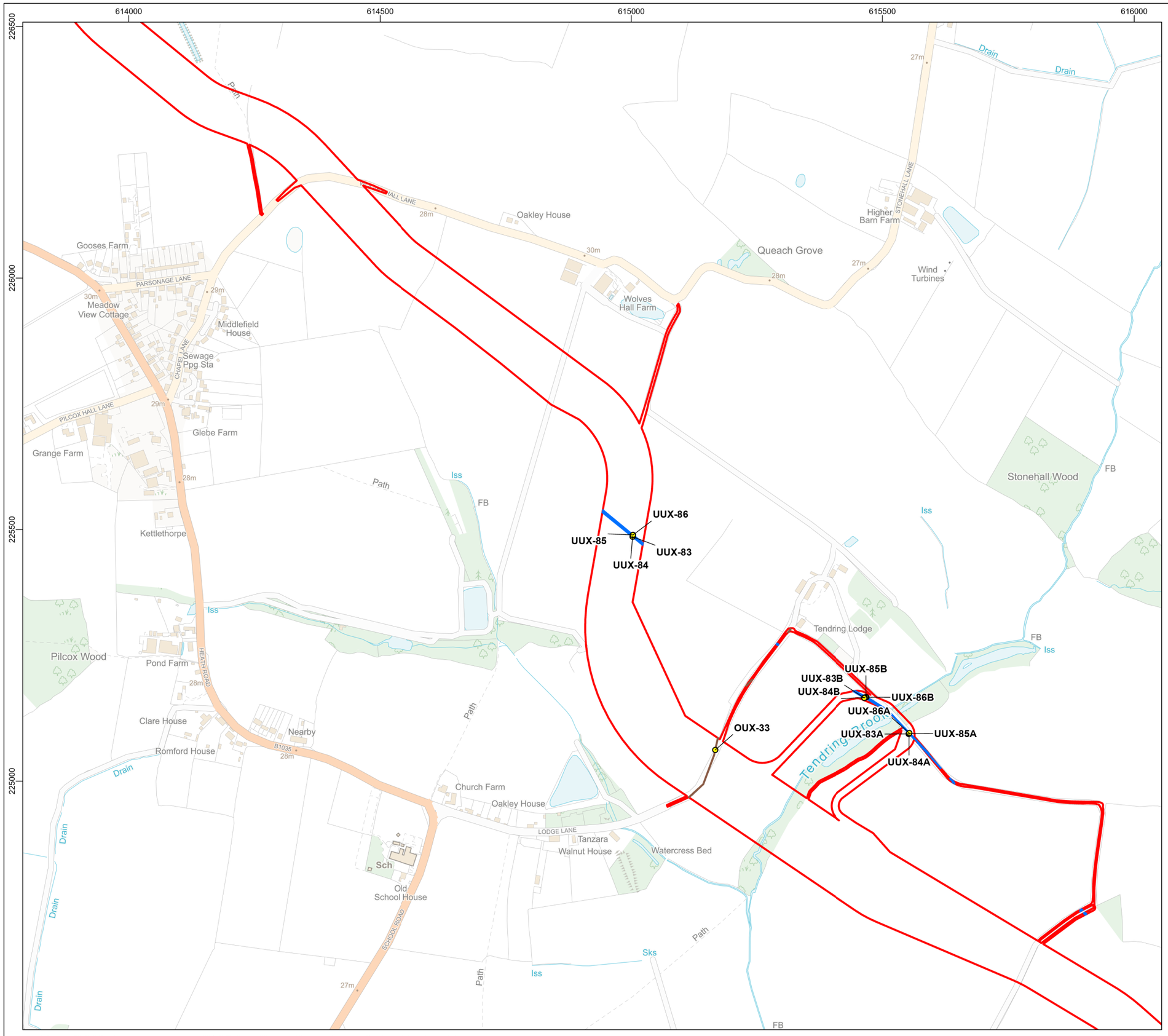

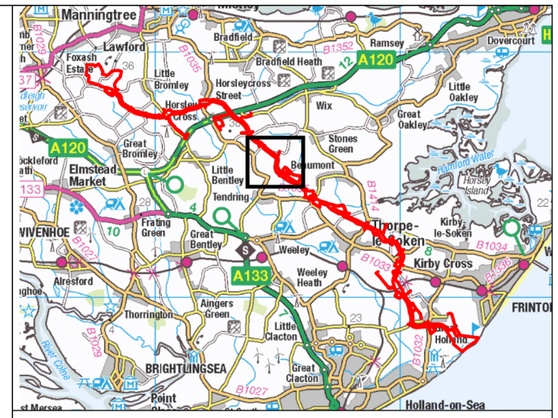

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 6 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

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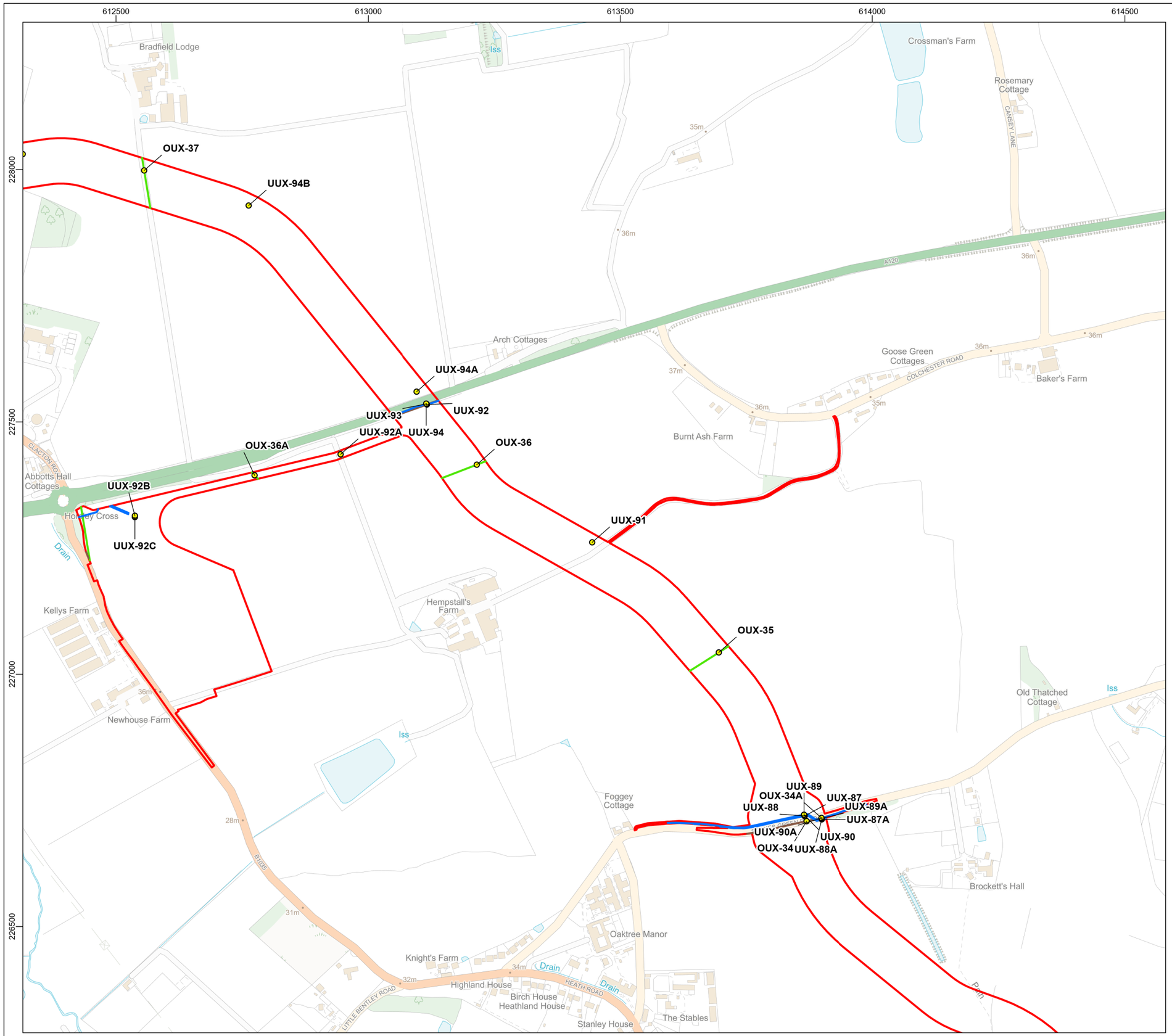

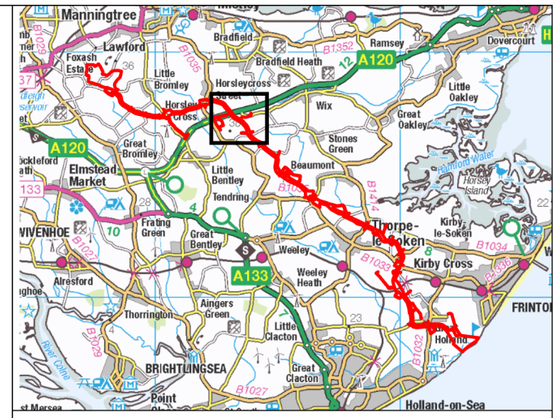

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 7 of 10

Rev	Date	Remarks	Drwn	Chkd
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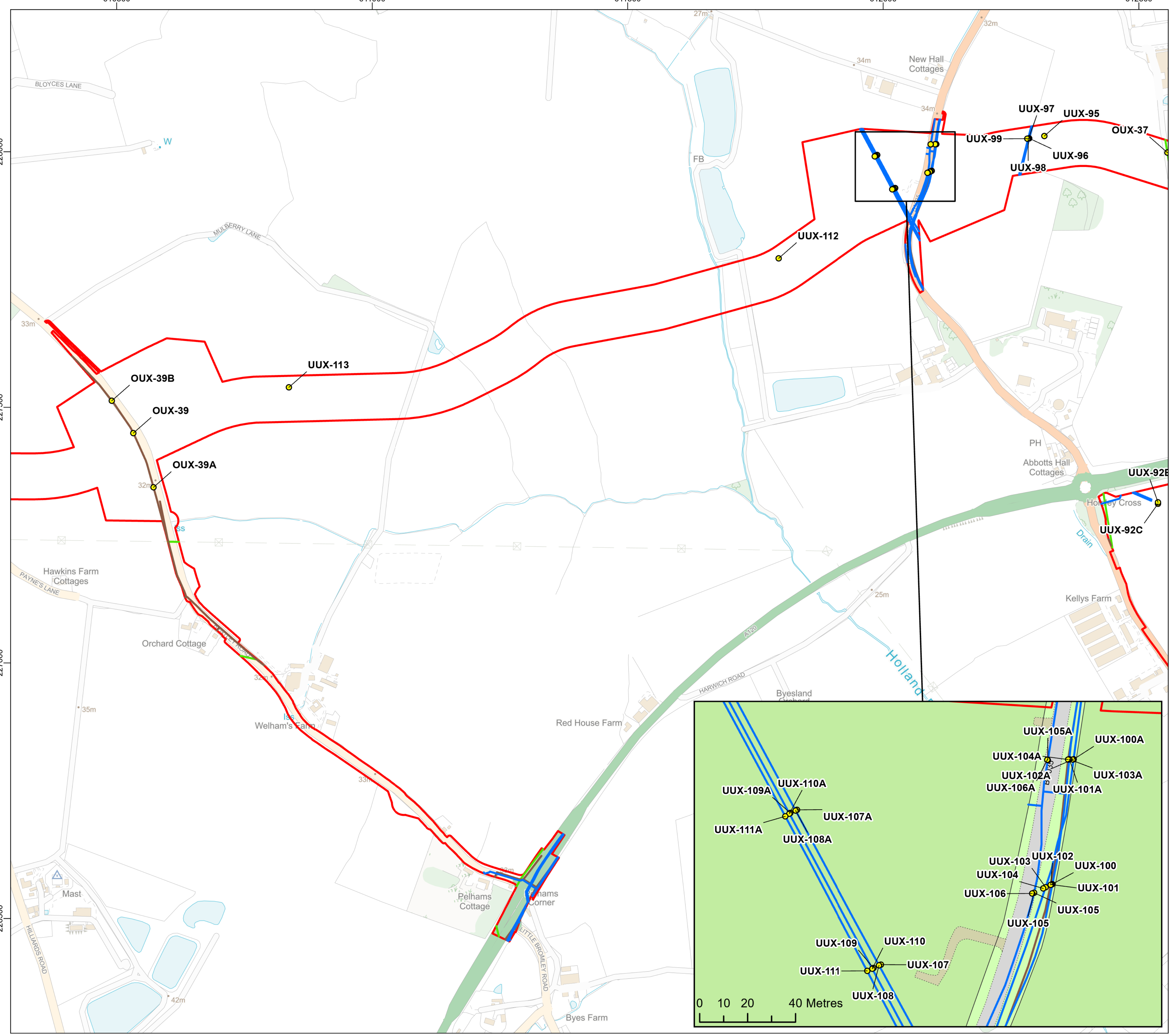

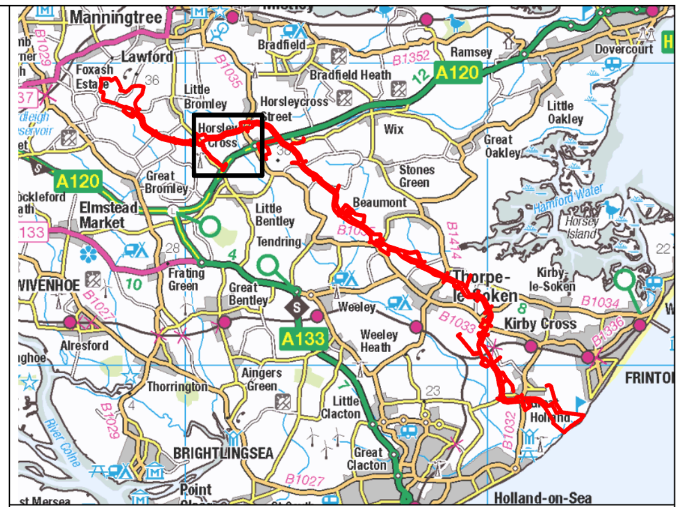

Legend

Onshore Project Area

Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

Electric - UK Power Network

Telecom - Openreach

Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 8 of 10

Rev	Date	Remarks	Drwn	Chkd
01	12/02/2025	First issue	FC	GC

Drawing Number	Figure Number
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608500 609000 609500 610000 610500

228000 227500 227000 226500

Braham Hall Bungalow
War Meml
33m
34m
BLOYCES LANE
The Old Blacksmiths
PH
Mulley's Farm
MULBERRY LANE
CHURCH ROAD
Path
Wind Turbine
Coach House
Hall Farm
PW
34m
Drain
The Old Rectory
33m
BARLON ROAD
SPRATTS LANE
OUX-42
OUX-41
OUX-39B
OUX-39
OUX-39A
32m
BENTLEY ROAD
LANE
Path
FB
Barlon House
LITTLE BROMLEY ROAD
Iss
Triangle Farm
Hiskeys Poultry Farm
Hawkins Farm Cottages
Orchard Cottage
Wind Turbines
Badley Hall Cottage
BADLEY HALL ROAD
Badley Hall Farm
Sheep Wash
Sparling's Hall
35m
Hilliards
HILLIARDS ROAD
MOREBARN ROAD
30m
Lee View
Mast
COCK LANE

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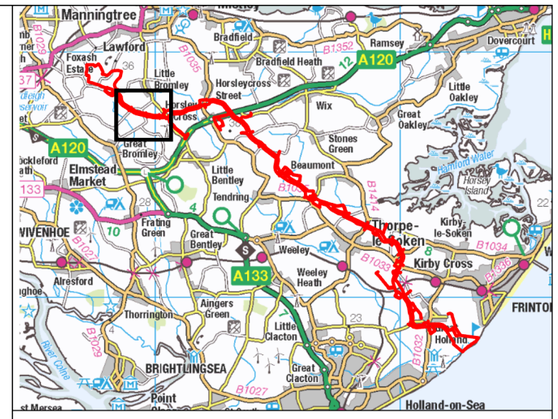

Legend

- Onshore Project Area
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Telecom - Openreach

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 9 of 10

Rev	Date	Remarks	Drwn	Chkd
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Drawing Number	Figure Number
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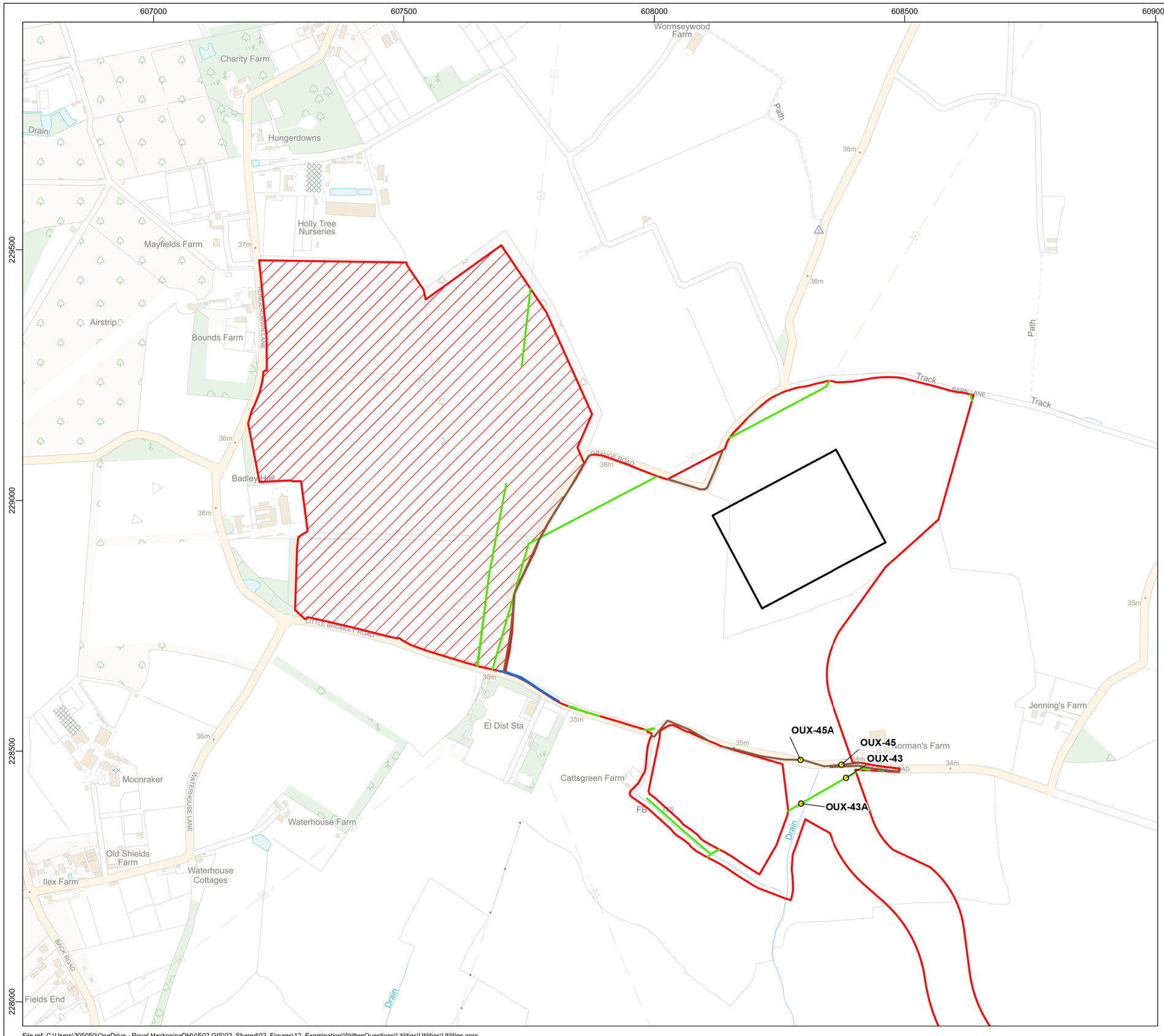

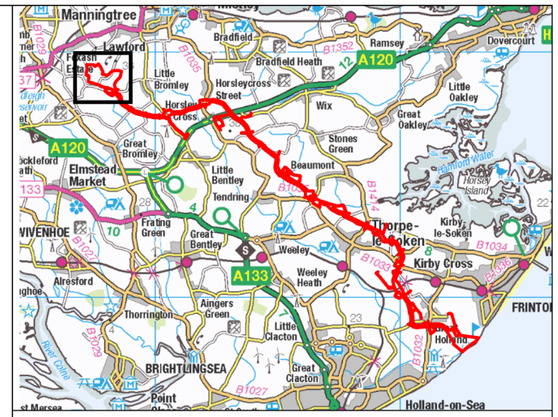

Legend

- Onshore Project Area
- Onshore Substation
- East Anglia Connection Node (EACN)
- Utilities Crossing (3.3.2 Environmental Statement Appendix 5.1 Crossing Schedule **[APP-092]**

Utilities

- Electric - UK Power Network
- Telecom - Openreach
- Water - Affinity Water

0 100 200 400 Metres

N

Drawing Title

Utilities Crossings Plan - Sheet 10 of 10

Rev	Date	Remarks	Drwn	Chkd
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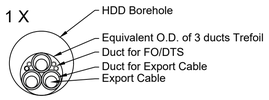
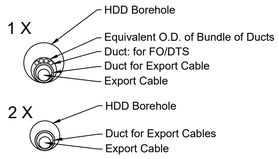
Q3.1.11 INDICATIVE CROSS-SECTIONS FOR SIMPLE AND COMPLEX TRENCHLESS CROSSINGS (4 CIRCUITS)

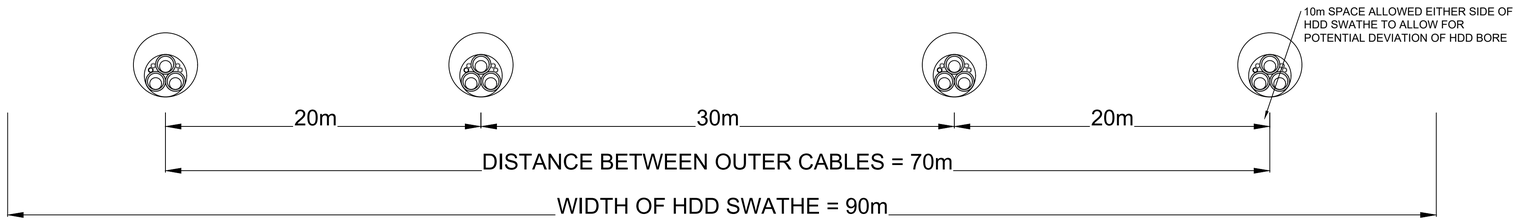
TREFOIL ARRANGEMENT - INDICATIVE SCHEMATIC OF DUCTS FOR SINGLE CIRCUIT



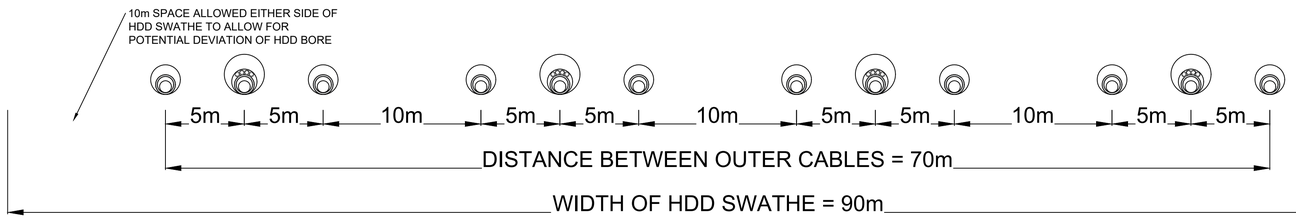
FLAT ARRANGMENT - INDICATIVE SCHEMATIC OF DUCTS FOR SINGLE CIRCUIT



SCHEMATIC OF COMBINED FIVE ESTUARIES AND NORTH FALLS OFFSHORE WIND FARMS HDD FOR FOUR CIRCUITS IN TREFOIL ARRANGEMENT <5m DEPTH (SCHEMATIC ONLY - NTS)



SCHEMATIC OF COMBINED FIVE ESTUARIES AND NORTH FALLS OFFSHORE WIND FARMS HDD FOR FOUR CIRCUITS IN FLAT ARRANGEMENT BETWEEN 5m AND 10m DEPTH (SCHEMATIC ONLY - NTS)



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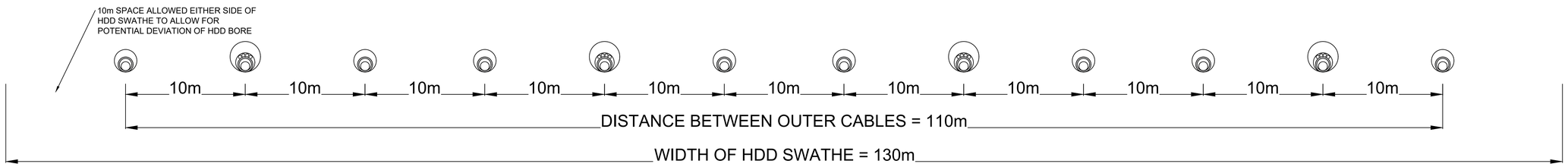


DO NOT SCALE FROM THIS DRAWING

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. ELECTRICAL CABLE DUCTS PRESENTED ARE FOR ILLUSTRATION ONLY.
3. CIRCUIT SEPARATIONS FOR LESS THAN 5m DEEP HDD PRESENTED ARE BASED ON PARAMETERS PROVIDED BY RWE WITHIN CONSTRAINTS SUMMARY DOCUMENT (RWE ECODOC REFERENCE 004568388–02).
4. CABLE AND CIRCUIT SEPARATIONS FOR 5–10m DEEP HDD PRESENTED ARE BASED ON PARAMETERS PROVIDED BY RWE WITHIN CONSTRAINTS SUMMARY DOCUMENT (RWE ECODOC REFERENCE 004568388–02). SPACING IS WIDER THAN MINIMUM REQUIRED FOR ELECTRICAL SEPARATION BUT PROVIDES MORE COMFORT IN HDD FEASIBILITY AND WILL ALLOW FOR SLIGHTLY GREATER HDD DEPTHS / VARIATIONS IN ELECTRICAL ASSUMPTIONS.
5. CABLE AND CIRCUIT SEPARATIONS FOR 10–20m DEEP HDD PRESENTED ARE BASED ON PARAMETERS PROVIDE BY RWE WITHIN MEETING OF 4TH MAY 2022 AND PRESENTED WITHIN CONSTRAINTS SUMMARY DOCUMENT (RWE ECODOC REFERENCE 004568388–02).
6. DRAWING INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN. GROUND CONDITIONS AT LOCATION OF HDD CROSSING IS CURRENTLY UNKNOWN AND SWATHE WIDTH REQUIREMENT AT CROSSINGS IS TBC.

REV	DATE	REASON FOR ISSUE	BY	CHK	APP
02	13/02/2023	UPDATE TO REFLECT CABLE SPACINGS WITHIN DOCUMENT 004568388-02, TO SHOW CABLES WITHIN DUCTS AND INCLUSION OF SCHEMATIC OF DUCTS IN SINGLE CIRCUIT.	PM	NP	AH
01	06/02/2023	DRAFT FOR COMMENT	PM	AH	AH

FIVE ESTUARIES OFFSHORE WIND FARM

NORTH FALLS Offshore Wind Farm

wardell armstrong

PROJECT TITLE
FIVE ESTUARIES / NORTH FALLS OFFSHORE WIND FARMS

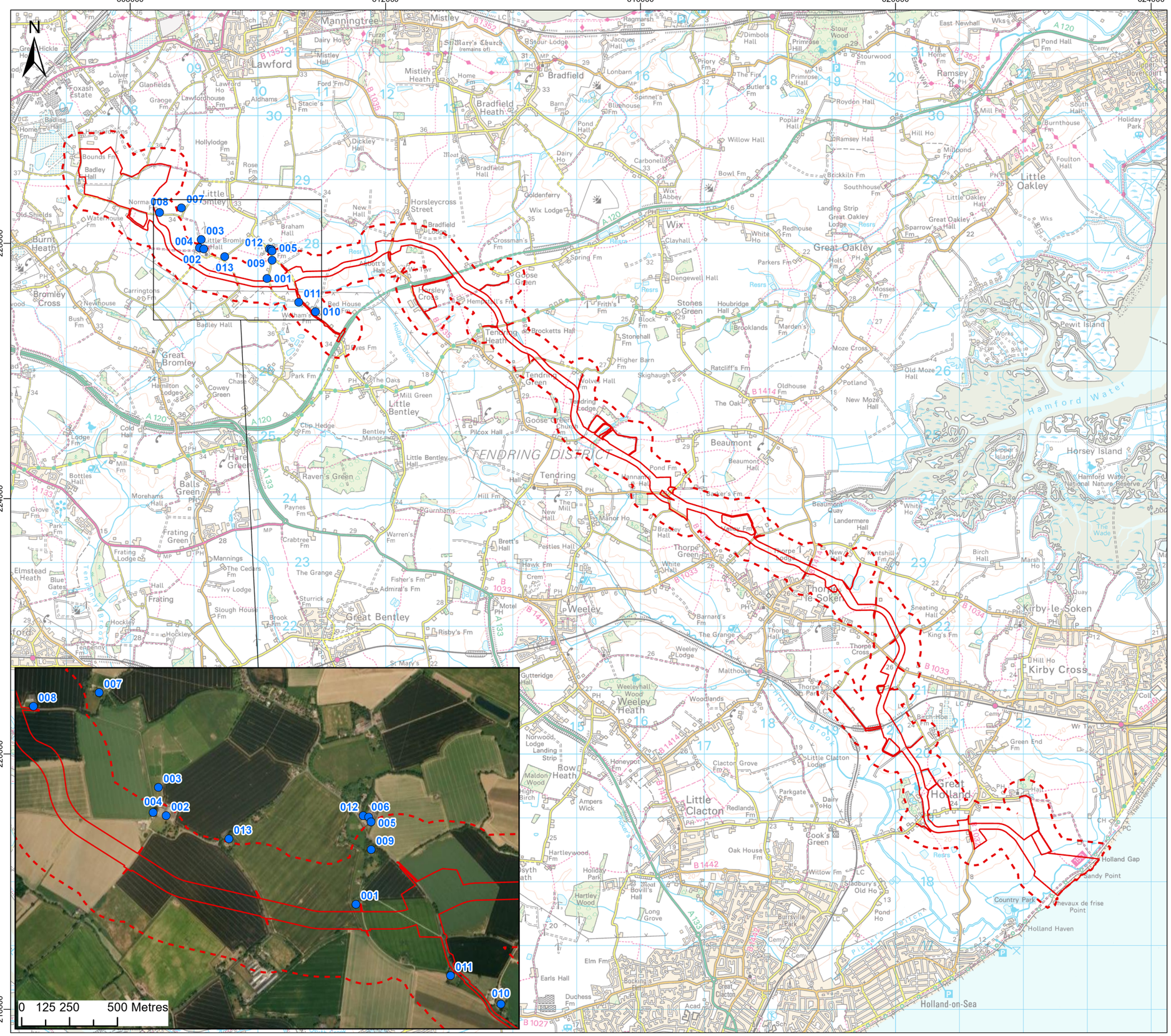
DRAWING TITLE
INDICATIVE HDD SCHEMATICS FOR COMBINED SWATHE WIDTH (4 CIRCUITS)

DRAWING STATUS
DRAFT-FOR-COMMENT

SHEET SIZE	DESIGNED	DRAWN	CHECKED	APPROVED
A1	PM	PM	NP	AH
SHEET SCALE	DATE	DATE	DATE	DATE
NTS	06/02/2023	13/02/2023	13/02/2023	13/02/2023

WA DRAWING NUMBER	REVISION
ED13538-GE-1041	02
VE DOCUMENT NUMBER	REVISION
VE-WAR-V2-XX-M2-C-0037-B	02
RWE ECODOC NUMBER / SHEET No	REVISION
TBC / 001 OF 001	-

Q11.1.7 GROUNDWATER MONITORING POINTS



Legend

🟥 Onshore Project Area

▭ Onshore Project Area (250m Buffer)

● Groundwater Monitoring Location

0 1 2 4 km

N

Data Source: © Wardell Armstrong, 2025. © HaskoningDHV UK Ltd. 2025.
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Drawing Title

Groundwater Monitoring Points

Rev	Date	Remarks	Drwn	Chkd
01	25/02/2025	First issue	FC	GC

Drawing Number	Figure Number
PB9244-RHD-ZZ-ON-DR-GS-0642	Q11.1.7

Scale	Plot Size	Datum	Projection
1:60,000	A3	OSGB36	BNG

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NORTH FALLS
Offshore Wind Farm

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Q14.1.11 SEASCAPE SENSITIVITY TO OFFSHORE WIND FARMS - FINAL REPORT (WHITE CONSULTANTS, OCTOBER 2020)

Suffolk

Seascape sensitivity to offshore wind farms

Final Report

for

Suffolk County Council
Suffolk Coast and Heaths AONB Partnership

October 2020

white CONSULTANTS

with Northumbria University

Suffolk

Seascape sensitivity to offshore wind farms

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October 2020

white CONSULTANTS

with Northumbria University

CONTENTS

FIGURES

PART 1: Overview, method and summary of findings

1. Introduction

1.1. White Consultants were appointed in June 2020 to carry out a seascape sensitivity study for offshore wind farms located in the inshore and offshore waters off the Suffolk coast. The study was commissioned and funded by Suffolk County Council and Suffolk Coast and Heaths AONB Partnership in consultation with East Suffolk Council and Natural England. Northumbria University provided GIS and mapping support.

1.2. The brief states that the intention is that the Seascape Sensitivity Study will contribute to the baseline evidence for Seascape, Landscape and Visual Impact Assessments (SLVIAs) and development of the proposals for a series of proposed developments in Suffolk's waters and coast consisting of two offshore wind farm extensions (Gabbard and Galloper), East Anglia 1N and 2 and East Anglia 3 (consented, but currently subject to amendments). Beyond that it will contribute to the development of proposals arising from the Crown Estate Round 4 seabed allocation.

1.3. The brief further indicates that the scope of the sensitivity study should focus on identifying how the sensitivity of seascape interacts with the sensitivity of adjacent coastal landscapes and designations in *Suffolk* including both Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) and areas outside it.

1.4. The study area is defined by the area of the existing local seascape character study within the UK Marine plan area.

1.5. This report is the final report combining the Stage 1 desk study report with the findings of the site visit to the coast. Part 1 of this report sets out policy considerations, the method used to define zones for assessment and the assessment of seascape and visual sensitivity and then summarises the findings with figures. Part 2 sets out the assessment of each defined seascape zone. The factors influencing the sensitivity of seascape zones are included in Appendix A. Appendix B considers visibility distances derived from local weather stations data. Appendix C sets out details of the site visit. The study is a technical exercise and the report uses a number of technical terms for precision and as a means for reaching conclusions. These terms are defined in the Glossary in Appendix D along with abbreviations used.

2. Consideration of Policy

2.1. The review of policy is derived from our previous reports on OESEA seascape visual buffers study (BEIS, 2020) and approach to seascape sensitivity (MMO, 2020) with an additional focus on the study area.

UK National Policy Statements

2.2. The UK Government produces National Policy Statements (NPSs) under the Planning Act (2008) which sets out Government policy for the development of Nationally Significant Infrastructure Projects (NSIPs). National policy statements EN-1 and EN-3 address national infrastructure planning in relation to renewable energy including offshore wind farms with an output above 100MW but are a material consideration for smaller projects.

2.3. **EN-1** states that virtually all nationally significant energy infrastructure projects will have effects on the landscape/seascape. Projects need to be designed carefully taking account of the potential impacts. The aim should be to minimise harm, providing reasonable mitigation where possible and appropriate (5.9.8). It reasserts that National Parks and AONBs have been confirmed as having the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help to ensure their continued protection and which the decision-maker should have regard to in its decisions. The conservation of the natural beauty of the landscape and countryside should be given substantial weight by the decision-maker in deciding on applications for development consent in these areas. The same test applies to projects outside the designation boundaries which may have impacts within them (5.9.12). Therefore, both offshore wind farms and associated land-based infrastructure need to take this into consideration. The aim should be to avoid compromising the purposes of designations. This policy is a key driver in defining how the assessment of sensitivity is carried out.

2.4. Outside nationally designated areas, landscapes may be highly valued locally and protected by local landscape designation. However, these factors in themselves should not be used to refuse consent. The decision maker should judge whether any adverse impact is so damaging that it is not offset by the benefits of the project.

2.5. **EN-3** considers the seascape and visual effects of offshore windfarms in more detail. It sets out three principal considerations on the likely effect of offshore windfarms on the coast:

- Limit of visual perception from the coast
- Individual characteristics of the coast which affect its capacity to absorb a development
- How people perceive and interact with the seascape (2.6.203).

2.6. In terms of mitigation, it states that neither the design or scale of individual wind turbines can be changed without significantly affecting the output of the development so, instead, the layout of the turbines should be designed appropriately to minimise harm (2.6.210).

2.7. For smaller projects (below 100 MW) the Marine and Coastal Access Act (2009) indicates that decisions are made by the Marine Plan Authority (MPA). When considering the impact of an activity it states that the MPA should take into account existing character and quality, how highly it is valued and its capacity to accommodate change (2.6.5.3).

AONBs

2.8. The 1949 National Parks and Access to the Countryside Act, formed the basis for designating National Parks and AONBs. The Environment Act 1995 revised the original legislation. The Countryside and Rights of Way Act 2000 (CRoW Act) subsequently acts as the legislative framework protecting AONBs, setting out natural beauty criteria, the designation process and the roles and responsibilities of different organisations.The Section 85 'duty of regard' requires all relevant authorities to have regard to the purpose of AONBs when exercising or performing any functions in relation to, or affecting, these areas.

2.9. The primary purpose of AONBs is to conserve and enhance natural beauty. In pursuing the primary purpose of the designation, account should be taken of the needs of agriculture, forestry and other rural industries and of the economic and social needs of local communities.

2.10. Natural Environment Planning Practice Guidance (PPG) states in relation to AONBs that:

'Land within the setting of these areas often makes an important contribution to maintaining their natural beauty, and where poorly located or designed development can do significant harm. This is especially the case where long views from or to the designated landscape are identified as important, or where the landscape character of land within and adjoining the designated area is complementary. Development within the settings of these areas will therefore need sensitive handling that takes these potential impacts into account.' (Paragraph: 042 Reference ID: 8-042-20190721 Revision date: 21 07 2019)

2.11. It is noted that the Glover review (Landscapes Review, 2019) has made recommendations that AONBs should be strengthened, with increased funding, governance reform, new shared purposes with National Parks, and a greater voice on development. At the time of writing, this is being considered by Government.

2.12. Suffolk Coast and Heaths AONB Partnership sets out landscape character and special qualities along with its vision, aims, objectives and action plan in its Management Plan 2018- 2023. The special qualities are further refined in the Natural Beauty and Special Qualities indicators report (LDA Design, 2016). The relevant indicators are used in the sensitivity assessment. Development in the setting of the AONB is discussed in a position statement, endorsed by the AONB Partnership in December 2015. This indicates that the partnership considers that development in the setting of the AONB that would have a significant adverse impact on the natural beauty and special qualities of the area should not be supported. This in line with Section 85 of the CRoW Act and Natural Environment PPG (paragraph 042).

Heritage Coasts

2.13. Heritage Coasts were established to conserve the best stretches of undeveloped coast in England. They are non-statutory landscape definitions agreed between Natural England and

the relevant maritime authorities. Their purpose is to conserve, protect and enhance the natural beauty of the coastline and related flora and fauna and heritage features. They often overlap with National Parks and AONBs, as in the case of Suffolk, reinforcing the importance of these coasts. The purpose of Heritage Coast definition is similar to that of an AONB. Suffolk Heritage Coast was one of the first three coasts defined by the Countryside Commission in 1973. The Heritage Coast Plan was adopted in 1978. Its policies were subsequently incorporated into the AONB Management Plan which now includes objectives, policies and action that are applied to the Heritage Coast.

2.14. Heritage Coasts also occur in their own right where the hinterland does not have national landscape status. In these cases the National Planning Policy Framework (NPPF) states that planning policies and decisions within areas should be consistent with the special character of the area and the importance of its conservation (173).

2.15. Whilst not a policy document, the OESEA, 2020 report noted that decisions related to offshore wind farms indicated that National Park/AONB and Heritage Coast combined was the most sensitive combination of designations. It indicated that offshore wind farm development along the coast from these combined designations may be acceptable at a distance in seascape terms but not where the development is viewed directly offshore (13.74).

Marine Planning

2.16. The **Marine and Coastal Access Act 2009** introduced eight key measures to help ensure *'clean, healthy, safe, productive and biologically diverse oceans and seas'*. The measures included the introduction of a marine planning system and the setting up of the Marine Management Organisation (MMO) delivering marine functions in English territorial waters and UK offshore waters for matters that are not devolved. The Act requires that all public authorities should undertake planning decisions should do so in accordance with the Marine Planning Statement.

2.17. The **UK Marine Policy Statement** (MPS) (2011) the national policy framework for preparing marine plans throughout the UK. The high level marine objectives (page 11, Box 1) include:

'*Ensuring a strong, healthy and just society:*

People appreciate the diversity of the marine environment, its ***seascapes****, its natural and cultural heritage and its resources and act responsibly*' (this report emphasis).

2.18. The MPS sets out how seascape should be considered in marine spatial planning. It states: '*When developing Marine Plans, marine plan authorities should consider at a strategic level visual, cultural, historical and archaeological impacts not just for those coastal areas that are particularly important for seascape, but for all coastal areas, liaising with terrestrial planning authorities as necessary. In addition, any wider social and economic impacts of a development or activity on coastal landscapes and seascapes should be considered.*' (Defra, 2011, 2.6.5.2)

2.19. It goes on to state: '*In considering the impact of an activity or development on seascape, the marine plan authority should take into account existing character and quality, how highly it is valued and its capacity to accommodate change specific to any development. Landscape Character Assessment methodology may be an aid to this process.*' (Defra, 2011, 2.6.5.3).

2.20. The **East Marine Plan** was the first marine plan to be completed in England, in April 2014. The inshore area extends out from the mean high water mark to the territorial limit. The offshore area extends from the territorial limit to the boundary of the Exclusive Economic Zone. Policy SOC3 (page 58) states that proposals should demonstrate, in order of preference:

a. that they will not adversely impact the terrestrial and marine character of an area

b. how, if there are adverse impacts, they will minimise them

c. how, if they cannot be minimised, they will be mitigated against

d. the case for proceeding with the proposal if it is not possible to minimise or mitigate the adverse impacts

2.21. Seascape character areas have been identified for the East inshore and offshore areas to support the East Marine Plan (URS/Scott Wilson for Natural England, 2012). These are at a national scale and were completed as part of a pilot study to inform seascape character

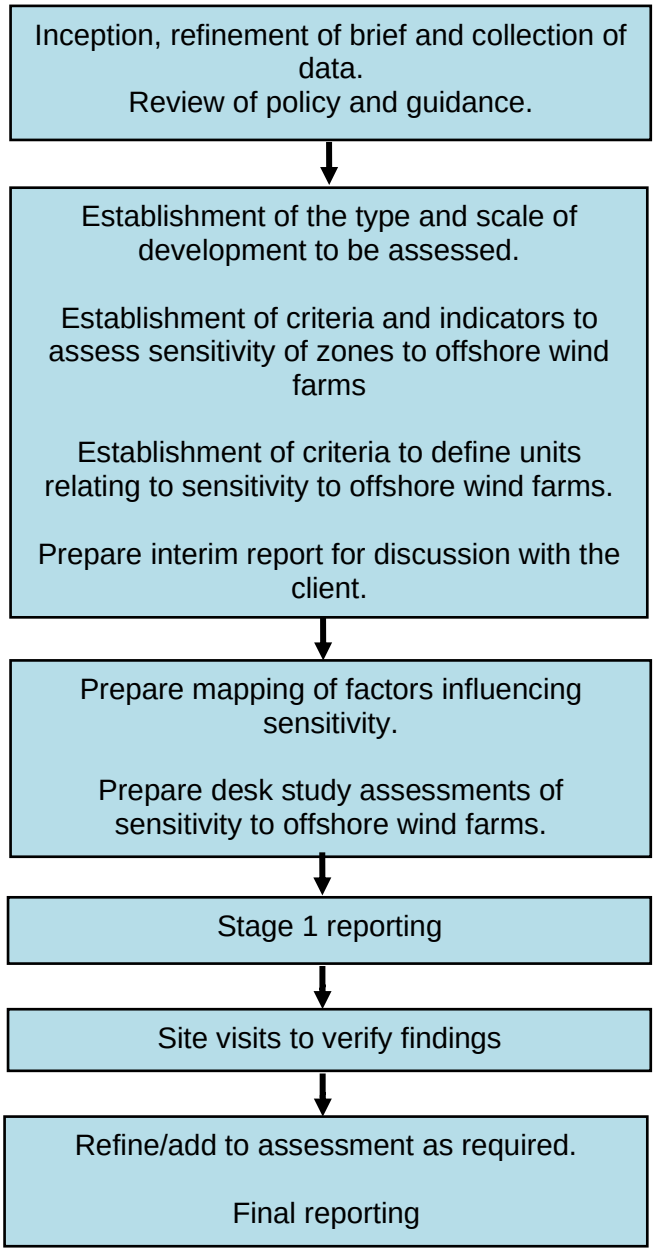
assessment (NECR106). They are the equivalent of the subsequent Marine Character Areas which were completed for the rest of English inshore and offshore waters.

2.22. Local seascape character areas have subsequently been defined and described at a more local level off the coast of Suffolk, South Norfolk and North Essex (LDA Design, 2018). This identified six seascape character types.

3. Study approach and process

Process

3.1. The study process is summarised below:



Focus and limitations of the report

3.2. The brief requires a sensitivity study to offshore wind farm developments including those potentially coming forward in the Crown Estate Round 4 process. The aim is to avoid significant adverse effects on high sensitivity seascape receptors. The premise that the study works on is that the most important effect of offshore windfarms is on the perception of seascape character from the coast ie the relationship between any proposed

development with coastal seascape character when seen in juxtaposition with each other. This means that the main drivers are distance from the coast and the character and value of the coastal seascape and its component sensitive receptors. Therefore, the areas or zones identified are focussed on this purpose alone and should not be used for other purposes or development types which may need full seascape characterisation taking intrinsic natural and cultural processes and other characteristics into account.

Relevant Guidance

3.3. The most relevant guidelines and reports taken into consideration in this study are as follows:

- An approach to seascape sensitivity assessment, MMO, 2020.
- Offshore Energy Strategic Environmental Assessment (OESEA): Review and update of Seascape and Visual Buffer study for Offshore Wind farms, BEIS/Hartley Anderson, 2020. (Referred to in the report as OESEA, 2020).
- Guidelines for Landscape and Visual Impact Assessment, Edition 3, (GLVIA 3) LI and IEMA, 2013.
- Guidance on the Assessment of the Impact of Offshore Windfarms: seascape and visual impact report, DTI, 2005.
- An approach to seascape character assessment, NECR 105 (Natural England)- broad brush guidance on seascape character assessment.
- Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance. Stages 1-3. NRW Evidence Series. Report No: 315, NRW, Bangor, 2019
- Seascape character assessment: Suffolk, South Norfolk and North Essex, Suffolk County Council, 2018.
- East Inshore and East Offshore seascape character assessment, Natural England, 2012.
- Suffolk Coast and Heaths AONB Management Plan 2018-2023 and associated planning documents including the natural beauty indicators
- Suffolk Landscape Character Assessment 2008/updated 2019
- Relevant offshore wind farm SVIAs

3.4. The OESEA (2020) study sets out visual buffers for different types of coastal character and designations at an England and Wales level. It is worth noting (as noted in 4.43 of the report) that the buffers to designated areas are a strategic level tool to identify where effects are likely and do not necessarily suggest no-go areas for development. These areas would need to be subject to careful further assessment should development be proposed within them. This is the purpose of the study.

Definitions

3.5. The following definitions are derived from the MMO Approach (2020) (1.5):

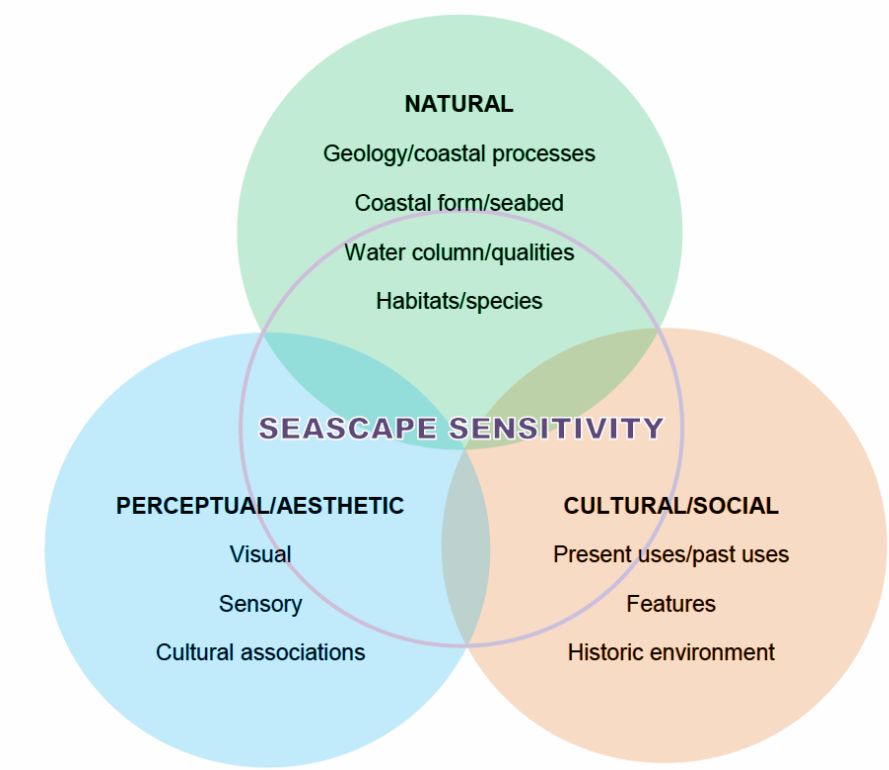
- Seascape character **susceptibility** is defined as the degree to which a defined seascape character area (SCA) and its associated visual qualities and attributes might respond to the specified types of development or change without undue negative effects on character and the visual resource.
- Seascape character **value** is defined as the relative value or importance attached to an SCA, which may express national or local consensus, because of its quality, its special qualities including perceptual aspects such as scenic beauty, tranquillity and wildness, natural or historic attributes or features, cultural associations, or its relationship with designated or valued landscapes and coasts.
- Seascape character **sensitivity** is a term applied to marine character and seascape and the associated visual resource, combining judgements of their susceptibility to a

specific type of development / development scenario or other change being considered and the value(s) related to that seascape, marine character and visual resource.

3.6. The potential for **cumulative effects** is explored in the area due to existing windfarms and other proposals. The strategic cumulative assessment is of the *combined* effect of all existing and consented developments, bearing in mind the proposed extensions and freestanding windfarms as well as the Round 4 bidding area.

Structure of proforma assessment

3.7. The structure of the proforma assessment relates to the relevant components of seascape character as shown in Figure 2 from the MMO Approach (2020).



3.8. The nature of offshore wind farm development means that there is a particular emphasis on the perceptual and aesthetic criteria and indicators.

Type and scale of development

3.9. The type and scale of offshore wind farm development is defined in the OESEA (2020) study and in the seascape and visual impact assessments (SVIAs) analysed. This study divides turbines into bands of heights each of which has different likely magnitudes of visual effects (see Figures 6 and 7). This report assumes that offshore wind farms are likely to be at a larger scale than has been seen previously. This tends to mean, based on the experience of Rounds 1 to 3, that the further offshore, the larger the development is likely to be in terms of turbine numbers, unless it is an extension of an existing development eg Greater Gabbard. This study assumes that the scale of development is between 20 and 300 turbines in the following turbine height to blade tip bands:

- 107-145m
- 146-175m
- 176-224m
- 225-300m
- 301-350m
- 351-400m

3.10. It is acknowledged that this covers a wide range of scales but reflects the types of development that have come forward or are likely to be considered in Round 4 or beyond.

3.11. Other characteristics of turbines include:

- Monopile or jacket foundations on the sea bed in seas of maximum depth 60m;
- Floating foundations anchored to sea bed in deeper waters;
- Generally pale grey painted towers and blades (eg RAL 7035) with Trinity House yellow on lower towers and bases;
- Red aircraft warning lights of medium intensity on nacelles (upto 2000 candela);
- Navigational warning lights on turbines and surrounding buoys;
- Constantly in operation with moving turbine blades unless in calm conditions or very high wind conditions;
- Offshore substations and operations bases on platforms in larger developments;
- Cable on sea bed;
- Long term installation and operation (but not permanent);
- Associated maintenance and supply craft during operation.

3.12. It is assumed that there will be associated offshore and coastal ancillary development to enable transmission of electricity to shore but the implications of transmission inland has not been taken into account as this is considered in a separate study. The main driver of effects is assumed to be the turbines themselves and their associated lighting although it is acknowledged that other infrastructure such as offshore substations contribute to effects.

Identifying criteria for seascape character and visual resource and indicators to explore sensitivity to development type

The seascape resource

3.13. The information used to inform the assessment includes:

- Bathymetry and elevation;
- Existing seascape character assessments (Figure 1);
- Landscape designations (Figures 3 and 4);
- National Park and AONB management plans and related planning policies- with a particular emphasis on natural beauty/ special qualities indicators;
- Suffolk Landscape Character Assessment 2008/updated 2019 (Figure 2)
- Cultural heritage designations and features eg scheduled monuments, Conservation Areas (Figures 3 and 4);
- Biodiversity designations eg SPAs, SACs, MCZs;
- Coastal access eg Suffolk Coast Path (Figures 3 and 4);
- Existing intervisibility analysis – defining land with sea views and sea visibility from land (part of the national seascape assessment);
- Crown Estate existing round zones and Round 4 bidding area;
- Existing marine uses and structures- existing windfarms etc (Figure 5);
- Patterns of maritime use- shipping lanes and mineral extraction;
- OESEA 2020 background report – identifying visual buffers for offshore windfarms related to National Parks and AONBs and elsewhere taking into consideration marine visibility modifiers;
- Principles defined in Wales seascape sensitivity to offshore windfarms study Stage 2 report (2019).

Defining seascape units/zones

3.14. NECR 105 sets out in broad brush terms how to carry out a seascape character assessment. This states characterisation concentrates on making clear what makes one area different or distinctive from another. It also states that it is based on the integration of natural and cultural information combined with aesthetic and perceptual experiential aspects. This has already been carried out in East inshore/offshore seascape character assessment, identifying four areas in the study area. This has been refined in the local seascape character assessment for Suffolk and adjacent coastal areas into six seascape character types.

3.15. The type of development proposed and the main national planning policies that drive decision-making, ie NPS EN1 and NPS EN3, mean that these units are not appropriate in themselves as a spatial representation for assessing sensitivity to offshore wind farms. The units need to appropriately reflect the large scale of development and large spread of visual effects of very tall structures in an open seascape combined with the relationship with national landscape-related designations. This means that this is not a character assessment in terms of NECR 105. Instead it is focussed on the factors which are most important in defining the relative seascape and visual sensitivity of an area to offshore wind farms, also taking into account existing and consented development. As such, the areas are defined as seascape zones to avoid any implication that they are characterised as seascape character areas taking in the full range of factors which define such areas eg bathymetry and seabed geology. The grain of the assessment may group together some existing areas and divide up others.

3.16. The definitive factors contributing to defining zones (Figures 9 and 10) are:

- The extent of visual buffers relating to the designated and other landscapes- these inform the distances of the zones away from the coast. These are primarily defined by SVIA analysis in the OESEA (2020) study (Figures 6, 7 and 8) and a review of meteorological visibility modifiers relating to the study area (see **Appendix C** for a contextual review);
- The presence or otherwise of existing or consented windfarms, which affects seascape character (Figure 5);
- The existing defined local seascape character areas (Figure 1);
- National seascape character areas/marine character areas (Figure 1);
- The character of the coastline.

Criteria and Indicators

3.17. The sensitivity of a zone to offshore wind farms is based on a series of criteria with associated indicators which define what makes an area more or less susceptible to the development type or influences its value. These are set out in **Appendix A.**

3.18. For each zone we complete a proforma assessing different levels of susceptibility and value based on the indicators. It is important to note that whilst each factor will be scored, the overall sensitivity is not a simple adding up of the scores. Some criteria and indicators are more important than others and the summary of sensitivity explains the key factors underpinning the judgement.

3.19. The potential for cumulative effects are taken into consideration where possible development may result in adverse combined effects with existing and consented development. A series of criteria are set out in the proforma to assess the likelihood of this occurring and possible sensitivities deriving from this.

Thresholds of sensitivity

3.20. The thresholds for landscape and visual sensitivity are defined below in Table 1. The five point scale reflects the subtlety of different seascape's character.

Table 1 Thresholds for landscape and visual sensitivity

Level	Definition
Low	Seascape and/or visual characteristics of the zone are robust or degraded and/or its values are low and it can accommodate the relevant type of development without significant character change or adverse effects. Thresholds for significant change are very high.
Medium/low*	Seascape and/or visual characteristics of the zone are resilient to change and/or its values are medium/low or low and it can accommodate the relevant type of development in many situations without significant character change or adverse effects. Thresholds for significant change are high.
Medium*	Seascape and/or visual characteristics of the zone are susceptible to change and/or its values are medium/low through to high/medium and/or it *may* have some potential to accommodate the relevant type of development in some *defined* situations without significant character change or adverse effects. Thresholds for significant change are intermediate. Suitability for wind farm development will be determined by the distance offshore in relation to buffers set out in OESEA, 2020.
High/ medium*	Seascape and/or visual characteristics of the zone are vulnerable to change and/or its values are medium through to high (although this level of value is not essential where landscape or visual susceptibility are key issues). The seascape zone may be able accommodate the relevant type of development but only in limited situations without significant character change or adverse effects if defined in the relevant zone summary. Thresholds for significant change are low.
High*	Seascape and/or visual characteristics of the zone are very susceptible to change and/or its values are high or high/medium and it is unable to accommodate the relevant type of development without significant character change or adverse effects. Thresholds for significant change are very low.

*Suitability for wind farm development will also be determined by the distance offshore in relation to buffers set out in OESEA, 2020.

3.21. It is important to note as above that the levels of sensitivity must be read in conjunction with OESEA, 2020 buffer distances. This may mean that even in medium sensitivity seascapes that development is not appropriate if too close inshore. We define the extent, size and location of potentially suitable development in the recommendations and associated summary text. For high/medium sensitivity zones there may be sea which has high sensitivity with other parts which may have some very minor potential but this does not amount to a large scale allocation. Overall, this level of sensitivity is considered to be a constraint on large wind farms in terms of seascape and visual factors.

Stage 1 reporting

3.22. The Stage 1 draft report summarised the method, findings for the seascape zones with associated mapping, and backed up by the detailed assessments.

Site visits

3.23. A site visit to locations along the coast was carried out to verify boundaries and aesthetic and sensory qualities at representative key viewpoints (see **Appendix C**). This assisted in reviewing the natural beauty indicators and associated qualities, value and sensitivity. These findings fed into the final report.

4. Summary of findings

4.1. The seascape and visual sensitivity findings indicate the preferred zones for the location of offshore wind farms with a tabular summary of sensitivities for each seascape zone in Table 2 below. A detailed assessment for each zone is set out in Part 2 which sets out the recommendations for different heights of wind turbines. All these conclusions clearly only relate to seascape and visual matters and not other factors which have to be taken into consideration, particularly in relation to the intrinsic nature of the sea and sea bed.

4.2. The following conclusions summarised in Table 2 have been reached on the locations that development might proceed in terms of seascape and visual sensitivity factors. They are based entirely on the zone evaluations and if there is any perceived conflict or difference in emphasis between the two, the detailed evaluations should be taken as the definitive position. The zones and their sensitivities are set out in Figures 9 and 10.

Table 2 Suffolk seascape sensitivity

Ref no	Name	Sensitivity
SCZ 01	Suffolk Heritage Coast Inshore- South	High/medium
SCZ 02	Suffolk Heritage Coast Offshore- South	Medium
SCZ 03	Greater Gabbard Environs	Medium
SCZ 04	Suffolk Heritage Coast Inshore- North	High
SCZ 05	Suffolk Heritage Coast Offshore- North	Medium
SCZ 06	North Suffolk and Norfolk Inshore	Medium
SCZ 07	North Suffolk and Norfolk Offshore	Medium
SCZ 08	Outer Offshore	Medium/low

4.3. Overall, the seascape of Suffolk is sensitive to offshore wind farm development primarily due to its relationship with the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast, contributing significantly to the AONB's setting and natural beauty. The distance offshore of each seascape zone is primarily determined by the OESEA (2020) report which sets out buffers for different levels of sensitivity of coast and heights of turbine to blade tip. Though a low lying and gently curving coast, the qualities of panoramic unspoilt views, tranquillity and remoteness, the relatively clear visibility offshore indicated by weather station data (**Appendix B**), and the easterly aspect where turbines are potentially most visible in the afternoon/early evening all contribute with other factors to enhance the value and sensitivity of the area.

4.4. The site visit revealed the degree of intervisibility of Sizewell A and B nuclear power stations and the masts at Orford Ness with some stretches of coast on either side. Clearly, users walking along the coast needed to be facing towards the structures for them to feature in views. However, their visibility in places emphasised their contrast with the special qualities and natural beauty of the AONB in the intervening rural coast and the open sea and the predominantly clear horizon offshore. This could be considered to make the AONB and Heritage Coast more vulnerable to intrusion from energy infrastructure offshore which could cumulatively adversely affect the natural beauty of coast and its setting. Sizewell C would be likely to exacerbate this situation.

4.5. The most sensitive seascape zones are SCZ 01 and SCZ 04 which lie adjacent to the AONB and Heritage Coast.

4.6. SCZ 01 lies within 34km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on a combined AONB and Heritage Coast. This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development. There is distinct separation between Greater Gabbard/Galloper and the London Array wind farms which, combined with distance, is helpful in avoiding substantial combined cumulative effects on the designated coastline. A very limited extension of Greater Gabbard/ Galloper to the south west (as currently proposed) may cause limited effects if the turbines are the same/similar in height and spacing to the existing. An extension further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB.

4.7. SCZ 02, just offshore from SCZ01, lies between 34km and 40km which potentially allows consideration of wind farms with turbines between 107m to 204m high but it contributes to the separation between Greater Gabbard/Galloper and the London Array wind farms. Further development, such as the wind farm extension proposed, needs to avoid a curtaining effect on the horizon and should be within the range of heights specified to avoid combined cumulative effects.

4.8. SCZ 03 is strongly associated with Greater Gabbard/Galloper offshore windfarms and it is considered that an extension within the area may be appropriate provided the turbines are the same or very similar height and spacing to the existing.

4.9. SCZ 04 lies within 34km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on a combined AONB and Heritage Coast. This, combined with the susceptibility and other values related to the zone, suggest an area of strong constraint on windfarm development. Turbines as proposed in East Anglia TWO *within the zone* would be considered to cause significant harm to the qualities and natural beauty of the AONB. A limited extension of Greater Gabbard/ Galloper to the south of the zone (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing. An extension of Greater Gabbard/ Galloper further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB.

4.10. SCZ 05, just offshore from SCZ 04, lies between 34km and 40km which potentially allows consideration of wind farms with turbines between 107-224m high but is a constraint buffer for turbines from 225-400m high to avoid significant adverse effects on a combined AONB and Heritage Coast. Arrays should avoid a curtaining effect when viewed from the AONB and Heritage Coast coastline. This could be achieved with gaps between arrays of at least 12km, preferably more, and arrays not exceeding 15km width as perceived from shore. A limited extension of Greater Gabbard/ Galloper to the south of the zone (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing.

4.11. SCZ 06 lies within 14km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on largely undesignated coast with urban areas. This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development. Scroby Sands is an early development with small 2MW turbines located very close to shore. An extension of this would be problematic in seascape terms due to current commercially available turbine sizes and the potential for cumulative effects.

4.12. SCZ 07, just offshore of SCZ 06, lies between 14km and 30km which potentially allows consideration of appropriately designed wind farms with turbines between 107-350m high at graded distances offshore but is a suggested constraint buffer for turbines over 351m high to avoid significant adverse effects on the largely undesignated coast with urban areas. There may be some cumulative effects in conjunction with Scroby Sands and this would need to be carefully considered.

4.13. SCZ 08 is an area of more limited seascape/visual constraints, especially to the east. An extension of Greater Gabbard/ Galloper to the east and south east within the area may cause limited effects but the turbines should be similar in height and spacing to the existing. Turbines as proposed in East Anglia TWO and ONE North *within the zone* would not be considered to cause significant harm to the qualities and natural beauty of the AONB.Further proposals within the zone should be located as far offshore as possible, and if located towards the western boundary maintain large gaps (say 12km+) between arrays (say a similar size to East Anglia ONE North) so clear views of the horizon between arrays is possible from the designated coast.

SCA 07
SCA 03
SCA 09
Norfolk County
GREAT YARMOUTH
LOWESTOFT
SOUTHWOLD
SCA 04
Suffolk County
ALDEBURGH
SCA 10
IPSWICH
FELIXSTOWE
HARWICH
Essex County
MCA 19
MCA 20
MCA 17

KEY

Study Area

National Marine Character Areas

MCA 17 Thanet Shipping Waters
MCA 19 Essex and South Suffolk Estuaries and Coastal Waters
MCA 20 Thames Approaches
SCA 03 East Midlands Offshore Gas Fields
SCA 04 East Anglian Shipping Waters
SCA 07 East Midlands Coastal Waters
SCA 09 Norfolk Coastal Waters
SCA 10 Suffolk Coastal Waters

Suffolk Seascape Character Types (February 2019)

SCT 01 Inland Navigable Waters
SCT 02 International Ports and Approaches
SCT 03 Nearshore Waters
SCT 04 Developed Nearshore Waters
SCT 05 Coastal Waters
SCT 06 Offshore Waters

N

0 5 10 20
Km

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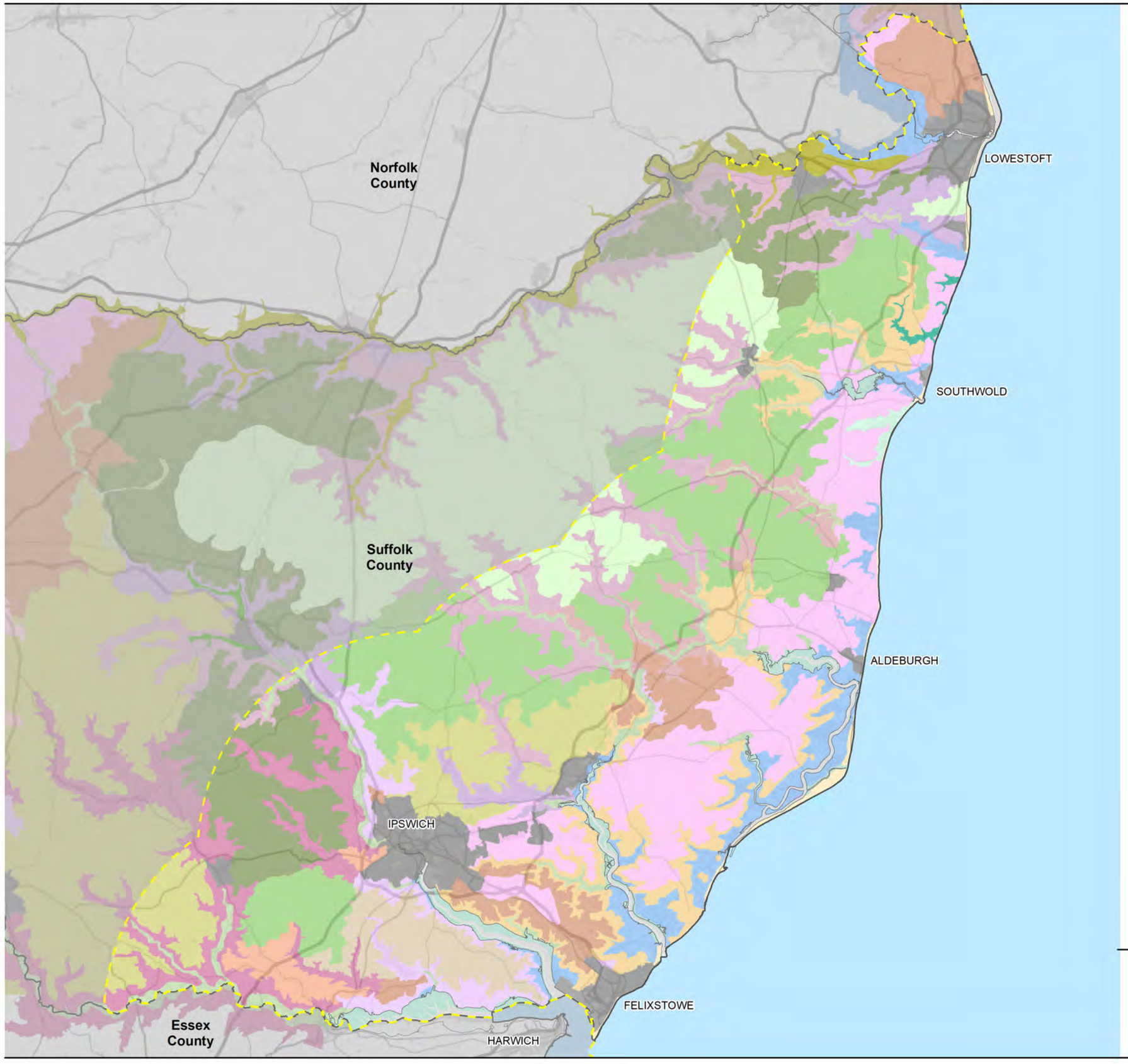
17/07/20 | v2 | Drawn: HK | Checked SW

Suffolk seascape sensitivity to offshore windfarms

Figure 1
National Marine Character Areas and local Seascape Character Types



KEY

Study Area

Suffolk Landscape Character Types (Feb 2019)

- Ancient Estate Claylands
- Ancient Estate Farmlands
- Ancient Plateau Claylands
- Ancient Rolling Farmlands
- Coastal Dunes and Shingle Ridges
- Coastal Levels
- Estate Sandlands
- Open Coastal Fens
- Planned Fenlands
- Plateau Claylands
- Plateau Estate Farmlands
- Plateau Farmlands
- Rolling Estate Chalklands
- Rolling Estate Claylands
- Rolling Estate Farmlands
- Rolling Estate Sandlands
- Rolling Valley Claylands
- Rolling Valley Farmlands
- Rolling Valley Farmlands and Furze
- Saltmarsh and Intertidal Flats
- Settled Chalklands
- Settled Fenlands
- Undulating Ancient Farmlands
- Undulating Estate Farmlands
- Urban
- Valley Meadowlands
- Valley Meadows and Fens
- Wooded Chalk Slopes
- Wooded Fens
- Wooded Valley Meadowlands
- Wooded Valley Meadowlands and Fens

N

0 2.5 5 10

Km

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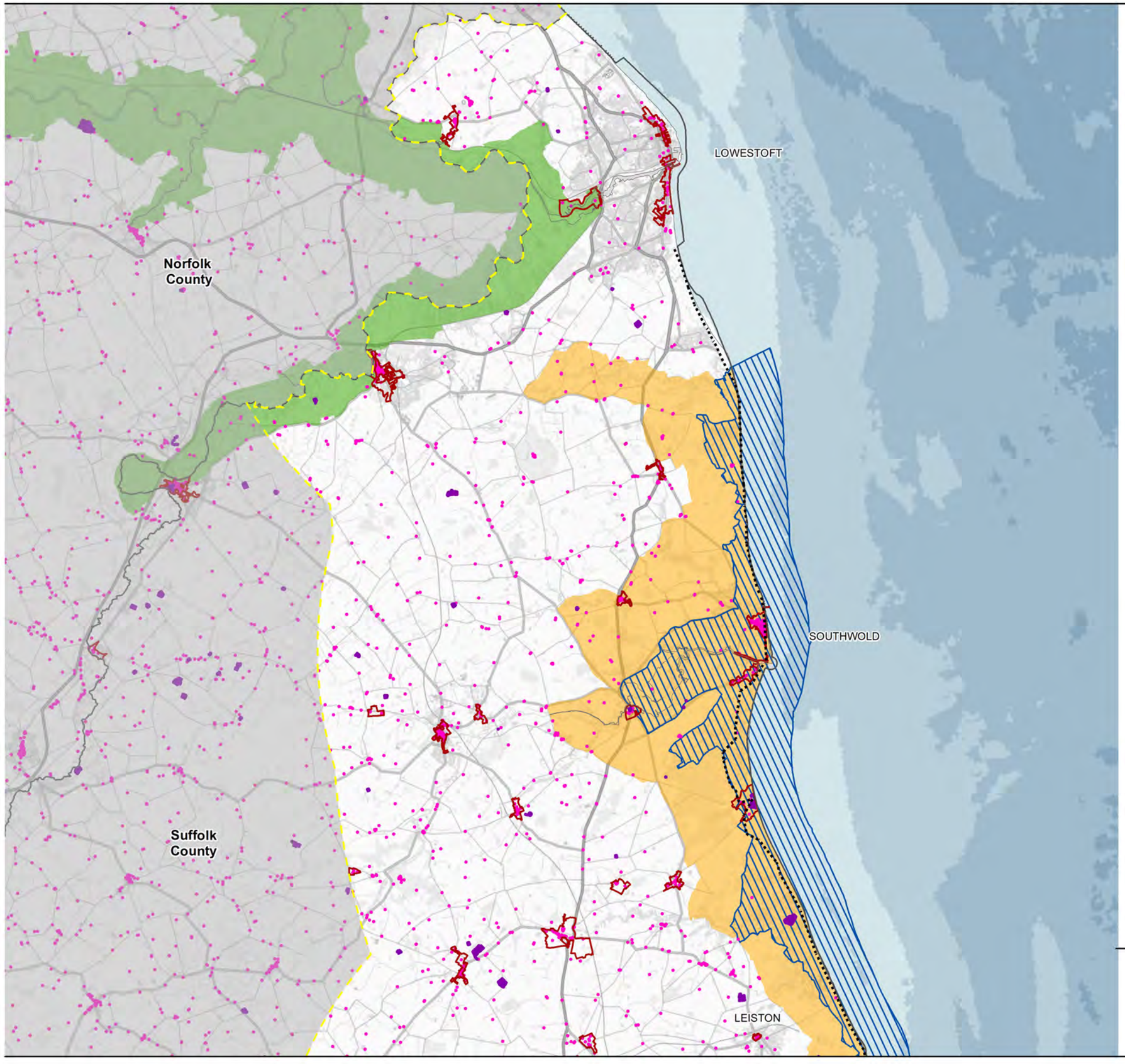
Suffolk seascape sensitivity to offshore windfarms

Figure 2
County landscape character



KEY

- Study Area
- Suffolk Coast Path
- National Parks
- AONB
- Heritage Coasts
- Conservation Areas
- Scheduled ancient monuments
- Listed Buildings

Bathymetry (m)

- -10 - 0
- -20 - -10
- -30 - -20
- -40 - -30
- -50 - -40
- -60 - -50

N

0 1.25 2.5 5

Km

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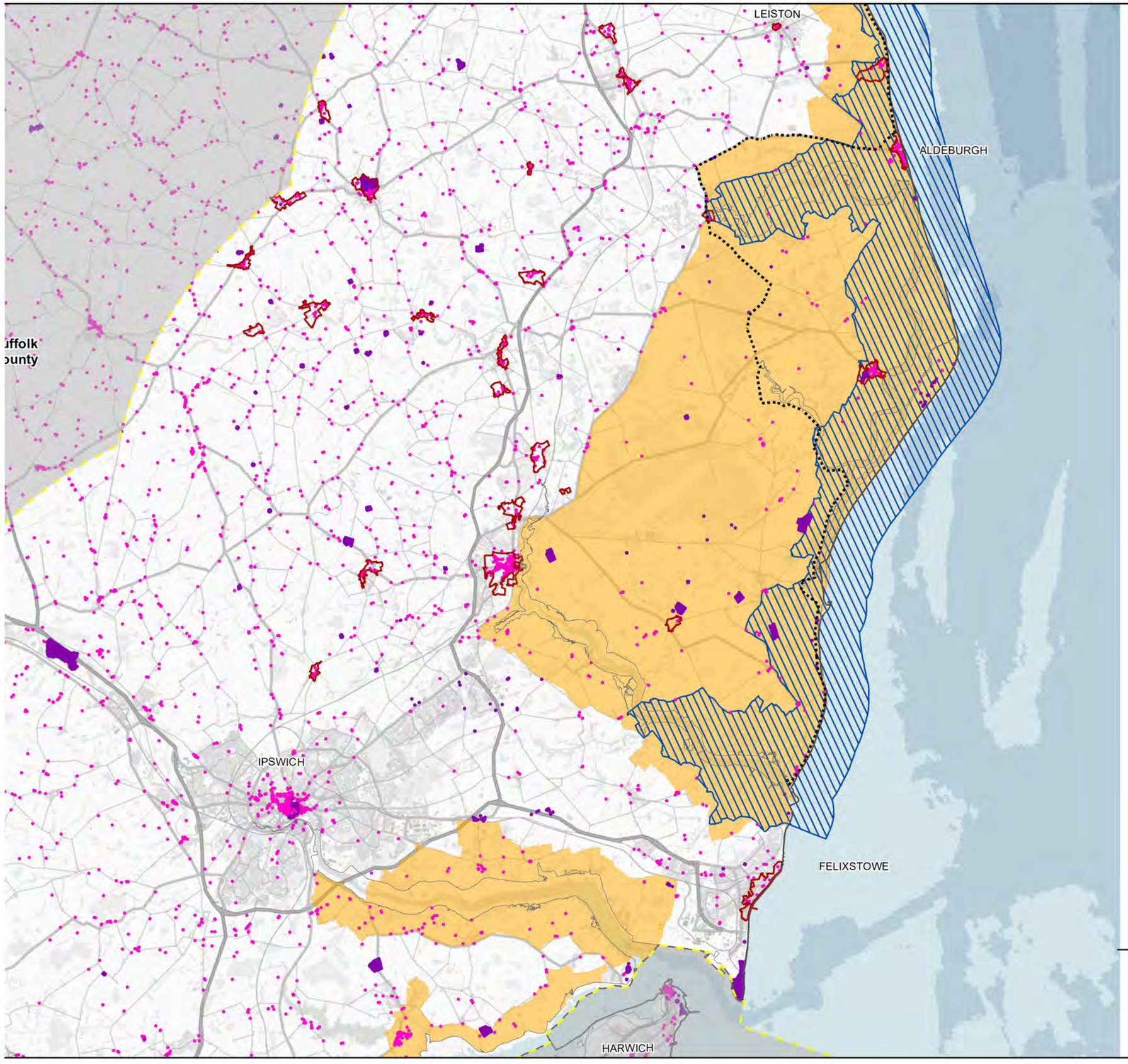
Suffolk seascape sensitivity to offshore windfarms

Figure 3
Landscape and Heritage Designations, and Coast Path (North)



KEY

- Study Area
- Suffolk Coast Path
- National Parks
- AONB
- Heritage Coasts
- Conservation Areas
- Scheduled ancient monuments
- Listed Buildings

Bathymetry (m)

- -10 - 0
- -20 - -10
- -30 - -20
- -40 - -30
- -50 - -40
- -60 - -50

N

0 1.25 2.5 5

Km

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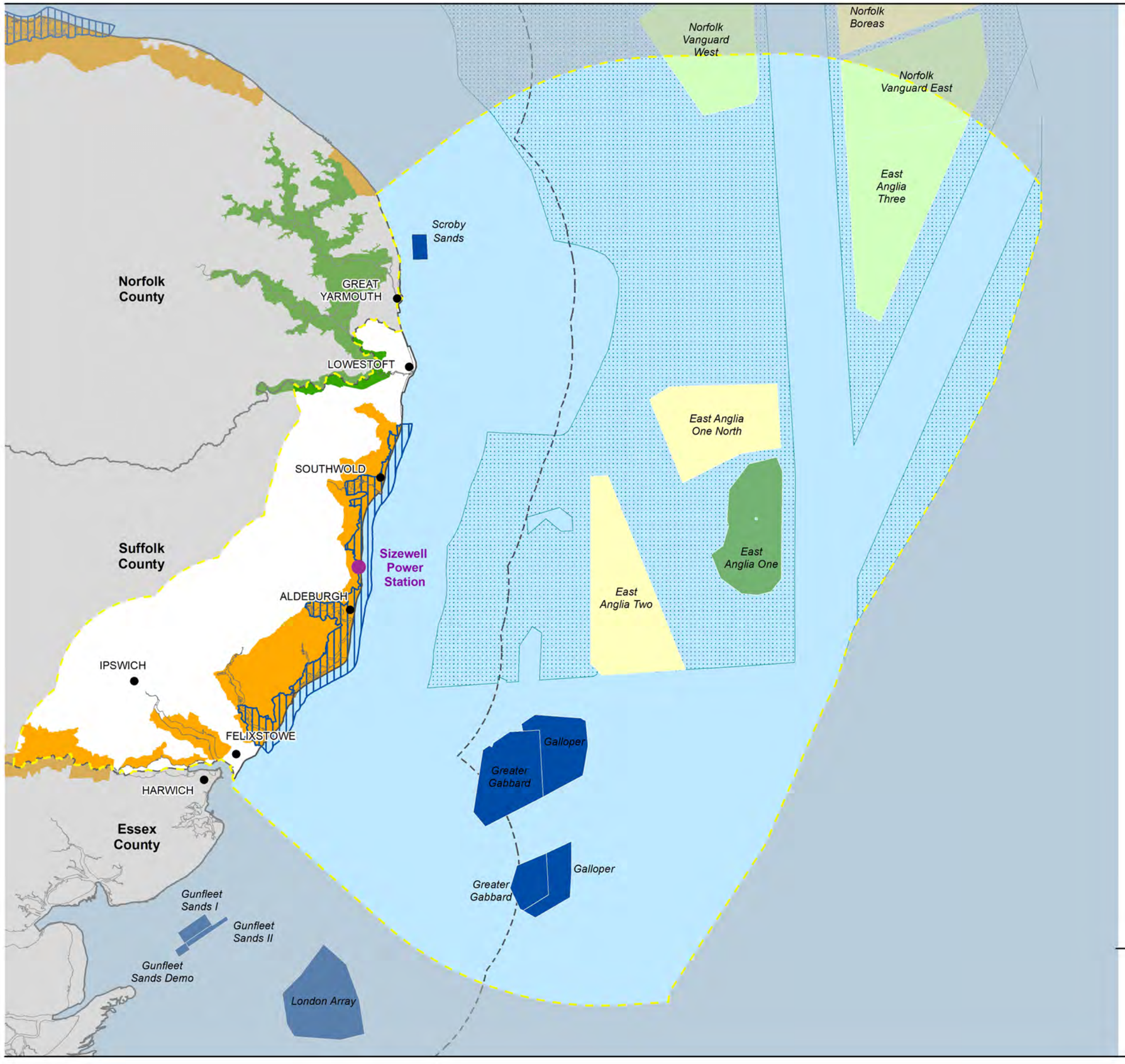
Suffolk seascape sensitivity to offshore windfarms

Figure 4
Landscape and Heritage Designations, and Coast Path (South)



KEY

- Study Area
- National Parks
- AONB
- Heritage Coasts
- UK Territorial limit

Offshore wind farms

- Active/In Operation
- Under Construction
- Consented
- In Planning
- Pre-planning Application

Round 4 Bidding Area: Eastern Regions
Hard constraints removed

N

0 5 10 20
Km

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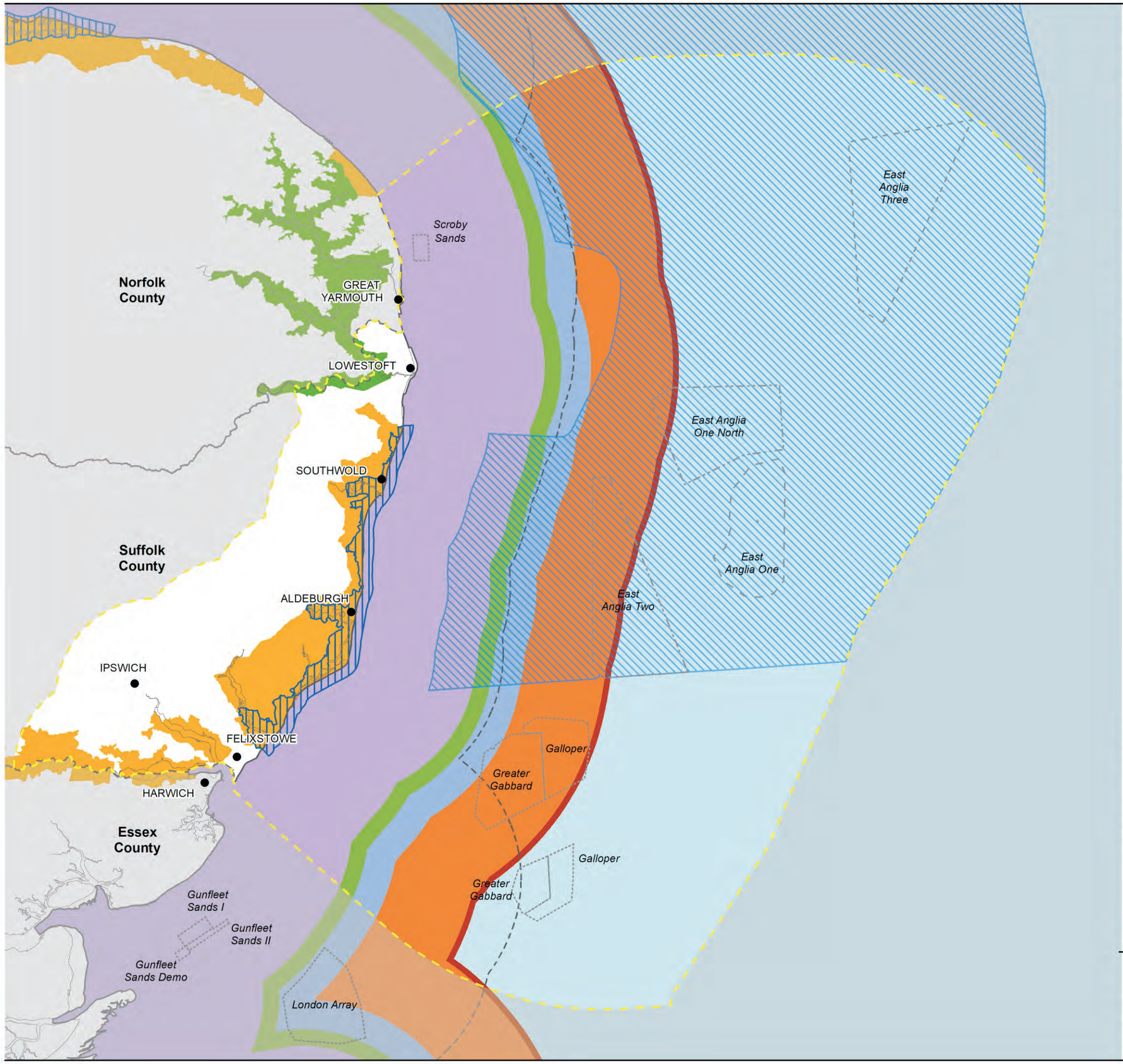
Suffolk seascape sensitivity to offshore windfarms

Figure 5
Offshore windfarms and Round 4 bidding area



KEY

- Study Area
- Heritage Coasts
- AONB
- National Parks
- UK Territorial limit

Average low* magnitude of effect for wind turbines from coast (OESEA, 2020)

- 107-145m high turbines to blade tip = 19.2km
- 150-175m high turbines to blade tip = 21.7km
- 176-223m high turbines to blade tip = 26.2km
- 250-300m high turbines to blade tip = 38.6km
- 301-400m high turbines to blade tip = 39.5km

*The distances represent the zones where there is an average low/moderate or low visual magnitude of effect on coastal receptors. Turbines of the size noted should be placed beyond the distance noted eg 107-145m turbines should be placed at least 19.2km from the coast.

Offshore wind farms

- Active/In Operation
- Consented
- In Planning
- Under Construction
- Round Four Area: Eastern Regions

N

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Km

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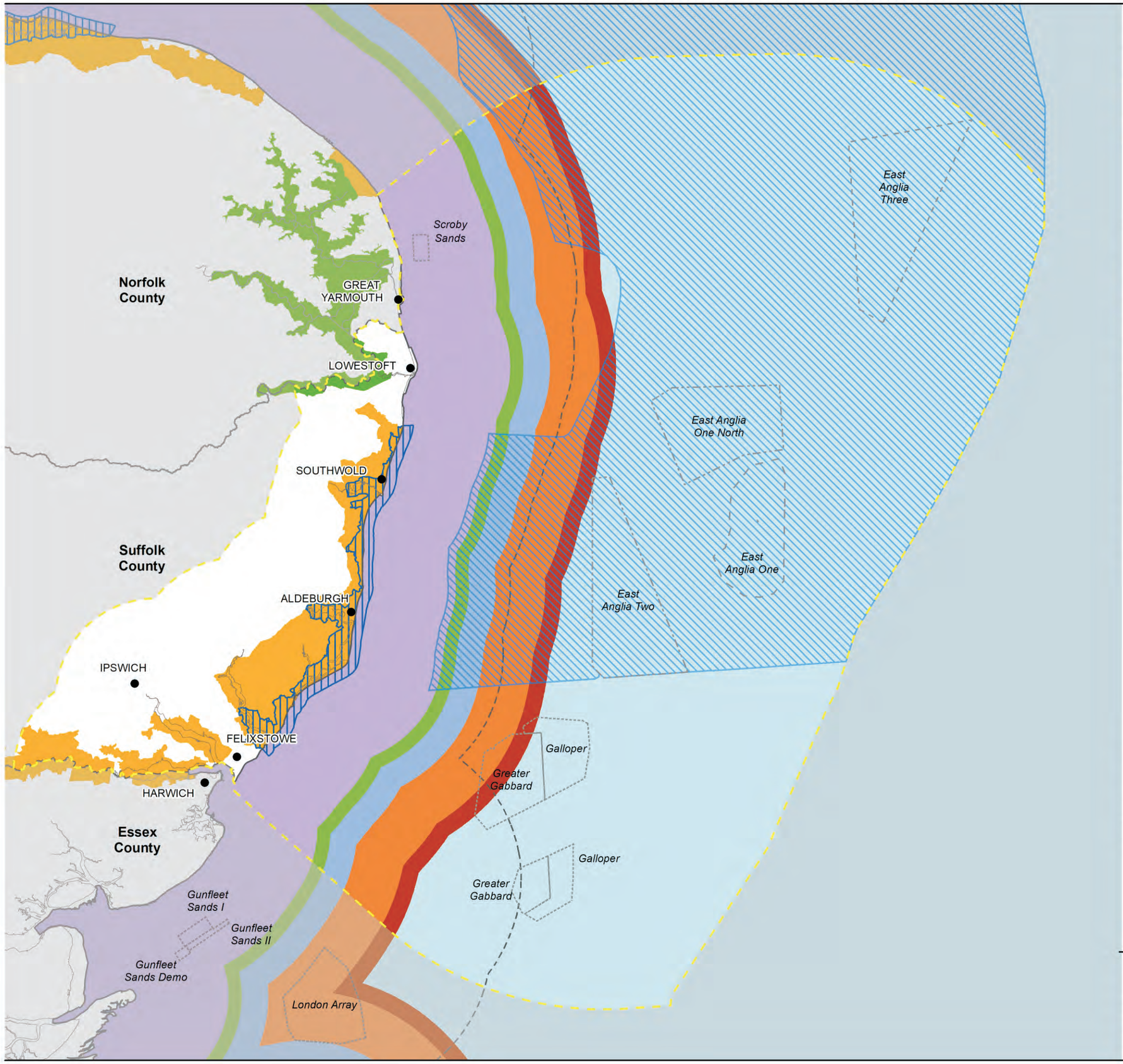
Suffolk seascape sensitivity to offshore windfarms

Figure 6
Average low magnitude of visual effect for wind turbines from coast



KEY

- Study Area
- Heritage Coasts
- AONB
- National Parks
- UK Territorial limit

Average medium* magnitude of effect for wind turbines from coast (OESEA, 2020)

- 107-145m high turbines to blade tip = 14km
- 150-175m high turbines to blade tip = 16km
- 176-223m high turbines to blade tip = 20km
- 250-300m high turbines to blade tip = 27.5km
- 301-400m high turbines to blade tip = 30km

*The distances represent the zones where there is an average medium/moderate visual magnitude of effect on coastal receptors. Turbines of the size noted should be placed beyond the distance noted eg 107-145m turbines should be placed at least 14km from the coast.

Offshore wind farms

- Active/In Operation
- Consented
- In Planning
- Under Construction
- Round Four Area: Eastern Regions

N

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Km

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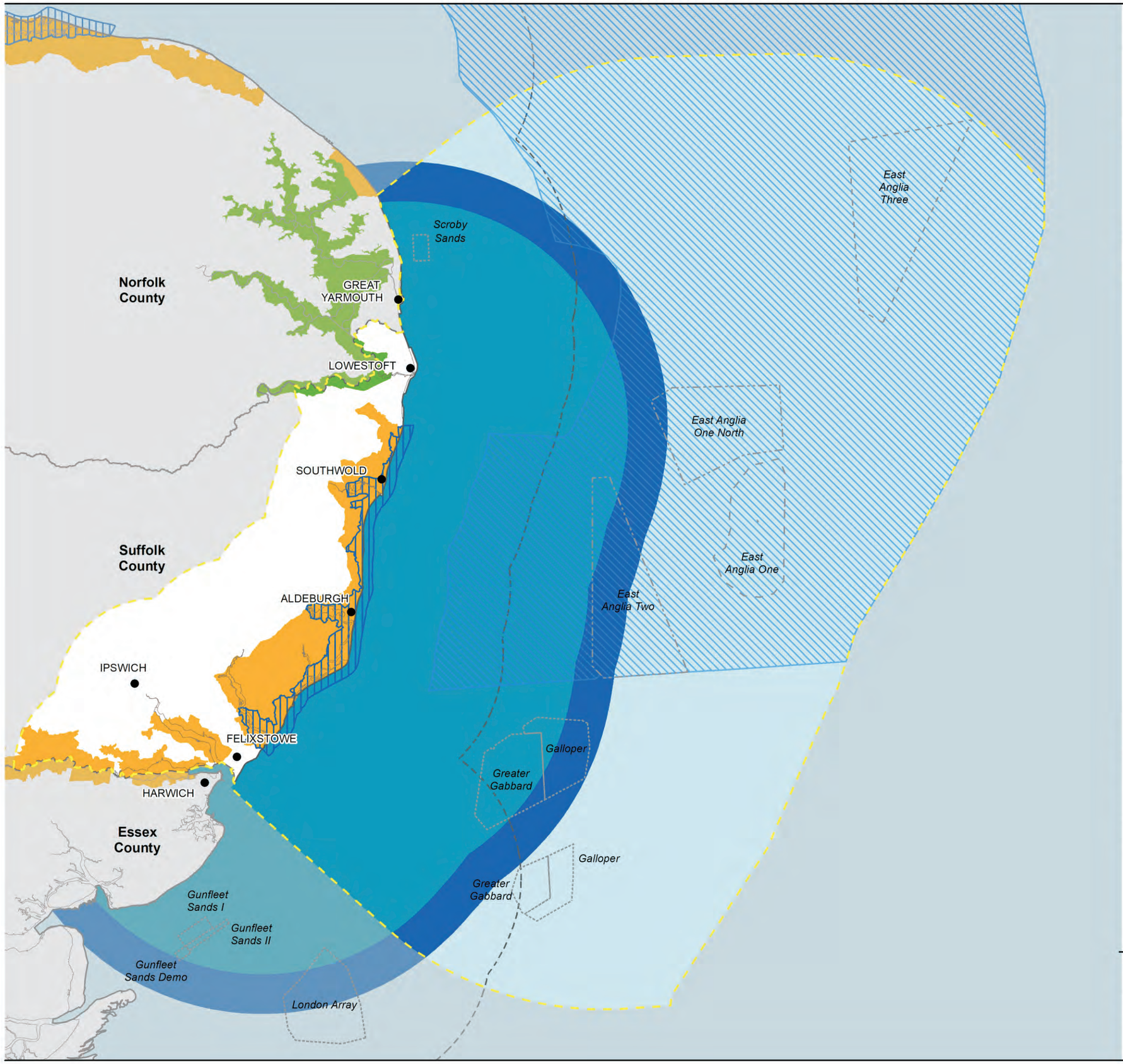
04/09/20 | v5 | Drawn: HK | Checked SW

Suffolk seascape sensitivity to offshore windfarms

Figure 7
Average medium magnitude of visual effect for wind turbines from coast



KEY

- Study Area
- Heritage Coasts
- AONB
- National Parks
- UK Territorial limit

Recommended buffers for AONB/Heritage Coast (OESEA, 2020)

- 107-225m high turbines to blade tip = 34km
- 226-400m high turbines to blade tip = 40km

Offshore wind farms

- Active/In Operation
- Consented
- In Planning
- Under Construction
- Round Four Area: Eastern Regions

N

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Km

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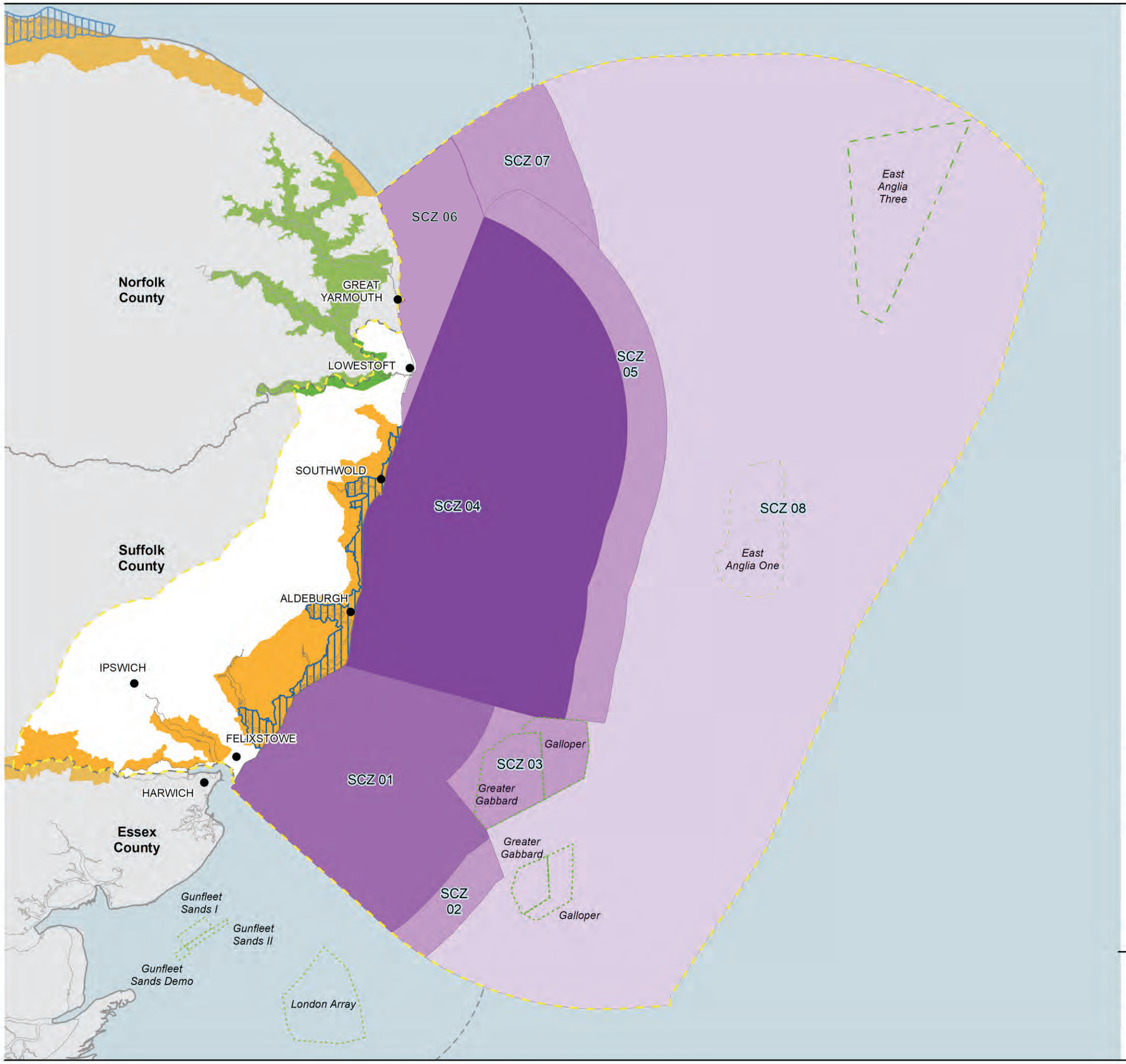
Suffolk seascape sensitivity to offshore windfarms

Figure 8
Visual buffers for combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast



KEY

- Study Area
- National Parks
- AONB
- Heritage Coasts
- UK Territorial limit

Seascape and visual sensitivity zones (offshore wind farms) (High to Low)

- High
- High/medium
- Medium
- Medium/low

Offshore wind farms

- Active/In Operation
- Under Construction
- Consented

N

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Km

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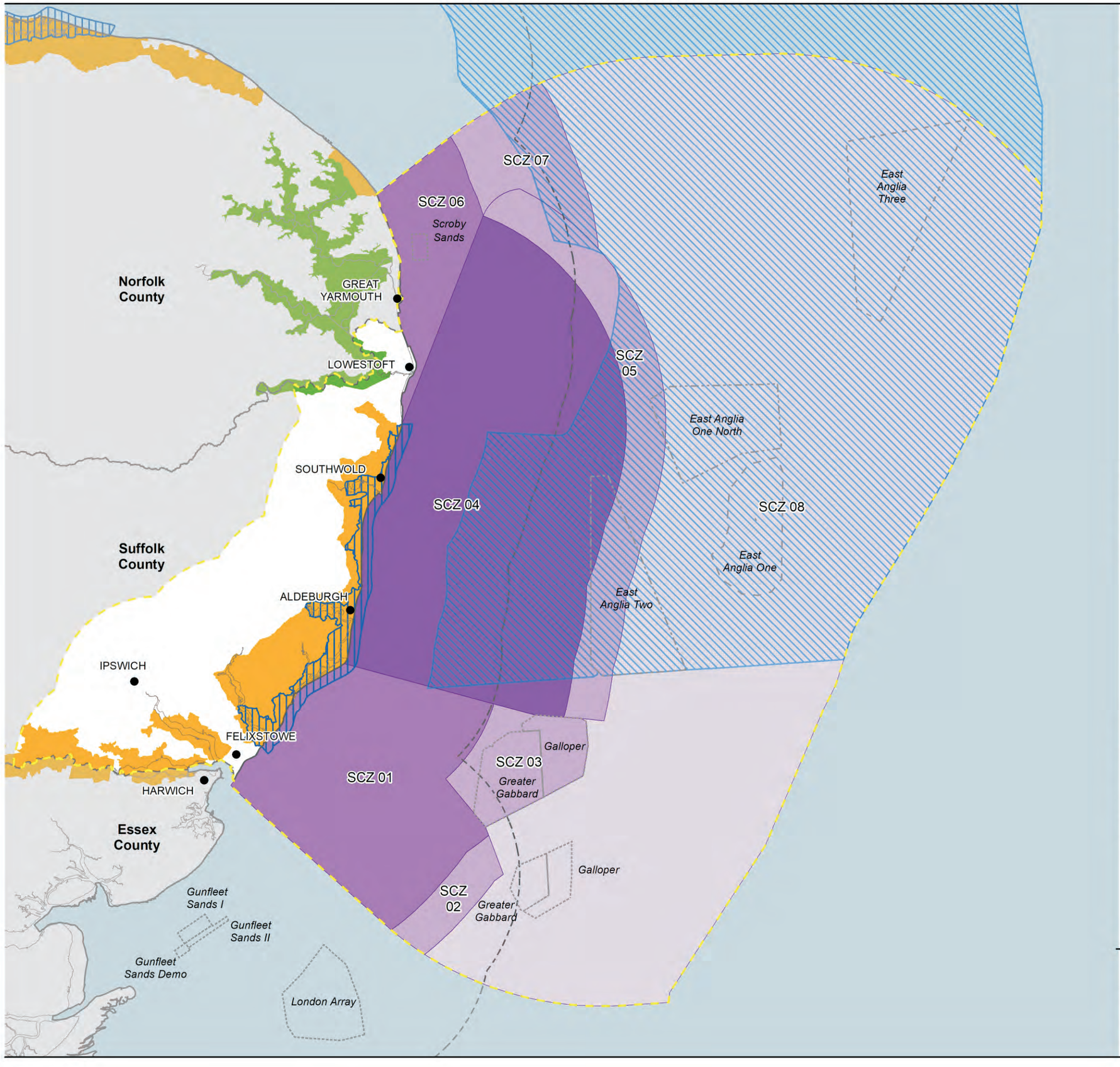
11/08/20 | v2 | Drawn: HK | Checked SW

Suffolk seascape sensitivity to offshore windfarms

Figure 9
Suffolk designated landscapes and their seascape and visual sensitivity to offshore wind farms



KEY

- Study Area
- Heritage Coasts
- AONB
- National Parks
- UK Territorial limit

Seascape and visual sensitivity zones (offshore wind farms) (High to Low)

- High
- High/medium
- Medium
- Medium/low

Offshore wind farms

- Active/In Operation
- Consented
- In Planning
- Under Construction
- Round Four Area: Eastern Regions

N

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Km

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Suffolk seascape sensitivity to offshore windfarms

Figure 10
Suffolk designated landscapes and their seascape and visual sensitivity to offshore wind farms - 2

PART 2: Detailed seascape zone assessments

Seascape zone No: 01	Name: Suffolk Heritage Coast Inshore- South
Location/Extent	
The seascape zone is defined by the southern boundary of the study area to the south, the change of direction of the coast at Orford Ness to the north, the boundary of average low/medium-low magnitude of effects of turbines of a similar scale to Greater Gabbard/Galloper to the east (21.7km) (derived from the OESEA study, 2020), and the suggested buffer distance for smaller turbines off combined AONBs and Heritage Coasts (34km) to the south east (also OESEA, 2020).	
OVERALL SENSITIVITY	
Sensitivity	High/medium
Summary	
70% of the generally low-lying coast of this seascape zone is covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designation. The south western part between Felixstowe and Felixstowe Ferry is fronted by urban/suburban development, park or a golf course but includes a seafront Conservation Area and popular beaches. The approaches to Harwich Harbour/Felixstowe lie in the southern part of the inshore/offshore area and are used by a range of shipping including container vessels and ferries, as well as leisure craft from Shotley and the Deben estuary. Greater Gabbard/Galloper windfarms lie offshore from the zone. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path along this part of the coast and from the north, framed views from the Deben estuary, the sense of remoteness, tranquillity and openness at the distinctive spit at Orford Ness and around Shingle Street which the seascape contributes to, and which relate to the AONB's natural beauty criteria, and the relatively high frequency of visibility upto long distances offshore. The zone's value lies in its role as part of the setting of the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast with 70% of the coast covered by the designation, the views from the scheduled monuments overlooking the area including the listed Orford Castle and numerous Martello towers and from listed Bawdsey Manor and associated gardens, views from Aldeburgh Conservation Area to the north and SPA/SACs. The factors which slightly reduce sensitivity are the presence of shipping and associated infrastructure to the south and World War II and subsequent military infrastructure on the coast including the masts at Orford Ness, and the presence of Greater Gabbard/Galloper wind farms offshore, but the latter raise the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies within 34km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on a combined AONB and Heritage Coast. This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development. There is distinct separation between Greater Gabbard/Galloper and the London Array wind farms which, combined with distance, is helpful in avoiding substantial combined cumulative effects on the designated coastline. A very limited extension of Greater Gabbard/ Galloper to the south west (as currently proposed) may cause limited effects if the turbines are the same/similar in height and spacing to the existing. An extension further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB and Heritage Coast.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	MCA 19 Essex and South Suffolk Estuaries and Coastal Waters (part) MCA 20 Thames Approaches (part) SCA 04 East Anglian Shipping Waters (part)

	SCA 10 Suffolk Coastal Waters (part)
Local seascape character areas	SCT 2 International Ports and Approaches (all) SCT 03 Nearshore Waters (part) SCT 05 Coastal Waters (part) SCT 06 Offshore Waters (part)
VISUAL BUFFERS	
Distance offshore- range	Shore to 34km except where between Greater Gabbard wind farm and the shore- 21.7km.
*Size of turbines potentially having low or medium/low magnitude of effect**	• Turbines below 145m would be likely to exceed low magnitude of effect less than 19.2km from shore. • Turbines 145-175m would be likely to exceed low magnitude of effect less than 21.7 km from shore. • Turbines above 176-225m would be likely to exceed low magnitude of effect less than 26.2 km from shore. • Turbines above 226-300m would be likely to exceed low magnitude of effect.
*Size of turbines potentially having medium magnitude of effect**	• Turbines below 145m would be likely to exceed medium magnitude of effect less than 14km from shore. • Turbines 145-175m would be likely to exceed medium magnitude of effect less than 15.8km from shore. • Turbines 176-225m would be likely to exceed medium magnitude of effect less than 20.2km from shore. • Turbines 226-300m would be likely to exceed medium magnitude of effect less than 27.5km from shore. • Turbines 301-350m would be likely to exceed medium magnitude of effect less than 30km from shore. • Turbines 351-400m would be likely to exceed medium magnitude of effect less than 30km+ from shore.

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying with some coastal plateau and some low slopes of the estate sandlands behind coastal levels.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■			Mix of very gently curving bays with minor headlands and small estuaries and a very gently convex coast, occasional low cliffs, extensive shingle beaches in places including the very long spit at Orfordness and at Shingle Street.
Coastal edge	Intertidal				■		Mix of simple shingle beaches and banks with estuarial deposits, with groynes and rock armour at Felixstowe and in places elsewhere.

							Some small lagoons behind shingle banks.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).						Estuary SPAs, Orford Shingle Street SAC, Outer Thames Estuary SPA (wintering red-throated diver and common tern and little tern during the breeding season), Margate and Long Sands SAC
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.						To the south- use by shipping accessing the ports of Felixstowe and Harwich (Harwich Haven) with associated beacons, buoys and anchorages, some aggregate production areas offshore, Greater Gabbard and London Array outside the area offshore, some fishing, leisure sailing eg from Shotley and Felixstowe Ferry, use of beaches at Felixstowe. Intensity of use reduces to the north.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.						Felixstowe- port with related infrastructure and residential and leisure uses to the south, former military and atomic research station on Orfordness to north, otherwise rural coast/hinterland Suffolk Coast Path, golf course, limited settlements and Bawdsey Manor- PGL centre.
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes						Recession of coastline over many years, numerous wrecks, some related to harbours.
Historic features on coast	eg coastal forts, castles, lighthouses						Napoleonic Wars fort (Landguard Fort) and numerous Martello towers, military related structures such as pagodas at Orford Ness, Bawdsey Manor historic park and garden, Orford Castle (and church) set back from the coast but overlooking it.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Historic ports at Harwich and Felixstowe (associated with the Mayflower) with trade routes, defensive coast -Napoleonic forts and Martello towers, WWII infrastructure and former military use of Orfordness alongside the national nature reserve, Orford Castle, Bawdsey Manor- former manor, now outdoor education facility, painting of Orfordness lighthouse by Daniell.

Main criteria	Sub-criteria	H	H / M	M	M /L	L	Comments
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape busier to the south with shipping and beacons apparent, Greater Gabbard and London Array visible in very good visibility. Masts at Orfordness.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						Generally well maintained and protected coast (with designations) but managed dereliction at Orford Ness which contributes to distinctiveness.
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						The sea feels large scale with panoramic views
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Openness is a key characteristic of the coast especially to the north with generally open views out to sea from beaches with some framing at the mouth of the Deben.
Exposure	Sheltered, calm, exposed.						Exposed, eroding and accreting coast with distinctive character to north with sheltered waters in estuaries and anchorages to the south.
Aspect	Relationship with sun.						South east facing with potential for highlighting of turbines in low sun in afternoon and near sunset especially in summer.
Seascape pattern and foci	Features and elements on/above the sea surface.						Presence of shipping/ferries with markers to the south but shipping less evident to the north. Windfarms at a distance offshore- 170m high turbines at Greater Gabbard/Galloper most apparent and London Array.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						Very distinctive shingle spit at Orford Ness, some limited cliffs with small headlands, with Martello towers and Orford Castle inland increasing susceptibility. Small scale and low landmarks generally apart from 60m masts at Orfordness to the north.
Contribution to the setting of a coast or seascape							The zone is integral to the character of the coast all lying within the

character area							limits of visual perception
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from Orford Castle, Felixstowe seafront, around Martello towers and from Suffolk Coast Path- Felixstowe Ferry/Deben estuary/edge of Bawdsey Manor, Bawdsey East Street, Shingle Street and mouth of the Alde/Ore estuary which is a distinctive location near the end of Orford Ness.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Most of the coast is accessible and directly facing the sea with a direct relationship with the seascape zone. The zone is also visible from the north eg Aldeburgh.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast (70% of coast). Suffolk Coast Path users, visitors to beach, promenade and pier at Felixstowe, and to Felixstowe Ferry. Visitors to Orford Ness. Leisure sailing from Deben Estuary and Shotley. Harwich ferry users.
OVERALL SUSCEPTIBILITY							

VALUE		
DESIGNATIONS		
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB
	Heritage Coast Designation	Suffolk Heritage Coast
Historic	*Key scheduled*	Orford Castle; Martello Towers- on golf course adjoining Woodbridge Haven, at Felixstowe ferry, Rose Cottage,

designations	*monuments*	Bawdsey Beach, SE of Buckanay Farm and Shingle Street; Landguard Fort- Felixstowe.
	Conservation Areas	Felixstowe, Orford (also Aldeburgh to north)
	Key listed buildings	Orford Castle- Grade I listed building tower, Bawdsey Manor and associated buildings and structures, various Martello towers and battery observation post.
	Historic parks and gardens	Bawdsey Manor Historic Park and Garden; Cliff Gardens (and Town Hall Garden), Felixstowe
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA, Margate and Long Sands SAC, Southern North Sea SAC
	Marine Conservation Zone	-

VALUE CRITERIA

Main criteria	Sub-criteria	H	H / M	M	M /L	L	Comments
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						75% of the coast Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Outer Thames Estuary SPA, Margate and Long Sands SAC, Southern North Sea SAC
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Bawdsey Manor Historic Park and Garden including listed structures, Felixstowe Conservation Area, Martello towers dotted along the coast- all increase value.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast directly overlook the seascape zone.
	Scenic quality- sense of place						Strong sense of place especially associated with Orford Ness and shingle beaches and banks and estuaries, and Martello towers overlooking the sea.
	Scenic quality- panoramic views and vantage points						Panoramic views from Coast Path
	Relative wildness, sense of remoteness, lack of human						Sense of remoteness to the north east around Shingle Street and Orford Ness with extensive shingle

	influence						banks, estuary and nature reserves.
	Relative tranquillity- absence of development						Substantially tranquil north of Bawdsey and in parts of Orford Ness reducing to the south east with limited tranquillity at Felixstowe on coast. Shipping reduces tranquillity to an extent.
	Relative tranquillity- dark skies						Substantially dark to the north east around Orford Ness, although possibly with mast lights to the north, reducing to the south east with lit streets at Felixstowe. Shipping, beacons and wind farms' red aviation lights offshore.
	Cultural associations/artistic representations						Historic defence structures, link to the Mayflower- Harwich, painting of Orfordness lighthouse by Daniell, smuggling around Shingle Street.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Leisure sailing, fishing and visits to the nature reserve form communities of interest, the Coast Path is well used and Felixstowe still popular.
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Leisure sailing fishing and walking.
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Greater Gabbard/ Galloper and London Array nearby. Further development potentially could cause cumulative effects if using larger turbines or extending the perceived width of development along the horizon.
Potential planned further development in zone	Greater Gabbard/ Galloper extension
Current relationship of wind farms and effect on seascape character and setting of AONB	At present there is a clear separation between Greater Gabbard/ Galloper and London Array (30km). They are apparent on the horizon and are located within the setting of the AONB. They are detractors and not a key characteristic of the AONB. Their effect is mitigated by the size of turbine, the distance offshore, the apparent width along the horizon and the influence of visibility modifiers/weather.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	The Greater Gabbard/ Galloper extension would be likely to slightly increase adverse effects on the AONB but the level of effects would depend on the size of turbine proposed. If this was the same/very similar in height and spacing then the effects may be limited. If turbine size is increased, the level of effect would also increase. Views of East Anglia TWO may be possible from the northern part of the area- Orford Ness. This could create a curtain of turbines on the horizon in close juxtaposition with Greater Gabbard/Galloper (7km gap).

Compatibility of cumulative combined effects with AONB policies	A small extension using the same size turbines as existing for Greater Gabbard/ Galloper could be construed as minimising effects on the purposes of the AONB. East Anglia TWO would be likely to be incompatible.
CUMULATIVE EFFECTS	**Comments**
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	A very limited extension of Greater Gabbard/ Galloper to the south west (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing. An extension further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB. No other wind farm developments are considered appropriate within the zone.

Seascape zone No: 02	Name: Suffolk Heritage Coast Offshore- South
Location	
The seascape zone is defined by the southern boundary of the study area to the south, a line between two Greater Gabbard arrays to the north east, the suggested buffer distance for smaller turbines off combined AONBs and Heritage Coasts (34km) (derived from the OESEA study, 2020) to the west and the suggested buffer distance for larger turbines to the east (40km).	
OVERALL SENSITIVITY	
Sensitivity	Medium
Summary	
The zone lies between 34km and 40km offshore from a generally low-lying coast which is 70% covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designation. The south western part of the coast between Felixstowe and Felixstowe Ferry is fronted by urban/suburban development, park or a golf course but includes a seafront Conservation Area and popular beaches. The approaches to Harwich Harbour/Felixstowe run through the zone and are used by a range of shipping including container vessels and ferries. Greater Gabbard/Galloper windfarms lie to the north and east. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path along this part of the coast and from the north, framed views from the Deben estuary, the sense of remoteness, tranquillity and openness at the distinctive spit at Orford Ness and around Shingle Street which the seascape contributes to, and which relate to the AONB's natural beauty criteria. The zone's value lies in its role as part of the setting of the combined AONB and Heritage Coast, the views from the scheduled monuments overlooking the area including the listed Orford Castle and numerous Martello towers and from listed Bawdsey Manor and associated gardens, and MCZ/SPA/SAC. The factors which reduce sensitivity are the distance offshore, the presence of shipping and World War II and subsequent military infrastructure on the coast including the masts at Orford Ness, and the presence of Greater Gabbard/Galloper wind farms, but the latter raise the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies between 34km and 40km of the shore which potentially allows consideration of wind farms with turbines between 107-224m high but is a suggested constraint buffer for turbines from 225-400m high to avoid significant adverse effects on a combined AONB and Heritage Coast . This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development over 224m high. However, the zone contributes to the distinct separation between Greater Gabbard/Galloper and the London Array wind farms which, combined with distance, is helpful in avoiding substantial combined cumulative effects on the designated coastline. Extension of the Greater Gabbard/ Galloper arrays south or east into this area may cause adverse combined cumulative effects through either a curtaining effect on the horizon or if the turbines are higher than the existing.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 04 East Anglian Shipping Waters
Local seascape character areas	SCT 06 Offshore Waters
VISUAL BUFFERS	
Distance offshore- range	34km-40km offshore
*Size of turbines potentially having low or medium/low magnitude of effect**	• Turbines 226-300m would be likely to exceed low magnitude of effect less than 38.6km from shore. • Turbines 301-350m would be likely to exceed low

	magnitude of effect less than 40km from shore. • Turbines 351-400m would be likely to exceed low magnitude of effect less than 40km+ from shore.
*Size of turbines potentially having medium magnitude of effect**	• Turbines 145-400m would not generally be likely to exceed medium magnitude of effect. (Note: East Anglia TWO assessed as medium effect from 36km in SVIA)

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying with some coastal plateau and some low slopes of the estate sandlands behind coastal levels.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■			Mix of very gently curving bays with minor headlands and small estuaries and a very gently convex coast, occasional low cliffs, extensive shingle beaches in places including the very long spit at Orfordness and at Shingle Street.
Coastal edge	Intertidal				■		Mix of simple gravel beaches and banks with estuarial deposits, with groynes and rock armour at Felixstowe and in places elsewhere. Some small lagoons behind shingle banks.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).			■			Kentish Knock MCZ, Outer Thames Estuary SPA (wintering red-throated diver and common tern and little tern during the breeding season), Margate and Long Sands SAC
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.			■	■		Use by shipping accessing the ports of Felixstowe and Harwich, Greater Gabbard/ Galloper and London Array and some aggregate production nearby, possible fishing but busy shipping waters.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.			■	■		Felixstowe- port with related infrastructure and residential and leisure uses to the south, former military and atomic research station on Orfordness to north, otherwise rural coast/hinterland Suffolk Coast Path, golf course, limited settlements and Bawdsey Manor- PGL centre.
Historic features at sea, on seabed	eg wrecks, paleolandscapes			■			Paleolandscape, recession of coastline over many years, a few

or buried below							wrecks.
Historic features on coast	eg coastal forts, castles, lighthouses						Napoleonic Wars fort (Landguard Fort) and numerous Martello towers, military related structures such as pagodas at Orford Ness, Bawdsey Manor historic park and garden, Orford Castle (and church) set back from the coast but overlooking it.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Associated with shipping across the North Sea linking UK ports with Europe and from English Channel, paleolandscape associations pre-sea level rise and the North Sea.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape busy with shipping, Greater Gabbard/Galloper and London Array visible relatively nearby.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						N/A
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						Large scale open sea
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Very open away from the coast.
Exposure	Sheltered, calm, exposed.						Highly exposed open sea.
Aspect	Relationship with sun.						South east of the coast at a distance so potential for highlighting of turbines in low sun near sunset limited.
Seascape pattern and foci	Features and elements on/above the sea surface.						Presence of wind farms nearby and shipping/ferries.

Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						Very distinctive shingle spit at Orford Ness, some limited cliffs with small headlands, with Martello towers and Orford Castle inland increasing susceptibility. Small scale and low landmarks generally apart from 60m masts at Orford Ness to the north.
Contribution to the setting of a coast or seascape character area							The zone is integral to the character of the coast all lying within the limits of visual perception
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from Orford Castle, Felixstowe seafront, around Martello towers and from Suffolk Coast Path- Felixstowe Ferry/Deben estuary/edge of Bawdsey Manor, Bawdsey East Street, Shingle Street and mouth of the Alde/Ore estuary which is a distinctive location near the end of Orford Ness. Sea to sea- views from ferries and other passenger ships.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Most of the coast is accessible and directly facing the seascape zone at a distance.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast (75% of coast). Suffolk Coast Path users, visitors to beach, promenade and pier at Felixstowe, and to Felixstowe Ferry. Visitors to Orford Ness. Harwich ferry and other passenger ship users.

OVERALL SUSCEPTIBILITY							

VALUE							
DESIGNATIONS							
Landscape designations on coast	*AONB Designation*	Suffolk Coast and Heaths AONB					
	Heritage Coast Designation	Suffolk Heritage Coast					
Historic designations on coast	*Key scheduled monuments*	Orford Castle; Martello Towers- on golf course adjoining Woodbridge Haven, at Felixstowe ferry, Rose Cottage, Bawdsey Beach, SE of Buckanay Farm and Shingle Street; Landguard Fort- Felixstowe.					
	Conservation Areas	Felixstowe, Orford (also Aldeburgh to north)					
	Key listed buildings	Orford Castle- Grade I listed building tower, Bawdsey Manor and associated buildings and structures, various Martello towers and battery observation post.					
	Historic parks and gardens	Bawdsey Manor Historic Park and Garden; Cliff Gardens (and Town Hall Garden), Felixstowe					
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA, Margate and Long Sands SAC.					
	Marine Conservation Zone	Kentish Knock MCZ					
VALUE CRITERIA							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						75% of the coast Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Kentish Knock MCZ, Outer Thames Estuary SPA, Margate and Long Sands SAC
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Bawdsey Manor Historic Park and Garden including listed structures, Felixstowe Conservation Area, Martello towers dotted along the coast- all increase value.
Relevant special qualities	If landscape/ coastal designation overlooks area. (List and define						The AONB and Heritage Coast directly overlook the seascape zone but at a distance of 34-40km.

/natural beauty indicators	the degree to which the area contributes to these).						
	Scenic quality- sense of place						Contributes to open seascape setting to AONB and Heritage Coast .
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
	Scenic quality- panoramic views and vantage points						Panoramic views from Coast Path towards zone.
	Relative wildness, sense of remoteness, lack of human influence						Remote zone but used by shipping with wind farms nearby.
	Relative tranquillity- absence of development						Generally tranquil but use by shipping.
	Relative tranquillity- dark skies						Substantially dark with shipping and wind farms' red aviation lights to north, south and east.
	Cultural associations/artistic representations						Limited cultural associations other than maritime use.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Very limited community values
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Very limited leisure sailing
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Greater Gabbard/ Galloper and London Array nearby. Further development potentially could cause cumulative effects if using larger turbines or extending the perceived width of development along the horizon.
Potential planned further development in zone	Greater Gabbard/ Galloper extension
Current relationship of wind farms and effect on seascape character and setting of AONB	At present there is a clear separation between Greater Gabbard/ Galloper and London Array (30km). They are apparent on the horizon and are located within the setting of the AONB. They are detractors and not a key characteristic of the AONB. Their effect is mitigated by the size of turbine, the distance offshore, the apparent width along the horizon and the influence of visibility modifiers/weather.
Potential cumulative combined effect of existing, consented and potential planned development on	There are no current plans for development in the seascape zone.

seascape character and setting of AONB	
CUMULATIVE EFFECTS	**Comments**
Compatibility of cumulative combined effects with AONB policies	There are no current plans for development in the seascape zone.
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	Extensions of Greater Gabbard/ Galloper from the north or east within the seascape zone (if feasible) would be considered to cause harm to the qualities and natural beauty of the AONB and Heritage Coast as they would reduce the gap between the existing arrays.

Seascape zone No: 03	Name: Greater Gabbard Environs
Location/extent	
The seascape zone is defined by the extent of the northern arrays of the Greater Gabbard and Galloper wind farms extending east towards the coast to the boundary of average low/medium-low magnitude of effects of turbines of a similar scale to those in the existing arrays (21.7km).	
OVERALL SENSITIVITY	
Sensitivity	Medium
Summary	
The zone lies between 21.7km and 40km offshore. The majority of this is existing wind farm so the comments relate to the part of the zone to the west of the arrays, towards the coast. The area is offshore from a generally low-lying coast which is 70% covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designation which also continues northwards for a substantial distance. The south western part of the coast between Felixstowe and Felixstowe Ferry is fronted by urban/suburban development, park or a golf course but includes a seafront Conservation Area and popular beaches. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path along this part of the coast and from the north, the sense of remoteness, tranquillity and openness at the distinctive spit at Orford Ness and around Shingle Street which the seascape contributes to, and which relate to the AONB's natural beauty criteria. The zone's value lies in its role as part of the setting of the combined AONB and Heritage Coast, the views from the scheduled monuments overlooking the area including the listed Orford Castle and numerous Martello towers, from Aldeburgh Conservation Area and from listed Bawdsey Manor and associated gardens, and SPA/SACs. The factors which reduce sensitivity are the distance offshore, World War II and subsequent military infrastructure on the coast including the masts at Orford Ness, and the presence of Greater Gabbard/Galloper wind farms, but the latter raise the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies over 21.7km from the shore which potentially allows consideration of wind farms with turbines upto 175m high but is a suggested constraint buffer for turbines above this to avoid significant adverse effects on a combined AONB and Heritage Coast . This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development over 175m high. Extension of the Greater Gabbard/ Galloper arrays east into this area may also cause adverse combined cumulative effects if the turbines are higher and with wider spacing than the existing.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 04 East Anglian Shipping Waters
Local seascape character areas	SCT 06 Offshore Waters
VISUAL BUFFERS	
Distance offshore- range	21.7km- c.40km offshore
*Size of turbines potentially having low or medium/low magnitude of effect**	• Turbines above 176-225m would be likely to exceed low magnitude of effect less than 26.2 km from shore. • Turbines 226-300m would be likely to exceed low magnitude of effect less than 38.6km from shore. • Turbines 301-350m would be likely to exceed low magnitude of effect less than 40km from shore. • Turbines 351-400m would be likely to exceed low magnitude of effect less than 40km+ from shore.

*Size of turbines potentially having medium magnitude of effect**	• Turbines 226-300m would be likely to exceed medium magnitude of effect less than 27.5km from shore. • Turbines 301-350m would be likely to exceed medium magnitude of effect less than 30km from shore. • Turbines 351-400m would be likely to exceed medium magnitude of effect less than 30km+ from shore. (Note: East Anglia TWO assessed as medium effect from 36km in SVIA)

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying with some coastal plateau and some low slopes of the estate sandlands behind coastal levels.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■			Mix of very gently curving bays with minor headlands and small estuaries and a very gently convex coast, occasional low cliffs, extensive shingle beaches in places including the very long spit at Orfordness and at Shingle Street.
Coastal edge	Intertidal				■		Mix of simple shingle beaches and banks with estuarial deposits, with groynes and rock armour at Felixstowe and in places elsewhere. Some small lagoons behind shingle banks.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).				■		Southern North Sea SAC
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.					■	Greater Gabbard/ Galloper offshore windfarms and associated support vessels.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.			■	■		Felixstowe- port with related infrastructure and residential and leisure uses to the south, former military and atomic research station on Orfordness to north, otherwise rural coast/hinterland Suffolk Coast Path, golf course, limited settlements and Bawdsey Manor- PGL centre.
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes				■		Paleolandscape, potentially a few wrecks.

Historic features on coast	eg coastal forts, castles, lighthouses			■			Napoleonic Wars fort (Landguard Fort) and numerous Martello towers, military related structures such as pagodas at Orford Ness, Bawdsey Manor historic park and garden, Orford Castle (and church) set back from the coast but overlooking it.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc				■		Paleolandscape associations pre-sea level rise and the North Sea.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.					■	Greater Gabbard/Galloper in area.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						N/A
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.				■		Large scale open sea with large turbine structures.
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.					■	Very open away from the coast, some framing/enclosure by turbines.
Exposure	Sheltered, calm, exposed.				■		Highly exposed open sea.
Aspect	Relationship with sun.					■	East of the coast but with existing turbines to the east.
Seascape pattern and foci	Features and elements on/above the sea surface.				■	■	Presence of existing wind farms.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.			■			Very distinctive shingle spit at Orford Ness, some limited cliffs with small headlands, with Martello towers and Orford Castle inland

							increasing susceptibility. Small scale and low landmarks generally apart from 60m masts at Orford Ness to the north.
Contribution to the setting of a coast or seascape character area							The zone is visible from the coast within the limits of visual perception but the existing windfarm in the eastern part of the zone is a detractor and so does not contribute positively to the setting.
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order).						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from Orford Castle, Felixstowe seafront, around Martello towers and from Suffolk Coast Path- Felixstowe Ferry/Deben estuary/edge of Bawdsey Manor, Bawdsey East Street, Shingle Street and mouth of the Alde/Ore estuary which is a distinctive location near the end of Orford Ness, Aldeburgh seafront. Sea to sea- views from ferries and other passenger ships.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Most of the coast is accessible and directly facing the seascape zone at a distance. Views from Aldeburgh slightly oblique.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast (75% of coast). Suffolk Coast Path users, visitors to beach, promenade and pier at Felixstowe, to Felixstowe Ferry, Orford Ness and the seafront at Aldeburgh. Harwich ferry and other passenger ship users.
OVERALL SUSCEPTIBILITY							

VALUE							
DESIGNATIONS							
Landscape designations on coast	*AONB Designation*	Suffolk Coast and Heaths AONB					
	Heritage Coast Designation	Suffolk Heritage Coast					
Historic designations on coast	*Key scheduled monuments*	Orford Castle; Martello Towers- on golf course adjoining Woodbridge Haven, at Felixstowe ferry, Rose Cottage, Bawdsey Beach, SE of Buckanay Farm and Shingle Street; Landguard Fort- Felixstowe.					
	Conservation Areas	Felixstowe, Orford (also Aldeburgh to north)					
	Key listed buildings	Orford Castle- Grade I listed building tower, Bawdsey Manor and associated buildings and structures, various Martello towers and battery observation post.					
	Historic parks and gardens	Bawdsey Manor Historic Park and Garden; Cliff Gardens (and Town Hall Garden), Felixstowe					
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA, Margate and Long Sands SAC, Southern North Sea SAC					
	Marine Conservation Zone	-					
VALUE CRITERIA							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						75% of the coast Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Outer Thames Estuary SPA, Margate and Long Sands SAC
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Bawdsey Manor Historic Park and Garden including listed structures, Felixstowe Conservation Area, Martello towers dotted along the coast- all increase value.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast directly overlook the seascape zone but at a distance of 21.7- 40km.

	Scenic quality- sense of place						Eastern part contributes to open seascape setting to AONB and Heritage Coast but wind farm a detractor.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
	Scenic quality- panoramic views and vantage points						Panoramic views from Coast Path towards zone but wind farm a detractor.
	Relative wildness, sense of remoteness, lack of human influence						Remote zone but used by shipping with wind farms nearby.
	Relative tranquillity- absence of development						Presence of existing wind farm
	Relative tranquillity- dark skies						Wind farms' red aviation lights to east of the zone.
	Cultural associations/artistic representations						Limited cultural associations other than maritime use.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Very limited community values
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Very limited leisure sailing
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Greater Gabbard/ Galloper in part of the zone. Further development potentially could cause cumulative effects if using larger turbines at different spacing to existing.
Potential planned further development in zone	Greater Gabbard/ Galloper extension
Current relationship of wind farms and effect on seascape character and setting of AONB	At present there is a clear separation between Greater Gabbard/ Galloper and London Array (30km). They are apparent on the horizon and are located within the setting of the AONB. They are detractors and not a key characteristic of the AONB. Their effect is mitigated by the size of turbine, the distance offshore, the apparent width along the horizon and the influence of visibility modifiers/weather.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	An extension to Greater Gabbard/ Galloper within the area is only likely to have adverse cumulative effects if using larger turbines at different spacing to existing. This would be due to a greater visual effect on coastal receptors through the use of larger turbines and a more confusing visual composition with different spacings necessitated by the turbine size.

Compatibility of cumulative combined effects with AONB policies	There are no current plans for development in the seascape zone.
CUMULATIVE EFFECTS	**Comments**
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	An extension to Greater Gabbard/ Galloper within the zone would be considered to minimise harm on the qualities and natural beauty of the AONB if turbines are the same size and spacing and arrangement as existing.

Seascape zone No: 04	Name: Suffolk Heritage Coast Inshore- North
Location	
The seascape zone is off the northern part of the Suffolk Heritage Coast from Orfordness Lighthouse to Kessingland. It is defined by the change of direction of the coast at Orford Ness to the south, the northern point of the combined AONB and Heritage Coast to the north west, the line of view just off the coast beyond Lowestoft port from the AONB/HC out to 34km which is the suggested buffer distance for smaller turbines off combined AONBs and Heritage Coasts (34km) (derived from the OESEA study, 2019) to the north east and east.	
OVERALL SENSITIVITY	
Sensitivity	High
Summary	
All of the generally low-lying coast of this seascape zone is covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designation. The coast is largely rural and sparsely settled interspersed with historic old ports/now popular seaside towns with beaches including Aldeburgh, Southwold and Dunwich with associated Conservation Areas and historic features. Sizewell A and B nuclear power stations lie roughly centrally. The area is used for fishing, both commercial and leisure, as evidenced by small craft on the shingle beaches and in estuary harbours, and for leisure sailing and other watersports. Greater Gabbard/Galloper windfarms lies offshore to the south, outside the zone. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path which continues to the north and south, such as around the Coastguard Cottages south of Dunwich, the strong sense of remoteness, tranquillity and openness at Orford Ness and between settlements which the seascape contributes to in association with the marshes inland, and which relate to the AONB's natural beauty criteria, the limited number of detractors and lighting both along the coast and offshore, and the relatively high frequency of offshore visibility over long distances. The zone's value lies in its role as a major part of the setting of the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast, the views from Conservation Areas with associated listing buildings at Aldeburgh, Southwold, Dunwich and Thorpeness, and from the scheduled monuments overlooking the area including the listed Orford Castle and MCZ/SPAs/SAC. The factors which slightly reduce sensitivity are Sizewell A and B nuclear power stations and the masts at Orford Ness to the south, but these do not affect the views to the open waters offshore, and the presence of Greater Gabbard/Galloper wind farms offshore to the south. The latter raise the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies within 34km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on a combined AONB and Heritage Coast . This combined with the susceptibility and other values related to the zone suggest an area of strong constraint on windfarm development. Turbines as proposed in East Anglia TWO *within the zone* would be considered to cause significant harm to the qualities and natural beauty of the AONB. A limited extension of Greater Gabbard/ Galloper to the south of the zone (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing. An extension of Greater Gabbard/ Galloper further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB. Development within the Round 4 bidding area *within the zone* would be considered to cause significant harm to the qualities and natural beauty of the AONB.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 04 East Anglian Shipping Waters (part) SCA 09 Norfolk Coastal Waters (part)

	SCA 10 Suffolk Coastal Waters (part)
Local seascape character areas	SCT 03 Nearshore Waters (part) SCT 04 Developed Nearshore Waters (part) SCT 05 Coastal Waters (part) SCT 06 Offshore Waters (part)
VISUAL BUFFERS	
Distance offshore- range	Upto 34km from AONB and Heritage Coast (HC) coastal boundary.
*Size of turbines potentially having low magnitude of effect**	• Turbines below 145m would be likely to exceed low magnitude of effect less than 19.2km from AONB/HC. • Turbines 145-175m would be likely to exceed low magnitude of effect less than 21.7 km from AONB/HC. • Turbines above 176-225m would be likely to exceed low magnitude of effect less than 26.2 km from AONB/HC. • Turbines above 226-300m would be likely to exceed low magnitude of effect.
*Size of turbines potentially having medium magnitude of effect**	• Turbines below 145m would be likely to exceed medium magnitude of effect less than 14km from shore. • Turbines 145-175m would be likely to exceed medium magnitude of effect less than 15.8km from shore. • Turbines above 176-225m would be likely to exceed medium magnitude of effect less than 20.2km from shore. • Turbines 226-300m would be likely to exceed medium magnitude of effect less than 27.5km from shore. • Turbines 301-350m would be likely to exceed medium magnitude of effect less than 30km from shore. • Turbines 351-400m would be likely to exceed medium magnitude of effect less than 30km+ from shore.

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying coastal plateau with very gentle slopes of the estate sandlands either behind coastal levels and marshes or reaching the coast.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■			Mix of straight or very gently curving bays with small estuaries, occasional low cliffs such as at Dunwich, Easton and Covehithe, and extensive shingle beaches in places including the very long spit at Orfordness.
Coastal edge	Intertidal				■		Mix of simple gravel beaches and banks with estuarial deposits, with groynes at Southwold. Some small

							lagoons behind coastal banks.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).						Orford Inshore MCZ, Outer Thames Estuary SPA (wintering red-throated diver and common tern and little tern during the breeding season), Greater Wash SPA, Orford Shingle Street SAC
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.						Commercial fishing intense along the coast (eg fishing boat moorings at Southwold harbour and beached boats at Aldeburgh), use of beaches focussed on tourist towns, some leisure fishing, leisure sailing and watersports, some aggregate production areas offshore, Greater Gabbard and Galloper visible outside the area offshore.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.						Popular seaside towns- Southwold, Aldeburgh, with other destinations including Thorpeness and Dunwich. Sizewell A and B Nuclear Power Stations are incongruous features in an area of sparsely settled coast. Orfordness radio masts lie to the south. Otherwise farmed rural coast/hinterland with significant areas of marsh/coastal levels and heath. Suffolk Coast Path and National Trust Coastguard Cottages at Dunwich heath.
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes						Recession of coastline over many years, numerous wrecks, some related to harbours. Dunwich Bank Wreck- designated.
Historic features on coast	eg coastal forts, castles, lighthouses						Orford Castle tower set back from the coast to the south but overlooking it. Martello tower at Slaughden, Many conservation areas with associated listed buildings overlooking sea eg Southwold, Aldeburgh).
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Former historic ports at Southwold (with Georgian and Regency revival), Dunwich (now lost to the sea) and Aldeburgh with its former shipbuilding industry, Orford Castle and the defensive coast to the south- Slaughden Martello towers and former military use of Orford Ness; national nature reserves, Turner painting of Aldeburgh.

							Sizewell is associated with the nuclear age with associated ambivalent connotations.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape intact with very few detractors- Sizewell is visible along part of the coast- mostly south of Southwold, and Greater Gabbard is visible in very good visibility to the south east. Orford Ness masts to the south.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						Generally well maintained and protected coast (with designations).
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						The sea feels large scale with panoramic views
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Openness is a key characteristic of the coast with generally open views out to sea from beaches with some framing within settlements.
Exposure	Sheltered, calm, exposed.						Exposed, eroding coast with sheltered waters in river estuaries and mouths.
Aspect	Relationship with sun.						East facing with potential for highlighting of turbines in low sun in afternoon and sunset and interfering with sunrise.
Seascape pattern and foci	Features and elements on/above the sea surface.						Limited foci- local fishing boats and leisure boats apparent in places. Some shipping visible to the north out of Lowestoft/anchored (including cruise liner off Southwold during site visit). Greater Gabbard/Galloper visible from southern part of the coast in good/very good visibility.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						Generally simple coast with few foci- to the south- very distinctive shingle spit at Orford Ness with Martello tower and masts. To the north- some limited cliffs and historic settlements, Southwold Pier. Sizewell power stations have some visual influence centrally

							between Southwold and Aldeburgh but not along the whole coast.
Contribution to the setting of a coast or seascape character area							The zone is integral to the character of the coast all lying within the limits of visual perception
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from Orford Castle, from Suffolk Coast Path (including likely new route along coast to the north), Aldeburgh and Southwold seafronts (and pier), Dunwich Coastguard Cottages.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Most of the coast is accessible and directly facing the sea with a direct relationship with the seascape zone. The zone is also visible from the southern part of the AONB/HC and just offshore from Lowestoft South Conservation Area.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast. Suffolk Coast Path users, visitors to beaches, promenades such as Southwold. Leisure sailing from Southwold Harbour and Lowestoft.
OVERALL SUSCEPTIBILITY							

VALUE		
DESIGNATIONS		
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB

	Heritage Coast Designation	Suffolk Heritage Coast
Historic designations	*Key scheduled monuments*	Orford Castle and Slaughden Martello Tower (south of Aldeburgh)- both with views over sea. Also Greyfriars, Dunwich- sheltered from view except at the south eastern coastal edge.
	Conservation Areas	Aldeburgh, Thorpeness, Dunwich, Southwold, Lowestoft (south).
	Key listed buildings	Orford Castle- Grade I listed building tower; Slaughden Martello Tower; Aldeburgh- eg Moot Hall, White Lion Hotel, Market Cross House, 8-14, Market Cross Place. Southwold- numerous eg Gun Hill Place, Centre Cliff, Cliff House and Shrimp Cottage, Bay View and East Cliff; Lowestoft- Wellington Esplanade.
	Historic parks and gardens	-
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA, Greater Wash SPA, Orford Shingle Street SAC
	Marine Conservation Zone	Orford Inshore MCZ

VALUE CRITERIA

Main criteria	Sub-criteria	H	H / M	M	M /L	L	Comments
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						All the coast is Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Orford Inshore MCZ, Outer Thames Estuary SPA, Greater Wash SPA, Orford Shingle Street SAC.
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Conservation Areas at Aldeburgh, Thorpeness, Dunwich, Southwold, Lowestoft (south) and many related listed buildings; Slaughden Martello Tower (south of Aldeburgh) scheduled monuments- both with views over sea.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast directly overlook the seascape zone.
	Scenic quality- sense of place						Strong sense of place especially associated with old seaside towns with related marine character and views, views from coastal heaths, views from shingle ridges next to

							coastal levels/marshes, Orford Ness and the Slaughden Martello tower overlooking the sea.
	Scenic quality- panoramic views and vantage points						Panoramic views from Coast Path and locations such as Dunwich Coastguard Cottages, and beaches such as Aldeburgh and Southwold.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
	Relative wildness, sense of remoteness, lack of human influence						Sense of remoteness at Orford Ness with estuary and nature reserves and between settlements to the north such as around Minsmere and Dingle Marshes.
	Relative tranquillity- absence of development						Substantially tranquil around Orford Ness with estuary and nature reserves and between settlement to the north such as around Minsmere and Dingle Marshes. Sizewell power stations are a presence that influences some views.
	Relative tranquillity- dark skies						Substantially dark to around Orford Ness, although possibly with mast lights, with only intermittent small settlements and Sizewell along a substantially dark coast. Wind farms' red aviation lights offshore to the south east.
	Cultural associations/artistic representations						Aldeburgh- festival and association with Britten; Dunwich, Southwold and Walberswick popular with artists, historic ports/harbours.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Leisure sailing between Aldeburgh and Lowestoft, fishing and visits to the nature reserves form communities of interest, the Coast Path is well used and all the coastal settlements and associated beaches are popular.
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Leisure sailing, sea and beach angling and walking.
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Greater Gabbard/ Galloper nearby. Further development potentially could cause cumulative effects if using larger turbines or extending the perceived width of development along the horizon.

Potential planned further development in zone	East Anglia TWO at around 30km offshore at its closest point. Greater Gabbard/ Galloper extension to the south. The Round 4 bidding area significantly impinges on the zone reaching 13km offshore over a distance of 40km.
CUMULATIVE EFFECTS	**Comments**
Current relationship of wind farms and effect on seascape character and setting of AONB	At present Greater Gabbard/ Galloper wind farms appear as an isolated array 25km-37km offshore within a wider panorama and open horizon and is within the setting of the AONB. They are detractors and not a key characteristic of the AONB. Their effect is mitigated by the size of turbine, the distance offshore, the apparent width along the horizon and the influence of visibility modifiers/weather.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	In clear visibility, East Anglia TWO could create a curtain of turbines 30km long on the horizon along almost the entire width of SCZ 04's coastline and separated from Greater Gabbard/ Galloper by only 7km. This would cause notable cumulative effects with the only substantial open horizon available in views to the north-east. The Greater Gabbard/ Galloper extension to the south would be likely to slightly increase adverse effects on the AONB but the level of effects would depend on the size of turbine proposed. If this was the same/very similar in height and spacing then the effects may be limited. If turbine size is increased, the level of effect would also increase. Development within the Round 4 bidding area would be likely to significantly exacerbate cumulative effects of the developments above and could fundamentally change the character of the seascape, potentially becoming one of the dominant characteristics. The effects would be greater the closer development is to the coast, and the greater the height of turbine and size of array.
Compatibility of cumulative combined effects with AONB policies	East Anglia TWO would be incompatible with AONB policies especially relating to the purpose of conservation and enhancement and its special qualities/natural beauty. A small extension of Greater Gabbard/ Galloper using the same size turbines as existing could be construed as minimising effects on the purposes of the AONB. It is unlikely that any additional development in the Round 4 bidding area would be compatible with AONB policies.
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	No wind farm developments are considered appropriate within the zone. A limited extension of Greater Gabbard/ Galloper to the south of the zone (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing. An extension further towards the coast *within* the seascape zone would be considered to cause harm to the qualities and natural beauty of the AONB.

Seascape zone No: 05	Suffolk Heritage Coast Offshore- North
Location/extent	
34km off the coast from Orfordness Lighthouse to Kessingland. The seascape zone is defined by the Galloper wind farm to the south, the suggested buffer distance for smaller turbines off the combined AONB and Heritage Coast (34km) (derived from the OESEA study, 2020) to the west, the suggested buffer distance for larger turbines (40km) to the east, both intersected with the line of view from the northern point of the AONB/HC to just off the coast beyond Lowestoft port. *(Note: only Suffolk and associated receptors are assessed- ie Norfolk Coast AONB is not taken into consideration).*	
OVERALL SENSITIVITY	
Sensitivity	Medium
Summary	
The zone lies between 34km and 40km offshore from a generally low-lying coast which is covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designations. The coast is largely rural and sparsely settled, interspersed with historic old ports/now popular seaside towns with beaches including Aldeburgh, Southwold and Dunwich with associated Conservation Areas and historic features. Sizewell A and B nuclear power stations lie roughly centrally. The area is used for commercial fishing and some navigation. Greater Gabbard/Galloper windfarms lies to the south, outside the zone. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path which continues to the north and south, such as around the Coastguard Cottages south of Dunwich, the strong sense of remoteness, tranquillity and openness at Orford Ness and between settlements which the seascape contributes to in association with the marshes inland, and which relate to the AONB's natural beauty criteria, the limited number of detractors and lighting both along the coast and offshore, and the relatively high frequency of offshore visibility over long distances. The zone's value lies in its role as a part of the setting of the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast, the views from Conservation Areas with associated listing buildings at Aldeburgh, Southwold, Dunwich and Thorpeness, and from the scheduled monuments overlooking the area including the listed Orford Castle and SPA/SACs. The factors which slightly reduce sensitivity are Sizewell A and B nuclear power stations and the masts at Orford Ness to the south, but these do not affect the views to the open waters offshore, and the presence of Greater Gabbard/Galloper wind farms offshore to the south, but the latter raise the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies between 34km and 40km of the shore which potentially allows consideration of wind farms with turbines between 107-224m high but is a suggested constraint buffer for turbines from 225-400m high to avoid significant adverse effects on a combined AONB and Heritage Coast . This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development over 225m high. Wind farm development using turbines less than 224m high is considered appropriate within the zone but arrays should avoid a curtaining effect when viewed from the AONB/HC coastline. This could be achieved with gaps between arrays of at least 12km, preferably more, and arrays not exceeding 15km width as perceived from shore. A limited extension of Greater Gabbard/ Galloper to the south of the zone (as currently proposed) may cause limited effects but the turbines should be similar in height and spacing to the existing. Development of turbines over 225m high within the Round 4 bidding area *within the zone* would be considered to cause significant harm to the qualities and natural beauty of the AONB.	
SEASCAPE CHARACTER CONTEXT	

National Marine Character Areas	SCA 04 East Anglian Shipping Waters
Local seascape character areas	SCT 05 Coastal Waters (small part to the north) SCT 06 Offshore Waters (majority)
VISUAL BUFFERS	
Distance offshore- range	34km-40km offshore
*Size of turbines potentially having low magnitude of effect**	• Turbines 226-300m would be likely to exceed low magnitude of effect less than 38.6km from shore. • Turbines 301-350m would be likely to exceed low magnitude of effect less than 40km from shore. • Turbines 351-400m would be likely to exceed low magnitude of effect less than 40km+ from shore.
*Size of turbines potentially having medium magnitude of effect**	• Turbines 145-400m would not generally be likely to exceed medium magnitude of effect. (Note: East Anglia TWO assessed as medium effect from 36km in SVIA)

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying coastal plateau with very gentle slopes of the estate sandlands either behind coastal levels and marshes or reaching the coast.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■			Mix of straight or very gently curving bays with small estuaries, occasional low cliffs such as at Dunwich, Easton and Covehithe, and extensive shingle beaches in places including the very long spit at Orfordness.
Coastal edge	Intertidal				■		Mix of simple gravel beaches and banks with estuarial deposits, with groynes at Southwold. Some small lagoons behind coastal banks.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).			■			Outer Thames Estuary SPA (wintering red-throated diver and common tern and little tern during the breeding season), Southern North Sea SAC, Haisborough, Hammond and Winterton SAC.
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.		■				Commercial fishing; some navigation from Great Yarmouth, Lowestoft and Felixstowe; Greater Gabbard/Galloper visible outside the area to the south.
Use of the coast/ hinterland	Settlement, industry, energy, marine related		■				Popular seaside towns- Southwold, Aldeburgh, with other destinations including Thorpeness and Dunwich.

	development such as ports, power stations, leisure/tourism, agriculture, conservation etc.		■				Sizewell A and B Nuclear Power Stations are incongruous features in an area of sparsely settled coast. Orfordness radio masts lie to the south. Otherwise farmed rural coast/hinterland with significant areas of marsh/coastal levels and heath. Suffolk Coast Path and National Trust Coastguard Cottages at Dunwich heath.
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes			■			Paleolandscape, recession of coastline over many years, some wrecks.
Historic features on coast	eg coastal forts, castles, lighthouses		■	■			Orford Castle tower set back from the coast to the south but overlooking it. Martello tower at Slaughden, Many conservation areas with associated listed buildings overlooking sea eg Southwold, Aldeburgh).
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc				■		Associated with some navigation across the North Sea although away from main routes, paleolandscape associations pre-sea level rise and the North Sea.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.		■				Seascape intact with very few detractors- Greater Gabbard/Galloper is visible to the south.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						N/A
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.				■		Large scale open sea
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of			■	■		Very open away from the coast.

	views.			■	■		
Exposure	Sheltered, calm, exposed.				■		Highly exposed open sea.
Aspect	Relationship with sun.		■				East of the coast at a distance so potential for highlighting of turbines in low sun in afternoon through to sunset.
Seascape pattern and foci	Features and elements on/above the sea surface.		■	■			Presence of wind farms at southern extent.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.			■			Generally simple coast with few foci- to the south- very distinctive shingle spit at Orford Ness with Martello tower and masts. To the north- some limited cliffs and historic settlements, Southwold Pier. Sizewell power stations have some visual influence centrally between Southwold and Aldeburgh but not along the whole coast. Windfarm at a distance offshore to the south east.
Contribution to the setting of a coast or seascape character area			■	■			The zone is integral to the character of the coast all lying within the limits of visual perception albeit at a distance.
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)	■					High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.		■				Land to sea- views from Orford Castle, from Suffolk Coast Path (including likely new route along coast to the north), Aldeburgh and Southwold seafronts (and pier), Dunwich Coastguard Cottages.
Intervisibility of the area with important visual receptors	Amount/length/extent/nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic		■	■			Most of the coast is accessible and directly facing the sea with a direct relationship with the seascape zone. The zone is also visible from the southern part of the AONB/HC and offshore from Lowestoft South Conservation Area.

	influences						
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast. Suffolk Coast Path users, visitors to beaches, promenades such as Southwold. Leisure sailing from Southwold Harbour and Lowestoft.
OVERALL SUSCEPTIBILITY							

VALUE							
DESIGNATIONS							
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB					
	Heritage Coast Designation	Suffolk Heritage Coast					
Historic designations	*Key scheduled monuments*	Orford Castle and Slaughden Martello Tower (south of Aldeburgh)- both with views over sea. Also Greyfriars, Dunwich- sheltered from view except at the south eastern coastal edge.					
	Conservation Areas	Aldeburgh, Thorpeness, Dunwich, Southwold, Lowestoft (south).					
	Key listed buildings	Orford Castle- Grade I listed; Slaughden Martello Tower; Aldeburgh- eg Moot Hall, White Lion Hotel, Market Cross House, 8-14, Market Cross Place; Dunwich- Greyfriars Monastery; Southwold- numerous eg Gun Hill Place, Centre Cliff, Cliff House and Shrimp Cottage, Bay View and East Cliff; Lowestoft- Wellington Esplanade.					
	Historic parks and gardens	-					
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA, Southern North Sea SAC, Haisborough, Hammond and Winterton SAC.					
	Marine Conservation Zone	-					
VALUE CRITERIA							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						All the coast is Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined

Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Outer Thames Estuary SPA, Southern North Sea SAC, Haisborough, Hammond and Winterton SAC
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Conservation Areas at Aldeburgh, Thorpeness, Dunwich, Southwold, Lowestoft (south) and many related listed buildings; Slaughden Martello Tower (south of Aldeburgh) scheduled monuments- both with views over sea. all increase value.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast overlook the seascape zone but at a distance of 34-40km.
	Scenic quality- sense of place						Contributes to open seascape setting to AONB and Heritage Coast .
	Scenic quality- panoramic views and vantage points						Panoramic views from Coast Path towards zone.
	Relative wildness, sense of remoteness, lack of human influence						Remote zone but wind farm to the south.
	Relative tranquillity- absence of development						Generally tranquil but some navigational use.
	Relative tranquillity- dark skies						Substantially dark with some navigational use and wind farms' red aviation lights to south.
	Cultural associations/artistic representations						Limited cultural associations other than maritime use.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Very limited community values
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Leisure sailing, sea and beach angling and walking.
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments

Existing and consented offshore wind farms within zone	Greater Gabbard/Galloper at the southern extent and East Anglia ONE to the east further offshore.
Potential planned further development in zone	East Anglia TWO and East Anglia ONE North. Greater Gabbard/ Galloper extension to the south. The Round 4 bidding area covers a significant proportion of the zone.
Current relationship of wind farms and effect on seascape character and setting of AONB	At present Greater Gabbard/ Galloper wind farms to the south appear as an isolated array 25km-37km offshore within a wider panorama and open horizon and is within the setting of the AONB. They are detractors and not a key characteristic of the AONB. Their effect is mitigated by the size of turbine, the distance offshore, the apparent width along the horizon and the influence of visibility modifiers/weather. East Anglia ONE is not generally perceptible from the coast at 50km offshore at its closest point.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	In clear visibility, East Anglia TWO could create a curtain of turbines 30km long on the horizon along almost the entire width of SCZ 04's coastline and separated from Greater Gabbard/ Galloper by only 7km. This would cause notable cumulative effects with the only substantial open horizon available in views to the north-east. The part of East Anglia ONE North within the zone would add to cumulative effects, and though separated from EA TWO by 10km overlaps visually and so could add to the curtaining effect to the north, albeit further offshore in part. The Greater Gabbard/ Galloper extension to the south would be likely to slightly increase adverse effects on the AONB but the level of effects would depend on the size of turbine proposed. If this was the same/very similar in height and spacing then the effects may be limited. If turbine size is increased, the level of effect would also increase. Further development in the Round 4 bidding Area within the zone would potentially contribute further to the cumulative curtaining effect to the north, extending the influence of wind farms where not already perceived.
Compatibility of cumulative combined effects with AONB policies	East Anglia TWO using the range of sizes of turbines proposed (250-300m high turbines) would be incompatible with AONB policies especially relating to the purpose of conservation and enhancement and its special qualities/natural beauty. A small extension using the same size turbines as existing for Greater Gabbard/ Galloper could be construed as minimising effects on the purposes of the AONB.
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	Wind farm development using turbines less than 225m high is considered appropriate within the zone but arrays should avoid a curtaining effect when viewed from the AONB/HC coastline. This could be achieved with gaps between arrays of at least 12km, preferably more, and arrays not exceeding 15km width as perceived from shore. A limited extension of Greater Gabbard/ Galloper within the zone as currently proposed may cause limited effects but the turbines should be similar in height and spacing to the existing in order to minimise harm to the qualities and natural beauty of the AONB.

Seascape zone No: 06	Name: North Suffolk and Norfolk Inshore
Location	
The seascape zone is off the northern part of the Suffolk and south Norfolk coasts from Kessingland to Winterton-on-Sea. It is defined by the coast to the west, the northern boundary of the study area to the north, the line of view from the northern point of the AONB/HC just off the coast beyond Lowestoft port to the south and the boundary of average medium magnitude of effects of turbines up to 145m high (14km) (derived from the OESEA study, 2020) to the north east. *(Note: only Suffolk and associated receptors are assessed- ie Norfolk Coast AONB is not taken into consideration).*	
OVERALL SENSITIVITY	
Sensitivity	Medium
Summary	
The undesignated coast is generally low lying and gently curving with low cliffs. The main urban centre of Lowestoft has a small port which forms a minor headland, a seafront Conservation Area and popular beaches. Areas of rural countryside separate small seaside developments. The sea is used by commercial vessels accessing the port and Great Yarmouth to the north, for commercial fishing and for leisure craft. Scroby Sands wind farm lies within the zone. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path and England Coast Path to the north, the largely dark and open seascape, views from Lowestoft south seafront, Dunton Warren and Kessingland beach, and the relatively high frequency of visibility upto long distances offshore. The zone's value lies in its role as part of the setting of Lowestoft Conservation Area and SPAs/SAC. The factors which slightly reduce sensitivity are the presence of the urban area of Lowestoft with wind turbine, shipping, and the presence of Scroby Sands wind farm, but the latter raises the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies within 14km of the shore which is the suggested buffer for all scales of wind farm development to avoid significant adverse effects on largely undesignated coast with urban areas. This combined with the susceptibility and other values related to the zone suggest an area of constraint on windfarm development. Scroby Sands is an early development with small 2MW turbines located very close to shore. An extension of this would be problematic in seascape terms due to current commercially available turbine sizes and the potential for cumulative effects.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 03 East Midlands Offshore Gas Fields (part) SCA 04 East Anglian Shipping Waters (part) SCA 09 Norfolk Coastal Waters (part) SCA 10 Suffolk Coastal Waters (part)
Local seascape character areas	SCT 03 Nearshore Waters (part) SCT 04 Developed Nearshore Waters (part) SCT 05 Coastal Waters (part)
VISUAL BUFFERS	
Distance offshore- range	Upto 14km from the coast.
*Size of turbines potentially having low magnitude of effect**	• Turbines below 145m would be likely to exceed low magnitude of effect less than 19.2km from AONB/HC. • Turbines 145m and above would be likely to exceed low

	magnitude of effect
*Size of turbines potentially having medium magnitude of effect**	• Turbines below 145m would be likely to exceed medium magnitude of effect less than 14km from shore. • Turbines 145m and above would be likely to exceed medium magnitude of effect

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character				■		The landform is generally low lying coastal plateau with very gentle slopes and valleys.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc			■	■		Mix of straight or very gently curving bays with occasional low cliffs such as at Pakefield, Gunton and Corton, and a mix of sand and shingle beaches.
Coastal edge	Intertidal				■		Mix of simple gravel and sand beaches, with some with rock armour and groynes in places.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).			■			Outer Thames Estuary SPA (wintering red-throated diver and common tern and little tern during the breeding season), Greater Wash SPA, Hammond and Winterton SAC.
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.			■			Lowestoft has a small port servicing offshore energy (Greater Gabbard/Galloper) and bulk cargoes, with a marina. There is an anchorage off Kessingland. Commercial fishing is found along the coast, use of beaches focussed on tourist towns, some leisure fishing, leisure sailing and watersports focussed on Lowestoft, aggregate production areas offshore from Lowestoft, and Scroby Sands offshore wind farm visible relatively close to shore.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.			■	■		Lowestoft is a major town with some industry and a small port. Seaside destinations include holiday developments north and south of Lowestoft including caravan sites. Otherwise farmed rural coast/hinterland. Suffolk Coast Path and England Coast Path.
Historic features at sea, on seabed	eg wrecks, paleolandscapes			■			Recession of coastline over many years, numerous wrecks, some

or buried below							related to port approaches.
Historic features on coast	eg coastal forts, castles, lighthouses						Lowestoft South Conservation Area with associated listed buildings and gardens overlooking sea but focusses more to the east south east.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Lowestoft associated with major fishing industry especially herring.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape moderately intact but with some detractors- Scroby Sands wind farm and the turbine and industrial seafront at Lowestoft.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						Generally well maintained with coastal protection but this is breaking up in places.
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						The sea feels large scale with panoramic views
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Openness is a key characteristic of the coast with generally open views out to sea from beaches with some framing within Lowestoft Conservation Area.
Exposure	Sheltered, calm, exposed.						Exposed, eroding coast with sheltered waters in river/dock mouth.
Aspect	Relationship with sun.						East facing with potential for highlighting of turbines in low sun in afternoon and sunset.
Seascape pattern and foci	Features and elements on/above the sea surface.						Limited foci- Scroby Sands wind farm and some commercial and service vessels and leisure boats apparent in places.

Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						There are a series of low cliffs but the main focus is Lowestoft with port protruding into the sea with wind turbine and commercial area, and the seafront of Conservation Area.
Contribution to the setting of a coast or seascape character area							The zone is integral to the character of the coast all lying within the limits of visual perception
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from Lowestoft south seafront, Gunton Warren and beach and Kessingland beach.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Much of the coast is accessible and intervisible directly with the seascape zone.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						The Suffolk Coast Path lies to the south and the England Coast Path to the north (but excluding Lowestoft ABP port and commercial area). Users of the trails and linking paths can view the sea along with visitors to beaches, promenade at Lowestoft. Leisure sailing from Lowestoft.
OVERALL SUSCEPTIBILITY							

VALUE							
DESIGNATIONS							
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB to the south					
	Heritage Coast Designation	Suffolk Heritage Coast to the south					
Historic designations	*Key scheduled monuments*	-					
	Conservation Areas	Lowestoft (south).					
	Key listed buildings	Lowestoft- Wellington Esplanade.					
	Historic parks and gardens	-					
Marine nature conservation designations	*SPA/SAC*	Greater Wash SPA, Outer Thames Estuary SPA, Haisborough, Hammond and Winterton SAC					
	Marine Conservation Zone	-					
VALUE CRITERIA							
Main criteria	**Sub-criteria**	**H**	**H/M**	**M**	**M/L**	**L**	**Comments**
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						Suffolk Coast and Heaths AONB and Suffolk Heritage Coast to the south but the area plays a very limited role in their setting.
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Greater Wash SPA, Outer Thames Estuary SPA, Haisborough, Hammond and Winterton SAC
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Lowestoft (south) with listed buildings and structures with views over the sea.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast do not overlook the seascape zone.
	Scenic quality- sense of place						Scenic quality in sea and coastal views with natural vegetated cliffs and hinterland at Gunton Warren and extensive beach at Kessingland.
	Scenic quality- panoramic views and vantage points						Panoramic views along the coast especially between settlements.

	Relative wildness, sense of remoteness, lack of human influence						The coast is relatively settled with limited green gaps.
	Relative tranquillity- absence of development						Tranquillity is limited to coastal edge/beach between settlements and offshore
	Relative tranquillity- dark skies						Substantially dark out to sea with some gaps between settlements. Scroby Sands wind farm's red aviation lights offshore.
	Cultural associations/artistic representations						Lowestoft- modern seafront art
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Leisure sailing between Lowestoft and Aldeburgh, beach and sea fishing form communities of interest, the Coast Path is well used and the coastal settlements and associated beaches are popular.
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Leisure sailing, sea and beach angling and walking. Suffolk Coast Path to the south and England Coast Path to the north.
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Scroby Sands offshore wind farm within zone but viewed end on and at an oblique angle north along the coast. Further development south or east potentially could cause cumulative effects if using larger turbines or extending the perceived width of development along the horizon.
Potential planned further development in zone	None known although the Round 4 bidding area lies around 27km offshore at its closest point.
Current relationship of wind farms and effect on seascape character and setting of AONB	Scroby Sands offshore wind farm does not affect Suffolk Coast and Heaths AONB or its setting.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	No cumulative effects are expected.
Compatibility of cumulative combined effects with AONB policies	N/A
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	N/A

Seascape zone No: 07	Name: North Suffolk and Norfolk Offshore
Location	
The seascape zone is off the northern part of the Suffolk and south Norfolk coasts from Kessingland to Winterton-on-Sea. It is defined by the northern boundary of the study area to the north, the boundary of average medium magnitude of effects of turbines up to 145m high (14km) (derived from the OESEA OESEA study, 2020) to the south west and medium magnitude of effects for larger turbines upto 400m high (30km) to the east, and a line between 34km and 40km from the northern edge of the AONB/HC to the south. *(Note: only Suffolk and associated receptors are assessed- ie Norfolk Coast AONB is not taken into consideration).*	
OVERALL SENSITIVITY	
Sensitivity	Medium
Summary	
The zone lies between 14km and 30km offshore from the undesignated coast which is generally low lying and gently curving with low cliffs. The main urban centre of Lowestoft has a small port which forms a minor headland, a seafront Conservation Area and popular beaches. Areas of rural countryside separate small seaside developments. The sea is used for commercial fishing and by commercial vessels. Scroby Sands wind farm lies inshore of the zone. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path and England Coast Path to the north, the largely dark and open seascape, oblique views from Lowestoft south seafront, views from Dunton Warren and Kessingland beach, and the relatively high frequency of visibility upto long distances offshore. The zone's value lies in its role as a limited part of the setting of Lowestoft Conservation Area and SPAs/SAC. The factors which slightly reduce sensitivity are the presence of the urban area of Lowestoft with wind turbine, shipping, and the presence of Scroby Sands wind farm inshore, but the latter raises the potential for cumulative effects.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone lies between 14km and 30km which potentially allows consideration of appropriately designed wind farms with turbines between 107-350m high at graded distances offshore (see below) but is a suggested constraint buffer for turbines over 351m high to avoid significant adverse effects on the largely undesignated coast with urban areas. Development within the Round 4 bidding area *within the zone* could be considered between 300m and 350m depending on distance offshore.There may be some cumulative effects in conjunction with Scroby Sands and this would need to be carefully considered.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 03 East Midlands Offshore Gas Fields (part) SCA 04 East Anglian Shipping Waters (part)
Local seascape character areas	SCT 05 Coastal Waters (part) SCT 06 Offshore Waters (part)
VISUAL BUFFERS	
Distance offshore- range	14-30km from the coast.
*Size of turbines potentially having low magnitude of effect**	• Turbines below 145m would be likely to exceed low magnitude of effect less than 19.2km from shore. • Turbines 145-175m would be likely to exceed low magnitude of effect less than 21.7 km from shore.

	• Turbines above 176-225m would be likely to exceed low magnitude of effect less than 26.2 km from shore. • Turbines 226-400m would be likely to exceed low magnitude of effect less than 38.6 km from shore.
*Size of turbines potentially having medium magnitude of effect**	• Turbines 145-175m would be likely to exceed medium magnitude of effect less than 15.8km from shore. • Turbines above 176-225m would be likely to exceed medium magnitude of effect less than 20.2km from shore. • Turbines 226-300m would be likely to exceed medium magnitude of effect less than 27.5km from shore. • Turbines 301-350m would be likely to exceed medium magnitude of effect less than 30km from shore. • Turbines 351-400m would be likely to exceed medium magnitude of effect less than 30km+ from shore.

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character						The landform is generally low lying coastal plateau with very gentle slopes and valleys.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc						Mix of straight or very gently curving bays with occasional low cliffs such as at Pakefield, Gunton and Corton, and a mix of sand and shingle beaches.
Coastal edge	Intertidal						Mix of simple gravel and sand beaches, with some with rock armour and groynes in places.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).						Hammond and Winterton SAC.
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.						Used for commercial fishing and some navigation, on the edge of the oil/gas field.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.						Lowestoft is a major town with some industry and a small port. Seaside destinations include holiday developments north and south of Lowestoft including caravan sites. Otherwise farmed rural coast/ hinterland. Suffolk Coast Path and England Coast Path.
Historic features at sea, on seabed	eg wrecks, paleolandscapes						Paleolandscape, some wrecks.

or buried below							
Historic features on coast	eg coastal forts, castles, lighthouses						Lowestoft South Conservation Area with associated listed buildings and gardens overlooking sea but focusses more to the east south east.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Lowestoft associated with major fishing industry especially herring.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape intact.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						Generally well maintained with coastal protection but this is breaking up in places.
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						Large scale open sea
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Very open away from the coast.
Exposure	Sheltered, calm, exposed.						Highly exposed open sea.
Aspect	Relationship with sun.						North east of Suffolk coast so away from sunset/sunrise locations.
Seascape pattern and foci	Features and elements on/above the sea surface.						Very limited foci – occasional vessels.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						There are a series of low cliffs but the main focus is Lowestoft with port protruding into the sea with wind turbine and commercial area, and the seafront of Conservation

							Area.
Contribution to the setting of a coast or seascape character area							The zone lies within the limits of visual perception but is at an oblique angle to the coast.
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is very good (20-40km) or excellent (40km+). (Two % in order to rt)						High levels of visibility Weybourne (34% and 20%) and Shoeburyness (36% and 9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- oblique views from Lowestoft south seafront, Gunton Warren and beach and Kessingland beach.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Much of the coast is accessible and intervisible obliquely with the seascape zone.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						The Suffolk Coast Path lies to the south and the England Coast Path to the north (but excluding Lowestoft ABP port). Users of the trails and linking paths can view the sea along with visitors to beaches, promenade at Lowestoft.
OVERALL SUSCEPTIBILITY							

VALUE		
DESIGNATIONS		
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB at a distance to the south west

	Heritage Coast Designation	Suffolk Heritage Coast at a distance to the south west
Historic designations	*Key scheduled monuments*	-
	Conservation Areas	Lowestoft (south)- but oblique views.
	Key listed buildings	Lowestoft- Wellington Esplanade but oblique views.
	Historic parks and gardens	-
Marine nature conservation designations	*SPA/SAC*	Haisborough, Hammond and Winterton SAC
	Marine Conservation Zone	-

VALUE CRITERIA

Main criteria	Sub-criteria	H	H / M	M	M /L	L	Comments
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						Suffolk Coast and Heaths AONB and Suffolk Heritage Coast to the south west at a distance and the area plays a very limited role in their setting.
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Haisborough, Hammond and Winterton SAC
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Lowestoft (south) with listed buildings and structures with oblique views over the sea.
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).						The AONB and Heritage Coast do not overlook the seascape zone.
	Scenic quality- sense of place						Scenic quality in sea and coastal views with natural vegetated cliffs and hinterland at Gunton Warren and extensive beach at Kessingland.
	Scenic quality- panoramic views and vantage points						Panoramic views along the coast especially between settlements.
	Relative wildness, sense of remoteness, lack of human influence						Remote zone with limited apparent human influence
	Relative						Generally tranquil- development

	tranquillity- absence of development						absent
	Relative tranquillity- dark skies						Substantially dark

Main criteria	Sub-criteria	H	H / M	M	M /L	L	Comments
	Cultural associations/artistic representations						Limited cultural associations other than maritime use.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Very limited community values
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Very limited leisure sailing
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	No offshore wind farm within zone.
Potential planned further development in zone	Round 4 bidding area covers the eastern part of the area.
Current relationship of wind farms and effect on seascape character and setting of AONB	Scroby Sands offshore wind farm to the west does not affect Suffolk Coast and Heaths AONB or its setting.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	Limited cumulative effects are expected in respect of Suffolk receptors.
Compatibility of cumulative combined effects with AONB policies	N/A
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	N/A

Seascape zone No: 08	Name: East Anglia Outer Offshore
Location/Extent	
The seascape zone comprises the outer offshore waters running from the Thames estuary north off the coast of East Anglia. It is defined by the boundary of the study area to the north, south and east, and, to the west, the suggested buffer distance for larger turbines off combined AONBs and Heritage Coasts (40km) (derived from the OESEA study, 2020) except where adjacent to the northern arrays of the Greater Gabbard and Galloper wind farms and 30km off the undesignated coast to the north west.	
OVERALL SENSITIVITY	
Sensitivity	Medium/low
Summary	
The zone lies over 40km offshore from the low lying coast covered by the combined Suffolk Coast and Heaths AONB and Suffolk Heritage Coast designation. These open, exposed offshore waters of the North Sea include deep water routes for shipping with widespread commercial fishing, some aggregate production and oil/gas fields. The southern array of the Greater Gabbard/Galloper windfarms lie to the south and the East Anglia ONE wind farm has been recently constructed lying centrally. Further wind farms of East Anglia Three and Norfolk Vanguard have been consented to the north. The zone's susceptibility lies in the panoramic views from the coast including the Suffolk Coast Path, England Coast Path, and the sense of remoteness, tranquillity and openness of the coast which relate to the AONB's natural beauty criteria. The zone's value lies in its role as part of the setting of the combined AONB and Heritage Coast, the views from the scheduled monuments, Conservation Areas, listed buildings and associated gardens, and MCZ/SPA/SACs. However, the effects on these receptors are significantly modified and reduced by the minimum distance of the zone offshore which means that most developments would be perceived as small and would be visible/perceptible between 10-20% of the time.	
RECOMMENDATIONS FOR OFFSHORE WIND FARMS IN TERMS OF SEASCAPE AND VISUAL FACTORS	
Summary	
The seascape zone is an area of more limited seascape/visual constraints, especially to the east. An extension of Greater Gabbard/ Galloper to the east and south east within the area may cause limited effects but the turbines should be similar in height and spacing to the existing. Turbines as proposed in East Anglia TWO and ONE North *within the zone* would not be considered to cause significant harm to the qualities and natural beauty of the AONB. Further proposals within the zone, such as in the Round 4 bidding area, should be located as far offshore as possible, and if located towards the western boundary maintain large gaps (say 12km+) between arrays (say a similar size to East Anglia ONE North) so clear views of the horizon between arrays is possible from the designated coast.	
SEASCAPE CHARACTER CONTEXT	
National Marine Character Areas	SCA 04 East Anglian Shipping Waters (part)
Local seascape character areas	SCT 06 Offshore Waters (part)
VISUAL BUFFERS	
Distance offshore- range	East/south east of Greater Gabbard/Galloper wind farms, 40km offshore of Suffolk Coast and Heaths AONB and Heritage Coast and 30km offshore to the north.
*Size of turbines potentially having low magnitude of effect**	• Turbines below 225m would not be likely to exceed low magnitude of effect within the zone. • Turbines 226-300m would be likely to exceed low magnitude of effect less than 38.6 km from shore.

	• Turbines 301-350m would be likely to exceed low magnitude of effect less than 40 km from shore. • Turbines 351-400m would be likely to exceed low magnitude of effect less than 40km+ from shore.
*Size of turbines potentially having medium magnitude of effect**	• Turbines below 350m would not be likely to exceed medium magnitude of effect within the zone. • Turbines 351-400m would be likely to exceed medium magnitude of effect less than 30km+ from shore.

SUSCEPTIBILITY							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Natural							
Hinterland	Form/ topography/ character						The landform is generally low lying with low coastal plateau and slopes behind coastal levels.
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc						Mix of very gently curving bays with minor headlands and small estuaries and a very gently convex coast, occasional low cliffs, extensive shingle beaches in places including the very long spit at Orfordness.
Coastal edge	Intertidal						Mix of simple gravel beaches and banks with estuarial deposits, with groynes and rock armour in places.
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).						Offshore open water with sediments- Kentish Knock MCZ, Outer Thames Estuary SPA, Haisborough, Hammond and Winterton SAC
Cultural/ Social							
Use of the sea *(see under seascape pattern and foci for assessment)*	Navigation, fishing, leisure, energy production, mineral extraction etc.						Shipping- deep water routes to the north and traffic separation zones to the south and anchorages on the approaches to Felixstowe/Harwich. Several wind farms in area including Greater Gabbard/Galloper and East Anglia ONE with more consented. Widespread commercial fishing and some aggregate production and oil/gas fields.
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.						Urban settlements with ports of Felixstowe to the south and Lowestoft to the north, Sizewell nuclear power stations, and a scattering of coastal settlements which are visitor destinations within a largely rural coast/hinterland including nature reserves and levels linked by the Suffolk Coast Path and England Coast Path. Orford Ness is a

							major shingle spit centrally located.
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes						Paleolandscape, wrecks are widely scattered across the area including HMS Amphion from the World War II.
Historic features on coast	eg coastal forts, castles, lighthouses						Numerous Conservation Areas and associated listed buildings, Napoleonic Wars features including Martello towers, Orfordness lighthouse, Bawdsey Manor historic park and garden, Orford Castle set back from the coast but overlooking it.
Cultural associations	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc						Associated with shipping across the North Sea linking UK ports with Europe and from English Channel, paleolandscape associations pre-sea level rise and the North Sea.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Quality/ Condition							
Intactness	Degree of completeness or fragmentation of area character or elements, presence of detractors and extent.						Seascape largely open and intact with windfarms currently widely separated although busier with sea traffic where cross North Sea routes intersect with English Channel traffic.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.						N/A
Aesthetic and Perceptual							
Scale	Of sea in relation to coastal form or offshore.						Large scale open sea
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.						Very open away from the coast.
Exposure	Sheltered, calm, exposed.						Highly exposed open sea.
Aspect	Relationship with sun.						East of the coast so potential for highlighting of turbines in low sun near sunset but at a distance.

Seascape pattern and foci	Features and elements on/above the sea surface.						Presence of wind farms and shipping/ferries.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.						Very distinctive shingle spit at Orford Ness, some limited cliffs with small headlands, with occasional historic seaside towns, Martello towers and Orford Castle inland. Small scale and low landmarks generally. Current windfarms in zone not perceptible from the coast.
Contribution to the setting of a coast or seascape character area							The zone contributes to the character of the coast but the eastern part of the area lies beyond the limits of visual perception.
Weather-visibility modifiers	Based on 10 years local weather station data, the % of time that visibility is excellent (40km+).						High levels of visibility Weybourne (20%) and Shoeburyness (9.5%).
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Visual Characteristics							
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.						Land to sea- views from coastal Conservation Areas, Orford Castle, Martello towers and from Suffolk Coast Path and England Coast Path. Sea to sea- views from ferries.
Intervisibility of the area with important visual receptors	Amount/length/extent /nature of intervisibility and distance away from unit/development. eg relationship in terms of angle of view, topographic influences						Most of the coast is accessible and directly facing the sea with a direct relationship with the seascape zone but at a distance.
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas						Users of coast within AONB and Heritage Coast, Suffolk Coast Path, visitors to historic towns and beaches. Leisure sailors from various estuaries at a distance. Harwich ferry users.
OVERALL SUSCEPTIBILITY							

VALUE							
DESIGNATIONS							
Landscape designations	*AONB Designation*	Suffolk Coast and Heaths AONB					
	Heritage Coast Designation	Suffolk Heritage Coast					
Historic designations	*Key scheduled monuments*	Orford Castle; Landguard Fort- Felixstowe and associated Napoleonic Wars Martello Towers. Greyfriars, Dunwich- sheltered from views except at the south eastern coastal edge.					
	Conservation Areas	Felixstowe, Orford, Aldeburgh, Thorpeness, Dunwich, Southwold, Lowestoft (south).					
	Key listed buildings	Orford Castle- Grade I listed building tower, Bawdsey Manor and associated buildings and structures, various Martello towers and battery observation post. Aldeburgh- eg Moot Hall, White Lion Hotel, Market Cross House, 8-14, Market Cross Place; Dunwich- Greyfriars Monastery; Southwold- numerous eg Gun Hill Place, Centre Cliff, Cliff House and Shrimp Cottage, Bay View and East Cliff; Lowestoft- Wellington Esplanade.					
	Historic parks and gardens	Bawdsey Manor Historic Park and Garden; Cliff Gardens (and Town Hall Garden), Felixstowe.					
Marine nature conservation designations	*SPA/SAC*	Outer Thames Estuary SPA; Haisborough, Hammond and Winterton SAC.					
	Marine Conservation Zone	Kentish Knock MCZ					
VALUE CRITERIA							
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).						Suffolk Coast and Heaths AONB and Suffolk Heritage Coast combined overlook zone but at a distance of 40km+.
Nature conservation designations	Main relevant marine designations eg MCZ, RAMSAR, SAC, SPA, etc						Kentish Knock MCZ; Outer Thames Estuary SPA; Haisborough, Hammond and Winterton SAC; Southern North Sea SAC.
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings						Heritage assets dotted along the coast overlook the area but at a distance of 40km+.
Relevant special	If landscape/ coastal designation overlooks						The AONB and Heritage Coast directly overlook the seascape zone

qualities /natural beauty indicators	area. (List and define the degree to which the area contributes to these).						but at a distance of 40km+.
Main criteria	**Sub-criteria**	**H**	**H / M**	**M**	**M /L**	**L**	**Comments**
	Scenic quality- sense of place						Eastern edge of the zone may contribute to the sense of place.
	Scenic quality- panoramic views and vantage points						Large structures on the eastern edge of the zone would be visible in long views.
	Relative wildness, sense of remoteness, lack of human influence						Eastern edge of the zone contributes to feeling of remoteness.
	Relative tranquillity- absence of development						Eastern edge of the zone contributes to relative tranquillity.
	Relative tranquillity- dark skies						Eastern edge of the zone contributes to relative tranquillity.
	Cultural associations/artistic representations						Broader cultural associations of trade and defence.
Community values	Value associated with area or features by people- communities of interest/place, public attitudes.						Very limited community values
Recreational value	Use for leisure or sport on sea, intertidal, coast.						Very limited leisure sailing
OVERALL VALUE							

CUMULATIVE EFFECTS	Comments
Existing and consented offshore wind farms within zone	Existing East Anglia One and Greater Gabbard/ Galloper within and adjacent to the zone and London Array nearby to the south. Consented East Anglia Three and Norfolk Vanguard East and West. Further development potentially could cause cumulative effects with Greater Gabbard/Galloper and London Array if using very large turbines extending along a major part of the horizon along the eastern edge of the zone.
Potential planned further development in zone	Greater Gabbard/ Galloper extension, East Anglia TWO and ONE North. The Round 4 bidding area covers a large part of the northern part of the zone.
Current relationship of wind farms and effect on seascape character and setting of AONB	Existing and consented wind farms within the area are sufficiently far offshore and separated to not have an effect on the setting of the AONB. To the north, the character of the seascape is developing into an offshore wind farm seascape.
Potential cumulative combined	The Greater Gabbard/ Galloper extension within the zone is

effect of existing, consented and potential planned development on seascape character and setting of AONB	unlikely to significantly increase adverse effects on the AONB although the level of effects would depend on the size of turbine proposed. Views of East Anglia TWO and ONE North within the zone may be possible in very good/excellent visibility conditions which could create large groupings of turbines visible on the horizon and in close juxtaposition with Greater Gabbard/ Galloper (7km gap). Whilst at 40km+ the effects would be reduced, views to clear horizons between arrays are highly desirable off the AONB. Development within the Round 4 bidding area would be likely to increase cumulative effects of the developments above. Views to clear horizons between arrays are highly desirable off the AONB.
CUMULATIVE EFFECTS	**Comments**
Compatibility of cumulative combined effects with AONB policies	An extension using similar size turbines as existing for Greater Gabbard/ Galloper could be construed as minimising effects on the purposes of the AONB. The parts of East Anglia TWO and ONE North *within the zone* could also be considered to minimise effects through distance and the increase in spacing between arrays to the north.
Recommendations for constraint or opportunities setting out the most suitable locations for development with appropriate design, scale and spacing in order to provide benefits and/or mitigate and minimise effects	An extension of Greater Gabbard/ Galloper to the east and south east within the area may cause limited effects but the turbines should be similar in height and spacing to the existing. Turbines as proposed in East Anglia TWO and ONE North *within the zone* would not be considered to cause significant harm to the qualities and natural beauty of the AONB. Further proposals within the zone, such as in Round 4, should be located as far offshore as possible, and if located towards the eastern boundary maintain large gaps (say 12km+) between arrays (say a similar size to East Anglia ONE North) so clear views of the horizon between arrays is possible from the designated coast.

Appendix A Factors influencing the sensitivity of seascape character areas

FACTORS INFLUENCING SENSITIVITY

Seascape susceptibility criteria and indicators

Main criteria	Sub-criteria	Indicators of higher susceptibility	Indicators of lower susceptibility
Natural			
Hinterland	Form/ topography/ character	Mountainous or hilly hinterland ie long slopes rising from coast, high elevation	Plateau or flat hinterland. Highly enclosed by topography or land cover
Coastal edge	Cliffs, rocky coasts, upper beach, dunes etc	Intricate, complex, rugged forms and dramatic headlands/ends of peninsulas Where great simplicity is the key characteristic and introduction of structures into very horizontal composition would compromise this.	Flat, horizontal or gently undulating or largely straight coast. Simple forms
Coastal edge	Intertidal	Intricate, complex, rugged forms Simple large beaches	Man-made interventions/ structures in area
Key habitats, features and species	Marine, intertidal, coastal edge (if relevant).	Presence of marine habitats with high biodiversity in area of search.	Limited range and extent of biodiverse areas in area of search.
Cultural/ Social			
Use of the sea	Navigation, fishing, leisure, energy production, mineral extraction etc.	Uses with limited infrastructure.	Presence of energy production and large shipping vessels/trade routes nearby (not through area).
Use of the coast/ hinterland	Settlement, industry, energy, marine related development such as ports, power stations, leisure/tourism, agriculture, conservation etc.	Uses with limited infrastructure. Rural uses or semi-natural land. Small scale, traditional, historic settlements and harbours.	Presence of industry/energy production/dock infrastructure. Urban form
Historic features at sea, on seabed or buried below	eg wrecks, paleolandscapes	Substantial presence of wrecks and other submerged historic features which have significance as a group or make it difficult to microsite turbines.	Limited number or no heritage features.
Historic features on coast	eg coastal forts, castles, lighthouses	Presence of coastal and island historic features such as forts, castles, chapels, monasteries, other buildings and structures and other heritage features which have a strong relationship with the coast and sea visually, physically or	Limited number or no heritage features

		culturally.	
Main criteria	**Sub-criteria**	**Indicators of higher susceptibility**	**Indicators of lower susceptibility**
Cultural associat-ions	eg former use of the sea or coast, boatmaking, former trade routes, associations with artists and writers, food traditions, spiritual connections, education and interpretation etc	Where there are strong collective cultural associations with the sea and coast through people and events and their expression through literature, art, music or other media. These can include religious connections, legends, books and poems, pictures, music, films, plays and other cultural media.	Limited or no cultural associations, or cultural associations which are compatible with development, possibly relating to industry, military infrastructure and trade.
Quality/ Condition			
Intactness	Degree of completeness or fragmentation or area character or elements, presence of detractors and extent.	Intact and consistent character of seascape. Few or no detractors.	Seascape character fragmented. Presence of detractors.
State of repair	Condition of coastal natural and built features/ elements, maintained or not maintained.	Well maintained seascape or landscape character at coast.	Poorly maintained seascape or landscape character at coast. Presence of dereliction/neglect.
Aesthetic and Perceptual			
Scale	Of sea in relation to coastal form or offshore.	Small scale, enclosed, views to horizon limited by landform Introduction of an element of scale into previously un-scaled area	Large scale views
Openness and enclosure	Degree and nature of enclosure of sea by land, framing of views.	Where openness is a key characteristic and introduction of built elements would compromise this.	Unframed open views unimpeded by natural elements or features.
Exposure	Sheltered, calm, exposed.	Sheltered and calm seascapes Where seascape is extremely exposed such that the perceived wild, elemental nature is a key characteristic and development would significantly change this perception.	Open, exposed seascapes which does not provide a perception of elemental or wild seascape character and development would be perceived as relating to these characteristics.

Main criteria	Sub-criteria	Indicators of higher susceptibility	Indicators of lower susceptibility
Aspect	Relationship with sun.	Development would interfere with notable views of sunrises and particularly sunsets. Where turbines would be highlighted in contrast to their background by sun light or be highlighted in silhouette from backlighting, thereby increasing visual prominence. Development seen from higher level views, particularly where viewer elevation results in development, and its geometric layout pattern, being seen much closer than on the horizon line.	Development located away from sunrise and sunset positions
Seascape pattern and foci	Features and elements on/above the sea surface.	Complex or unified pattern which would be disrupted by development.	Presence of existing vertical or other elements at sea including shipping/ferries.
Seascape pattern and foci - coast and hinterland	eg Headlands, cliffs, high hills or landmarks such as towers or castles.	Important focal points eg islands, islets, headlands, distinctive sweeping beaches, and high hills. Open unspoilt views of the sea with no signs of development offshore.	Lack of intact pattern Lack of natural or historic feature focal points
Contribut-ion to the setting of a coast or seascape character area		Is perceived from, and forms the setting of, a sensitive coast or seascape character area within the limits of visual perception. (See sensitivity criteria below).	Is perceived from a less sensitive coast or seascape character area. Is beyond the limits of visual perception.
Visual Characteristics			
Key views- **land to sea** **sea to land** **sea to sea**	Including nature of views and elevation, perhaps including iconic features. Views from within area and from outside.	Open or framed views from key viewpoints. Views to key features eg islands, other coasts, headlands. Views from well used sea area for leisure focussed on seascape/scenic quality.	Few or no views from key viewpoints. Sea not used for leisure sailing.
Intervisib-ility of the area with important visual receptors	Amount/length/ extent /nature of intervisibility and distance away from unit/ development. eg relationship in terms of angle of view, topography influences	Strong intervisibility with coast in terms of length and/or area and/or relatively close to.	Poor intervisibility with coast in terms of length and/or area and/or relatively far away.

Main criteria	Sub-criteria	Indicators of higher susceptibility	Indicators of lower susceptibility
Typical receptors - type and number	eg coast walkers, visitors to coast/features, beach visitors, residents, leisure sailors, ferries, shipping, urban areas etc. In designated areas or outside designated areas	Coast path and users of paths and access land. Visitors to heritage features. Promenade and pier users. Leisure sailors.	Users of ferries. Shipping. People in urban areas at work. Users of roads (unless corniche). Users of railways.

Seascape value criteria and indicators

Main criteria	Sub-criteria	Indicators of higher value	Indicators of lower value
Landscape designations- National, regional, local	eg National Parks, AONBs, Heritage Coast, local countryside designations, (distance, relationship, extent of role as setting).	Presence of National Parks, AONBs, especially if combined with Heritage Coast, overlooking area. Perceived as lying within seascape setting of a designation.	Absence of landscape designations. Not within seascape setting of a landscape designation.
Nature conservation designations	Marine and coastal eg MCZ, RAMSAR, SAC, SPA, SSSI etc (if relevant).	Presence of nature conservation designations within or potentially affected by area of potential development.	Absence of nature conservation designations within or potentially affected by area of potential development
Heritage designations	Marine and coastal- eg scheduled monuments, Conservation Areas, listed buildings, historic parks and gardens, and their settings (if relevant).	Presence of heritage designations overlooking or within area of potential development. Perceived as lying within seascape setting of a designation.	Absence of heritage designations overlooking or within area of potential development
Relevant special qualities /natural beauty indicators	If landscape/ coastal designation overlooks area. (List and define the degree to which the area contributes to these).	Area contributes to special qualities**/natural beauty indicators**.	Area does not contribute to special qualities/ **natural beauty indicators**.
	Scenic quality- sense of place	A clear and recognisable sense of place which the area contributes to.	A limited sense of place and/or limited contribution to sense of place.
	Scenic quality- panoramic views and vantage points	Panoramic views out to sea and along Heritage Coast Views from elevated	No or very limited views out to sea or along coast

		vantage points out to sea	No or very limited vantage points
Main criteria	**Sub-criteria**	**Indicators of higher value**	**Indicators of lower value**
Relevant special qualities /natural beauty indicators (cont'd)	Relative wildness, sense of remoteness, lack of human influence	Sense of remoteness with little indication of development onshore and offshore	Sense of settled landscape with presence of development onshore and offshore
	Relative tranquillity- absence of development	Perception of semi-natural character and absence of development and people	Perception of movement, development, people.
	Relative tranquillity- dark skies	Presence of dark skies with very limited light sources onshore and offshore	Presence of light sources on coast and offshore
	Cultural associations/artistic representations	Area with rich cultural associations.	Area with limited cultural associations.
Community values	Value associated with area or features/elements by people- communities of interest and place, public attitudes.	Area or features highly valued by people.	Area or features with attributed limited value by people.
Recreational value	Use for leisure or sport on sea, intertidal, coast.	Area used extensively for leisure especially related to enjoying seascape character and views.	Area with limited use for leisure, or where leisure relates to motorised pursuits/speed.

Cumulative effects criteria and indicators

Criteria	Indicators of higher cumulative effect	Indicators of lower cumulative effect
Current relationship of existing and consented wind farms and effect on seascape character and setting of AONB	Current development already creates a wind farm seascape or is nearing this state and is beginning to have a significant adverse effect on the setting of the AONB, eg curtaining on the horizon.	There are no existing and consented wind farms or development is at a low density and forms a seascape with occasional wind farms and has a limited or no adverse effect on the setting of the AONB.
Potential cumulative combined effect of existing, consented and potential planned development on seascape character and setting of AONB	Combined development is likely to create a wind farm seascape or is nearing this state and is beginning to have a significant adverse effect on the setting of the AONB, eg curtaining.	There is no or very limited combined development or forms a seascape with occasional wind farms and has a limited or no adverse effect on the setting of the AONB.
Compatibility of potential cumulative combined effects with AONB policies	Combined development significantly adversely changes the perception of AONB natural beauty/special qualities.	Combined development has no or very limited effect on the perception of AONB natural beauty/ special qualities.
Recommendations for constraint or opportunity.	Recommendations may include avoiding or limiting further development with strict limits on size, scale and design of development.	Recommendations may be limited or include size, scale, location advice to avoid potential seascape issues in the future.

Appendix B Visibility modifiers

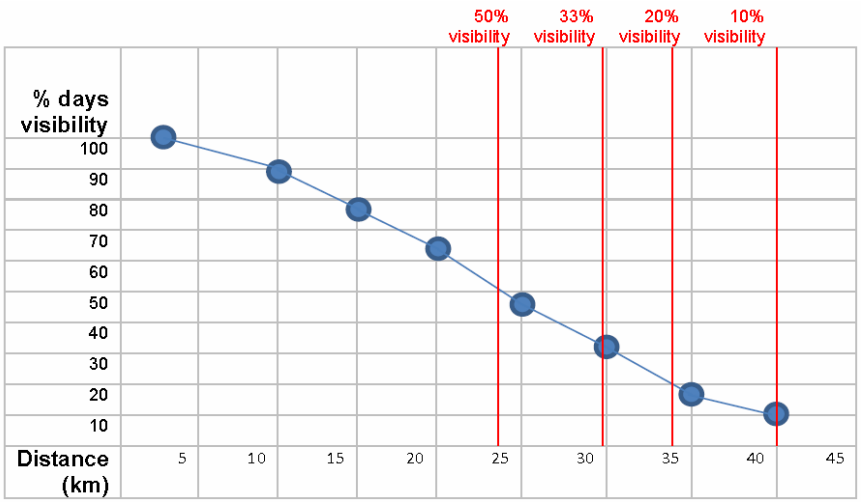
Visibility Distances for Coastal Stations in England and Wales over a 10 year period (2008-2017)- illustrating relative visibility of local weather stations with others *(Extract from OESEA,2020)*

Weather Stations	Visibility Distance (km)							
	0-5	6-10	11-15	16-20	21-25	26-30	35	40+
Boulmer % days visibility	10.9%	12.7%	12.4%	16.3%	13.9%	12.7%	4.6%	16.5%
cumulative totals	100.%	89.1%	76.4%	64.0%	47.7%	33.8%	21.1%	16.5%
Weybourne % days visibility	9.9%	13.0%	13.5%	11.1%	9.8%	14.1%	6.0%	22.6%
cumulative totals	100%	90.1%	77.1%	63.6%	52.5%	42.7%	28.6%	22.6%
Manston % days visibility	10.7%	13.2%	12.7%	13.1%	12.8%	17.0%	6.7%	13.7%
cumulative totals	100%	89.3%	76.1%	63.3%	50.2%	37.4%	20.5%	13.7%
Hurn % days visibility	11.0%	13.1%	13.8%	19.7%	15.1%	20.3%	3.7%	3.1%
cumulative totals	100%	89.0%	75.8%	62.1%	42.3%	27.2%	6.8%	3.1%
Culdrose % days visibility	19.9%	16.1%	17.5%	28.7%	11.8%	4.6%	0.7%	0.7%
cumulative totals	100%	80.1%	64.0%	46.5%	17.8%	6.0%	1.4%	0.7%
St Athan % days visibility	6.5%	9.6%	10.7%	14.3%	14.7%	22.9%	9.2%	12.0%
cumulative totals	100%	93.5%	83.8%	73.1%	58.8%	44.1%	21.2%	12.0%
Rhyl % days visibility	5.4%	7.4%	11.5%	14.0%	13.8%	20.1%	8.8%	19.1%
cumulative totals	100%	94.6%	87.2%	75.7%	61.7%	47.9%	27.9%	19.1%
St Bees Head % days visibility	13.5%	12.7%	17.5%	21.8%	18.3%	10.3%	1.8%	4.0%
cumulative totals	100%	86.5%	73.8%	56.3%	34.5%	16.2%	5.8%	4.0%
Average % days visibility	11%	12.2%	13.7%	17.4%	13.8%	15.2%	5.2%	11.5%
Avg. cumulative totals	100%	89.0%	76.8%	63.1%	45.7%	31.9%	16.7%	11.5%

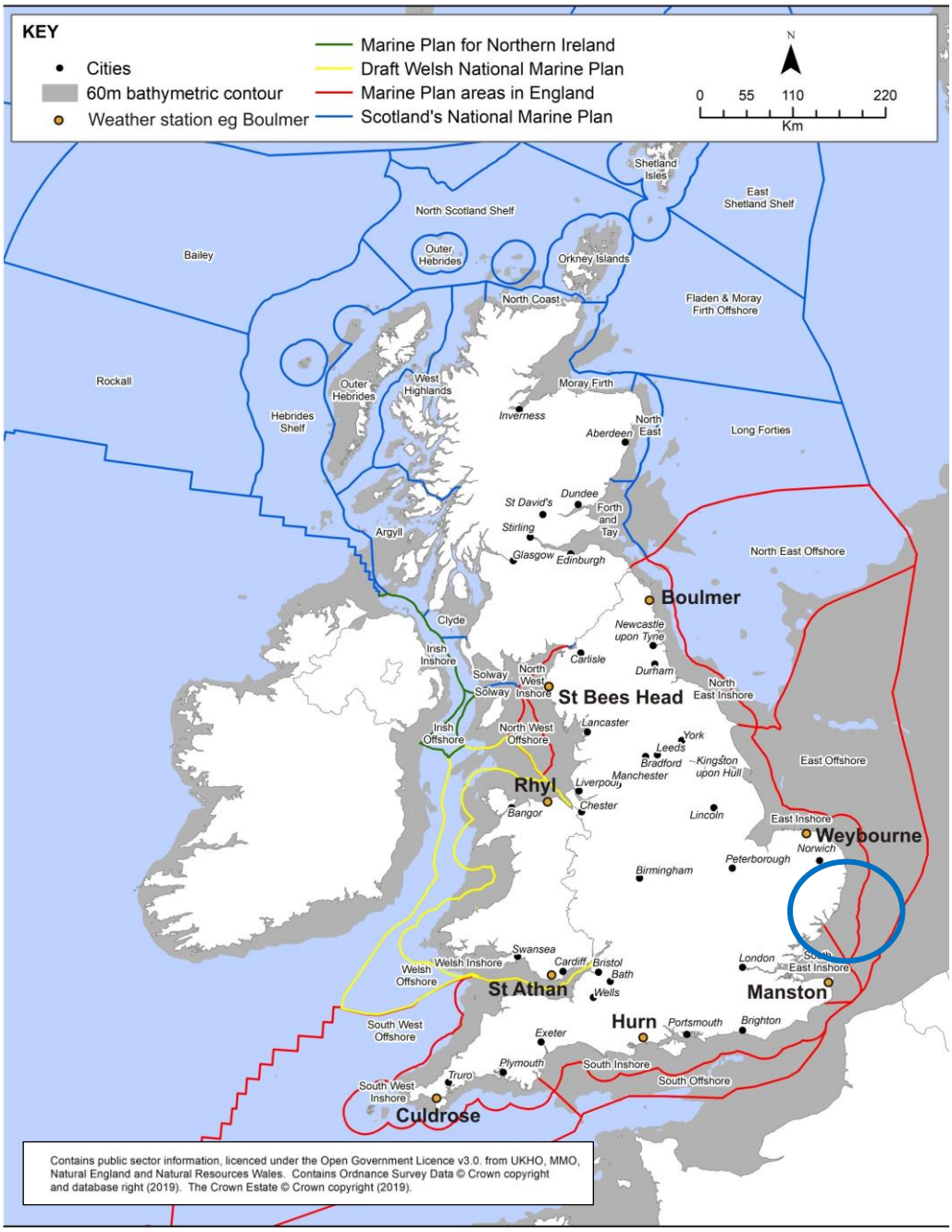
Notes:

The nearest coastal stations to the study area are highlighted in yellow- Weybourne and Manston (Ramsgate). Weybourne and Manston have substantially larger proportions of time with visibility over 35km and 40km than the national average.

Average national visibility distances related to % days per annum (2008-2017) *(Extract from OESEA, 2020)*



Weather Station Locations *(Extract from OESEA,2020)*

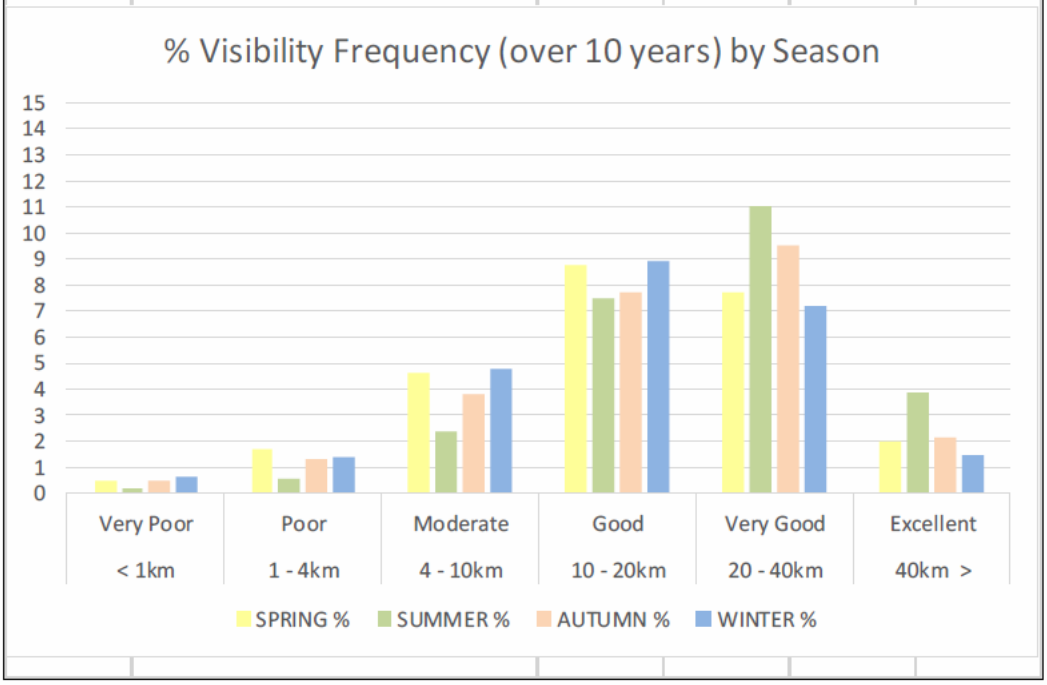


East Anglia TWO Environmental Statement (ES)

The effect of weather conditions on visibility was considered in the East Anglia TWO ES Appendix 28.8 Offshore Windfarm Visibility. This used data from Shoeburyness weather station (near Southend on Sea) which is relatively close to Manston. In addition to overall annual visibility at various distances which was similar to the nearby weather stations, the report also analysed frequency by season. This shows that there is a substantially higher proportion of days of very good and excellent visibility in the summer than in other seasons (see the table overleaf).

Visibility frequency by season *(extract from East Anglia TWO ES (Scottish Power) Appendix 28.8 Offshore Windfarm Visibility (page 17))*

% VISIBILITY FREQUENCY (10 YEARS)		SPRING	SUMMER	AUTUMN	WINTER
Visibility I	Visibility Definition	%	%	%	%
< 1km	Very Poor	0.51	0.16	0.50	0.60
1 - 4km	Poor	1.67	0.53	1.28	1.36
4 - 10km	Moderate	4.66	2.35	3.82	4.80
10 - 20km	Good	8.78	7.52	7.72	8.90
20 - 40km	Very Good	7.68	11.04	9.52	7.20
40km >	Excellent	2.02	3.86	2.14	1.42
		25	**25**	**25**	**24**



PlateA28.6 Visibility Frequency by Season

Appendix C Site visit

Suffolk seascape sensitivity to offshore windfarms

Site visit- 27-28 August 2020

The Suffolk coast was visited on the 27-28, August 2020. The findings of the site visit are incorporated in the detailed zone assessments.

The viewpoints visited are listed in order below.

27 August

- Bawdsey- East Street car park
- Shingle Street- near mouth of the River Alde/Ore
- Orford Castle- grounds
- Orford Ness- Slaughden Martello tower
- Aldeburgh- beach
- Thorpeness- beach to the north of settlement
- Sizewell beach

28 August

- Dunwich Coastguard Cottages
- Dunwich Heath
- Dunwich- priory and beach
- Southwold- IRB station beach
- Southwold – Gun Hill
- Southwold- East Cliff
- Kessingland- beach
- Lowestoft – Marine Parade- edge of South Beach
- Felixstowe Ferry

It was not possible to walk south down Orford Ness from the north much beyond Slaughden Martello tower due to National Trust restrictions on access.

The weather conditions on 27 August were a mixture of light to moderate cloud with occasional sun, with good visibility sometimes extending to very good visibility. The Thames Array was visible in the morning and the Greater Gabbard/Galloper array was visible for most of the day. Occasional sea mist offshore enveloped the Greater Gabbard/Galloper array at times. Sun reduced over the course of the day. This meant that the turbines were mostly viewed as grey shapes against a lighter background.

The weather conditions on 28 August were a mixture of light cloud with some sun, with good visibility sometimes extending to very good visibility. The Greater Gabbard/Galloper array was visible from the Dunwich and Felixstowe Ferry viewpoints but not from Southwold and further north- it is not clear if this was due to distance or sea mist. The turbines were mostly viewed as grey shapes against a lighter background in the morning and bright white in the afternoon (around 3pm) when highlighted by sunshine when viewed from Felixstowe Ferry. This did increase their visibility.

There were many visitors to the coast observed during the site visit. This may have been due to its proximity to the August Bank holiday weekend. Particular concentrations were located in Southwold, Aldeburgh, Orford Castle and Lowestoft with others observed along the coast path and on the beaches. The number of people reduced with distance away from the nearest car parks and settlement centres. In the settlements people promenaded along the coast or cliff paths or sat on beaches looking out to sea. Outside settlements people walked along beaches or the coast path where available, or on the adjacent heaths.

Visibility of the sea was mainly possible along the coastal edge and also from the more open low slopes behind the coast, including heaths. Elsewhere it was limited by vegetation such as hedges and trees or, in the case of coastal levels and marshes, by the seawall/embankment.

The visibility of Sizewell A and B nuclear power stations (c. 67m and c. 65m high respectively) and the masts at Orford Ness (c.60m down to c.13m high) were noted along the coast.

Appendix D Abbreviations and Glossary

Abbreviations

AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
CLVIA	Cumulative Landscape and Visual Impact Assessment
DCO	Development Consent Order
DPO	Draft Plan Option
EIA	Environmental impact assessment
ES	Environmental statement
ExA	Examining Authority
GLVIA	Guidelines for landscape and visual impact assessment
GIS	Geographic information system
HPMCZ	Highly protected marine conservation zone
HSC	Historic Seascape Characterisation
HWM	High water mark
ICZM	Integrated Coastal Zone Management
km	Kilometres
LCA	Landscape character assessment *or* landscape character area
LDP	Local Development Plan
LVIA	Landscape and visual impact assessment
LWM	low water mark
m	metres
MCA	Marine Character Area
MPA	Marine Planning Area
MPS	Marine Policy Statement
MHW	Mean high water
nm	nautical miles
NE	Natural England
PEIR	Preliminary Environmental Information Report
PU	Shoreline Management Plan policy unit
RSU	Regional Seascape Unit
SAC	Special Area of Conservation
SCA	Seascape character assessment / seascape character area
SCT	Seascape character type
SLA	Special Landscape Area
SM	Scheduled Monument
SMR	Scheduled Monument Record
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SNH	Scottish Natural Heritage
SVIA	Seascape, (landscape) and visual impact assessment
UKCS	United Kingdom Continental Shelf
WHS	World Heritage Site
ZTV	Zone of theoretical visibility
ZVI	Zone of visual influence

Glossary

Term	Definition
Seascape, marine and coastal processes terms	
Abrasion	The mechanical wearing effect on rocks caused by corrosion. The abrading agent can take a variety of forms e.g. sand, pebbles or boulders moving across a rock surface.
Attrition	The mechanism by which the particle size of any material is reduced by friction during transport.
Biogenic	A feature that is created by living organisms, either animal or plant.
Characteristics	elements, features and qualities which make a particular contribution to distinctive character.
Characterisation	the process of identifying areas of similar character, classifying and mapping them and describing their character. (NECR105)
Classification	concerned with dividing the seascape into areas of distinct, recognisable and consistent common character in grouping areas of similar character together. It requires the identification of patterns in the seascape, created by the way the natural and human influences interact and are perceived and experienced to create character in the seascape. (NECR105)
Description	capturing the overall essence of the character of the seascape, with reference to geology, landform, bathymetry, habitats, use of the coast and sea, cultural associations etc, drawing out the ways in which these factors interact together and are perceived and experienced and are associated with events and people.
Demersal	In relation to marine organisms: those which flourish on the ocean floor.
Elements	individual component parts of the seascape such as beaches, cliffs, submerged reefs, sea walls, groynes and rocky outcrops.
Features	particularly prominent or eye-catching elements such as lighthouses, rock stacks and coastal cliffs.
Fetch	The distance of open water across which wind blows or over which wind generated water wave travels, unobstructed by major land obstacles. The amount of fetch helps to determine the magnitude and energy of a wave and therefore its erosional or depositional tendencies on neighbouring shorelines.
Hydraulic action	Force exerted by moving water on rocks e.g. air forced into cracks in solid rocks by breaking waves is capable of causing their disintegration by expanding the fissures.
Key characteristics	those combination of elements which help given area its distinct sense of place. They can in many cases to be 'positive' characteristics but they may also in some cases be 'negative' features which nevertheless are important to the current character of the seascape. (Natural England, 2014)
Landward limits (of a seascape character assessment)	the distance which the seascape character assessment will expand onshore and inland. Such considerations relate to the mainland, peninsulas and islands, regardless of their distance out at sea. The extent is dependent on the purpose and/or scope of the assessment being undertaken.
Littoral	Pertaining to a shoreline.
Longshore drift	A general movement of beach material along the shoreline due to the effect of waves breaking obliquely on to the beach.
Pelagic	In relation to the environment: the open ocean as distinct from the ocean floor. In relation to marine organisms: those which flourish independent of the ocean floor and shoreline environments.
Perception	perception combines the sensory (that which we receive through our senses) with the cognitive (knowledge and understanding gained from many sources and experiences).
Reef	A line of rocks or material in the tidal zone of the coast, submerged at high water but partly uncovered at low water.
Ria	Submerged coastal valley or estuary resulting from a rise of sea level, often associated with post-glacial coasts.
Marine character area	See seascape character area. (Term used for national/regional scale units).

Term	Definition
Saltation	Sediment transported by bouncing or hopping along a surface carried by water or wind.
Seascape	Seascape is landscapes with views of the coast or seas, and coasts and the adjacent marine environment with cultural, historical and archaeological links with each other. (MPS)
Seascape character	Seascape character is a distinct and recognisable pattern of elements in the seascape that makes one seascape different from another, rather than better or worse. (NECR105)
Seascape character assessment (SCA)	SCA is the process of identifying and describing variation in the character of the seascape, and using this information to assist in managing change in the seascape. It seeks to identify and explain the unique combination of elements and features that make seascape distinctive. (NECR105)
Seascape or marine character area	These are single unique geographical areas of a particular seascape character type. Each has its own individual character and identity, even though it shares the same generic characteristics with other seascape character areas of the same type. (NECR105)
Seascape or marine character capacity	Seascape capacity refers to the amount of specified development or change which a particular marine or local seascape character area and the associated visual resource is able to accommodate without undue negative effects on its character and qualities. (Adapted from Natural England, 2019)
Seascape or marine character sensitivity	Term applied to marine character and seascape and the associated visual resource, combining judgements of their susceptibility to a specific type of development / development scenario or other change being considered and the value(s) related to that seascape, marine character and visual resource. (Derived from Natural England, 2019)
Seascape or marine character susceptibility	The degree to which a defined seascape or marine character area and its associated visual qualities and attributes might respond to the specified types of development or change without undue negative effects on character and the visual resource. (Adapted from Natural England, 2019)
Seascape or marine character type	These are distinct types of seascape that are relatively homogeneous in character. They are generic in nature in that they may occur in different locations but wherever they occur they share broadly similar combinations of geology, bathymetry, ecology, human influences and perceptual and aesthetic attributes. (NECR105)
Seascape or marine character value	The relative value or importance attached to a seascape or marine character area, which may express national or local consensus, because of its quality, its special qualities including perceptual aspects such as scenic beauty, tranquillity and wildness, natural or historic attributes or features, cultural associations, or its relationship with designated or valued landscapes and coasts. (Adapted from Natural England, 2019)
Seascape quality	The physical state of the seascape. It includes the extent to which typical character is represented in individual areas, sometimes referred to as strength of character, the intactness of the seascape from visual, functional and ecological perspectives and the condition or state of repair of individual elements of the seascape. (NECR105)
Seascape strategy	the objectives and overall vision of what the seascape should be like in the future, and what is thought to be desirable for a particular seascape character type or area, as a whole. (Natural England, 2014)
Seascape, (Landscape) and Visual Impact Assessment (SVIA)	SVIA is an established methodology which is used to assess the impact of the development or other use change on seascape, landscape and visual amenity. It includes analysis of the effects during the construction, operation and decommissioning phases of the development, including any restoration or after uses.
Seaward limits (of an SCA)	distance out to sea that the SCA will extend.
Slack	an area of almost motionless water.
Suspension	The process by which lightweight materials are transported by moving water in the zone of turbulent flow.
Swash	The movement of a turbulent layer of water up the slope of the beach as a result of the breaking of a wave. It is capable of moving beach material of substantial size and is an important factor in longshore drift.

Term	Definition
Swell	A regular movement of marine waves created by wind stress in the open ocean.
Traction	Solid load carried by water.
Other terms associated with landscape	
Amenity (Planting)	planting to provide environmental benefit such as decorative or screen planting.
Analysis	the process of dividing up the seascape/landscape into its component parts to gain a better understanding of it.
Apparent	object visible in the seascape/landscape.
Approach	the step-by-step process by which seascape/landscape assessment is undertaken.
Arable	land used for growing crops other than grass or woody species.
Aspect	in Wales, an aspect is a component of the LANDMAP information recorded, organised and evaluated into a nationally consistent spatial data set. The landscape information is divided into five aspects- geological landscape, landscape habitats, visual and sensory, historic landscape and cultural landscape.
Aspect area	areas defined in each of the LANDMAP aspect assessments which are mutually exclusive
Assessment	term to describe all the various ways of looking at, analysing, evaluating and describing the seascape/landscape or assessing impacts on seascape/landscape and visual receptors.
Biodiversity	the variety of life including all the different habitats and species in the world.
Conservation	the protection and careful management of natural and built resources and the environment.
Complexity	(in the context of describing a skyline) how varied or complicated the skyline is from dead flat with even vegetation at one end of the scale to mountainous with varied vegetation at the other.
Consistent	relatively unchanging element or pattern across a given area of seascape/landscape.
Cultural heritage asset	see heritage asset
Cultural pattern	expression of the historic pattern of enclosure and rural settlement.
Cumulative impacts/effects	either additional changes caused by a proposed development in conjunction with similar developments or the combined effect of a set of developments, taken together
Distinctiveness	see sense of place
Diversity	(in terms of the function of an area) the variety of different functions of an area.
Dominant	main defining feature or pattern.
Effects	term used in environmental impact assessment (EIA) where effects are changes arising from the action, operation or implementation of a proposed development.
Effects, direct	where development lies within a seascape/landscape and physically removes an element or feature e.g. rocks, cliff, coastal vegetation
Effects, indirect	effects away from the development such as perceived change of character or from associated development such as transport infrastructure
Field Boundary	the defined edge of a field whether fence, hedge, bank, ditch or wall.
Field Size	Large 2 Ha Above, Medium Around 1.5 Ha, Small Less Than 1 Ha.
Geology	the study of the origin, structure, composition and history of the Earth together with the processes that have led to its present state.
Ground Type	expression of the soil forming environment and its influence in determining the surface pattern of vegetation and land use.
Hedge	fence of shrubs or low trees, living or dead, or of turf or stone. Though strictly a row of bushes forming a hedge, hedgerow has been taken to mean the same as a hedge.

Term	Definition
Hedge bank	earth bank or mound relating to a hedge
Heritage asset	a building, monument, site, place, area or landscape positively identified as having a degree of historical significance meriting consideration in planning decisions. Designated heritage assets include world heritage sites, scheduled ancient monuments, protected wreck sites, battlefields, listed buildings and registered parks and gardens.
Horticulture	intensive form of cropping, such as vegetables or fruit.
Impact	used as part of overall term, as in EIA or LVIA, to help describe the process of assessing potentially significant effects- see effects.
Inherent	dictionary definition- 'existing as an inseparable part'. In the context of sensitivity means the sensitivity of the seascape/landscape area itself with all its component elements and features rather than its relationship with types of development or adjacent areas.
Integrity	unspoilt by large-scale, visually intrusive or other inharmonious development
Landcover	combinations of natural and man-made elements including vegetation that cover the land surface.
Landform	combinations of slope and elevation which combine to give shape and form to the land.
Landscape	an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity. (GLVIA 3)
Landscape Character	a distinct, recognisable and consistent pattern of elements, features and qualities in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Area (LCA)	these are single unique areas which are discrete geographical areas of a particular landscape character. Each has its own individual character and identity. These areas in Wales are primarily derived from LANDMAP aspects.
Landscape Resource	the overall stock of the landscape and its component parts. (The landscape considered as a measurable finite resource like any other e.g. minerals, land, water).
Landscape value	the relative value or importance attached to a landscape (often as a basis for designation or recognition), which expresses national or local consensus, because of its quality, special qualities including perceptual aspects such as scenic beauty, tranquillity or wildness, cultural associations or other conservation issues. In Wales, value is also attributed to each LANDMAP aspect using a variety of criteria.
Magnitude of effect	degree of change
Mixed Farmland	a combination of arable and pastoral farmland
Mosaic	mix of different landcovers at a fine grain such as woodland, pasture and heath.
Objective	method of assessment in which personal feelings and opinions do not influence characterisation or judgements.
Outcrop	the area where a particular rock appears at the surface.
Pastoral	land down to grass either grazed by animals or for cutting.
Physiography	expression of the shape and structure of the land surface as influenced both by the nature of the underlying geology and the effect of geomorphological processes.
Polygon	discrete digitised area in a geographic information system (GIS).
Prominent	Highly conspicuous feature or pattern in the landscape.
Protect	to keep from harm. 4.14.
Qualities	aesthetic (objective visible patterns) or perceptual (subjective responses by the seascape/landscape assessor) attributes of the seascape such as those relating to scale or tranquillity respectively.

Term	Definition
Receptor, visual	people in a variety of different situations who can experience views within an area and who may be affected by change or development. Receptors can include users of public footpaths, open access land, roads, rail or cycleways or urban or rural residents.
Receptor, seascape/landscape	seascape/landscape character areas, designations, elements or features which may be affected by development
Remoteness	physical isolation, removal from the presence of people, infrastructure (roads and railways, ferry and shipping routes) and settlement
Resource	see seascape/landscape resource.
Restore	repair or renew.
Riparian	vegetation associated with the water body, usually a river or stream.
Scenic quality	seascape/landscape with scenes of a picturesque quality with aesthetically pleasing elements in composition
Semi-natural vegetation	any type of vegetation that has been influenced by human activities, either directly or indirectly. The term is usually applied to areas which are reverting to nature due to lack of management.
Sense of place	the character of a place that makes it locally identifiable or distinctive i.e. different from other places. Some features or elements can evoke a strong sense of place e.g. islands, forts, vernacular architecture
Sensory	that which is received through the senses i.e. sight, hearing, smell, touch.
Setting, of a heritage asset	The surroundings in which the asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or a negative contribution to an asset, may affect the ability to appreciate that significance or may be neutral.
Settlement	all dwellings/habitations, whether single or clustered in cities, towns and villages.
Settlement Pattern	the predominant pattern of settlement in an area.
Significance	a measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic. A significant effect needs to be taken into account in decision-making.
Subjective	method of assessment in which personal views and reaction are used in the characterisation process.
Topography	term used to describe the geological features of the Earth's surface e.g. mountains, hills, valleys, plains.
Unity	consistency of pattern over a wide area i.e. the repetition of similar elements, balance and proportion, scale and enclosure.
Value	see landscape value
Vernacular	built in the local style, from local materials.
Visual Effects	effects on specific views and on the general visual amenity experienced by people.

Q14.1.11 SEASCAPE SENSITIVITY TO OFFSHORE WIND FARMS - UPDATE ADDENDUM (WHITE CONSULTANTS, JUNE 2023)

Suffolk

Seascape sensitivity to offshore wind farms

UPDATE ADDENDUM

Final Report

for

Suffolk County Council
East Suffolk Council
Suffolk Coast & Heaths AONB Partnership

June 2023

white CONSULTANTS

CONTENTS

FIGURES AND TABLES

PART 1: Update of baseline, approach and summary of findings

1. Introduction

1.1. White Consultants were appointed in April 2023 to carry out an update of the 'Suffolk seascape sensitivity study to offshore wind farms' report[1] 2020 located in the inshore and offshore waters off the Suffolk coast. The study was commissioned and funded by Suffolk County Council and Suffolk Coast & Heaths AONB Partnership in consultation with East Suffolk Council.

1.2. The intention of the Suffolk seascape sensitivity study is that it contributes to the baseline evidence for the Seascape, Landscape and Visual Impact Assessment (SLVIA) and development of the proposals for a series of projects in waters off Suffolk's coast.. This update is necessary in order to accommodate the more rapid than anticipated changes in offshore wind technology and considers the potential effects of turbines greater than 400m to blade tip–above Lowest Astronomical Tide (LAT).

1.3. The function of this report is as an addendum to the 2020 report and together they will act as baseline evidence and a framework for assessment. As such there is a minimum of repetition in this document. Unless otherwise expressly stated in this document the content of the Suffolk seascape sensitivity study to offshore wind farms report, 2020 (from here on referred to as the Suffolk, 2020 report) including text and figures remain unchanged and relevant.

1.4. The study considers the same study area as the Suffolk, 2020 report and the analysis of sensitive receptors is limited to the County of Suffolk including Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB) within the county.

1.5. The Suffolk, 2020 report relied on the buffers the turbines up to 400m to blade tip set out in the 'Review and update of OESEA seascape and visual buffer study', 2020[2] (from here on referred to as the OESEA, 2020 study.) These were derived from substantial research including reviewing and analysing 28 UK windfarm SVIAs, wireframe analysis and considering visibility modifiers alongside results of examinations and European experience. In order to future proof the study, turbines upto 550m high to blade tip are considered in this update even though none of this size are known to be in development at present.

1.6. It is not intended to carry out baseline analysis of further SVIAs or wireframes for this study as this should be carried out as part of future OESEA reports. As such it is proposed to:

- Briefly review the current national and local planning policy context and status of the OESEA 4 Environment Report and related studies (Section 2).
- Summarise any changes in the baseline (Section 3).
- Review the findings of the OESEA, 2020 study and the factors which influenced the proposed buffers with a commentary on how this relates to turbines over 400m to blade tip. This will be divided into expected effects of different sizes of turbines and different distances on the one hand and consideration of visibility modifiers and visual acuity on the other. Other studies such as NRW seascape sensitivity studies are also referred to (Section 3).
- Summarise the findings (Section 5).
- Review each seascape zone and set out a commentary on the sensitivity to turbines over 400m high for each (Part 2).

2. Policy update

UK National Policy Statements

2.1. The UK Government's National Policy Statements (NPSs) under the Planning Act (2008) set out Government policy for the development of Nationally Significant Infrastructure Projects (NSIPs). National policy statements EN-1 and EN-3 address national infrastructure planning

[1] Suffolk: Seascape sensitivity to offshore wind farms, White Consultants, October 2020.
[2] Offshore Energy Strategic Environmental Assessment (OESEA): Review and update of Seascape and Visual Buffer study for Offshore Wind farms, BEIS/Hartley Anderson, 2020

in relation to renewable energy including offshore wind farms with an output above 100MW but are a material consideration for smaller projects.

2.2. EN-1 and EN-3 drive the evidence for this guidance. They were published in 2011 and are current at the time of writing this report. However, there are revised drafts dated March 2023 out to consultation at present. These are broadly consistent with the current versions and do not affect the relevance or weight of the Suffolk 2020 study or this addendum. Relevant potential changes are set out below.

EN-1

2.3. The EN-1 March 2023 revised draft expresses a renewed sense of urgency to work towards net zero emissions by 2050 and provides more detail on achieving this. Like the previous policy substantial weight is given to the need for renewable energy infrastructure (3.2.5-3.2.6).

2.4. Nationally designated landscapes are confirmed as having the highest status of protection in relation to landscape and natural beauty (5.10.7). The duty to have regard to the purposes of nationally designated areas also applies in consideration of projects outside the boundaries of an area but which may have impacts within them. The aims should be to either avoid harm to the purposes or minimise adverse effects (5.10.8).

2.5. As before, the assessment should include the visibility and conspicuousness of the project and potential impact on views and visual amenity (5.10.20).

EN-3

2.6. The key difference in the EN-3 March 2023 revised draft is that the provision of offshore wind and associated infrastructure is now considered a 'critical national priority' (CNP) (3.8.12). However, applicants must continue to show how their application meets the requirements of EN-1 and EN-3 applying mitigation hierarchy.

2.7. An additional paragraph indicates that seascape is an issue for consideration especially where it provides the setting for a nationally designated landscape and supports the delivery of the designated area's statutory purpose (3.8.221).

2.8. The text states that where a proposed offshore windfarm will be visible from the shore within the setting of a nationally designated landscape with potential effects on the area's statutory purpose, an SLVIA should be undertaken in accordance with the relevant offshore windfarm EIA policy and the latest offshore energy SEA including the 'White 2020'[3] report (ie OESEA, 2020 report). This will always be the case where coastal national park or their settings are potentially affected. (3.8.224).

2.9. Four principal considerations on the likely effect of offshore windfarms on the coast are mentioned (3.8.225):

- the limit of visual perception from the coast under poor, good and best lighting conditions:
- the effects of navigation and hazardous lighting on dark night skies;
- individual landscape and visual characteristics of the coast and the special qualities of designated landscapes, such as World Heritage Sites, which limits the coast's capacity to absorb a development;
- how people perceive and interact with the coast and natural seascape.

2.10. This adds to the previous EN-3 text to include lighting and special qualities.

2.11. In terms of decision-making the Secretary of State should not refuse to grant consent unless the harmful effects on the statutory purposes of designated landscapes are considered to outweigh the benefits taking into consideration offshore wind energy's CNP status (3.8.369).

2.12. Overall, the draft revised EN-3 text reinforces and expands on the EN-3 text specifically supporting the OESEA, 2020 report and potential effects on designated landscapes and their setting which underpin the Suffolk 2020 study.

[3] Offshore Energy Strategic Environmental Assessment (OESEA): Review and update of Seascape and Visual Buffer study for Offshore Wind farms, BEIS/Hartley Anderson, 2020

AONBs and Heritage Coasts

2.13. Policies on AONBs and Heritage Coasts have not changed since the Suffolk 2020 study. However, the extent of the AONB has been increased to include an area in Essex and the AONB Management Plan has been updated. The statutory purposes remain the same. There has been a review of the Heritage Coasts report dated 30 August 2022. The landscape character baseline information remains essentially the same.

Marine Planning

2.14. Marine planning policies have not changed since the Suffolk 2020 study. The seascape character information baseline also remains the same.

2.15. The OESEA 4 Environmental Report[4] (ER) was published in March 2022 along with Feedback[5] and Consultation Response[6] reports in September 2022. The ER refers to the OESEA, 2020 report and sets outs its findings and these are not substantially challenged in the contributions to the Feedback report although the Response makes appropriate corrections. As such the OESEA, 2020 report remains valid as the underpinning analysis to the Suffolk, 2020 report. The plan/programme based on OESEA 4 is expected to have a lifespan of approximately four years from 2022.

3. Baseline seascape and consents update

Baseline

3.1. No substantive changes have occurred in the physical baseline since completion of the Suffolk 2020 study.

Consents

3.2. The following developments have been consented since completion of the Suffolk 2020 study:

- East Anglia ONE North offshore windfarm 37.7km at its closest point from shore with wind turbines upto 282m to blade tip.
- East Anglia TWO offshore windfarm 32.6km at its closest point from shore with wind turbines upto 282m to blade tip.
- Sizewell C nuclear power station.
- Kittiwake nesting structures, 17.5m high above LAT and 11m wide, as compensation for Hornsea Three offshore windfarm. One is proposed 1.4km offshore from Minsmere and up to two are proposed 1km off the coast of Lowestoft. These will be in situ for 40 years.

3.3. The consented proposals will add to cumulative effects of development and will be reflected in the update for each seascape zone.

4. Update approach

Focus and limitations of the report

4.1. The OESEA, 2020 study sets out visual buffers for different types of coastal character and designations at an England and Wales level. These are refined in the Suffolk seascape study, 2020 and seascape zones are derived with different levels of sensitivity to different sizes of turbines upto 400m to blade tip. The aim is to avoid significant adverse effects on high sensitivity seascape receptors. The premise that the study works on is that the most

[4] UK Offshore Energy Strategic Environmental Assessment, OESEA 4 Environmental Report, BEIS, March 2022
[5] UK Offshore Energy Strategic Environmental Assessment, Consultation Feedback, BEIS, September 2022
[6] UK Offshore Energy Strategic Environmental Assessment, Government response to OESEA 4 public consultation, BEIS, September 2022

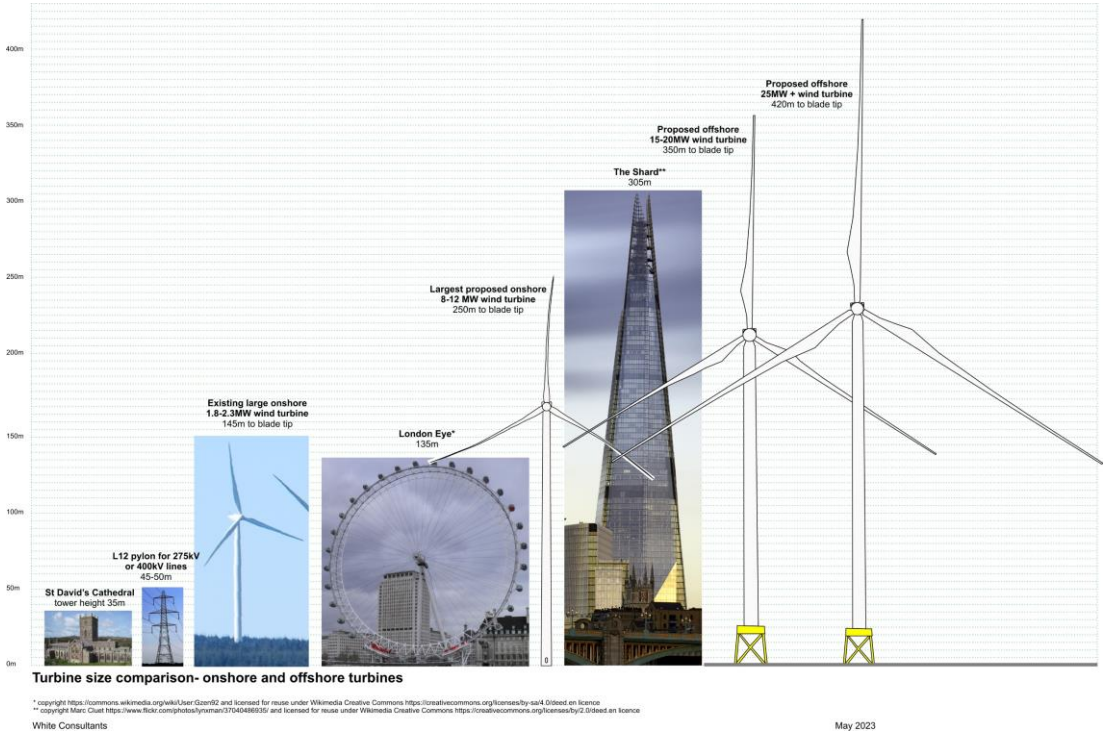
important effect of offshore windfarms is on the perception of seascape character from the coast ie the relationship between any proposed development with coastal seascape character when seen in juxtaposition with each other. This means that the main drivers are distance from the coast and the character and value of the coastal seascape and its component sensitive receptors. Therefore, the seascape zones identified are focussed on this purpose alone and should not be used for other purposes or development types which may need full seascape characterisation taking intrinsic natural and cultural processes and other characteristics into account.

Relevant guidance, reports and publications

4.2. The most relevant guidelines and reports are the Suffolk, 2020 report itself and those set out in paragraph 3.3 of that report.

4.3. An article published in Landscape Design 2021[7] sets out the case for a strategic approach to offshore wind farm planning incorporating seascape and visual factors. The scale of offshore turbines in relation to established landmarks such as the Shard at 305m high was set out in a diagram. This has been updated to incorporate turbines currently proposed as an option for Five Estuaries offshore windfarm (see **Figure 1**). These are 420m tall to blade tip- just under 40% taller than the Shard. These are therefore very large structures with associated movement of blades with very wide swept paths at high levels which are likely to be seen over long distances.

Figure 1 Relative size of offshore wind turbines



Seascape sensitivity and zones

4.4. Based on a review of the updated planning and baseline context it is considered that the findings of the Suffolk, 2020 report remain valid for turbines upto 400m to blade tip.

4.5. As it is not intended to carry out further baseline analysis of SVIAs or wireframes for this study the approach is to consider if the findings can be reasonably built upon or extrapolated to consider turbines upto 550m to blade tip to reasonably future proof the study.

4.6. A NRW, 2019[8] study predated the OESEA, 2020 study but used a similar approach analysing

[7] [redacted]

[8] Seascape and visual sensitivity to offshore wind farms in Wales: Strategic assessment and guidance.

fewer SVIAs. The findings showed a relationship between the likely scale of effect of different sizes of turbines to distance from the viewer. The 'very approximate ratio' between turbine height and distance for an average low magnitude of effect was found to be 1:133. For an average medium magnitude of effect the ratio was 1:100 (2.3 on page 14 and 7.8 on page 37). For example, a 300m high turbine is likely on average to have a low magnitude of effect at around 40km and a medium magnitude of effect at 30km. These are the equivalent of 'possible' and 'probable' significant effects respectively when considering views from high sensitivity receptors (2.5 page 15). This is relevant to Suffolk Coast & Heaths AONB. These are useful rules of thumb although there are caveats including the fact these are averages and there could be significant effects beyond these distances. These also assume worst case visibility conditions ie very good or excellent visibility.

4.7. It is useful to consider the OESEA, 2020 analysis of visual effects of offshore windfarms for 28 SVIAs based on turbine height summarised in Tables 7.2, 7.3 and 7.4 of that report to plot the relationship between turbine height and effects at various distances and to consider if similar rules of thumb apply. This is illustrated in **Figure 2** with derived potential distances for low and medium magnitude of effects in **Table 1**.

Table 1 Derived potential low and medium magnitude of effects

Heights of turbine to blade tip (m)	Low magnitude of effect average distance (to nearest km)	Medium magnitude of effect average distance (to nearest km)
425	56.5	42.5
450	60	45
500	66.5	50
550	73	55

4.8. **Figure 2** indicates that the low magnitude of effect is likely to occur at a ratio of *over* 1:133 for turbines over 225m- the line shows the 1:133 ratio and most of the levels of effects are above this. For example, turbines 400m high potentially have a low magnitude of effect at around 53km. Medium magnitudes of effect are likely to occur at a ratio of just *over* 1:100- the line shows the 1:100 ratio and most of the levels of effects are above this. These bear out the NRW, 2019 study findings. So, for example, an array of 425m high turbines potentially/probably have significant effects on high sensitivity receptors at 42.5km depending on visibility modifiers and other factors such as their relationship with existing turbines.

4.9. The OESEA, 2020 study also included an assessment of likely visual effects of turbines over 300m high to blade tip using wireframes. This was a useful additional analysis which supported the trajectory of expected effects from the SVIA analysis. As such it is not intended to repeat or extend these findings in this report.

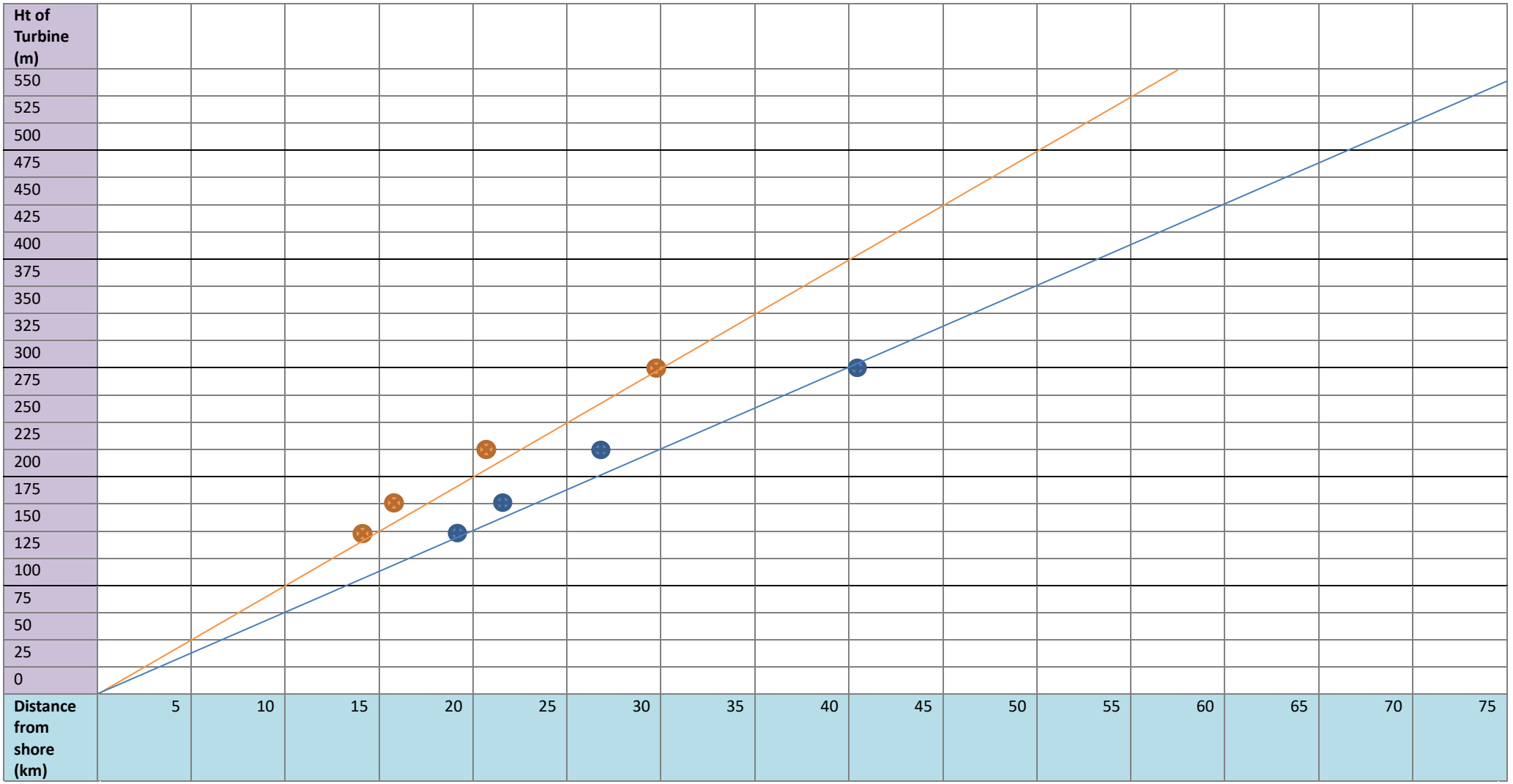
Visibility modifiers

4.10. The influence of visibility modifiers increases with distance. The Suffolk, 2020 report considered visibility modifiers off the Suffolk coast in Appendix 2 using data from the OESEA, 2020 report. The nearest coastal stations identified were Weybourne and Manston (Ramsgate). It was concluded that visibility from these locations have substantially larger proportions of time with visibility over 35km and 40km than the national average. This is explored further in **Table 2** below which extracts and analyses data from those two coastal stations. This measures only upto 40km in increments with distances over 40km left open. **Figure 3** graphically illustrates the measured percentage of days' visibility from the data and then extrapolates to explore a possible range of percentage of days where visibility may be possible above 40km.

4.11. The key conclusion of the existing data visibility analysis is that developments at around 39km offshore may be visible for 20% days annually. This is a significantly larger proportion than the national average of 10% noted for 40km in the OESEA, 2020 report. This latter figure fed into the OESEA, 2020 conclusions that 40km was a reasonable buffer from designated

Stages 1-3. NRW Evidence Series. Report No: 315, NRW, Bangor, 2019

Figure 2: Low and medium magnitude of visual effects of wind turbines



Key

Average distance for low magnitude of effect

Average distance for medium magnitude of effect

Source of average effects: OESEA, 2020: Table 7.4 Summary of SVIA visual effects of offshore windfarms excluding extensions, page 66.

Average 1:133 ratio of turbine height to distance for low magnitude of effect

Average 1:100 ratio of turbine height to distance for medium magnitude of effect

White Consultants/060623

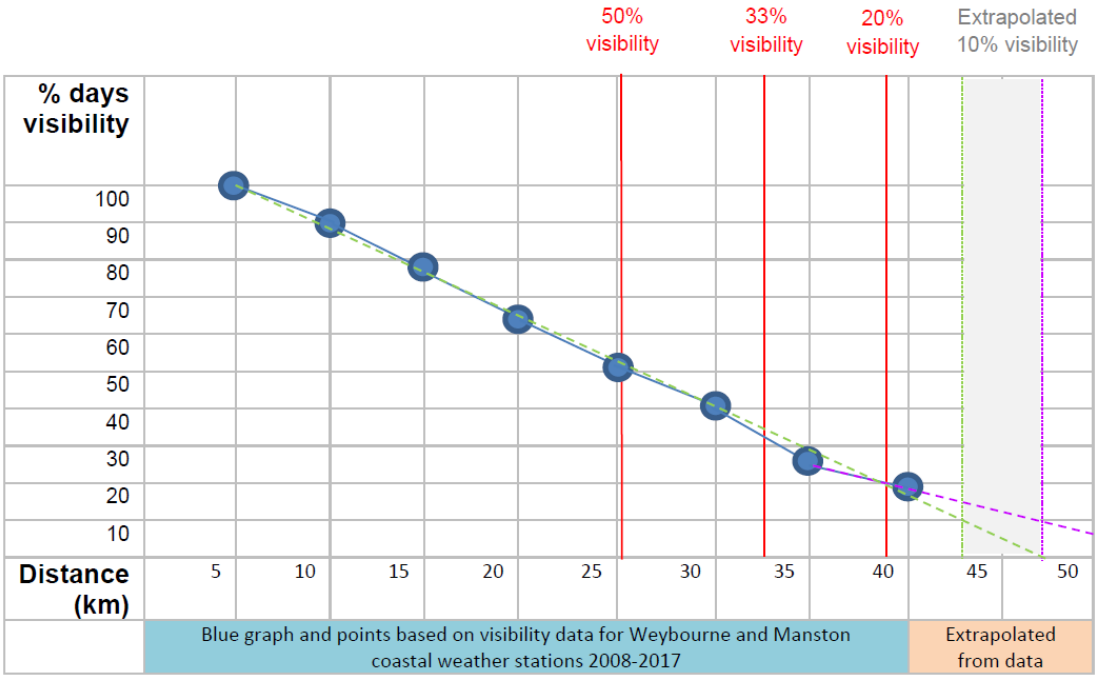
coastal landscapes for turbines upto 400m high to blade tip.

4.12. The extrapolated part of **Figure 3** explores visibility over 40km. It illustrates that 10% days visibility may be possible 43-47km offshore but this depends on the rate of reduction of visibility over distance being roughly the same as for lesser distances. Observation indicates that landscape features and objects can be seen over long distances eg Lundy at around 50km from the Gower and Whitelee wind farm's upto 140m high turbines visible from 57km away (mentioned in the East Anglia TWO Environmental Statement (EA2 ES) Appendix 28.8 on visibility, paragraph 28).

Table 2 Visibility distances at East Coast coastal stations in a 10 year period (2008-2017)

Weather Stations	Visibility Distance (km)							
	0-5	6-10	11-15	16-20	21-25	26-30	35	40+
Weybourne % days visibility	9.90%	13.00%	13.50%	11.10%	9.80%	14.10%	6.00%	22.60%
cumulative totals	100%	90.10%	77.10%	63.60%	52.50%	42.70%	28.60%	22.60%
Manston % days visibility	10.70%	13.20%	12.70%	13.10%	12.80%	17.00%	6.70%	13.70%
cumulative totals	100%	89.30%	76.10%	63.30%	50.20%	37.40%	20.50%	13.70%
Average % days visibility	10.3%	13.1%	13.1%	12.1%	11.3%	15.6%	6.4%	18.2%
Avg. cumulative totals	100%	90%	77%	63%	51%	40%	25%	18%

Figure 3 Average offshore visibility distances related to percentage days per annum



4.13. The Suffolk, 2020 report Appendix 2 also noted the seasonal variation set out in the EA2 ES Appendix 28.8. This shows that visibility over longer distances are most prevalent in summer. This is when the most people would be visiting or enjoying coastal and sea views.

4.14. It is appropriate to mention EA2 ES Appendix 28.9 concerning visibility measured on vessels off the East coast and compiled by the Met Office. This indicated that developments at distances over 36km may be visible less than 10% of the year (10, page 4). This analysis has not been verified in this study.

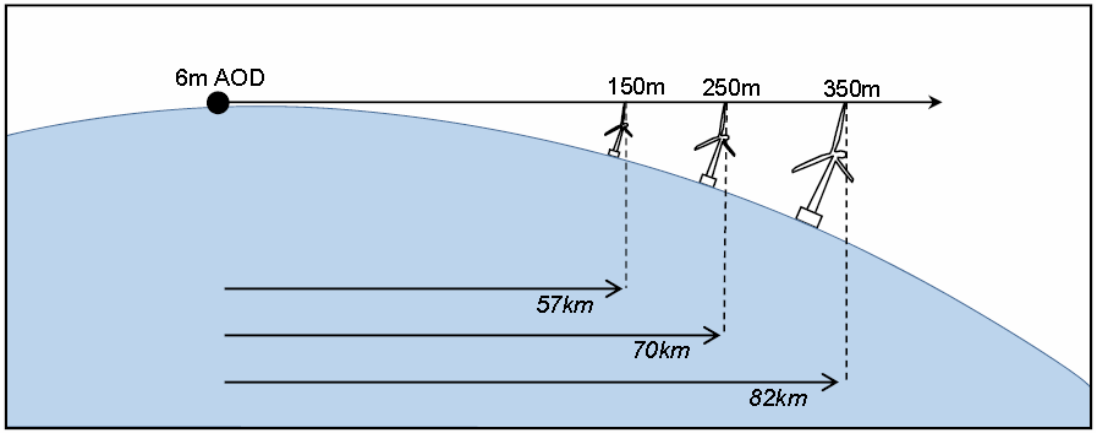
Aspect

4.15. The direction and angle of the sun in relation to a wind turbine and visual receptor is a notable factor influencing how clearly a turbine can be seen. Viewed from the east coast, offshore turbines broadly have the sun behind them in the morning, to one side in the middle of the day and highlighting them in the afternoon and evening. The effect of a lower angle of sun, particularly in the latter part of the day means turbines beyond 40km may be more likely to be visible in the afternoon/early evening. It is broadly the case that more people are likely to be enjoying the coast and views out to sea at this time which in turn influences sensitivity.

Earth's curvature

4.16. As the distance from the coast increases the effect of the earth's curvature on the amount of turbine visible also increases. This factor is implicitly already taken into account in SVIAs magnitude of visual effects analysed in the OESEA, 2020 study which underpin the buffers in the Suffolk 2020 study. The furthest SVIA distance analysed is 53km (Moray West in Table 7.2). The height of turbines screened by the earth's curvature at different distances from a viewpoint at 6m AOD is illustrated in **Figure 2**. This may be typical of views from the lower parts of the Suffolk Coast. For instance, at 57km a 150m high turbine is completely below the horizon. Therefore, the top 275m of a 425m high turbine, including the majority of its blade sweep, would theoretically be visible at this distance.

Figure 4 Effect of curvature of the Earth on visibility of turbines (Source: NRW (2019))



Discussion

4.17. A low magnitude of effect combined with a high sensitivity of receptor is relevant to visual buffers in the study area upto 40km. However, beyond this distance the influence of visibility modifiers as set out in **Figure 3** increases in influence. Therefore, a reasonable, if conservative, measure for significant effects is the medium magnitude of effect set out in **Table 1**. It is suggested that the following constraints buffers from the Suffolk Coast & Heaths AONB should be considered to guide development:

- Turbines 400+-425m high to blade tip- 42.5km buffer
- Turbines 425+-450m high to blade tip- 45km buffer
- Turbines 450+-500m high to blade tip- 50km buffer (although visibility may be less than 10%)
- Turbines 500m+-550m high to blade tip- 55km buffer (although visibility may be less than 10%)

4.18. The buffers above (effectively in the western part of Seascape Zone 8) are part of a reasoned approach to the future strategic location of offshore wind farms in relation to the AONB and are relevant in reviewing the likely seascape and visual effects of current proposals. However, it is recognised that 40km is a substantial buffer for larger wind turbines off sensitive designated coastal landscapes based on the evidence and meteorological data set out in OESEA, 2020. In determining individual proposals, decision-makers will need to balance the potential harm to the purposes of the AONB, including the combined cumulative effects of existing and proposed developments, with the likely future status of offshore wind as CNP

development.

5. Summary of findings and recommendations

5.1. In general, larger wind turbines both in terms of overall height and diameter of tower and swept path have a larger magnitude impact than smaller wind turbines at the same distance. Therefore, larger buffers for larger turbines are reasonable.

5.2. The percentage of time visibility is possible over long distances and the aspect of the east coast both increase the likelihood of visibility of turbines beyond 40km.

5.3. Turbines over 400m to blade tip are likely to be visible beyond 40km at times although their visibility decreases with distance due to reduced perceived scale of effect and the influence of visibility modifiers.

5.4. Wind farms with turbines over 400m high should be at least 40km away from the coast and preferably more as set out in the buffers in 4.17. If the nearest turbines of any given array are around 40km away from the AONB coast it is highly desirable for the number around this distance to be minimised in order to avoid significant adverse effects on the AONB and curtaining effects on the skyline in excellent visibility conditions.

5.5. The sensitivity of each seascape zone (SCZ) to wind turbine development remains the same except where East Anglia TWO windfarm overlaps with SCZ04 where it reduces to medium- see text for this zone below.

5.6. The treatment of turbines over 400m to blade tip in each Seascape Zone is set out in Part 2.

PART 2: Detailed seascape zone updates

Note: The sensitivity noted below is the overall sensitivity of each seascape zone to wind turbines generally as per the Suffolk, 2020 study, not specifically to turbines over 400m high to blade tip.

Seascape zone No: 01	Name: Suffolk Heritage Coast Inshore- South
Sensitivity	High/medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper. This would be likely to increase cumulative effects.	

Seascape zone No: 02	Name: Suffolk Heritage Coast Offshore- South
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms as a suggested constraints buffer apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper and increasing a curtaining effect towards the London Array. This would be likely to increase cumulative effects.	

Seascape zone No: 03	Name: Greater Gabbard Environs
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations describing this zone as a constraints buffer for turbines above 175m high apply to a greater degree to turbines more than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper. This would be likely to substantially increase cumulative effects.	

Seascape zone No: 04	Name: Suffolk Heritage Coast Inshore- North
Sensitivity	High
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper where extensions are proposed. This would be likely to increase cumulative effects. Now that East Anglia TWO is consented this becomes part of the baseline. Sensitivity *within* its boundaries reduces to medium as per SCZ03 which includes Greater Gabbard. Any replacement of turbines within the windfarm extent should not exceed 282m to blade tip. Sensitivity within the zone directly adjacent to East Anglia TWO remains high due to the proximity to the coast. It should remain as a constraint buffer for turbines of all sizes, especially those above 400m, to avoid significant adverse effects on the combined AONB and Heritage Coast. As with Greater Gabbard/Galloper extensions of the arrays into this zone may also exacerbate adverse combined cumulative effects if the turbines are above 400m high due to the contrast in scale and spacing. In addition, turbines over 400m could contribute strongly to a curtaining effect on the skyline between existing and consented wind farms and to the north.	

Seascape zone No: 05	Suffolk Heritage Coast Offshore- North
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations as a constraints buffer for turbines above 225m-400m high apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the	

existing development at Greater Gabbard/Galloper and East Anglia TWO. This would be likely to increase cumulative as well curtaining effects.

Seascape zone No: 06	Name: North Suffolk and Norfolk Inshore
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale acutely with existing development at Scroby Sands. This would be likely to increase cumulative effects.	

Seascape zone No: 07	Name: North Suffolk and Norfolk Offshore
Sensitivity	Medium
Additional comments relating to turbines above 400m to blade tip	
The comments made in the summary of recommendations for offshore windfarms as a buffer for turbines over 350m high clearly also applies to turbines over 400m. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale with existing development at Scroby Sands. This would be likely to increase cumulative effects.	

Seascape zone No: 08	Name: East Anglia Outer Offshore
Sensitivity	Medium/low
Additional comments relating to turbines above 400m to blade tip	

The comments made in the summary of recommendations for offshore windfarms apply to turbines greater than 400m high. Turbines of this size are likely to have greater individual effects than smaller turbines as well as contrasting in scale more acutely with the existing development at Greater Gabbard/Galloper where extensions are proposed and also East Anglia ONE North and East Anglia TWO. This would be likely to increase cumulative effects. In addition, turbines over 400m could contribute to a curtaining effect on the skyline between existing and consented wind farms and to the north.

A low magnitude of effect combined with a high sensitivity of receptor is relevant to visual buffers in the study area upto 40km. However, beyond this distance the influence of visibility modifiers as set out in **Figure 3** increase in significance. Therefore, a measure for significant effects is the medium magnitude of effect set out in **Table 1.** it is recommended that the following constraints buffers should be considered to guide development:

- Turbines 400+-425m high to blade tip- 42.5km buffer
- Turbines 425+-450m high to blade tip- 45km buffer
- Turbines 450+-500m high to blade tip- 50km buffer (although visibility may be less than 10%)
- Turbines 500m+-550m high to blade tip- 55km buffer (although visibility may be less than 10%)

Now that East Anglia TWO is consented this becomes part of the baseline. Any replacement of turbines within the windfarm extent should also be subject to the above buffers due to potential contrasts in scale with consented turbines.

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