



SCOTTISHPOWER
RENEWABLES

East Anglia ONE North Offshore Windfarm

Windfarm Layout Principles Statement

Applicant: East Anglia ONE North Limited
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Applicable to **East Anglia ONE North**



Revision Summary

| Rev | Date | Prepared by | Checked by | Approved by |
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| 001 | 23/03/2021 | Gero Vella | Ian MacKay | Rich Morris |

Description of Revisions

| Rev | Page | Section | Description |
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| 001 | n/a | n/a | Final for submission at Deadline 8 |



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Glossary of Acronyms

| | |
|-----|--------------------------------|
| DCO | Development Consent Order |
| DML | Deemed Marine Licence |
| EAH | East Anglia HUB |
| FID | Final Investment Decision |
| SPR | ScottishPower Renewables |
| MCA | Maritime and Coastguard Agency |
| MGN | Marine Guidance Note |
| MMO | Marine Management Organisation |
| Nm | Nautical Mile |
| SAR | Search and Rescue |
| UXO | Unexploded Ordnance |
| WTG | Wind Turbine Generator |



Glossary of Terminology

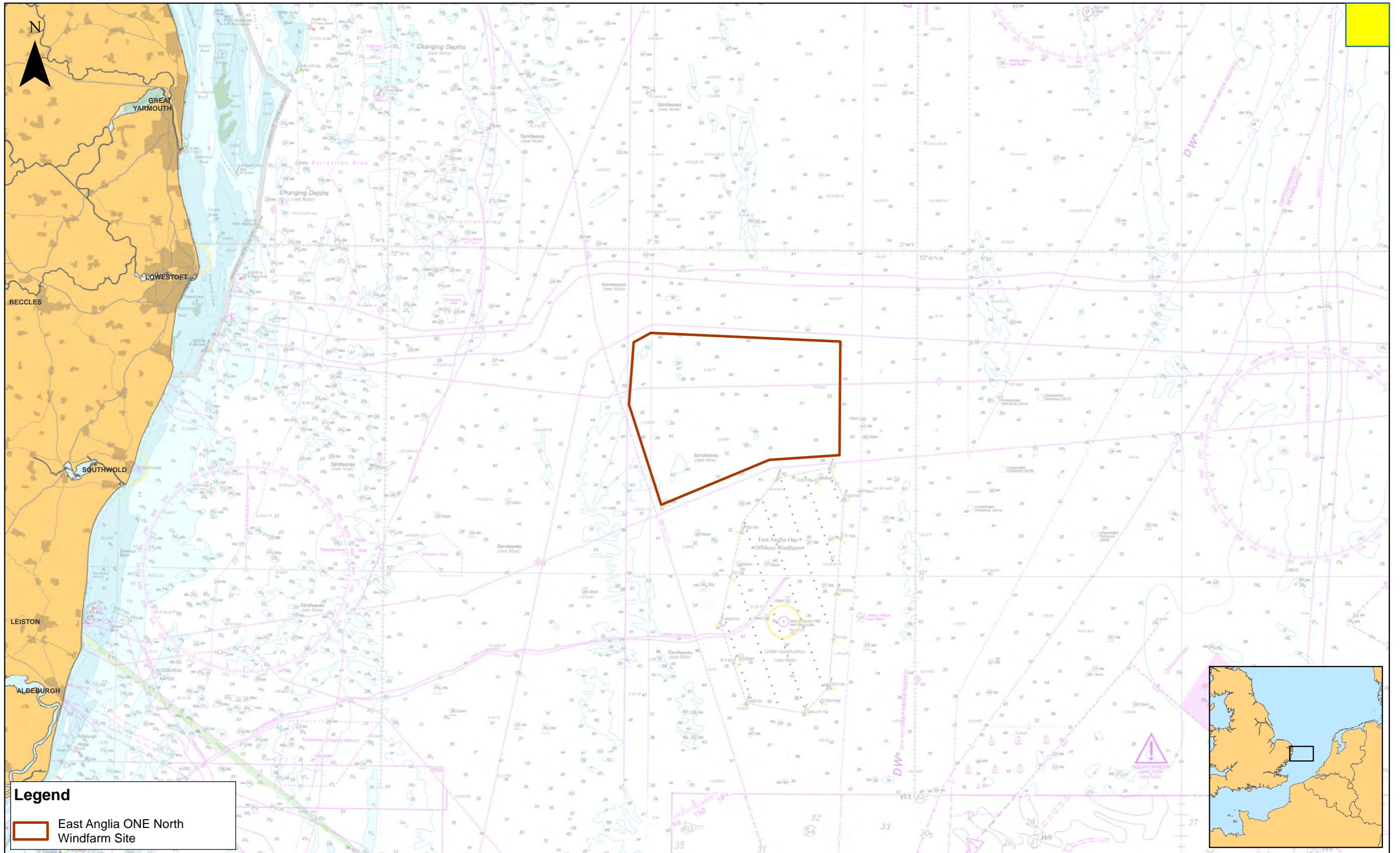
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|--|---|
| Applicant | East Anglia ONE North Limited |
| Construction, operation and maintenance platform | An offshore structure housing or incorporating temporary accommodation, landing ports for vessels and helicopters, standby electricity generation equipment, marking and lighting and other equipment facilities to assist in the co-ordination of marine activities related to the authorised development |
| East Anglia ONE North project | The proposed project consisting of up to 67 wind turbines, up to four offshore electrical platforms, up to one 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 ONE North windfarm site | The offshore area within which wind turbines and offshore platforms will be located. |
| Final WTG position | WTG position after micro siting is applied. |
| Generation Deemed Marine Licence (DML) | The deemed marine licence in respect of the generation assets set out within Schedule 13 of the draft DCO. |
| 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. |
| Line of Orientation | Consistent transit lines on the same bearing throughout the site. The Lines of Orientation form the centre lines of the SAR Access Lanes. |
| Micro siting allowance (m) | Radius of the circle around the target WTG position within which the final WTG position can be located. |
| Nominal WTG position | WTG position aligned with the line or lines of orientation prior to any tolerance being applied. |
| 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. These cables will include fibre optic cables. |
| Offshore infrastructure | All of the offshore infrastructure including wind turbines, platforms, and cables. |
| Platform link cable | Electrical cable which links one or more offshore platforms. These cables will include fibre optic cables. |
| Offshore platforms | The construction, operation and maintenance platform and the offshore electrical platforms. |
| Target WTG position | WTG position after tolerance is applied. |
| Tolerance allowance (m) | Radius of the circle around the nominal WTG position within which the target WTG position can be located. |
| Transmission DML | The deemed marine licence in respect of the transmission assets set out within Schedule 14 of the draft DCO. |



1 Introduction and Scope

1. ScottishPower Renewables ('SPR') are currently developing the East Anglia Hub offshore windfarms in the southern North Sea, off the coast of East Anglia. The East Anglia Hub consists of three individual offshore windfarms: East Anglia ONE North (the 'Project'), East Anglia TWO and East Anglia THREE.
2. The Applicant has committed to designing the final layout of infrastructure within the Project windfarm site (**Figure 1**) in compliance with the recommendations set out in MGN 543¹ as secured in the draft DCO under Condition 17(1)(a) and 18(5) of the Generation DML and 13(1)(a) and 14(5) of the Transmission DML. With respect to the Search and Rescue ('SAR') requirements of MGN543, this document presents Wind Turbine Generator (WTG) layout principles, which have been agreed with the Maritime and Coastguard Agency (MCA).
3. The purpose of this document is to define the key WTG layout principles that will be used in the design of the Project WTG layout.
4. The final design plan, submitted in accordance with Condition 17(1)(a) of the Generation DML and Condition 13(1)(a) of the Transmission DML to the Marine Management Organisation (MMO) for approval, in consultation with the MCA and Trinity House, must comply with the layout principles set out within this document. Furthermore, the MCA will assess the layout's compliance with MGN 543 and its annexes to ensure Condition 17(1)(a)(x) of the Generation DML and Condition 13(1)(a)(x) of the Transmission DML have been met. No part of the authorised scheme may commence until the MMO, in consultation with the MCA, has confirmed in writing that the undertaker has taken into account and, so far as is applicable to that part of the authorised scheme, adequately addressed all MCA recommendations as appropriate to the authorised scheme contained within MGN543 "Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response Issues" and its annexes, as secured under Condition 18(5) of the Generation DML and 14(5) of the Transmission DML.

¹ MGN 543 (2016) Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/502021/MGN_543.pdf



Legend

East Anglia ONE North Windfarm Site



| 1 | 17/02/2021 | FC | First Issue. |
|-----|------------|----|--------------|
| Rev | Date | By | Comment |

| | |
|-----------|----|
| Prepared: | FC |
| Checked: | PM |
| Approved: | PP |

1:300,000
Scale @ A3

East Anglia ONE North Offshore Windfarm Site

| | | |
|--------|-------------------------|----------------------|
| Drg No | EA1N-DEV-DRG-IBR-001281 | |
| Rev | 1 | Datum: WGS 1984 |
| Date | 17/02/21 | Projection: Zone 31N |
| Figure | 1 | |

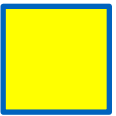


2 Layout Principles

5. **Table 1** lists the layout principles agreed with the MCA and Trinity House.

Table 1. Layout Principles

| Principle | Definition | Reason |
|---------------|--|--|
| Principle 1 | All WTG, offshore platforms and the meteorological mast will be located within the Project windfarm site. No blade overfly or structural overhang is permitted, therefore all WTGs must be positioned at least half a rotor diameter inside the boundary of the windfarm site. | DCO constraint |
| Principle 2 | Minimum separation between WTGs will be: <ul style="list-style-type: none"> • 800m in-row spacing • 1200m inter-row spacing | DCO constraint |
| Principle 3 | SAR lanes shall be allowed for and shall be a minimum of 500m wide, measured from the perimeter of any offshore asset. In the case of WTGs, SAR lanes will be measured from the blade tips that are transverse to the wind turbine. SAR lanes will cross the array on the same bearing until the edge of the Site or until a Helicopter Refuge Area is reached. | MGN 543 |
| Principle 4 | All assessments will consider two lines of orientation with the final WTG layout respecting as a minimum one line of orientation. If the proposed final layout presents one line of orientation, a safety justification will be developed to demonstrate that risks to SAR and navigational safety are acceptable for such particular layout. | MGN 543 |
| Principle 5 | Where an array is proposed to border another array with different alignment and/or spacing a minimum spacing of 1nm (blade tip to blade tip) will be maintained between the two arrays. | To facilitate SAR asset access and to assist internal surface navigation |
| Principle 6.1 | For all WTG positions, the tolerance allowance will be 100m, either side of the nominal WTG position whilst still complying with Principle 2 and 3. | Limited micro siting is required to avoid any new constraints or further optimise the design |
| Principle 6.2 | For all WTG positions, the micro siting allowance will be 50m, either side of the Target WTG position. | Limited micro siting is required to avoid any new constraints on readiness for installation. |



| | | |
|-------------|--|--|
| Principle 7 | <p>Packed boundaries are permitted, that is, WTGs on the perimeter of the windfarm area maintain minimum spacing whilst internal spacing can be greater. The minimum WTG spacing shall be compliant with Principle 2 (minimum spacing of 800m).</p> <p>SAR lanes will be compliant with principle 3 and access to the SAR lane will be allowed between the perimeter WTGs.</p> | SAR requirement for the use of Packed Boundary Layout. Required to facilitate SAR asset access |
| Principle 8 | Principle is no longer in use. | N/A |
| Principle 9 | <p>Where SAR Access Lanes are more than circa 10nm, a Helicopter Refuge Area perpendicular to the SAR Access Lanes will be included within the layout design. The Helicopter Refuge Area shall be at least 1nm (tip to tip) in width and allow access across the array.</p> | SAR access |