East Anglia TWO Offshore Windfarm

Site Characterisation Report (Offshore Cable Corridor)

Applicant: East Anglia TWO Limited
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Glossary of Acronyms

DCO	Development Consent Order
EIA	Environmental Impact Assessment
ES	Environmental Statement
GBS	Gravity Base Structure
LAT	Lowest Astronomical Tide
m	Metre
m^3	Metre Cubed
MarSEA	Marine Evidence based Sensitivity Assessment
MMO	Marine Management Organisation
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEL	Probable Effect Levels
SPR	ScottishPower Renewables
SQG	Sediment Quality Guidelines
SSC	Suspended Sediment Concentration
TEL	Threshold Effect Levels
ZEA	Zone Environmental Appraisal

Glossary of Terminology

Applicant	East Anglia TWO Limited.
Construction operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
Development area	The area comprising the Indicative Onshore Development Area and the Offshore Development Area.
East Anglia TWO project	The proposed project consisting of up to 75 wind turbines, up to four offshore electrical platforms, up to one offshore construction, operation and maintenance platform, inter-array cables, platform link cables, up to one operational meteorological mast, up to two offshore export cables, fibre optic cables, landfall infrastructure, onshore cables and ducts, onshore substation, and National Grid infrastructure.
East Anglia TWO windfarm site	The offshore area within which wind turbines and offshore platforms will be located.
European site	Sites designated for nature conservation under the Habitats Directive and Birds Directive, as defined in regulation 8 of the Conservation of Habitats and Species Regulations 2017 and regulation 18 of the Conservation of Offshore Marine Habitats and Species Regulations 2017. These include candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to the EIA and the information required to support HRA.
Horizontal directional drilling (HDD)	A method of cable installation where the cable is drilled beneath a feature without the need for trenching.
Inter-array cables	Offshore cables which link the wind turbines to each other and the offshore electrical platforms, these cables will include fibre optic cables.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Natura 2000 site	A site forming part of the network of sites made up of Special Areas of Conservation and Special Protection Areas designated respectively under the Habitats Directive and Birds Directive.
Offshore cable corridor	This is the area which will contain the offshore export cable between offshore electrical platforms and landfall jointing bay.
Offshore development area	The East Anglia TWO windfarm site and offshore cable corridor (up to Mean High Water Springs).
Offshore electrical infrastructure	This includes transmission assets required to export generated electricity to shore. This includes inter-array cables from the wind turbines to the offshore electrical platforms, offshore electrical platforms, platform link cables and export cables from the offshore electrical platforms to the landfall.
Offshore electrical platform	A fixed structure located within the windfarm area, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore export cables	The cables which would bring electricity from the offshore electrical platforms to the landfall.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the offshore operation and maintenance platform and the offshore electrical platforms.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.

1 Introduction

1.1 Background

1. East Anglia TWO Limited ('the Applicant') (which is a wholly owned subsidiary of ScottishPower Renewables (SPR) UK Limited) is seeking a Development Consent Order (DCO) for the proposed East Anglia TWO project consisting of an offshore windfarm and an associated offshore cable corridor to the landfall location just north of Thorpeness.

2. The offshore components of the proposed East Anglia TWO project would comprise:

- Up to 75 wind turbines;
- Up to four offshore electrical platforms;
- Up to one offshore construction, operation and maintenance platform;
- One meteorological mast;
- Up to 20 buoys (LiDAR, wave or guard buoys);
- Inter-array cables (a maximum of 200km combined length); platform link cables between offshore electrical platforms (each up to 15km in length with an overall maximum length of 75km);
- Fibre optic cables may also be installed; however, these would be bundled with, or secured to the outside of the inter-array, platform link or export cables; and
- Up to two export cables (up to 80km in length each).

3. A full project description is available as part of the Environmental Statement (ES) in ***Chapter 6 Project Description***.

1.2 Purpose of this Document

4. The Applicant is applying to designate the following areas for the disposal of material extracted during the construction period (e.g. drilling and / or sea bed preparation (dredging)). The proposed disposal areas are:

- The East Anglia TWO windfarm site; and
- The offshore cable corridor.

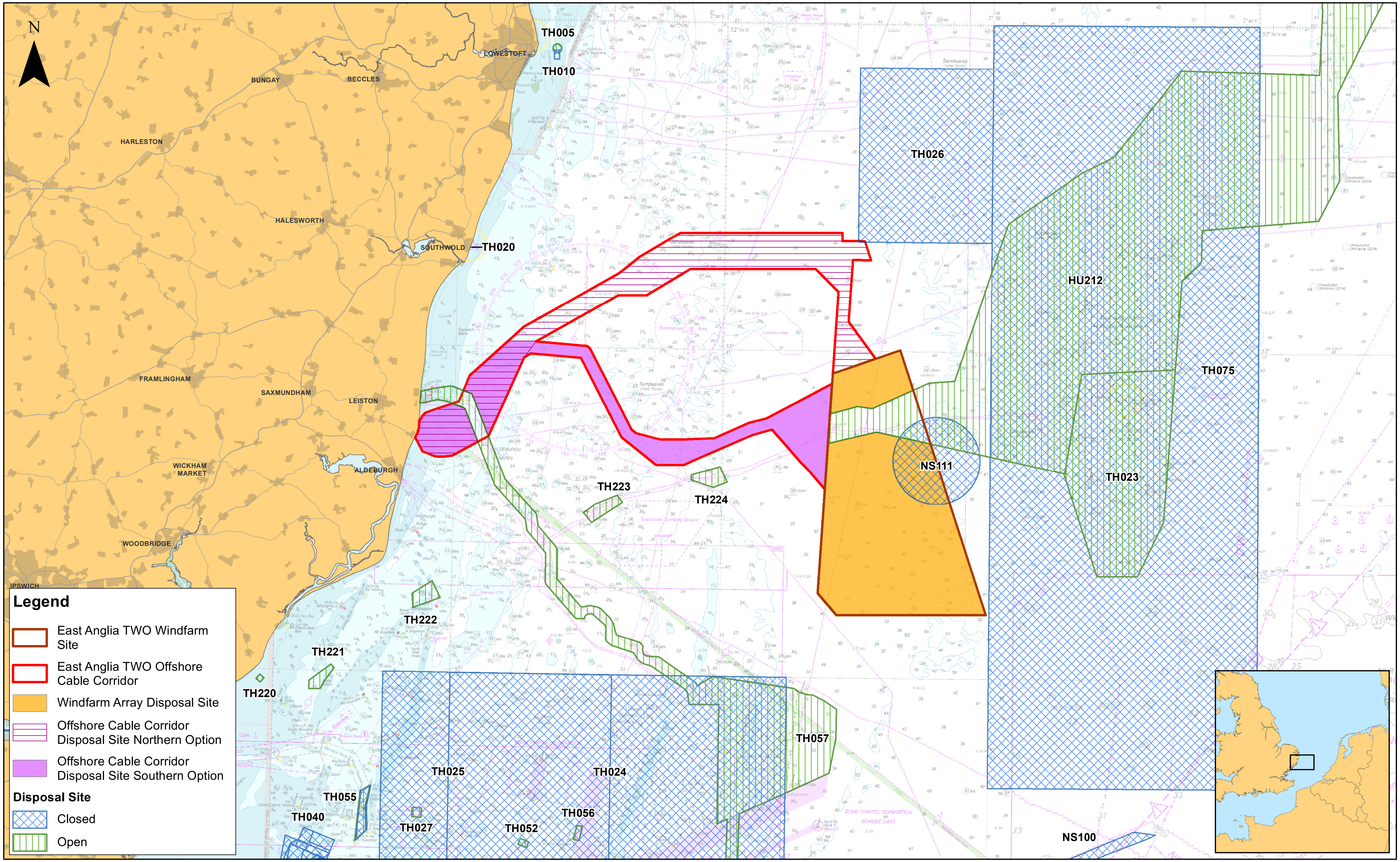
5. This document has been produced to enable the Applicant to designate the East Anglia TWO offshore cable corridor as a licenced disposal site. It provides the necessary information to characterise the disposal requirements in the offshore cable corridor. It should be noted that, given the East Anglia TWO and East Anglia

ONE North projects may potentially share an offshore cable corridor, the Applicant has requested for the northern offshore cable corridor route option of East Anglia TWO (see ***Figure 1***) to be a shared disposal site (where they overlap) with the proposed East Anglia ONE North offshore cable corridor disposal site, should the northern offshore cable corridor route option for East Anglia TWO be selected post-consent. Full details of the disposal requirements in the East Anglia ONE North offshore cable corridor are provided in that project's Site Characterisation Report however given the similarity in the worst case export cable lengths required for the two projects, the sediment disposal assumptions in the offshore cable corridor are identical for both projects.

6. For information on the disposal requirements in the East Anglia TWO windfarm site see the Site Characterisation Report (Windfarm Site) (document reference 8.15). The locations of the proposed East Anglia TWO disposal sites are shown in ***Figure 1*** (and the coordinates to delineate the offshore cable corridor disposal site are provided in ***Appendix 1***). The offshore cable corridor disposal site consists of the entire East Anglia TWO offshore cable corridor route options minus areas which overlap with open disposal sites (the open and closed disposal sites are also shown on ***Figure 2***).

7. The purpose of this document is to provide the information required to enable disposal site designation. Accordingly, this document sets out:

- The need for disposal of material;
- Alternatives considered;
- The location of the disposal sites;
- The types of material to be disposed of;
- The quantity of the material to be disposed; and
- Potential impacts of disposal.



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East Anglia TWO

Disposal Site Locations

Drg No	EA2-DEV-DRG-IBR-000711
Rev	2
Date	02/09/19
Figure	1

Datum: WGS 1984
Projection: Zone 31N

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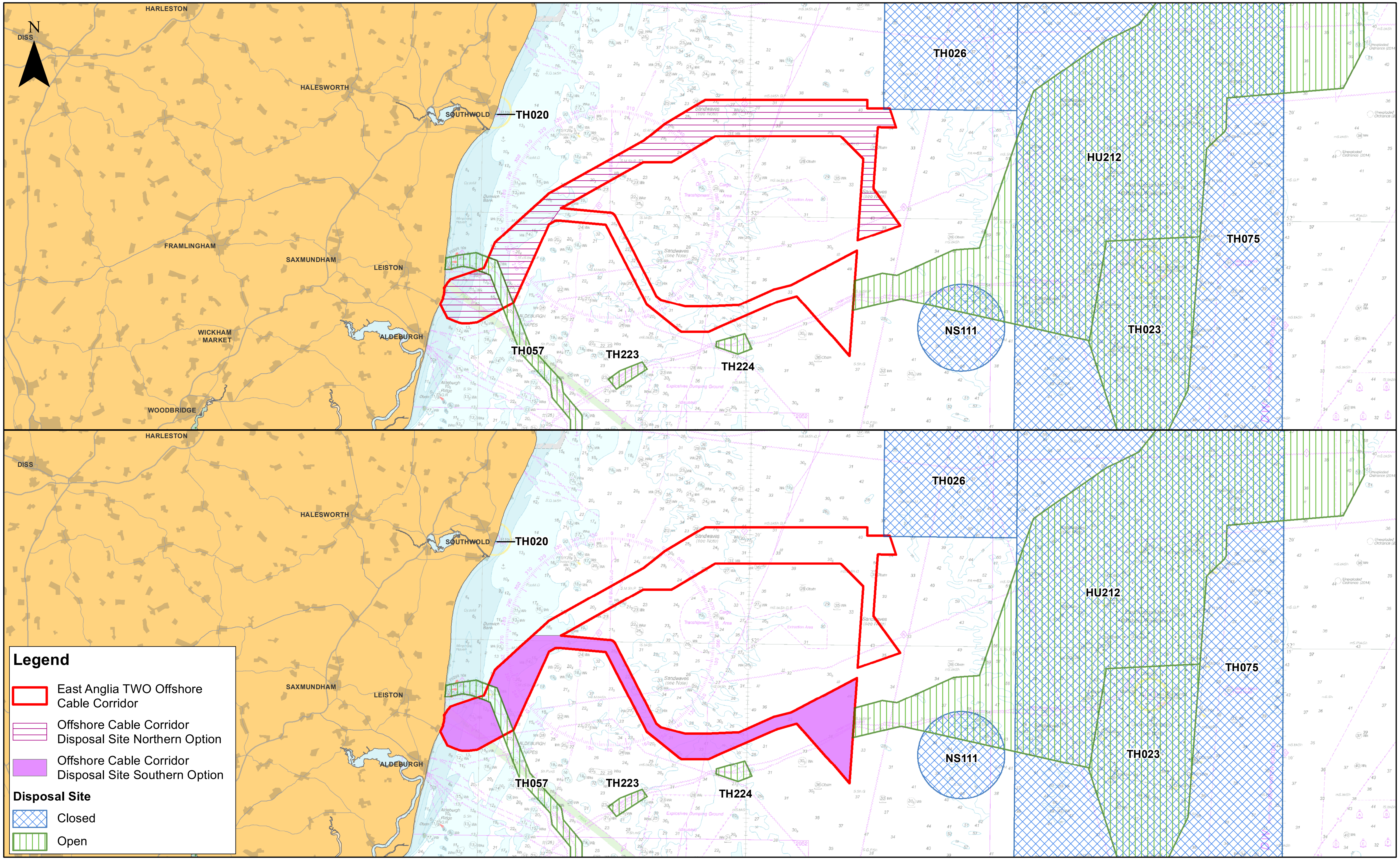

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East Anglia TWO

Proposed East Anglia TWO Offshore Cable Corridor Route Options Disposal Site Designations

Drg No	EA2-DEV-DRG-IBR-001003
Rev	1
Date	03/09/19
Figure	2

Datum: WGS 1984
Projection: Zone 31N

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2 The Need for Disposal of Material

8. The installation of export cables may result in the disposal of sediment where sand wave levelling or dredging / trenching (for example through the use of a backhoe dredger, see ***Chapter 6 Project Description*** of the ES) is required to facilitate the installation of export cables.

9. All spoil material would be disposed of in a disposal area adjacent to each location from where it was derived, where it would be dispersed by natural processes as described in the ES, ***Chapter 7 Marine Geology, Oceanography and Physical Processes***.

2.1 Cable Installation

10. Sand wave levelling (pre-sweeping) to a stable reference sea bed level may be undertaken in areas with large ripples and sand waves to reduce the potential that cables become unburied over the life of the project.

11. The sediment throughout the offshore cable corridor is primarily gravelly sand (see ***Figure 3***) and therefore it is expected that the majority of export cables will be buried using a cable plough. This means that for the majority of the export cable route, no excavation and subsequent disposal of sediment would be required.

12. Anticipated sediment volumes for the excavation of sand waves and for dredging are provided in ***section 4.1***.

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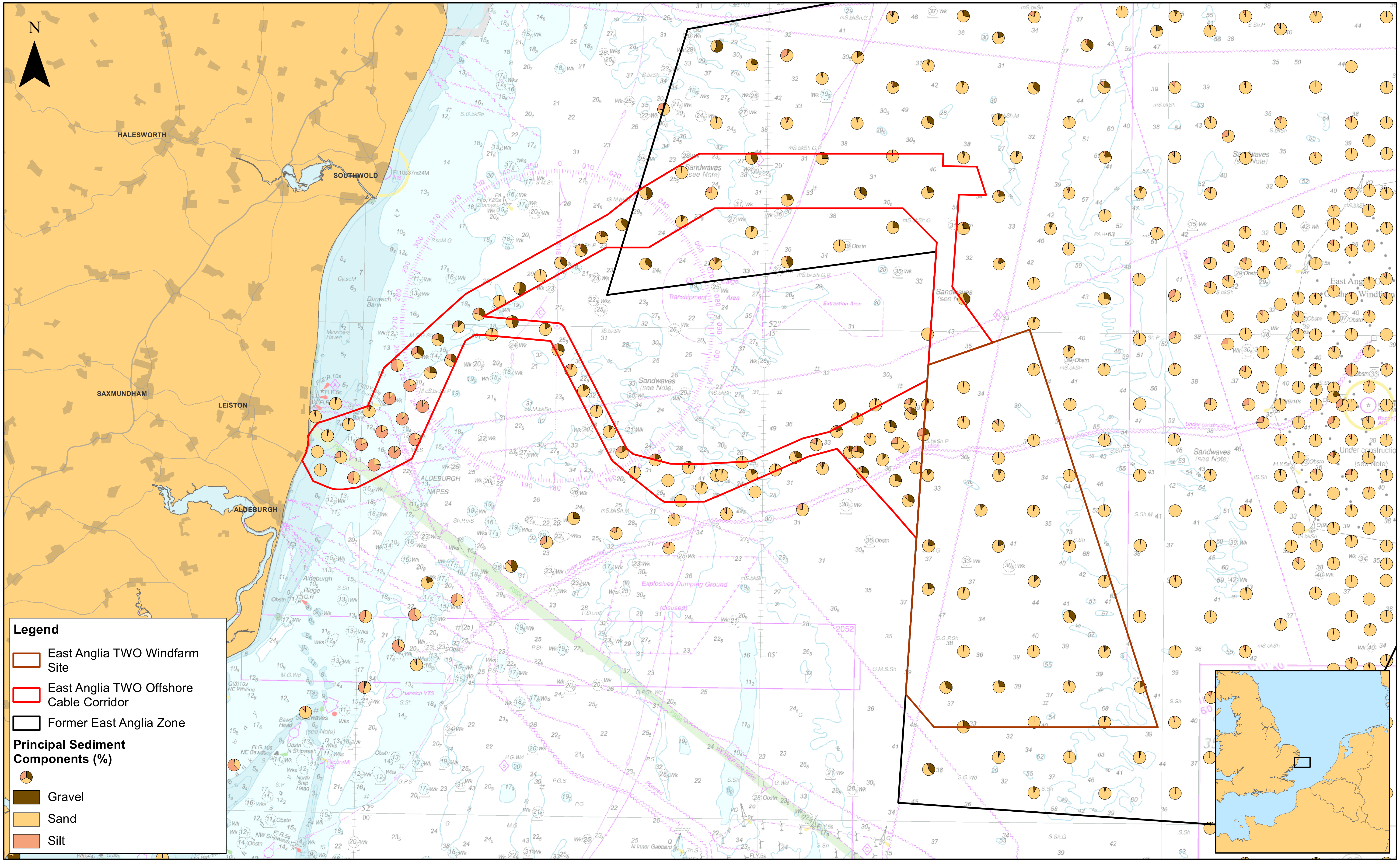

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East Anglia TWO

Sediment Distribution

Drg No	EA2-DEV-DRG-IBR-001070
Rev	1
Date	01/10/19
Figure	3

Datum: WGS 1984
Projection: Zone 31N

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2.2 Mitigation and Best Practice

13. The Applicant has committed to a number of areas of mitigation and best practice in order to minimise the potential impacts of the proposed East Anglia TWO project. The following examples of embedded mitigation are of relevance to sediment disposal:

- Routeing to avoid sand waves, where possible.

3 Type of Material to be Disposed

3.1 Sea Bed Sediment Type

14. Grab samples collected within the offshore cable corridor as part of the project-specific benthic survey (see ***Appendix 9.2*** of the ES) show the majority of the sediments to be slightly gravelly sand (using the Folk scale). The section of the cable corridor furthest offshore and closest to the East Anglia TWO windfarm site is composed of seabed sediments primarily slightly gravelly sand and gravelly muddy sand. The central section of the offshore cable corridor has the highest percentage of fines in samples collected (reaching over 90%), with sediment mainly falling within the sandy mud classification. Closest to landfall, sediment size is highly variable, ranging from sandy mud to sandy gravel in the samples that were taken. One sample was found to contain 53% gravel while another was calculated at less than 1% gravel.

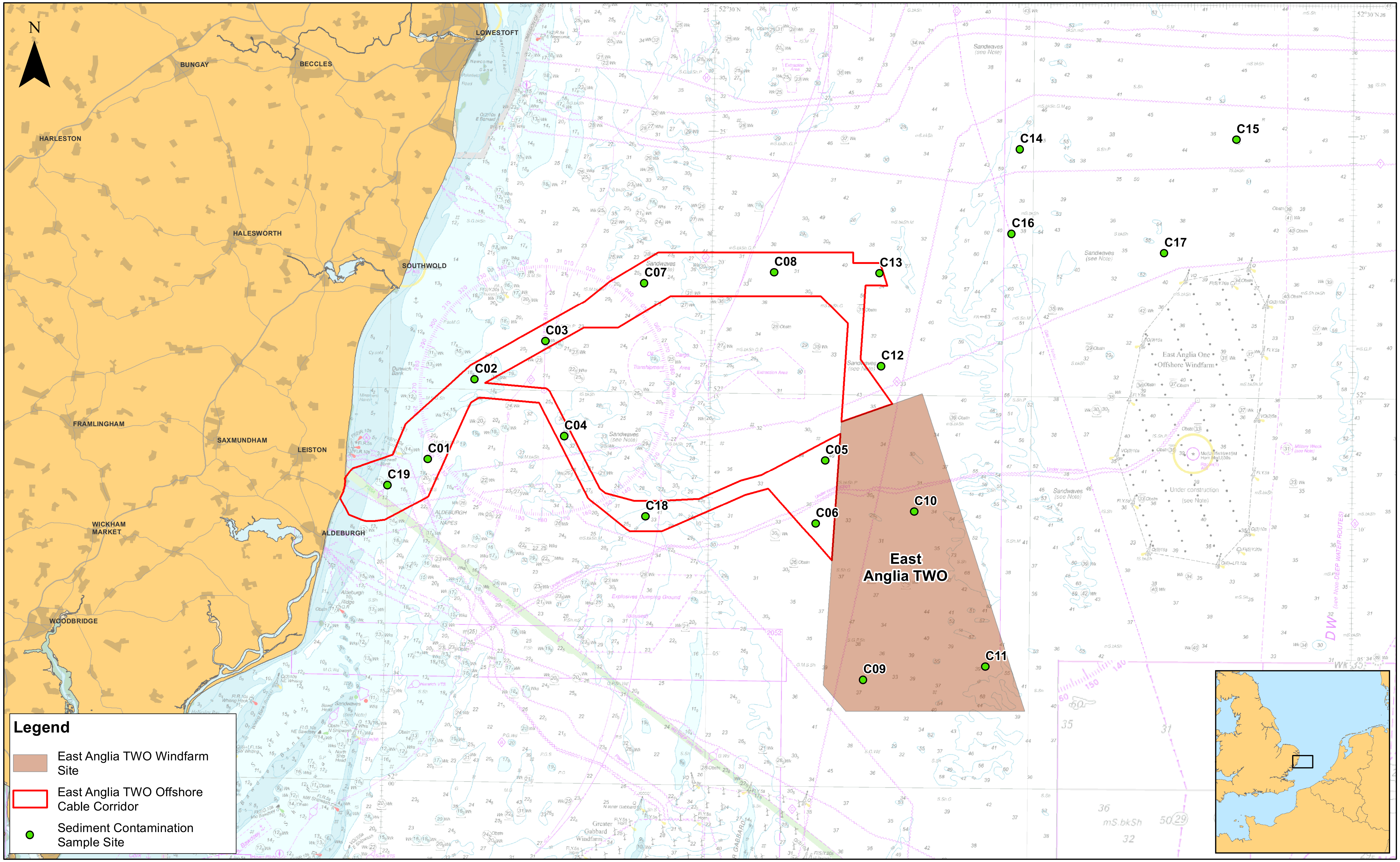
3.2 Sediment Contamination Analysis of the Offshore Development Area

15. The locations of the East Anglia TWO and East Anglia ONE North site specific sediment contamination sample sites are shown in ***Figure 4*** and contaminant data for heavy and trace metals are summarised in ***Table 2***. Contaminant sample numbers C01-C08, C13, C18 and C19 were taken within the East Anglia TWO offshore cable corridor and are therefore of particular relevance to this report. However, reference to samples taken in the East Anglia TWO windfarm site (sample numbers C9, C10 and C11) and East Anglia ONE North windfarm site (sample numbers C14, C15, C16, C17) is provided for context.

16. Cefas Action Levels are commonly used to provide an indication of contaminant levels within sediments. Whilst these levels were specifically developed to assess dredged material, they are an accepted way of assessing the risks to the environment from other marine activities as part of the EIA process. The Marine Management Organisation (MMO) (using the Cefas Action levels) states that, in general, contaminant levels below Action Level 1 are not considered to be of concern. Material with persistent contaminant levels above Cefas Action Level 2 are generally considered to pose an unacceptable risk to the marine environment

(and therefore material is unlikely to be considered suitable for disposal to sea). For material with persistent contaminant levels between Action Levels 1 and 2, further consideration of additional evidence is required before the risk can be identified. Cefas Action Levels are summarised in the ES, ***Chapter 8 Water and Sediment Quality***.

17. If contaminant levels in the material under consideration persistently exceed Cefas Action Levels, additional assessment is required. This can be undertaken by applying the more stringent Canadian sediment quality guidelines (SQG) (CCME 2002) which also consist of two sets of concentrations: Threshold Effect Levels (TEL) and Probable Effect Levels (PEL). The Canadian SQGs also include PELs for individual polycyclic aromatic hydrocarbons (PAHs) which do not have Cefas Action Level 2 concentrations. Canadian SQGs are summarised in the ES, ***Chapter 8 Water and Sediment Quality***.



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East Anglia TWO

Location of Sediment Contamination Sample Sites

Drg No	EA2-DEV-DRG-IBR-001071
Rev	1
Date	01/10/19
Figure	4

Datum: WGS 1984
Projection: Zone 31N

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18. The difference between these values and the Cefas Action Levels is that ecotoxicological information has been used from field and laboratory testing. Therefore, the TEL and PEL concentrations represent concentrations where adverse effects may or may not occur. The lower level (TEL) represents a concentration below which adverse biological effects are expected to occur only rarely (in some sensitive species for example). The higher level (PEL), defines a concentration above which adverse effects may be expected in a wider range of organisms.

19. Levels of aluminium, iron, barium and tin were also measured however as there are no associated Cefas Action Levels or Canadian SQG values, they are not discussed further.

20. Sediment contaminant analysis was also undertaken for polychlorinated biphenyls (PCBs), PAHs and organotins. The combined PCBs[1] gave a value below 0.001mg/kg. Individual PAH concentrations were all below 0.00008mg/kg and combined 2-6 ring PAH were below 0.00128mg/kg. Concentrations of organotins were highest at site C01 (see ***Appendix 9.3*** of the ES) where they were 0.01mg/kg. None of these results exceeded Cefas Action Level 1 or Canadian TEL levels.

21. A number of samples (11) exceed Cefas Action Level 1 for concentrations of arsenic. The majority of samples that exceeded Cefas Action Levels 1 do so only marginally, remaining well below Action Level 2. All samples exceeded the TEL for concentrations of arsenic with three samples (C05, C07 and C16) also marginally exceeding the PEL.

22. The elevated levels of arsenic which were recorded are typical of the region; inshore these are associated with a history of arsenic waste disposal and offshore these are associated with estuarine and geological inputs and sea bed rock weathering (Royal Haskoning 2011). Given that there were no exceedances of Action Level 2 and levels are typical for the region, further assessment (i.e. comparison with additional sediment quality guidelines or other methods) is not deemed necessary.

23. One sample (C01) marginally exceeded Cefas Action Level 1 for cadmium, copper, nickel and zinc (***Table 2***). Sample C01 also exceeded the TEL for cadmium, copper, lead and zinc. The exceedances did not approach the higher Action Level 2 or the PEL. Considering the predominantly sandy nature of the sea bed sediments, which significantly reduces the potential for any contaminants to accumulate and for sediments to be resuspended into the water column and

[1] Based on the "ICES 7 PCBs". Seven of the 209 existing PCBs are analysed in monitoring because they are found in relatively high concentrations in technical mixtures and cover the range of toxicological properties of the PCB group

transported over long distances (see ***section 6.2.2***), these are not deemed to be of concern.

24. From the information and data presented above it can be concluded that the baseline sediment quality in the offshore development area is generally good and site specific information in relation to concentrations of contaminants in sediments does not record significantly elevated levels.

Table 1 East Anglia TWO and East Anglia ONE North Site Specific Sediment Contamination Analysis Results Compared to Cefas Action Levels (mg/kg) (see *Appendix 9.3* of the ES)

Sample station	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Vanadium	Zinc	Total Hydrocarbon Content
C01	12.6*	0.8*	33.8	52.2*	45.5*	0.09	22.8	45.4	132.3*	53.5
C02	34.2*	0.26	17.1	10.1	7.7	0.03	13.6	38.1	23.7	26.2
C03	31.7*	0.07	9.7	7	7.7	0.03	6.6	35.5	24	36.6
C04	29*	0.05	7.4	5.3	5.8	0.03	6.2	31.2	19.8	33.4
C05	43.9**	0.08	13.9	6.5	8.1	0.02	8.2	52.3	24.8	35.1
C06	28.2*	0.05	20.5	10.2	5.2	0.02	14.2	28.4	13.7	35.8
C07	42.4**	0.08	6.9	5.6	7.5	0.05	8.4	41	21.6	33.9
C08	16.4*	<0.04	6	5.5	4.7	0.03	4.2	21.4	14.2	32.0
C09	8.9*	<0.04	4.2	3.8	2.8	0.03	3.5	10.1	8.1	32.3
C10	24*	0.07	5.5	3.4	4.5	0.02	5.8	25.5	11.9	31.8
C11	7.5*	<0.04	4	5.1	2.4	0.02	3.3	8.5	7.1	32.5
C12	28.1	<0.04	8.2	6.2	6.1	0.03	6.5	32.3	18.3	34.3
C13	20.3	0.05	7.6	6.2	5.4	0.03	4.6	21.3	14.9	34.9
C14	34.9*	0.05	4.4	5	5.2	0.06	5.3	29.9	15.4	32.6
C15	9.7*	<0.04	6.5	4.4	2.9	0.02	3.9	13.6	10.6	24.5

Sample station	Arsenic	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Vanadium	Zinc	Total Hydrocarbon Content
C16	65.6**	0.07	7.5	4.9	5.4	0.02	10.2	49	22.6	28.2
C17	16.6*	<0.04	4.5	3.6	2.9	0.02	3.8	15.7	9.6	26.9
C18	14.1*	0.06	10	6.9	6.3	0.04	5.2	26.6	20.1	30.6
C19	20.8*	0.1	14.4	7.8	15.7	0.05	10.7	34	41.3	28.5

Yellow highlight above Cefas Action Level 1; *Above Canadian SQC TEL; **Above Canadian SQC PEL;
Orange highlight cells indicate sample locations in the East Anglia ONE North windfarm site which were gathered in the same survey and have been included for context.

4 Quantity of Material to be Disposed

25. Material to be disposed of may arise from sand wave levelling and dredging for export cable installation.

4.1 Sea Bed Preparation

4.1.1 Export Cables

26. Up to 1,000,000m^3 of sediment may be excavated as a result of sand wave levelling for up to 160km of export cables. It is acknowledged that a portion of the export cable(s) will be within the East Anglia TWO windfarm site and therefore 10% (100,000m^3) of this volume has been attributed the windfarm site disposal volume (see Site Characterisation Report (windfarm site) (document reference 8.15)) which is considered conservative. Up to 900,000m^3 could therefore be deposited within the offshore cable corridor disposal site. Any required sand wave levelling is anticipated to be in discrete areas and not along the full length of the offshore cable corridor, and would be deposited back within the offshore cable corridor at locations which avoid sensitive features. These locations would be determined post consent in consultation with Natural England and the MMO.

27. Furthermore, there may be a requirement for dredging in the offshore cable corridor. This could be at any point along the length of the offshore cable corridor and it is anticipated that up to **68,800**m^3 of sediment could be excavated as a result of dredging activity.

28. This results in a total of up to **968,800m^3** of sediment potentially being disposed of within the offshore cable corridor.

4.1.2 Total volumes

29. These volumes are summarised in ***Table 2***.

Table 2 Total Worst Case Surface Sediment Disturbance

Infrastructure / Activity	Worst Case Scenario type	Worst case volume (m^3)
Export cable sand wave levelling	Based on a maximum of 160km combined length. Levelling of a corridor up to 60m wide, with an average depth of 2.5m	900,000
Dredging	Based on experience from EA1, but noting an anticipation for harder ground, it is assumed that up to 5% (4km) of each cable corridor could require a v-shaped trench cross section: 8.6m wide by 4m deep.	68,800

Infrastructure / Activity	Worst Case Scenario type	Worst case volume (m^3)
Total		**968,800**

4.2 Programme

30. It is anticipated that the offshore construction works would be completed in approximately 27 months. The time periods of specific offshore activities would vary and would be encompassed within this 27 month period.

4.3 Daily Disposal Amounts

31. The worst case assumes that up to **968,800m³** of near-surface sediment would be removed by means of dredging throughout the entire construction period within the offshore cable corridor. Dredged sediment would be returned to the water column at its surface layer as overflow from a dredger vessel.

32. In the East Anglia ONE modelling studies, consecutive daily releases of 22,500m^3 of sediment (mostly medium-grained sand, but also with small proportions of gravel, other sand fractions and muds) were simulated at the water surface at 15 wind turbine locations. This sediment release represents a suitable analogue for the type and magnitude of effect that would be anticipated from the proposed East Anglia TWO project. Therefore, 22,500m^3 of sediment release per day is considered as the worst case daily sediment disposal volume for the proposed East Anglia TWO project.

5 Alternatives Considered

5.1 Use of Material for Ballast

33. Where extensive excavation works are required, such as for sand wave levelling or sea bed preparation for foundation installation, it is possible that material could be retained and used for infill works or ballast material, if geotechnically suitable for purpose. Ballast material is heavy material which is used to enhance stability of foundations and is likely to be composed of locally dredged sand.

34. The Applicant is considering the use of several different foundation types. Sand dredged locally during the sea bed preparation could be used as ballast material for GBS foundations during the foundation preparation works if geotechnically suitable for purpose . This reuse of sand would be preferable to sourcing ballast material from elsewhere in accordance with the waste hierarchy. The remainder would be disposed of as described in ***section 4*** above.

35. The use of excavated material as ballast would depend on a suitable foundation type being used and the results of detailed post-consent geotechnical investigations. However, for the purposes of the EIA, and as a worst case for this report, it has been assumed that all drilled and dredged material would be disposed of on site, rather than being used as ballast material.

5.2 Other Disposal Sites

36. The suitability and capacity of nearby existing disposal sites (***Figure 1***) has been considered.

37. The largest open disposal sites in the vicinity of the offshore cable corridor are associated with the East Anglia ONE offshore windfarm (TH222, TH223, TH224, TH023), East Anglia THREE offshore windfarm (HU212) and the Galloper offshore windfarm (TH057). However, the marine licence conditions for these disposal sites state that they are only to be used for disposal of material derived from their associated windfarm, therefore these sites are not available to the proposed East Anglia TWO project.

6 Potential Impacts of Disposal

38. The impact of disposal of material within the offshore cable corridor has been incorporated into impacts assessed within the East Anglia TWO Environmental Impact Assessment (EIA) and presented within the ES (SPR 2019); specifically, within ***Chapter 7 Marine Geology, Oceanography and Physical Processes, Chapter 8 Marine Water and Sediment Quality*** and ***Chapter 10 Benthic Ecology***. It should be noted however that the impacts presented within the ES assess the impacts of the proposed East Anglia TWO project as a whole and so the specific parts of the assessment that consider disposal of sediment have been drawn out and are presented below.

39. ***Chapter 5 EIA Methodology*** of the ES presents an overarching method for enabling assessments of the potential impacts arising from the proposed East Anglia TWO project on the receptors under consideration. Such assessments incorporate a combination of the sensitivity of the receptor, its value (if applicable) and the magnitude of the change to determine a significance of impact. This method has been followed for the assessment of marine geology, oceanography and physical processes receptors; marine water and sediment quality receptors and benthic ecology receptors.

40. The sensitivity of a receptor is dependent upon its:

- **Tolerance:** the extent to which the receptor is adversely affected by an effect;

- **Adaptability:** the ability of the receptor to avoid adverse impacts that would otherwise arise from a particular effect; and
- **Recoverability:** a measure of a receptor's ability to return to a state at, or close to, that which existed before the effect caused a change.

41. Definitions of sensitivity of receptor are summarised in ***Table 3***.

Table 3 Definition of Different Sensitivity Levels for a Generic Receptor

Sensitivity	Definition
High	Individual receptor has very limited or no capacity to avoid, adapt to, accommodate or recover from the anticipated impact. Tolerance: Receptor has very limited tolerance of effect Adaptability: Receptor unable to adapt to effect Recoverability: Receptor unable to recover resulting in permanent or long-term (greater than ten years) change
Medium	Individual receptor has limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact. Tolerance: Receptor has limited tolerance of effect Adaptability: Receptor has limited ability to adapt to effect Recoverability: Receptor able to recover to an acceptable status over the medium term (5-10 years)
Low	Individual receptor has some tolerance to accommodate, adapt or recover from the anticipated impact. Tolerance: Receptor has some tolerance of effect Adaptability: Receptor has some ability to adapt to effect Recoverability: Receptor able to recover to an acceptable status over the short term (1-5 years)
Negligible	Individual receptor is generally tolerant to and can accommodate or recover from the anticipated impact. Tolerance: Receptor generally tolerant of effect Adaptability: Receptor can completely adapt to effect with no detectable changes Recoverability: Receptor able to recover to an acceptable status near instantaneously (less than one year)

42. A value component may also be considered when assessing a receptor. This ascribes whether the receptor is rare, protected or threatened.

43. The magnitude of an effect is dependent upon its:

- Scale (i.e. size, extent or intensity);
- Duration;
- Frequency of occurrence; and
- Reversibility (i.e. the capability of the environment to return to a condition equivalent to the baseline after the effect ceases).

44. Definitions of magnitude of effect levels are summarised in ***Table 4***.

Table 4 Definitions of the Magnitude of Effect Levels for a Morphological Receptor

Value	Definition
High	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptors character or distinctiveness
Medium	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptors character or distinctiveness
Low	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptors character or distinctiveness
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptors character or distinctiveness

45. Following the identification of receptor sensitivity and magnitude of the effect, it is possible to determine the significance of the impact using an impact matrix (***Table 5***). Impacts may be deemed as being either positive (beneficial) or negative (adverse).

Table 5 Impact Significance Matrix

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

46. Impact significance is described using the definitions in ***Table 6***.

Table 6 Impact Significance Definitions

Value	Definition
Major	Very large or large change in receptor condition, both adverse or beneficial, which are likely to be important considerations at a regional or district level because they contribute to achieving national, regional or local objectives, or, could result in exceedance of statutory objectives and / or breaches of legislation
Moderate	Intermediate change in receptor condition, which are likely to be important considerations at a local level
Minor	Small change in receptor condition, which may be raised as a local issue but which is unlikely to be important in the decision-making process
Negligible	No discernible change in receptor condition
No change	No impact, therefore no change in receptor condition

47. Within ***Chapter 7 Marine Geology, Oceanography and Physical Processes*** of the ES, impacts on the physical characteristics of the site have been assessed. The impacts which contain relevant information for this assessment are as follows:

- Changes in Suspended Sediment Concentrations During Export Cable Installation (***section 6.1.2.1***); and
- Changes in Sea Bed Level due to Export Cable Installation (***section 6.1.3.1***).

48. ***Chapter 8 Marine Water and Sediment Quality*** of the ES incorporates the potential effects of disposal on water and sediment quality. This assessment directly builds upon the assessment in ***Chapter 7 Marine Geology, Oceanography and Physical Processes***. The impacts which contain relevant information for this assessment are as follows:

- Deterioration in Offshore Water Quality due to Increased Suspended Sediment Concentration (SSC) (***section 6.2.1***); and
- Deterioration in Water Quality due to Re-suspension of Sediment Bound Contaminants (***section 6.2.2***).

49. ***Chapter 9 Benthic Ecology*** of the ES incorporates the potential effects of disposal on the biological characteristics of the project. This assessment also builds upon the assessment in ES ***Chapter 7 Marine Geology, Oceanography and Physical Processes***. The impacts which contain relevant information for this assessment are as follows:

- Increased SSC and Associated Potential Smothering of Benthic Receptors (***section 6.3.1***); and

- Remobilisation of Contaminated Sediments (***section 6.3.2***).

6.1 Potential Impacts of Sediment Disposal on Physical Characteristics

50. The assessment provided in ES ***Chapter 7 Marine Geology, Oceanography and Physical Processes*** is supported by an evidence-base obtained from research into the physical impacts of marine aggregate dredging on sediment plumes and sea bed deposits (Whiteside *et al*. 1995; John *et al*. 2000; Hiscock and Bell 2004; Newell *et al*. 2004; Tillin et al. 2011; Cooper and Brew 2013).

51. Modelling simulations undertaken for East Anglia ONE using the Delft3D plume model (ABPmer 2012) confirm the above assessments of suspended sediment concentrations and sea bed deposits arising from disturbance of surface and shallow near-surface sediments.

6.1.1 Identified Receptors for the Physical Processes Assessment

52. The East Anglia Zone Environmental Appraisal (ZEA) identified 17 receptor groups in total. The location of these is shown in ***Figure 5***.

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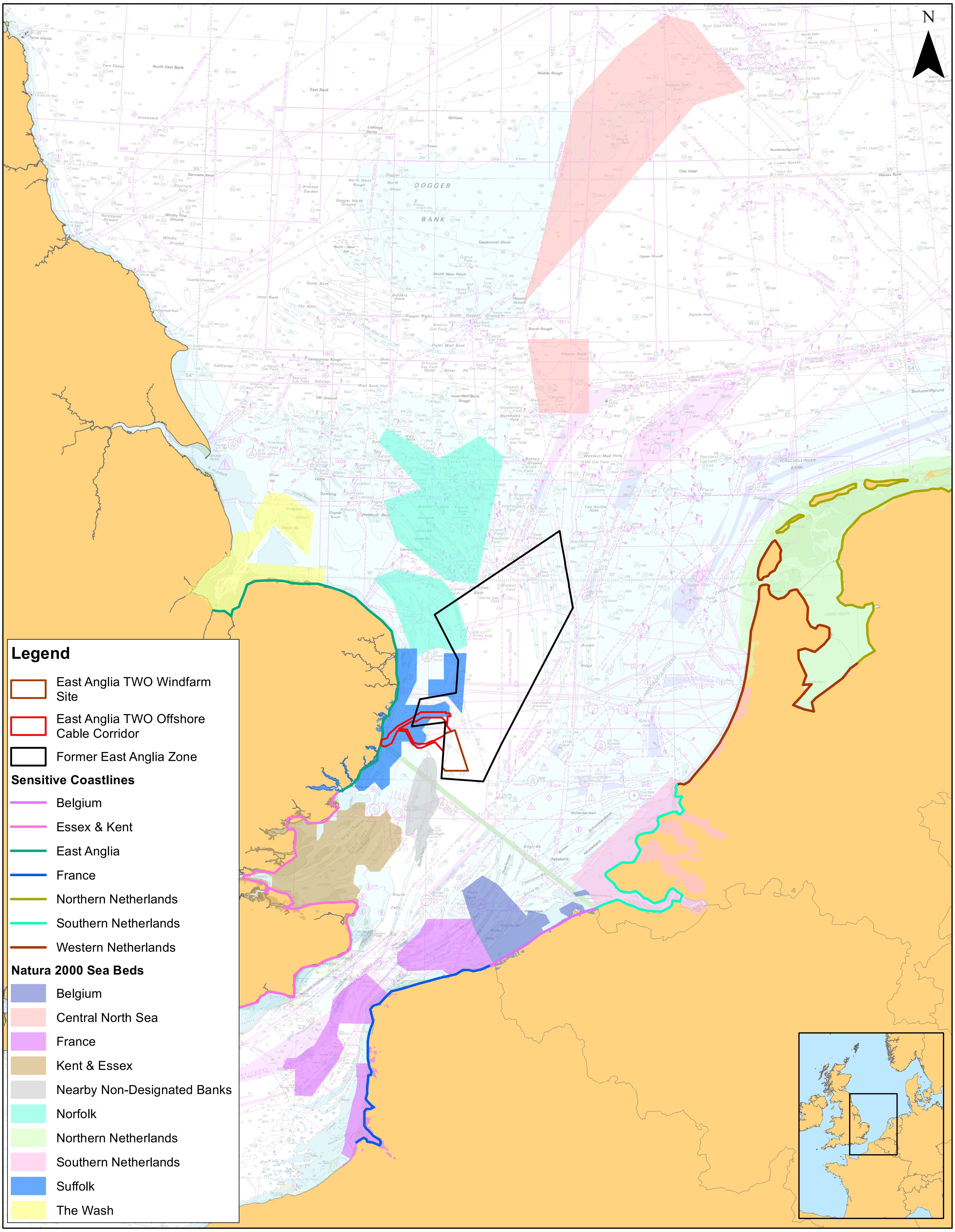

SCOTTISHPOWER RENEWABLES

East Anglia TWO

Receptor Groups for Marine Geology, Oceanography and Physical Processes

Scale @ A3: 1:2,000,000 — 0, 25, 50, 100 Km

Rev	Date	By	Comment		
				Prepared:	FC
1	01/10/19	FC	First Issue.	Checked:	NC
				Approved:	PP

Figure	Date	Dwg No.	
5	01/10/19	EA2-DEV-DRG-IBR-001072	Datum: WGS 1984 Projection: Zone 31N

D:\Box Sync\PB4842 EA 1N and 2\PB4842 EA 1N and 2 Team\E. TECHNICAL DATA\E03 GIS\EA2\Figures\DCO\Other_Docs\SiteCharacterisation\Fig_5_EA2_ReceptorGroups_RH_20191001.mxd

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53. Seven receptor groups covered sensitive coasts in both eastern England (two receptor groups, 'East Anglia' and 'Essex & Kent') and across northern mainland Europe (five receptor groups, including 'France', 'Belgium', 'Southern Netherlands', 'Western Netherlands' and 'Northern Netherlands').

54. Nine further receptor groups were identified to cover the designated Natura 2000 sites in eastern England (five receptor groups, 'The Wash', 'Central North Sea', 'Norfolk', 'Kent & Essex' and 'Suffolk') and wider Europe (four receptor groups, 'France', 'Belgium', 'Southern Netherlands' and 'Northern Netherlands'). It should be noted that the Natura 2000 sites often comprise groupings of multiple distinct (and designated) features, such as sand banks, sand dunes, and sand and shingle beaches.

55. One further receptor group covered nearby 'non-designated sand banks' in the Outer Thames Estuary, including Inner Gabbard, Outer Gabbard, The Galloper, North Falls and one un-named bank.

56. The Suffolk Natura 2000 site receptor group has been identified as having the potential to be affected from proposed sediment disposal activities in the offshore cable corridor and is considered as such in the following sections.

6.1.2 Changes in Suspended Sediment Concentrations

57. Baseline suspended sediment concentrations within the former East Anglia Zone are typically between 1mg/l and 35mg/l, with a clear pattern of enhancement in values due to wave-stirring of sediment from the sea bed during storm conditions. During such conditions, values can reach greater than 80mg/l offshore, with up to 170mg/l recorded at the coast.

6.1.2.1 Changes in Suspended Sediment Concentrations due to Export Cable Installation

58. The assessment of changes in suspended sediment concentrations during export cable installation have been considered separately from those for the inter-array and platform link cables (see Site Characterisation Report (Windfarm Site) document reference 8.15) because parts of the offshore cable corridor are in shallower water and closer to the identified morphological receptor groups (see ***section 6.1.1***).

59. Subject to the final project design, present estimates are that up to two cables would be installed, each with a maximum length of 80km, providing a total maximum length of 160km of export cable. As for other cables, there is potential to disturb the seabed down to a sediment thickness of up to 5m through sea bed levelling. The volume of sediment affected due to sand wave excavation is estimated to be up to 900,000m^3 (***section 4.1***), removed by means of dredging and returned to the water column at its surface layer as overflow from a dredger

vessel. The sediment released at any one time would depend on the capacity of the dredger.

60. This assessment is based on the overall sediment release volumes being low and confined to areas along the alignment of the offshore cable corridor where sand waves that require levelling are present.

61. It is likely that the concentrations would be enhanced by the greatest amount in the shallowest sections of the offshore cable corridor, but in these locations the background concentrations are also greater than in deeper waters.

62. Modelling simulations undertaken for East Anglia ONE (ABPmer 2012b) confirm the expert-based assessment and provided the following quantification of magnitude of change:

- Sand-sized sediment (which represents most of the disturbed sediment) would settle out of suspension within less than 1km from the point of installation within the offshore cable corridor and persist in the water column for less than a few tens of minutes.
- Mud-sized material (which represents only a very small proportion of the disturbed sediment) would be advected a greater distance and persist in the water column for hours to days.
- In water depths greater than 20m LAT, peak suspended sediment concentrations would be typically less than 100mg/l, except in the immediate vicinity (a few tens of metres) of the release location.
- In shallow water depths nearer to the coast (less than 5m LAT) the potential for dispersion is more limited and therefore suspended sediment concentrations are likely to be greater, approaching 400mg/l at their peak. However, these plumes would be localised to within less than 1km of the location of installation and would persist for no longer than a few hours.
- After 180 hours following cessation of installation activities any plume would have been fully dispersed.

63. There are similarities in water depth, sediment types and metocean conditions between the offshore cable corridor for East Anglia ONE and for the proposed East Anglia TWO project making the earlier modelling studies a suitable analogue for the present assessments.

6.1.2.2 Assessment of Effect Magnitude and / or Impact Significance

64. The likely magnitudes of effect of worst case changes in suspended sediment concentrations due to export cable installation are summarised in ***Table 7***.

Table 7 Magnitude of Effect on Suspended Sediment Concentrations Under the Worst Case Scenarios

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Effect
Export Cable Installation					
Near-field* (nearshore)	High	Negligible	Negligible	Negligible	Medium
Near-field* (offshore)	Low	Negligible	Negligible	Negligible	Low
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible

*The near-field effects are confined to a small area of sea bed (likely to be of the order of several hundred metres up to a kilometre from the offshore cable corridor) and would not cover the whole East Anglia TWO windfarm site or offshore cable corridor.

65. The effects on suspended sediment concentrations due to export cable installation are considered highly unlikely to have the potential to impact directly upon the identified receptor groups for marine geology, oceanography and physical processes due to separation distances, except for parts of the Suffolk Natura 2000 site receptor group across which part of the offshore cable corridor crosses. Effects will be spread along the offshore cable corridor with the slow progression of the cable installation.

66. Given these aspects, the sensitivity and value of the Suffolk Natura 2000 site receptor group are presented in ***Table 8***.

Table 8 Sensitivity and Value Assessment for the Suffolk Natura 2000 Site Receptor Group

Receptor	Tolerance	Adaptability	Recoverability	Value	Sensitivity
'Suffolk Natura 2000' site	Negligible	Negligible	Negligible	High	Negligible

67. The overall impact of export cable installation activities under a worst case scenario on suspended sediment concentrations for the identified morphological receptor groups is considered to be no impact, except for the 'Suffolk Natura 2000' site receptor group which is assessed to have an impact of **minor adverse** to **negligible** significance.

68. The effects of suspended sediment concentrations due to export cable installation do have the potential to impact upon other receptors, discussed in ***sections 6.2*** and ***6.3***.

6.1.3 Changes in Sea Bed Level due to Export Cable Installation

6.1.3.1 Changes in Sea Bed Level due to Export Cable Installation

69. Up to 900,000m^3 of sediment may be released as a result of sand wave levelling of up to 160km of export cables (***section 4.1***). With the exception of any potential sand waves occurring on the section of the export cable route that is inside the East Anglia TWO windfarm site, sediment would be disposed of within the offshore cable corridor itself with no net loss of sand from the area other than potentially very fine sands which could be dispersed more widely. It is likely that some of this sand would be redistributed over time by tidal currents, back over the levelled area as re-formed sand waves. Given the relatively low volumes of sand likely to be affected, the overall effect of changes to the seabed would be minimal.

6.1.3.2 Assessment of Effect Magnitude and / or Impact Significance

70. The likely magnitudes of effect of worst case changes in sea bed level due to foundation installation, inter-array cable and platform link cable installation are summarised in ***Table 9***.

Table 9 Magnitude of Effects on Sea Bed Level Changes Under the Worst Case Scenarios

Location	Scale	Duration	Frequency	Reversibility	Magnitude of Effect
Export Cable Installation					
Near-field*	Low	Negligible	Negligible	Negligible	Low
Far-field	Negligible	Negligible	Negligible	Negligible	Negligible

*The near-field effects are confined to a small area of sea bed (likely to be of the order of several hundred metres up to a kilometre from the offshore cable corridor), and would not cover the whole offshore cable corridor.

71. These effects on sea bed level are considered highly unlikely to have the potential to impact directly upon the identified receptor groups for marine geology, oceanography and physical processes due to separation distances, except for parts of the 'Suffolk Natura 2000' site receptor group across which part of the offshore cable corridor crosses.

72. Given these aspects, the sensitivity and value of the 'Suffolk Natura 2000' receptor site are presented in ***Table 10***.

Table 10 Sensitivity and Value Assessment for the 'Suffolk Natura 2000' Site Receptor Group

Receptor	Tolerance	Adaptability	Recoverability	Value	Sensitivity
'Suffolk Natura 2000' site	Negligible	Negligible	Negligible	High	Negligible

73. The overall impact of export cable installation activities under a worst case scenario on bed level changes for the identified morphological receptor groups (see ***Chapter 7 Marine Geology, Oceanography and Physical Processes)*** is considered to be no impact, except for the 'Suffolk Natura 2000' site receptor group which is assessed to have an impact of **negligible** significance.

74. The effects of sea bed level changes due to export cable installation do have the potential to impact upon other receptors, discussed in ***sections 6.2*** and ***6.3***.

6.1.4 Cumulative Impacts

75. Due to the negligible magnitude of effects at the far-field scale it is considered that there is no potential for cumulative impacts with other projects or activities.

6.1.5 Summary of Impacts of Sediment Disposal on Physical Characteristics

76. With the exception of the 'Suffolk Natura 2000' site receptor group across which part of the offshore cable corridor crosses, the conclusion of all relevant impacts on physical characteristics was that there would be no impact. The overall impact of export cable installation activities on suspended sediment concentrations and bed level changes, under a worst case scenario, is assessed as being of **minor adverse** to **negligible** significance. Therefore, it is unlikely that there would be any discernible effect on the physical characteristics of the proposed East Anglia TWO offshore cable corridor disposal site, should it be designated.

6.2 Potential Impacts of Sediment Disposal on Water and Sediment Quality

6.2.1 Deterioration in Offshore Water Quality due to Increased SSC

77. As summarised in ***section 6.1.2.1***, disturbance to sea bed sediments and potential generation of plumes from installation of the offshore export cable (including sand wave levelling) would be limited in temporal and spatial extent due to the temporary nature of the activity and the dominance of sand sized material along the offshore export cable route. Therefore, the magnitude of impact would be low. Designated Bathing Waters are not located within the 1km area identified as being the most at risk of experiencing elevated levels (the nearest being over 30km away) and are therefore considered to be of low sensitivity. Since the sensitivity of the receptor and the magnitude of the impact are considered to be low, an overall **minor adverse** impact is predicted.

6.2.2 Deterioration in water quality due to re-suspension of sediment bound contaminants

78. The disposal of dredged material at the sea surface has the potential to release sediment-bound contaminants, such as heavy metals and hydrocarbons into the water column. The data in ***Table 1*** illustrates that levels of contaminants within the East Anglia TWO windfarm site and offshore cable corridor are very low.

79. There were eight exceedances of Cefas Action Level 1 for arsenic within the offshore cable corridor (out of 11 samples) with two samples in the offshore cable corridor (C05 and C07 (see ***Table 1***)) also marginally exceeding the PEL. Exceedances were marginal for arsenic and likely due to high concentrations of naturally occurring arsenic (***section 3.2***). Sample site C01 also recorded levels of cadmium, copper, lead, nickel and zinc above Cefas Action Level 1. None of the increases bring the concentrations close to Cefas Action Level 2 (***Table 1***), therefore the potential magnitude of effect is considered to be negligible.

80. Considering the negligible magnitude of effect, low receptor sensitivity (as discussed in ***section 6.2.1***) and the localised nature of the impact (see above impacts on increased SSCs), the re-suspension of contaminated sediment from construction activities is considered to have a **negligible** impact on water quality.

6.2.3 Cumulative impacts

81. Due to the negligible magnitude of effects at the far-field scale it is considered that there is no potential for cumulative impacts with other projects or activities.

6.2.4 Summary of Impacts of Sediment Disposal on Water and Sediment Quality

82. The conclusion of all relevant impacts on water and sediment quality was that there is considered to be a **minor adverse** impact on water quality due to increased SSC and a **negligible** impact on water quality as a result of the potential to release sediment-bound contaminants.

6.3 Potential Impacts of Sediment Disposal on Benthic Ecology

6.3.1 Increased Suspended Sediment Concentrations and Associated Potential Smothering of Benthic Receptors

83. The majority of receptors in the East Anglia TWO windfarm site are not sensitive to increased suspended sediments and smothering. *S. spinulosa* and *S. bombyx* use sediment to build tubes and can therefore thrive in environments with increased suspended sediments. This type of impact could occur within a few metres of the disposal locations where heavy smothering (>5cm) would be expected, representing a low impact magnitude. The worst case scenario is therefore an impact of **minor adverse** significance.

6.3.1.1 Increased Suspended Sediment Concentrations and Associated Potential Smothering of Benthic Receptors in the Offshore Cable Corridor

84. As described in ***section 6.1***, sand wave levelling / pre-sweeping activities associated with the export cable would result in the removal and disposal of sediment which would result in a temporary increase in suspended sediment concentrations. This increase has the potential to affect benthic ecology receptors through blockage to the sensitive filter feeding apparatus of certain species and / or smothering of sessile species upon deposition of the sediment.

85. As described in ***section 6.1***, most of the sediment released during construction would be coarse material. As a result, this would fall as a highly turbid dynamic plume upon its discharge, reaching the sea bed within minutes or tens of minutes. The resulting mound would be likely to be tens of centimetres to a few metres high local to the release point. Sand-sized sediment would settle to the sea bed within approximately 1km along the axis of tidal flow from the location at which it was released.

86. The sensitivity of receptors in the offshore cable corridor to increases in suspended sediments and smothering are shown below in ***Table 11***.

Table 11 Sensitivities to Increased Suspended Sediment and Smothering by Deposited Sediment (source: Tyler-Walters et al 2018; Gibb et al 2014; Tyler-Walters, Lear and Allen 2004; Tillin et al. 2015; Jackson and Hiscock 2008; Budd and Hughes 2005)

Receptor	Tolerance / Resistance	Recoverability / Resilience	Overall Sensitivity
Light smothering – up to 5cm of fine materials			
Circalittoral coarse sediment biotopes	Medium	High	Low
S. spinulosa	High	Immediate	Not sensitive
S. bombyx	High	High	Low
N. hombergii (proxy species for *N. cirrosa*)	Tolerant	N/A	Not sensitive
Heavy Smothering – up to 30cm of fine materials			
Circalittoral coarse sediment biotopes	Not available		
S. spinulosa	Not available (Medium*)		
S. bombyx	Not available		
N. hombergii (proxy species for *N. cirrosa*)	Not available		
Increased suspended sediment concentrations			
Circalittoral coarse sediment biotopes	High	High	Not sensitive
S. spinulosa	High	Immediate	Not sensitive
S. bombyx	Tolerant	N/A	Not sensitive
N. hombergii (proxy species for *N. cirrosa*)	Tolerant	N/A	Not sensitive

87. Any increases in suspended sediment concentration in the offshore cable corridor arising from the disturbance of near surface sediments would be less than those arising during foundation installation activities (see Site Characterisation Report (Windfarm Site) document reference 8.15). As described in ***section 6.1***, peak suspended sediment concentrations would be typically less than 100mg/l in

deeper offshore parts of the cable route (>20m LAT), except in the immediate vicinity of the release location. In the shallow near shore area (<5m LAT) SSCs are likely to be greater, approaching 400mg/l at their peak. However, these plumes would be localised to within less than 1km of the location of installation and would persist for no longer than a few hours

88. Although a relatively large quantity of material could be released, this would be spread throughout the entire offshore cable corridor area, which constitutes a maximum area of 137.6km^2 (when taking the larger northern route as a worst case). The disturbance of near surface sediments would be less than those arising during foundation installation activities therefore any potential smothering impact on benthic receptors is deemed to have a low impact magnitude. When considering the low sensitivity of receptors this would result in an overall impact of **minor adverse** significance.

6.3.2 Remobilisation of Contaminated Sediments

89. As described in ***section 6.2.2***, sediment disturbance could lead to the mobilisation of contaminants which may be lying dormant within sediment and which could be harmful to the benthos. Given the low level of contaminants present in the sediments within the development area (***section 3.2***), changes in water and sediment quality due to re-suspension of contaminants during construction have been assessed as negligible.

90. Marine Evidence based Sensitivity Assessment (MarSEA) (MarLIN 2017) shows that, where contaminant levels are within environmental protection standards, marine species and habitats are not sensitive to changes that remain within these standards. As a result of the absence of significant existing contamination and the application of mitigation to avoid release of contaminants, there would be **negligible** impact with regard to benthic ecology receptors.

6.3.3 Cumulative Impacts

91. East Anglia TWO and East Anglia ONE North may potentially share an offshore cable corridor and so there is potential for cumulative impacts between the two projects. Furthermore, there is an aggregate extraction area approximately 3km west of the northern offshore cable corridor route option. There is therefore potential for cumulative impacts associated with suspended sediments and deposition if there is any temporal overlap in offshore construction activities between the two projects. The programmes to install the offshore export cables for the proposed East Anglia TWO and East Anglia ONE North projects are highly unlikely to be aligned and so there is limited potential for cumulative impacts.

92. Small theoretical bed level changes are estimated as a result of cumulative impacts of East Anglia TWO cable installation and dredging at nearby aggregate sites. However, any changes would be small in scale, temporary and temporally

distinct depending on whether aggregate dredging and construction of the proposed East Anglia TWO and East Anglia ONE North projects were carried out at the same time. The sensitivity of benthic receptors to this level of change would be as described in ***section 6.3.1*** (low to negligible). Therefore, an overall impact of **minor adverse** significance would result.

6.3.4 Summary of Impacts of Sediment Disposal on Benthic Ecology

93. As the conclusion of all relevant impacts on benthic ecology was that they would range from no impact to minor adverse significance it is likely that, should the proposed East Anglia TWO offshore cable corridor disposal site be designated, impacts would occur to benthic species, however these would be no greater than of **minor adverse** significance.

7 Summary

94. As part of the DCO application for the proposed East Anglia TWO project, the Applicant is applying to designate the offshore cable corridor i.e. both the northern and southern cable corridor route options (see ***Figure 1***) as a single disposal site, although only one of these will be used following detailed project design. Furthermore, the Applicant has proposed that, should the northern offshore cable corridor route option for East Anglia TWO be selected in the project design phase then this disposal site would overlap with the proposed East Anglia ONE North offshore cable corridor disposal site. This would allow the Applicant to dispose of material extracted during construction for associated export cable installation works for both the East Anglia TWO and East Anglia ONE North projects in the same licenced disposal area. If the southern cable corridor route option is selected for the East Anglia TWO project then each project would have a separate licenced disposal site for their respective offshore cable corridors.

95. Two alternative disposal options have been considered for the disposal of drilled and dredged material:

- Use of the material for ballast for certain foundation types; and
- Use of other existing disposal sites.

96. The majority of the sediments in the offshore cable corridor are gravelly sand. The central section of the offshore cable corridor has the highest percentage of fines (reaching over 90%), with sediment mainly falling within the sandy mud classification. Closest to landfall, sediment size is highly variable, ranging from sandy mud to sandy gravel.

97. Sea bed levelling of any large sand waves that may be present along the export cable route prior to cable installation has the potential to disturb near-surface

sediments, as does export cable installation. However, disturbance from sand wave levelling would be in discreet areas along the length of the cable route with the actual export cable installation being episodic and disturbance confined to near the sea bed. Therefore, this represents limited potential for adverse effects on water quality and sea bed levels.

98. It is likely that the suspended sediment concentrations would be increased by the greatest amount in the shallowest sections of the offshore cable corridor (<5m LAT), approaching 400mg/l at their peak. Background suspended sediment concentrations are also greater in shallow waters. It is likely that some of the deposited material would be redistributed over time by tidal currents, back over the levelled area as re-formed sand waves.

99. The disposal of dredged material has the potential to release sediment-bound contaminants, such as heavy metals and hydrocarbons into the water column. However, levels of contaminants within the offshore cable corridor are generally very low. Elevated levels of arsenic, which are typical of the region, have been recorded at some locations but they are not at concentrations considered to pose an unacceptable risk to the marine environment. Similarly, elevated concentrations of some contaminants at one sample location on the nearshore section of the export cable route (C01) were not sufficiently high to pose an unacceptable risk to the marine environment or to have adverse effects on marine organisms.

100. Results of the benthic ecology assessment show that the majority of receptors in the offshore cable corridor are not sensitive to increased suspended sediments and smothering. Adverse impacts could occur within a few metres of the disposal locations where heavy smothering would be expected, but overall the worst case impact from the proposed designation of the East Anglia TWO offshore cable corridor disposal site would be of minor significance.

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Appendix 1

1. This appendix provides coordinates to delineate the disposal sites for the proposed East Anglia TWO project. ***Table A 1*** has coordinates delineating the proposed offshore cable corridor disposal site northern option and ***Table A 2*** has coordinates delineating the proposed offshore cable corridor disposal site southern option.

Table A 1 Coordinates Delineating the Offshore Cable Corridor Disposal Site Northern Option for the Proposed East Anglia TWO Project

Point	Latitude (Degree, minutes, seconds)	Longitude (Degrees, minutes, seconds)
1	52 20 02.2354	02 10 29.1419
2	52 19 10.4589	02 10 57.4908
3	52 19 10.4348	02 09 35.5671
4	52 16 21.1902	02 09 19.7303
5	52 14 39.6535	02 11 21.6556
6	52 13 57.4938	02 08 10.8720
7	52 17 42.6133	02 08 31.8301
8	52 18 44.2625	02 06 49.3187
9	52 18 39.6496	01 57 24.8484
10	52 17 25.8581	01 54 09.9694
11	52 17 24.6630	01 52 03.3739
12	52 17 24.6286	01 52 03.2770
13	52 15 14.3727	01 45 57.6061
14	52 14 29.5099	01 45 06.0501
15	52 10 51.3672	01 42 32.4619
16	52 12 47.7360	01 41 14.8200
17	52 12 55.7651	01 40 36.9498
18	52 13 37.1942	01 41 04.0136
19	52 15 54.9431	01 45 03.4416
20	52 18 25.1927	01 52 05.2756

Point	Latitude (Degree, minutes, seconds)	Longitude (Degrees, minutes, seconds)
21	52 20 19.4961	01 56 37.3269
22	52 20 25.4004	02 08 48.4289
23	52 20 02.1962	02 08 47.4610
24	52 10 35.5417	01 41 46.1012
25	52 09 56.7130	01 39 52.4425
26	52 09 53.1173	01 38 40.2534
27	52 10 06.7018	01 37 38.5965
28	52 10 44.4665	01 37 04.5507
29	52 11 01.5038	01 37 17.7500
30	52 11 02.3784	01 37 15.8334
31	52 11 11.4506	01 37 20.5452
32	52 11 22.0300	01 37 22.2330
33	52 11 30.6776	01 37 21.4166
34	52 11 31.2096	01 37 24.5343
35	52 11 33.4212	01 37 24.5048
36	52 11 53.6629	01 37 50.2460
37	52 12 19.8934	01 39 49.3464
38	52 12 06.9480	01 40 45.3360

Table A 2 Coordinates Delineating the Offshore Cable Corridor Disposal Site Southern Option for the Proposed East Anglia TWO Project

Point	Latitude (Degree, minutes, seconds)	Longitude (Degrees, minutes, seconds)
1	02 08 08.2722	52 13 29.5263
2	02 07 41.3102	52 08 38.9420
3	02 03 41.1162	52 11 21.4100
4	02 02 15.6902	52 11 06.5264
5	01 57 07.1975	52 09 40.8422
6	01 55 07.9500	52 09 39.2857
7	01 52 29.5011	52 10 54.4916
8	01 49 20.4967	52 14 31.4824
9	01 45 33.9417	52 14 40.1415
10	01 45 06.0501	52 14 29.5099
11	01 42 32.4619	52 10 51.3672
12	01 41 14.8200	52 12 47.7360
13	01 40 36.9498	52 12 55.7651
14	01 41 04.0136	52 13 37.1942
15	01 43 50.5574	52 15 13.0502
16	01 45 57.6061	52 15 14.3727
17	01 49 39.6844	52 15 04.7180
18	01 49 53.7489	52 15 01.6113
19	01 50 02.1263	52 14 55.7682
20	01 53 12.9723	52 11 16.0870
21	01 53 33.5150	52 11 06.2569
22	01 55 24.0502	52 10 49.5790
23	01 59 23.9161	52 10 56.1455
24	02 01 58.8237	52 11 39.5687

Point	Latitude (Degree, minutes, seconds)	Longitude (Degrees, minutes, seconds)
25	02 03 14.9013	52 11 52.1314
26	01 41 46.1012	52 10 35.5417
27	01 39 52.4425	52 09 56.7130
28	01 38 40.2534	52 09 53.1173
29	01 37 38.5965	52 10 06.7018
30	01 37 04.5507	52 10 44.4665
31	01 37 17.7500	52 11 01.5038
32	01 37 15.8334	52 11 02.3784
33	01 37 20.5452	52 11 11.4506
34	01 37 22.2330	52 11 22.0300
35	01 37 21.4188	52 11 30.6102
36	01 37 21.4173	52 11 30.6577
37	01 37 21.4166	52 11 30.6776
38	01 37 24.5343	52 11 31.2096
39	01 37 24.5048	52 11 33.4212
40	01 37 50.2458	52 11 53.6629
41	01 39 49.3464	52 12 19.8934
42	01 40 45.3360	52 12 06.9480