

East Anglia ONE North Offshore Windfarm Chapter 4

Site Selection and Assessment of Alternatives

Preliminary Environmental Information

Volume 1

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Glossary of Acronyms

AONB	Area of Outstanding Natural Beauty
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CION	Connection and Infrastructure Options Note
EAOW	East Anglia Offshore Wind
EIA	Environmental Impact Assessment
EPP	Evidence Plan Process
ETG	Expert topic Group
GIS	Geographical Information System
GWFL	Galloper Wind Farm Limited
HDD	Horizontal Directional Drilling
IMO	International Maritime Organisation
LPA	Local Planning Authority
MaRS	Marine Resources System,
MCA	Martine and Coastguard Agency
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
NE	Natural England
NPPF	National Planning Policy Framework
OESEA	Offshore Energy Strategic Environmental Assessment
PEIR	Preliminary Environmental Information Report
PROW	Public Rights of Way
RAG	Red Amber Green
REC	Regional Environmental Characterisation
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection area
SPR	ScottishPower Renewables

SSSI	Site of Special Scientific Interest
TWT	The Wildlife Trust
ZAP	Zone Appraisal Planning
ZDA	Zonal Development Agreement
ZEA	Zone Environmental Assessment

Glossary of Terminology

Applicant	East Anglia ONE North Limited.
Construction consolidation sites	Compounds which will contain laydown, storage and work areas for onshore construction works. The HDD construction compound will also be referred to as a construction consolidation site.
Construction operation and maintenance platform	A fixed offshore structure required for construction, operation, and maintenance personnel and activities.
Development area	The area comprising the Proposed Onshore Development Area and the Offshore Development Area
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.
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.
Jointing bay	Underground structures constructed at regular intervals along the onshore cable route to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall	The area (from Mean Low Water Springs) where the offshore export cables would make contact with land, and connect to the onshore cables.
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing electrical earthing links.
Met mast	An offshore structure which contains metrological instruments used for wind data acquisition.
Mitigation areas	Areas captured within the Development Area specifically for mitigating expected or anticipated impacts.
Monitoring buoys	Buoys to monitor in situ condition within the windfarm, for example wave and metocean conditions.

National Grid infrastructure	A National Grid substation, connection to the existing electricity pylons and National Grid overhead line realignment works which will be consented as part of the proposed East Anglia TWO project Development Consent Order but will be National Grid owned assets.
National Grid overhead line realignment works	Works required to upgrade the existing electricity pylons and overhead lines to transport electricity from the National Grid substation to the national electricity grid
National Grid overhead line realignment works area	The proposed area for National Grid overhead line realignment works.
National Grid substation	The substation (including all of the electrical equipment within it) necessary to connect the electricity generated by the proposed East Anglia ONE North project to the national electricity grid which will be owned by National Grid but is being consented as part of the proposed East Anglia TWO project Development Consent Order.
National Grid substation location	The proposed location of the National Grid substation.
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 cables between offshore electrical platforms and landfall jointing bay.
Offshore development area	The East Anglia ONE North windfarm site and offshore cable corridor (up to Mean High Water Springs).
Offshore electrical infrastructure	The 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, these cables will include fibre optic cables.
Offshore infrastructure	All of the offshore infrastructure including wind turbines, platforms, and cables.
Offshore platform	A collective term for the construction operation and maintenance platform and the offshore electrical platforms.
Onshore cable corridor	The corridor within which the onshore cable route will be located.
Onshore cable route	This is the construction swathe within the onshore cable corridor which would contain onshore cables as well as temporary ground required for construction which includes cable trenches, haul road and spoil storage areas.
Onshore cables	The cables which would bring electricity from landfall to the onshore substation. The onshore cable is comprised of up to six power cables and two fibre optic cables.

Proposed onshore development area	The area in which the landfall, onshore cable corridor, onshore substation, mitigation areas, temporary construction facilities (such as access roads and construction consolidation sites), and the National Grid Infrastructure will be located.
Onshore infrastructure	The combined name for all of the onshore infrastructure associated with the proposed East Anglia ONE North project from landfall to the connection to the national electricity grid.
Onshore substation	The East Anglia ONE North substation and all of the electrical equipment, both within and connecting to the National Grid infrastructure.
Onshore substation location	The proposed location of the onshore substation for the proposed East Anglia ONE North project.
Platform link cable	Electrical cable which links one or more offshore platforms, these cables will include fibre optic cables.
Safety zones	A marine area declared for the purposes of safety around a renewable energy installation or works / construction area under the Energy Act 2004.
Scour protection	Protective materials to avoid sediment being eroded away from the base of the foundations as a result of the flow of water.
Transition bay	Underground structures at the landfall that house the joints between the offshore export cables and the onshore cables.

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Chapter 4 Site Selection and Assessment of Alternatives appendices are presented in **Volume 3** and listed in the table below.

Appendix number	Title
4.1	East Anglia ONE North and East Anglia TWO Onshore Substations Site Selection RAG Assessment
4.2	East Anglia ONE North and East Anglia TWO Onshore Substations Suffolk Coast and Heaths AONB Impact Appraisal
4.3	Traffic and Access – W1 Substation Zone Appraisal
4.4	Summary Note on Landscape and Visual Impact and Mitigation

4 Site Selection and Assessment of Alternatives

4.1 Introduction

1. This chapter of the Preliminary Environmental Information Report (PEIR) presents a description of the site selection process and the approach undertaken by East Anglia ONE North Limited (the Applicant) to define the various elements of the proposed East Anglia ONE North project. The process includes consideration of both the offshore and onshore infrastructure and associated infrastructure, and the assessment of reasonable alternatives as the proposed East Anglia ONE North project has developed through the pre-application process. An important part of the Environmental Impact Assessment (EIA) process is to describe the reasonable alternatives considered during the evolution of the proposed East Anglia ONE North project, such as development design, technology, location, size and scale, and to set out the main reasons for selecting the chosen option.
2. For the offshore development area, the former East Anglia Zone within which the East Anglia ONE North windfarm site is located (**Figure 4.1**) was identified as part of The Crown Estate Round 3 Offshore Wind Farm development process. As such, the East Anglia ONE North windfarm site selection was limited to areas within the former East Anglia Zone.
3. The chapter outlines the site selection process for the proposed East Anglia ONE North project, however due to the strategic approach of developing both the proposed East Anglia ONE North and East Anglia TWO projects in parallel, the onshore site selection process has also considered co-location of both proposed East Anglia ONE North and East Anglia TWO projects (see **Chapter 1 Introduction** and **Chapter 6 Project Description** for further details on the relationship between the proposed East Anglia ONE North and East Anglia TWO projects).

4.2 Key Components of East Anglia ONE North

4. The proposed East Anglia ONE North project will comprise the following main offshore components (see **Chapter 6 Project Description**):
 - Wind turbines and their associated foundations;
 - Offshore platforms and their associated foundations (electrical platforms and construction, operation and maintenance platform);

- Subsea cables and cable protection – offshore export cables, fibre optic cables, platform link cables and inter-array cables;
 - Meteorological masts (met masts) and their associated foundations; and
 - Monitoring equipment including Light Detection and Ranging (LiDAR) and wave buoys.
5. The main onshore components of the proposed East Anglia ONE North project include:
- Up to four ducts installed under the cliff at landfall by Horizontal Direction Drilling (HDD);
 - Onshore cables laid within open cut trenches or installed in ducts, and associated infrastructure including transition bays and joint bays;
 - Trenched or trenchless crossing points at roads and sensitive features and habitats (e.g. sites of conservation importance);
 - Onshore cable route haul road;
 - Onshore cable route and substation construction haul access road;
 - Temporary construction access roads;
 - Substation operational access road;
 - Construction consolidation sites;
 - Onshore substation;
 - National Grid substation;
 - National Grid infrastructure; and
 - Associated earthworks and / or landscaping associated with the onshore substations.
6. Further details on the key components of infrastructure can be found in **Chapter 6 Project Description**.

4.3 Legislation, Policy and Guidance

4.3.1 Environmental Impact Assessment Regulations

7. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require an Environmental Statement (ES) to include “*a description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*”.
8. This chapter addresses this requirement.

4.3.2 National Policy Statement EN-1

9. The Overarching National Policy Statement (NPS) for Energy EN-1 is clear that *‘from a policy perspective this NPS EN-1 does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option’*. It does however note that in the execution of a competent EIA *‘applicants are obliged to include in their ES [Environmental Statement], as a matter of fact, information about the main alternatives they have studied.’*

4.3.3 National Policy Statement EN-3

10. The NPS for Renewable Energy Infrastructure EN-3 states that the *‘specific criteria considered by applicants and the weight they give to them will vary from project to project... The choices which energy companies make in selecting sites reflect their assessment of the risk that the IPC [now the Planning Inspectorate], ...will not grant consent in any given case. But it is for energy companies to decide what applications to bring forward and the Government does not seek to direct applicants to particular sites for energy infrastructure.’* NPS EN-3 outlines that the IPC (now the Planning Inspectorate) should be satisfied that the site selection process has been undertaken in a way that reasonably minimises adverse effects on a variety of environmental parameters.

4.3.4 National Policy Statement EN-5

11. The NPS for Electricity Networks Infrastructure EN-5 states that *‘the choices which energy companies making in selecting sites reflect their assessment of the risk that the IPC [now the Planning Inspectorate], following the principles set out in paragraph 4.1.1 of EN-1, will not grant consent in any given case.’*

4.3.5 Marine Policy Statement

12. The Marine Policy Statement (MPS) adopted by all UK administrations in March 2011 provides the policy framework for the preparation of marine plans, establishing how decisions affecting the marine area should be made in order to enable sustainable development.
13. The East Inshore and East Offshore Marine Plans (Defra 2014) encompass the offshore development area and state “Proposals for Offshore Wind Farms Inside Round 3 zones, including relevant supporting projects and infrastructure, should be supported” (HM Government 2014).

4.3.6 Planning Inspectorate Advice Note Seven

14. The Planning Act 2008 (as amended), and related secondary legislation, establishes the legislative requirements in relation to applications and proposed applications for orders granting development consent for Nationally Significant Infrastructure Projects (NSIPs).

15. Planning Inspectorate Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (The Planning Inspectorate 2017) suggest the EIA needs to explain “*the reasonable alternatives considered and the reasons for the chosen option considering the effects of the Proposed Development on the environment*”.

4.3.7 Electricity Act 1989

16. In formulating the relevant proposals consideration has been given to the preservation of natural beauty, flora and other environmental features including cultural heritage. Furthermore, consideration has been given to what reasonable mitigation can be applied to such environmental effects.

4.4 Site Selection Process and Consideration of Alternatives

4.4.1 Overview of Site Selection Process

17. The siting, design and refinement of the proposed East Anglia ONE North project has followed a site selection process, taking account of environmental, physical, technical, commercial and social considerations and opportunities as well as engineering requirements, with the aim of identifying sites that will be environmentally acceptable, are deliverable and consentable, whilst also enabling, in the long term, benefits of the lowest energy cost to be passed onto the consumer. A multi-disciplinary design team was formed to undertake the site selection process, which included a team of specialists comprising engineers, planners, land advisors, legal and EIA / topic consultants whose expertise was drawn upon throughout the site selection process.
18. Each stage of the site selection process forms part of an iterative design process undertaken to identify the most suitable locations and configuration, based on criteria outlined above for the proposed East Anglia ONE North project infrastructure. The framework for the site selection process is based upon a set of design principles and engineering requirements for the proposed East Anglia ONE North project infrastructure.
19. The Applicant has undertaken extensive pre-application engagement with stakeholders, communities and landowners in order to both seek input to refine the proposed East Anglia ONE North project design, and to communicate decisions on refinements. The Scoping Report (SPR 2017) and **section 4.7** to **section 4.9** sets out the process for the development of the onshore and offshore infrastructure of the proposed East Anglia ONE North project, showing a series of search areas for the offshore export cable corridor, landfall, onshore cable corridor, onshore substation and National Grid infrastructure.

4.4.2 Project Alternatives

20. A number of strategic-level project design alternatives have been considered as part of the site selection and project design decision-making process. The

strategic consideration of alternatives which fed directly into the proposed East Anglia ONE North project's site selection process is detailed in **Table 4.1**.

Table 4.1 Strategic-level Project Design Alternatives Considered

Alternatives Considered	Decision	Main Environmental Benefits
Strategic approach to concurrently delivering the proposed East Anglia ONE North project and the proposed East Anglia TWO project OR No elements of the proposed East Anglia ONE North project considered within the design envelope for the proposed East Anglia TWO project	To take a strategic approach to delivering the proposed East Anglia ONE North project and the proposed East Anglia TWO project	Co-location of onshore substations for the proposed East Anglia ONE North project and the proposed East Anglia TWO project will keep these developments contained within a localised area and, in so doing, will contain the extent of potential impacts.
Overhead lines along the onshore cable route from landfall to grid connection location OR Buried onshore cables along the onshore cable route from landfall to grid connection location	Buried onshore cables	The environmental benefits of burying cables as opposed to overhead lines and pylons is the minimisation of visual impacts.
HDD of the onshore cables from offshore to onshore OR Open trench cut and direct lay of offshore cables from offshore to onshore (landfall)	HDD of the offshore cables from offshore to onshore	The environmental benefit of HDD at the landfall removes any possible interaction with the Sizewell Beach SSSI and reduces potential risks associated with coastal cliff erosion in the Thorpeness area – an area with high cliff instability.

4.5 Consultation

4.5.1 Statutory Consultation

21. Consultation on refinements in the proposed East Anglia ONE North project site selection, layout and configurations have been undertaken through the informal

and formal pre-application stages to date between submitting the Scoping Report (SPR 2017) in November 2017 and the PEIR. Feedback received has been taken into consideration throughout, through a range of means including (but not exclusively limited to):

- Public Information Days held at locations within and adjacent to the proposed onshore development area;
- Community feedback reports shared with all registered participants, key local and community stakeholders, and on the proposed East Anglia ONE North project website;
- Phase 1 consultation (October / November 2017) with statutory consultees and the public;
- Phase 2 consultation (March 2018) with statutory consultees and the public;
- Phase 3 consultation (June / July 2018) with statutory consultees and the public;
- Phase 3.5 consultation (October / November 2018 and including four community engagement events held in October 2018) with statutory consultees and the public;
- Parish Council briefings;
- Direct discussions with landowners:
 - The Applicant and the Applicant's land agents have met affected landowners and/or land agents. A number of onshore cable route change proposals have been put forward by those affected by the proposed onshore development area and the proposed East Anglia ONE North project has been able to incorporate a number of those suggestions into the proposed onshore development area boundary;
 - The Applicant has engaged with landowners regarding survey access through consultation meetings. Letters were sent to all affected parties offering to meet to discuss the proposed East Anglia ONE North project proposals;
- Newsletters distributed throughout the onshore substation(s) site selection study area;
- Dedicated project e-mail address and freepost address to assist local communities in contacting the Applicant;
- Provision of a dedicated proposed East Anglia ONE North project website; and
- Regular and targeted discussion with regulators and other stakeholder bodies through various means including over 30 Expert Topic Group (ETG)

meetings, where the siting of onshore and offshore infrastructure was discussed in detail. More information is detailed in **section 4.5.2**.

22. **Table 4.2** details statutory consultee responses to the four phases of consultation (phase 1, 2, 3 and 3.5) undertaken prior to publishing this PEIR, pertaining to site selection and assessment of alternatives. All non-statutory consultation is detailed in the Phase 2 Summary Report, Phase 3 Summary Report and Phase 3.5 Decision Summary (listed under each phase of consultation), hosted on the ScottishPower Renewables website (SPR 2018).

Table 4.2 Consultation Regarding Site Selection and Assessment of Alternatives

Consultee	Feedback
Phase 1	
Suffolk County Council Suffolk Coastal and Waveney District Council	<p>Concern over Sizewell/ EDF Energy Land</p> <ul style="list-style-type: none"> Concerns identified over the use of Sizewell land for indicative location for onshore facilities including proximity to other infrastructure (including other substations, cabling and bunds), area is within the Suffolk Coast and Heaths AONB, partly within ecological mitigation land for Sizewell C New Nuclear Power Station and due to the options for Sizewell C New Nuclear Power Station electrical supply routing; Sizewell B is very constrained in terms of land, therefore insufficient space to facilitate a connection for the proposed East Anglia ONE North and East Anglia TWO projects. No sufficient space in vicinity of Leiston A substation as it is very constrained; It was agreed that land identified for Sizewell C New Nuclear Power Station was unlikely to be an area suitable for development, but that confirmation from EDF Energy on this particular matter would be required; Previous developments in the area have seen issues around the onshore cable laying and landfall, due to limited space and amount of infrastructure in the ground now. Possibility that EDF Energy will be concerned about laying more cables in the Sizewell area. Road access has also been a constraint for previous developments. Suggest land adjacent to the next pair of anchor towers ~1.5km SW from Galloper unless National Grid replace intermediate towers nearer Sizewell Gap. <p>Concern over how the proposals will affect the Area of Outstanding Natural Beauty (AONB) or SSSI</p> <ul style="list-style-type: none"> It was noted at a LPA meeting that effects of moving development out of the AONB might lead to greater effects than staying within it, so a thorough review of possible sites inside and outside of the AONB should be carried out. Alternatives to having any development in the AONB must be fully tested. SCC suggested the potential to consider substation locations further west away from the AONB, along the existing overhead line extending to the A12,

Consultee	Feedback
	<p>and locations that are separate from the existing overhead line.</p> <ul style="list-style-type: none"> It would be preferable to build nearer to other developments such as the industrial estate on the edge of Leiston and to consider locations away from the AONB. <p>Concern over proximity of infrastructure (cable route and substations) to residential properties/ preference to site away from residential properties</p> <ul style="list-style-type: none"> Concern over housing development planned in the area; Should put substation as far west as possible in open country; Query over why substation is not offshore; Concern over cable routing and proximity of the substation and associated works. SCC confirmed that there is no guidance around minimum distances from developments to housing, but that a preferred scenario would be to situate any East Anglia ONE North / East Anglia TWO developments next to industrial buildings. <p>Feedback on site selection principles</p> <ul style="list-style-type: none"> Avoiding designated Ancient Woodland (including early surveys); Avoid woodland and follow mitigation hierarchy; Presentation of heat mapping should be shown as quadrants rather than actual substation footprints; Consider management of existing woodland; Incorporate ecological enhancements into operational substation plot. <p>Design principles</p> <ul style="list-style-type: none"> Environmental constraints, disruption to local communities and mitigation hierarchy should be part of main design principles – not just micro-siting
Natural England	<p>Site should be at Sizewell / EDF Energy land</p> <ul style="list-style-type: none"> Natural England advised that the landfall connection to the onshore cable route either closely matches Sizewell C New Nuclear Power Station or the route comes in from the south up to the back of Sizewell B where the National Grid substation is. <p>Cable route concerns and suggestions</p> <ul style="list-style-type: none"> Cable impacts should be investigated in addition to the substation site. The preferred site may not be the best choice if a feasible cable route cannot be found. The western zones would require a longer cable corridor and therefore consideration of construction impacts and mitigation. <p>Substation suggestions</p>

Consultee	Feedback
	<ul style="list-style-type: none"> Substation location should be within farmland. Keep infrastructure close to pylons to avoid the need for additional pylons. <p>Concerns over impact on woodland</p> <ul style="list-style-type: none"> Ecological connectivity of woodland in relation to the wider area should be considered. Proximity to mature and ancient woodland within the western sites should be considered
Suffolk Coast and Heaths AONB Partnership	<p>Concern over how the proposals will affect the Area of Outstanding Natural Beauty (AONB) or SSSI</p> <ul style="list-style-type: none"> It was noted at a LPA meeting that effects of moving development out of the AONB might lead to greater effects than staying within it, so a thorough review of possible sites inside and outside of the AONB should be carried out. Alternatives to having any development in the AONB must be fully tested. Suggested the potential to consider substation locations further west away from the AONB, along the existing overhead line extending to the A12, and locations that are separate from the existing overhead line. It would be preferable to build nearer to other developments such as the industrial estate on the edge of Leiston and to consider locations away from the AONB. If substation built in the west, the cable corridor may impact the AONB and other non-designated ecological features. Concern over cutting AONB in half especially with cumulative impact with other projects
Historic England	<p>Listed Buildings</p> <ul style="list-style-type: none"> Any woodland removal at Aldeburgh Road may impact on the setting of the Grade II listed building. Concerns over crossing Aldeburgh Road impacting the setting of the Grade II Edwardian Villa. Concerns crossing Aldeburgh road.
Phase 2	
Suffolk County Council Suffolk Coastal and Waveney District Council	<p>General concerns about proposed substation location</p> <ul style="list-style-type: none"> Concern over substation building impact SCC and SCWDC do not agree with the proposed study area or the selected site for the substation (and subsequent cable route) Question about how zones were assessed <p>Concerns over placement of cables</p> <ul style="list-style-type: none"> Concerns about placement of onshore cables, suggest they should be sited

Consultee	Feedback
	<p>towards Thorpeness</p> <ul style="list-style-type: none"> • Cabling issues if National Grid Ventures (NGV) were east and then cabled to the west; • Concern over tunnel below the land and sea; • Cables to substations should take a course that minimises/avoids destruction of woodland • Cables must be underground to minimise long term impact • Concern over residential properties north of Thorpeness Common • Longer route if western zones chosen
Natural England	<p>Preference expressed for western zones (5, 6 or 7)</p> <ul style="list-style-type: none"> • Natural England expressed preference for Zones 7, 6 or 5 (formally named Zones W1, W2 or W3 respectively) as the western zones are not sited within protected landscapes or designated sites. • Natural England recognised that the eastern zones 4, 3, 2 and 1 (formally named Zones E1, E2, E4 and E3 respectively) are either within the boundary of the AONB or within the setting of the AONB. Natural England advised that there would be greater challenges to demonstrate that policy requirements have been met in relation to the AONB and Heritage Coast. <p>Concerns over cable route</p> <ul style="list-style-type: none"> • Natural England recognised that although the western zones represent less risk in terms of interactions with protected sites and landscapes, the resulting onshore cable corridor will inevitably be longer and more complex and may have impacts, both temporary and permanent, on the AONB and designated sites. The longer cable route could also result in greater disturbance to non-designated ecological features along this route.
Historic England	<p>Site should be at Sizewell/ EDF Energy land</p> <ul style="list-style-type: none"> • Comments regarding why the substation is not situated at Sizewell / using Galloper and Greater Gabbard land. • Suggestions that this land should be reconsidered. • Offshore energy hub off Sizewell <p>Preference expressed for eastern zones (1, 2, 3 or 4)</p> <ul style="list-style-type: none"> • Historic England expressed preference for Zones 4 and 2 (formally named Zones E1 and E4 respectively) due to the difficulty of the preferred crossing of the Aldeburgh Road, and the impact that the development would have upon the significance of a number of designated heritage assets in Knodishall and Friston, as well as in the surrounding landscape. We also note the high potential for nationally important archaeological remains as set out in SCCAS advice.
Suffolk Coast and	<p>Preference expressed for western zones (5, 6 or 7)</p>

Consultee	Feedback
Heaths AONB Partnership	<ul style="list-style-type: none"> The AONB Partnership prefers the western zones over those to the east, as the western zones are not sited within the nationally designated landscapes. The western zones represent less risk to the nationally designated AONB and Heritage Coast. <p>Concerns over cable route</p> <ul style="list-style-type: none"> The AONB Partnership notes that if Substation Zone 7 (formally named Zone W1) is chosen the resulting onshore cable corridor will be longer and more complex and may have impacts, both temporary and permanent, on the AONB, non-designated landscapes, the Heritage Coast and communities
Phase 3	
Historic England	<p>Concern expressed for substation in zone 7 / next to Friston</p> <ul style="list-style-type: none"> Zone 7 is farthest from the coast and sandwiched between a number of rural communities. Concern expressed for substation near Friston. Concerns that Zone 7 is the largest and could be to allow for future expansion and there would be less opposition Will be on agricultural land Alternative site should be found Construction compounds should not be near Friston
Suffolk County Council Suffolk Coastal and Waveney District Council	<p>Concern over RAG assessment/ site selection process</p> <ul style="list-style-type: none"> Parameters and weightings appear to be chosen arbitrarily. RAG methodology flawed as characteristics unrelated and an objective relative weighting was not applied to each characteristic. The RAG assessment cannot be relied on as the primary site selection criteria as the RAG assessment site selection outcome is extremely sensitive to even minor changes in the evaluation of the environmental parameters. RAG assessment has been engineered to get preferred outcome Broom Covert, Sizewell not considered in the RAG assessment Flood risk ignored in RAG assessment Agricultural land not properly rated. Concerns that alternative sites have not been fully considered. Site selection should be re-considered Concern that EDF land has not been properly considered. More sites should have been considered. Were landowner views considered?

Consultee	Feedback
	<p>Scheme refinement</p> <ul style="list-style-type: none"> Concern was raised regarding further refinement of any elements of the development scheme beyond the already refined area, until the results of the archaeological evaluation surveys are available. This is in order to retain the opportunity for flexibility within the scheme design, allowing for preservation in situ/avoidance of significant archaeological remains as appropriate.
Phase 3.5	
<p>Suffolk County Council</p> <p>Suffolk Coastal and Waveney District Council</p>	<p>Site Selection</p> <ul style="list-style-type: none"> LPA's state that the Broom Covert Site is the "least worst" option It is the local authorities' view that although the Friston site lies outside the AONB, the development of this site would be hugely detrimental resulting in significant impacts which would be extremely difficult to mitigate. In addition to the impacts experienced at the substation site, the longer cable route associated with this site selection and the challenges and impacts involved, result in the local authorities being of the opinion that the Friston site is not an effective alternative in policy terms. Concerns raised over lack of new information discussing cumulative impacts e.g. NGV and Crown Estate leasing. They raise the lack of assessments for Broom Covert. State there is a need for full LVIA for both sites <p>Grove Wood, Friston</p> <ul style="list-style-type: none"> The LPA question whether the cost and scope for developing the Friston site is so great as to render it an unreasonable alternative to Broom Covert. They believe that the disruption caused by the longer cable route also make the Friston site unsuitable especially around Aldringham court nursing home. They say we need to be able to demonstrate that all 4 projects can feasible go through to the west. They have difficulty supporting the Friston site if it results in the destruction of the Aldeburgh Road woodland. The LPA state that "based on the information presented to date, the local authorities are not satisfied that such planting (at Grove Wood) would be timely or sufficiently effective in delivering acceptable mitigation". They mention concerns of the limit of screening potential at the site due to drainage and the proximity of the OHLs Concerns raised over noise at Friston and impact of designated site close to the substation and along the extended cable route: The local authorities have significant concerns in relation to the development of the Grove Wood site and its impact on below ground heritage assets <p>Broom Covert, Sizewell</p> <ul style="list-style-type: none"> Mention that although further assessments are required, "there are considered

Consultee	Feedback
	<p>some potential advantages that the Broom Covert site may be able to provide"</p> <ul style="list-style-type: none"> Points mentioned: <ul style="list-style-type: none"> Shorter cable corridor Less visual impact of substation site due to existing energy cluster. Better planting potential at Broom Covert Concerns over drainage into SSSI raised Existing background noise in the area lessens the project impacts Better traffic routes Lack of listed buildings nearby However, if constructed concurrently with Sizewell C there could be benefits to locating the sub stations at Friston. This would distribute traffic over a wider part of the network avoiding congestion on any particular route. For either option the Highways Authority will carefully consider the impacts and necessary mitigation to reduce these to an acceptable level. <p>National Grid Technology</p> <ul style="list-style-type: none"> With regards to NG technology the LPA state that GIS technology should be utilised due to the size of the projects and impact on the surrounding environment.
Environment Agency	<p>Site Selection</p> <ul style="list-style-type: none"> EA raise the point that part of the Broom Covert land is with the Sizewell Marshes SSSI. Concerns raised that drainage will feed into the SSSI and there is potential for fuel and oils leaking into the watercourse. A suitable surface water drainage scheme needs to be established and opportunities to provide ecological enhancements should be considered. Broom covert does not include groundwater source protection unlike the Grove Wood site.
Historic England	<p>Grove Wood, Friston</p> <ul style="list-style-type: none"> Mention two highly designated sites, Church of St Mary and Friston post mill (both Grade II). "Substations would erode the rural setting of the church and compromise the appreciation of the building. This would result in a high level of harm to the significance of the grade II* building (church)" They mention that no visualisations from the south side of Friston are available to illustrate longer distance views and therefore unsure of the impact on the post mill- This needs to be considered in due course. "If the Friston site was to be taken forward, then it is likely we would consider an objection on heritage ground. In addition, the applicant would need to ensure there was a robust assessment of the impact upon the site and that this provided the clear and convincing justification that is required by the relevant planning policies."

Consultee	Feedback
	<p>Broom Covert, Sizewell</p> <ul style="list-style-type: none"> No designated heritage assets in this area. The closest highly designated asset is a Scheduled Monument situated to the south of the site on Aldringham Walks known as the 'Bowl barrow on Aldringham Common, 300m east of Stone House' however this is likely to be unaffected by the development. Concerns raised over the conservation area at Thorpeness which has various Grade II listed buildings e.g. house in the clouds. "We have however come to the conclusion that there are unlikely to be any significant views of the development from the highly designated assets."
Natural England	<p>Policy Terms</p> <ul style="list-style-type: none"> With regards to Broom Covert, Natural England consider that the Broom Covert site would be extremely challenging to develop without significantly impacting on the AONB. Concerns over impact on the SSSI around the site raised. They recognise the existing screening at broom covert but state that the protection of the AONB is a priority. Importance of the mitigation land at Broom Covert, Sizewell also highlighted in relation to the Sizewell C development due to the lack of screening and building design options for SZC.
RSPB	<p>Broom Covert, Sizewell</p> <ul style="list-style-type: none"> Query whether sufficient (and recent) ecological survey data are available to inform the assessment of potential impacts. E.g. woodlark and nightjar which are features of the SPA Concerns raised over the need to upgrade existing pylons (involving the erection of temporary pylons) should the Sizewell site be chosen could increase disturbance and potentially damage to habitats at the northern end of the SPA <p>Grove Wood, Friston</p> <ul style="list-style-type: none"> The Grove Wood substation site is further from the Sandlings SPA, and therefore once the cable route is in place, disturbance to wildlife during operation from noise and lighting at the substation may be more limited than if the Sizewell site was chosen. They state that proposals should be discussed and agreed with Natural England and Suffolk Wildlife Trust.
Suffolk Coast and Heaths AONB Partnership	<p>Broom Covert, Sizewell</p> <ul style="list-style-type: none"> The AONB Partnership consider that the major development proposal in the nationally designated AONB, i.e. at the Broom Covert site, should be avoided While supporting renewable energy production, the AONB Partnership considers bringing power ashore and through a nationally designated landscape should be avoided. The AONB Partnership do not consider there to be exceptional circumstances in this case and that major development should not be undertaken in the

Consultee	Feedback
	<p>AONB in this case.</p> <ul style="list-style-type: none"> The AONB Partnership considers that ScottishPower Renewables as a statutory undertaker has not paid sufficient regard to the purpose of conserving and enhancing the AONB in proposing a development proposal of this nature in the nationally designated landscape and should therefore should not take the Broom Covert site forward. The AONB Partnership does not consider that the development proposals have fully considered alternatives to bringing ashore cables in and through the nationally designated landscape

4.5.2 Technical Consultation

23. Consultation regarding site selection and assessment of alternatives has been conducted through various means including a Site Selection Expert Topic Group and through responses to the Scoping Report (SPR 2017) and the consultation events and process as outlined in **section 4.5.1**
24. **Table 4.3** details consultation and scoping responses received regarding site selection and assessment of alternatives. Members of the local community also responded to the Scoping Report (SPR 2017); these responses have been addressed separately by the Applicant. Consideration of local community comments has been undertaken throughout the site selection process, as detailed within this chapter.

Table 4.3 Technical Consultation Regarding Site Selection and Assessment of Alternatives

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
Natural England, Marine Management Organisation (MMO), Royal Society for the Protection of Birds (RSPB), Historic England (HE), Maritime and Coast Guard Agency (MCA), Whale and Dolphin Conservation (WDC) and The Wildlife Trust (TWT)	09/08/2017 Offshore Cable Corridor Briefing Note	Natural England, MMO, RSPB, HE, MCA, WDC, TWT were issued a briefing note outlining the proposed East Anglia ONE North offshore cable corridor detailing how the corridor had been developed and including data collection and proposed EIA methodology.	MMO provided comment that area of seabed around Sizewell was known to be hard substrate and there maybe issues collecting data samples. TWT requested clarification on data collection methodology. All stakeholders confirmed they were content with the general approach. Responses to clarifications were dealt with through the Evidence Plan Process and subsequent agreements on data collection reached.
EDF Energy	19/10/2017 Consultation	Consultation with EDF Energy to discuss proposed offshore cable corridor and	EDF Energy raised concerns in relation to the Coralline Crag seabed feature, suspended

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
	Meeting	possible landfall locations.	sediment entrainment in intake infrastructure and protective provisions. The offshore cable corridor was routed to maintain a minimum separation distance of 500m with the Sizewell B intake infrastructure. The approach to considering these concerns is further detailed in section 4.7 and section 4.8 .
The Crown Estate	01/11/2017 Draft Agreement for Lease (AfL) Application	Initial draft of the East Anglia ONE North offshore cable corridor sent to The Crown Estate for review. The Crown Estate responded with comments (01/12/2017) in relation to potentially important aggregate areas and seabed sterilisation with adjacent East Anglia ONE cable corridor.	These comments have been addressed through the development of the offshore cable corridor. Details are provided in section 4.7.4 .
Aldringham-cum-Thorpe Parish Council	07/12/2017 Scoping Response	The three supporting substations, two for SPR and one for the National Grid, should be sited as close to the coast as possible to minimise disruption and disturbance to local residents. However, this will make it necessary to site them within the Suffolk Coast AONB, which at this point on the coast is at its narrowest, and includes a substantial amount of agricultural land. It is our belief that the agricultural land within the AONB, and not the heathland, should be used for the siting of these substations and accommodate the cable routes.	Information on the site selection process is provided within this chapter.

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	The restrictive search area proposed for the onshore elements is a concern due to the number of constraints within the area identified already. It is suggested that this area is extended to enable avoidance of designated areas where possible.	A thorough site selection process has been undertaken and is explained within this chapter. In addition, engagement with many stakeholders has been undertaken throughout the development of the proposed East Anglia ONE North project through the Expert Topic Groups, and consultation events including Public Information Days.
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	Both scoping reports refer to Sizewell as the most economical solution following a review by National Grid. There is no reference to the environmental or social impacts arising from determining that Sizewell is the best location and this is a concern and an omission to the process.	Information on the site selection process is provided within this chapter (section 4.7.3).
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	The constraints likely to apply to the scheme have not considered all other potential infrastructure projects that may lead to cumulative impacts. In particular, intercontinental connectors (Nautilus) have not been referred to. This is likely to be of a similar scale to the East Anglia onshore infrastructure and coming ashore in the same broad area. In an area very constrained by national and international landscape and ecological designations, it will be important that the in-combination effects of all of these schemes are considered. Additionally there are constraints in relation to the changing	This is addressed in the cumulative impact assessment within each technical chapter. Constraints regarding the coastline were considered as part of the coastal processes study and are discussed in Chapter 7 Marine Geology, Oceanography and Physical Processes .

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		coastline, the eroding coastline and the unstable coastline (in areas).	
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	Clarification is required with regard to how additional capacity at Sizewell has been achieved. Previous advice from National Grid had been that there is not capacity to connect at Sizewell.	Information on the site selection process is provided within this chapter (section 4.7.3).
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	Both scoping reports fail to acknowledge that the point of landfall for the offshore cables is within the nationally designated Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB). There must also be reference to the National Parks and Access to the Countryside Act 1949 with reference to designation of AONB.	Noted
Suffolk County Council and Suffolk Coastal District Council	08/12/2017 Scoping Response	A haul road is proposed with a 50 metre working width. Is a constructed haul road necessary or could temporary tracking be used? This is queried as there is a massive length of haul road being installed for EA One, which could be replaced for the most part with the use of temporary tracking and tracked vehicles (depending on soil conditions). Positioning jointing bays near to road access would enable any haul road to be kept to a minimum. Installing a haul road results in additional vehicles and importation of materials and takes time	The EIA will be undertaken on the worst case which would be the use of haul road along the whole length of the onshore cable corridor. Detailed design post-consent would determine if other options would be suitable Location of jointing bays, accesses and construction consolidation sites has been taken account of in the site selection process, based upon experience of the East Anglia ONE project.

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		and has a cost involved that could be minimised and possible environmental impacts avoided.	
Natural England	08/12/2017 Scoping Response	Orford Inshore rMCZ has been put forward for designation during Tranche 3. The decision on designation is not due until 2018. From looking at the potential AoS for the export cable corridor it could be relatively close to the site, and should be considered under the designated sites assessment, particularly if the site gets designated.	The Orford Inshore recommended MCZ lies south of the East Anglia ONE / THREE offshore cable corridor. The offshore cable corridor for the proposed East Anglia ONE North project is north of the East Anglia ONE / THREE corridor. The rMCZ is shown in Figure 4.2 and is approximately 3.5km from the proposed East Anglia ONE North project offshore cable corridor southern route (as shown in Figure 4.3).
The Planning Inspectorate	20/12/2017 Scoping Response	The Inspectorate would expect to see a discrete section in the ES that provides details of the alternatives considered and the reasoning for the selection of the chosen option(s), including a comparison of the environmental effects. It is noted that the Applicant intends to include a chapter in the ES covering site selection and assessment of alternatives.	Noted and information on site selection and assessment of alternatives can be found within this chapter.
The Planning Inspectorate	20/12/2017 Scoping Response	The Inspectorate notes that the Applicant intends to apply the Rochdale Envelope approach to the application for the Proposed Development. A number of options for various components are presented in the Scoping Report, although it is acknowledged that the	Noted

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		design envelope will be developed and refined during the EIA process. The Applicant's attention is drawn to the Inspectorate's Advice Note 9 'Using the 'Rochdale Envelope' which provides additional details on the approach	
Leiston-cum-Sizewell TC	21/12/2017 Scoping Response	For the onshore element it is noted that it seems to be a foregone conclusion that the landfall will be between Sizewell and Thorpeness. Given the huge effort over many years to keep industrialisation from power generation (wind and nuclear) emphatically to the North of the C228 (Sizewell Gap Road) this latest application is a devastating blow to residents' aspirations to keep the Aldringham Walks sacrosanct and clear of development. It must be clearly and evidentially justified why no other route or site can be considered. This justification at present seems to be purely financial which must be clearly offset against the enormous impact on the AONB and, if it comes further inland, the unacceptable loss of amenity to the residents of Leiston, Aldringham and Knodishall.	Information on the site selection process is provided within this chapter (section 4.7.3).
The Planning Inspectorate	25/01/2018 Planning Inspectorate Meeting	The Applicant advised that, in light of additional information from The Crown Estate, it will be making some minor	A briefing note was provided to key offshore stakeholders. Stakeholders agreed that the changes to the offshore cable corridor did not require further

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		amendments to the offshore area of search (red line boundary). The Applicant stated that this will not introduce any new consultees, or receptors or impacts from those assessed during the scoping phase. The Inspectorate advised that on that basis it did not appear necessary to re-scope following these amendments (although that is a matter for the Applicant).	comment, beyond those provided in response to the Scoping Report (SPR 2017).
Suffolk County Council Suffolk Coastal District Council	06/02/2018	The LPAs were consulted on the approach to avoiding impacts to the Coralline Crag and how this had influenced offshore cable corridor routeing decisions; and what this meant for the onshore landfall location.	LPAs agreed they were content with the approach to offshore cable corridor routeing and the proposed location of the landfall.
Interroute Concerto	14/02/2018 Consultation meeting	Consultation with asset owners of Concerto Seg-S to discuss potential requirements to cross cables to the south of the Coralline Crag.	No concerns relating to the offshore cable corridor have been raised. Drafting of proximity and crossing agreements currently being progressed.
MMO, NE, RSPB, MCA, WDC, TWT.	27/02/2018 Briefing note	A briefing note was provided to key offshore stakeholders notifying them of changes to the offshore cable corridor as shown in the Scoping Report. Stakeholders agreed that the changes to the cable corridor did not require further comment, beyond those provided in response to the Scoping Report. The MCA noted that a shallow cable crossing would be required to cross the	No further action required. Commitment to provide MCA with further information on the cable crossing depth as known.

Consultee	Date/ Document	Comment	Response / where addressed in the PEI
		Concerto Seg-S cable.	
Natural England / MMO / Cefas	19/03/2018 Benthic ETG meeting	As part of the benthic ETG Meeting 2 Natural England, MMO and Cefas were consulted on the approach to avoiding impacts to the Coralline Crags and how this had influenced offshore cable corridor routeing decisions. The approach to data collection for the export cable corridor was also agreed.	MMO, Cefas and Natural England agreed they were content with the approach to offshore cable corridor routeing.
Suffolk County Council Suffolk Coastal District Council Environment Agency	23/05/2018	The LPAs and Environment Agency were consulted on the approach to avoiding impacts to the Coralline Crags and how this had influenced offshore cable corridor routeing decisions; and what this meant for the onshore landfall location.	LPAs and Environment Agency agreed they were content with the approach to offshore cable corridor routeing and the location of the landfall.

25. The Applicant has engaged in site selection discussions regarding the onshore and National Grid substation site(s) via meetings, site visits and workshops with a Site Selection ETG since July 2017. The Site Selection ETG comprised Suffolk County Council, Suffolk Coastal District Council, Natural England, Historic England, the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (AONB), the Environment Agency and National Grid Electricity Transmission. The Site Selection ETG met on the dates as outlined in **Table 4.4**.

Table 4.4 Site Selection Meetings, Site Visit and Workshops with Statutory Consultees

Date	Attendees	Topics covered
7 th July 2017	Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> Move to connection point in the vicinity of Leiston and Sizewell
24 th July 2017	Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> Site selection principles Landfall area Initial onshore substation(s) site selection study area (east of Leiston)

Date	Attendees	Topics covered
		<ul style="list-style-type: none"> Site selection constraints associated with Sizewell A
20 th September 2017	Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> National Grid substation Western extension of onshore substation(s) site selection study area Sizewell A – further clarifications Crossing Aldeburgh Road (interaction with property / woodland) Substation zones (west of Leiston)
1 st December 2017	Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> RAG assessment Eastern substation zones site visit
6 th February 2018	Suffolk County Council Suffolk Coastal District Council	<ul style="list-style-type: none"> Offshore geology – Coralline Crag Offshore export cable corridor routing Landfall consideration of alternatives and preferred location
20 th February 2018	Natural England Environment Agency Historic England Suffolk Coast and Heaths AONB National Grid Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> National Grid substation Western extension of onshore site selection study area Sizewell A Crossing Aldeburgh Road (interaction with property / woodland) Substation zones (west of Leiston) RAG assessment Eastern substation zones site visit
21 st February 2018	Natural England Environment Agency Historic England Suffolk Coast and Heaths AONB National Grid Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> Substation height reduction AONB special qualities impact appraisal Engineering feasibility of crossing Aldeburgh Road Updated RAG assessment Western zones site visit
23 rd May 2018	Suffolk County Council Suffolk Coastal District Council	<ul style="list-style-type: none"> Offshore geology – Coralline Crag Offshore export cable corridor routing

Date	Attendees	Topics covered
	Council Environment Agency	<ul style="list-style-type: none"> Landfall consideration of alternatives and preferred location
7 th June 2018	Natural England Environment Agency Historic England Suffolk Coast and Heaths AONB Suffolk County Council Suffolk Coastal and Waveney District Council	<ul style="list-style-type: none"> Communicate decision-making regarding choice of Substation Zone 7 Feedback on public consultation to date Indicative Onshore Development Area Landfall (technical discussions) Historic setting at Aldeburgh Road crossing Micro-siting of substation arrangements National Grid overhead line works Surveys

4.6 Development of the East Anglia ONE North Windfarm Site Boundary

26. Site selection for the proposed East Anglia ONE North project has been driven by the following key factors:
- The selection of the Round 3 Zone 5 (renamed the East Anglia Zone) by The Crown Estate, and subsequent award of the Zonal Development Agreement (ZDA) to East Anglia Offshore Wind¹ (EAOW) (see **section 4.7.1**);
 - The Zone Appraisal and Planning (ZAP) process which identified the areas of least constraint for windfarms within the former Zone (see **section 4.7.2**);
 - The grid connection agreement between the Applicant and National Grid signed on 21st December 2017, which finalised “in or around Leiston” as the grid connection point, and therefore enabled identification of offshore and onshore cable corridors and the onshore substation location for the onshore substation and associated National Grid substation (see **section 4.7.3**).
 - Consultation with statutory and non-statutory consultees from the outset of the project via a Site Selection ETG (see **section 4.5**);
 - Consultation with the public via Public Information Days, Parish Council Briefings, community engagement events and distributed leaflets, newsletters and materials regarding updates to the project (see **section 4.5**);

¹ The original joint venture between ScottishPower Renewables (SPR) and Vattenfall – see **Chapter 1 Introduction** for further details.

- Review of environmental constraints and planning policy which led to site specific refinement of the East Anglia ONE North windfarm site, offshore (see **section 4.7.4**) and onshore (see **section 4.9**) cable corridors, the landfall location (see **section 4.8**), the onshore substation location, and associated National Grid substation location (see **section 4.9.1**);
 - The site selection process and consideration of alternatives for the proposed East Anglia ONE North project included consideration of the proposed East Anglia TWO project, specifically in relation to the onshore cable corridor, landfall location, offshore cable corridor, onshore substation location and National Grid substation location.
27. The process of refining wider areas of search to determine the proposed onshore development area was an iterative one, requiring environmental, legal, planning, land and engineering input at an increasingly detailed scale, plus input from National Grid Electricity Transmission and was consulted upon by Local Planning Authorities (LPAs) and key stakeholders at various stages and consulted upon with the public via PIDs and Parish Council briefings (see **section 4.5.1**).
28. Each stage of the iterative site selection process is described in more detail below.

4.7 Offshore Site Selection and Alternatives

4.7.1 Initial Offshore Zone Selection

29. The former East Anglia Zone was originally identified as a suitable area offering 'potential for offshore wind' by The Crown Estate as part of the Round 3 Offshore Wind Zone tendering process in 2008. The Crown Estate used their Marine Resource System (MaRS) Geographic Information System (GIS) tool to identify suitable areas for offshore windfarm development. The Round 3 Zones were identified in an iterative process that took account of a number of constraints imposed by existing or future use of the sea.
30. The Crown Estate Round 3 Zones were the subject of the Offshore Energy Strategic Environmental Assessment (OESEA) undertaken in 2008/2009. The OESEA was prepared to assess the implications of further rounds of offshore windfarm leasing in the UK Renewable Energy Zone and the territorial waters of England and Wales, as well as the implications of other industry activities. The assessment covered ecological, physical and human environmental factors including heritage and seascape and landscape effects. The results of this strategic level analysis showed that the zones represent suitable 'areas of opportunity' for offshore wind projects, and have the ability to deliver the required capacity of offshore wind within acceptable environmental limits. It

was however recognised that there may be local or regional constraints to the development of offshore wind projects within the zone boundaries.

31. In 2010, The Crown Estate announced the successful bidders to the Round 3 offshore windfarm zones. East Anglia Offshore Wind (EAOW) a 50:50 joint venture between SPR and Vattenfall was successful in securing, what was later to be called, the East Anglia Zone, committed to developing 7.2GW of offshore wind renewable energy. After successfully obtaining consent and CfD (Contract for Difference) for East Anglia ONE, and successfully submitting the application for consent for East Anglia THREE (now consented), SPR and Vattenfall split the former zone. SPR agreed to develop the southern half of the former Zone and Vattenfall agreed to develop the northern half of the former Zone. SPR are now solely responsible for East Anglia ONE, East Anglia THREE, the proposed East Anglia TWO and East Anglia ONE North projects.

4.7.2 Zone Appraisal and Planning

32. The ZAP Process was introduced by The Crown Estate as a way of managing how development was taken forward across individual zones. It was a non-statutory strategic approach to zone design, project identification and consenting for each of the Round 3 Zones. The main aims of the ZAP process were to:
- Optimise the development opportunity within each zone through identification of initial boundaries for the most technically and environmentally suitable development sites;
 - Assess cumulative and in-combination impacts across the entire zone and in relation to other nearby offshore windfarm developments and marine activities; and
 - Encourage wider stakeholder engagement at a strategic level to help inform the longer term development strategy.
33. The ZAP process for the former Zone comprised two key elements:
- Zone Technical Appraisal (ZTA) – focusing on the key physical characteristics of the former East Anglia Zone e.g. water depth and seabed geology; and
 - Zone Environmental Appraisal (ZEA) - focusing on key environmental, social and economic characteristics of the former Zone.
34. The ZAP Process was based upon a number of site specific surveys (for example, ornithological surveys and benthic surveys) and desk-based assessments of publicly available and historical data. The key constraints considered in the ZEA and ZTA were:

- Civil and military radar coverage and helicopter main routes;
 - Infrastructure;
 - Benthic habitats (including those listed Annex I of the Habitats Directive);
 - Seascape and visual amenity;
 - Commercial and natural fisheries activity;
 - Ornithology;
 - Conservation designations;
 - Shipping and navigation;
 - Marine archaeology;
 - Physical processes; and
 - Underwater noise.
35. The ZAP Process also considered the following hard constraints to development within the former zone:
- Oil and gas platforms and pipelines;
 - Active subsea cables;
 - International Maritime Organisation (IMO) Deep Water Routes; and
 - Naval maritime graves.
36. These hard constraints were treated as barriers to development (i.e. the areas affected were treated as unsuitable for wind turbines).
37. From the review of the initial baseline data, 11 potential Development Areas were identified as the least constrained parts of the former Zone. These areas were further assessed by EAOW in order to identify a smaller number of preferred development areas.
38. The ZAP process identified a broad area for the proposed East Anglia ONE North project as being an area with a relatively low number of development constraints, both technical and environmental. Those constraints that were highlighted were similar to those highlighted for East Anglia ONE and East Anglia THREE. It is considered that the ZAP process did not highlight any major constraints within the East Anglia ONE North windfarm site that would prevent development. As such, this site was chosen by SPR to be taken through the consenting process.
39. The East Anglia ONE North windfarm site boundary has been selected on the basis of the ZAP process detailed above and further consideration of development potential carried out by the Applicant. The shape of the East Anglia ONE North windfarm site boundary was driven by surrounding

constraints. The boundary is delineated by the Outer Thames Estuary SPA to the north, proximity to East Anglia ONE at approximately 1km to the south, vessel transit routes and the its central location towards the southern end of the former East Anglia zone which boundaries in all directions. (and which was beyond 12 nautical miles from the coast as per the seascape constraint as set out in the OESEA).

40. The East Anglia ONE North windfarm site boundary, former Zone and other projects being developed within the former Zone can be seen in **Figure 4.1**.

4.7.3 Grid Connection Location

41. National Grid owns and operates the England and Wales electricity transmission network. This network carries electricity from generators to substations, where the voltage is lowered, ready for distribution to homes and businesses. In order to connect to the electricity transmission network, the Applicant requires a grid connection agreement with National Grid. The following section presents work undertaken jointly with National Grid in determining the grid connection location offer given to SPR.
42. The Connection and Infrastructure Options Note (CION) Process is the mechanism used by National Grid to evaluate the potential transmission options. This leads to the identification and development of the most efficient, coordinated and economical connection point in line with their obligation to development of the electricity transmission network. An important element of this assessment is the cost that will be passed on to the consumer (the public and businesses) as a result of the works which will be required to ensure the network can accommodate the project. As part of the economic assessment, the CION considers the total life cost of the connection assessing both the capital and projected operational costs to the onshore network (over a project's lifetime) to determine the most economic and efficient design option.
43. Guidance Note Issue 3 (National Grid 2018) explains how the CION assessment is carried out. The process looks at technical, commercial, regulatory, environmental, planning and deliverability aspects to identify the preferable connection for the consumer. The Electricity Act 1989 requires National Grid to develop and maintain an efficient, co-ordinated and economical system of electricity transmission whilst also, in formulating relevant proposals, having due regard to environmental matters and mitigating effects on those resources. When the development being connected is offshore, such as a windfarm, the offshore aspects need to be considered in that evaluation too. The assessment process therefore looks to minimise the total capital and operational cost whilst taking into account other key considerations, as set out above.

44. The total cost of connecting to each location is worked out based on Transmission Capital Costs + Developer Capital Costs + System Operator Constraint Costs. Constraint Costs are the costs of increasing generation from some power stations and decreasing it at others to balance the system. It then considers how the various options compare in cost terms against a range of future energy scenarios, which is known as the cost benefit analysis (CBA) process. Through the CBA assessment a recommended option is identified in economic terms. The costs of the options are then evaluated against the other key considerations to determine the preferred grid connection option, which can change as more detailed information is obtained.
45. SPR had grid connection agreements from 2010 for up to 3.6GW connecting at Bramford substation, which would have allowed both the proposed East Anglia ONE North and East Anglia TWO projects to connect at that location. At that time, based on the contracted generation background, there was no available connection capacity available near Sizewell. Since 2010, there have been changes in the contracted generation background and transmission technology which has created available connection capacity near Sizewell. In line with their duties under Section 9 of the Electricity Act 1989, National Grid are required to undertake an appropriate review having regard to the specific statutory duties incumbent upon them.
46. In spring 2017, National Grid advised that due to the changing contracted background, connection capacity could be available in the Sizewell area. The CION process reviewed all realistic options and in summer 2017 concluded that the most economic and efficient connections for the proposed East Anglia ONE North and East Anglia TWO projects, while considering environmental and programme implications, would be into the circuits in the Sizewell and Leiston area.

4.7.4 East Anglia ONE North Offshore Cable Corridor

47. The offshore cable corridor has been developed to facilitate connection between the grid connection location in the vicinity of Sizewell and Leiston (as outlined in **section 4.7.3**) and the East Anglia ONE North windfarm site. The offshore cable corridor has been refined through several phases as more information has become available and consultation with stakeholders has progressed. The following sections outline the process undertaken during the development of the proposed offshore cable corridor.

4.7.4.1 Phase 1 – Identification of Scoping Area of Search

48. An offshore cable corridor Area of Search (AoS) was developed to inform the East Anglia ONE North Scoping Report (SPR 2017). The development of the AoS was driven through consideration of hard and soft environmental and engineering constraints both offshore and at the landfall.

49. A preliminary exercise was undertaken to identify all known constraints in proximity to the East Anglia ONE North windfarm site and Suffolk coast near Sizewell and Thorpeness, this was based on broad corridors from the East Anglia ONE North windfarm site to a grid connection point in the vicinity of Sizewell and Leiston. At this stage of the process, it was considered that a joint corridor serving both the proposed East Anglia ONE North and East Anglia TWO projects would be the preferred option.
50. In addition to offshore constraints, this exercise was informed by a separate exercise that considered viable landfall locations that would provide access to a grid connection point in the vicinity of Sizewell and Leiston (**section 4.8**).
51. Identification of potential offshore cable corridors was made according to the following principles during the preliminary stage:
- Routeing options needed to be able to connect to viable landfall locations;
 - Ability to route East Anglia ONE North and East Anglia TWO offshore export cables in a single route (a minimum corridor width of 2000m was assumed);
 - The number of existing pipeline and cable crossings were minimised as far as possible; and, where crossing was required, cables and pipelines to be crossed at 90°;
 - Historic wrecks were avoided as far as possible;
 - Seabed take in aggregate dredging areas was minimised;
 - Avoidance of the Southwold Oil Transshipment Area (a ship-to-ship transfer area)²; and
 - Environmental and policy constraints including avoidance of designated sites and ecologically important sandbanks and potential reefs as far as possible.
52. Routeing options that were identified were then reviewed with regard to The Crown Estate guidance on the principles of cable routeing and spacing (The Crown Estate 2012).
53. It was not possible to avoid the Southern North Sea candidate Special Area of Conservation (cSAC) or the Outer Thames Estuary Special Protection Area (SPA) as the cSAC encompasses the whole offshore development area and the SPA forms a strip along the coast covering parts of the offshore cable corridor and the landfall. It was also identified that due to constraints at the landfall, it would not be possible to avoid spatial overlap with the Leiston to Aldeburgh Site

² “Ship-to-ship transfer” is generally used to describe the transfer of oil, carried as cargo, from one tanker to another tanker. It can also be used to describe transfers of substances other than oil, but oil transfers are the most common by far.

of Special Scientific Interest (SSSI) and therefore it is intended that interactions with the SSSI will be minimised including through construction methodologies which avoid physical impacts to the SSSI.

54. The exercise outlined above identified an initial 2000m wide joint corridor for both the proposed East Anglia ONE North and East Anglia TWO projects. However, the East Anglia ONE North windfarm site is bisected by the offshore cable corridor for East Anglia THREE which will influence how the windfarm site is ultimately developed and therefore its export cable requirements.
55. Further refinements to the cable routeing were then undertaken. The principles guiding the refinements were the same as those that informed the initial exercise. For this exercise it was determined that, in line with The Crown Estate guidance (2012), that minimum corridor widths of 1050m for a single project consisting of two export cables and 1600m for a shared cable corridor consisting of four export cables should be used. In order to minimise seabed take, these cable corridor widths were maintained as far as possible, however, in areas where environmental or engineering constraints were identified, the corridor width was widened to allow for sufficient flexibility and space for installation.
56. The result of this process identified a potential routeing option for the East Anglia ONE North windfarm site which allowed for connection via the northern tip of the East Anglia TWO windfarm site, i.e. enabling a potential shared cable corridor for the two projects, with the route making landfall at Thorpeness.
57. The East Anglia ONE North offshore cable corridor was developed to be contiguous with the East Anglia TWO offshore cable corridor northern route and is wide enough to accommodate cables for both projects.
58. Moving offshore from the shared approach to landfall, the East Anglia ONE North offshore cable corridor passes north of the Southwold Oil Transshipment Area (with a minimum buffer of 2000m) and Southwold East aggregates dredging area and follows the northern boundary of the East Anglia TWO windfarm site where there is a tie-in option to connect to the East Anglia TWO windfarm.
59. Geophysical and benthic survey undertaken as part of the East ZEA and North Sea aggregates industry Regional Environmental Characterisation (REC) identified potential areas of *Sabellaria spinulosa* reef to the north of the Southwold Oil Transshipment Area and Southwold East aggregates area. The route is broader at this point to allow flexibility to micro-site as required to avoid or minimise disturbance to *Sabellaria* reef that may be present. Due to the transient nature of *Sabellaria* reef, confirmation of reef presence, as well as

detailed cable routeing and micro-siting will be informed by pre-construction geophysical survey.

60. Whilst the number of wrecks within the offshore cable corridor was minimised as far as possible, there are several wrecks within the boundary of the route. A deviation to the route to reduce the number of wrecks was made after the submission of the Scoping Report (SPR 2017) (discussed in **section 4.7.4.3**), and there is sufficient width within the offshore cable corridor to avoid wrecks that remain by micro-siting.

4.7.4.2 Nearshore Area

61. For the development of the section of the offshore cable corridor as it approaches landfall, minimum corridor widths were calculated based on cables for two projects being installed and two export cables being required for each project using experience gained during development and construction of the East Anglia ONE project.
62. During the development of the offshore cable corridor, consultation was held with key stakeholders to ensure that all constraints were considered, with a briefing note sent to provide information on the East Anglia ONE North offshore cable corridor and the intended approach to EIA.
63. Concerns were raised by EDF Energy, who operate the Sizewell B Nuclear Power Station (and planned Sizewell C New Nuclear Power Station), and considered as part of the corridor routeing exercise. During EIA and Examination of the Galloper Wind Farm, EDF Energy raised a number of concerns to Galloper Wind Farm Limited (GWFL) with regard to the installation and maintenance of the Galloper offshore export cables, particularly nearshore. These same issues were considered in relation to the proposed East Anglia ONE North project and were as follows:
64. Stand-off distances between export cables and plant and Sizewell B intake infrastructure. The offshore cable corridor was routed to maintain a minimum separation distance of 500m from the Sizewell B and proposed Sizewell C intake infrastructure. This separation distance is fully compliant with EDF Energy's protective provision agreement with GWFL.
65. Impacts on the quality of cooling water. In their Written Representation to the Examination (The Planning Inspectorate 2012), EDF Energy raised concerns about sediment suspended during Galloper export cable installation and operational works reducing the quality of cooling water within the Sizewell B cooling system. To address this concern, the Applicant employed a larger 500m buffer between the offshore cable corridor and the intakes than the 300m agreed between EDF and GWFL.

66. Impacts on Coralline Crag during cable installation works; EDF Energy raised concerns with GWFL about the impact from cable trenching works on Coralline Crag geology near to Sizewell which includes subtidal rock formations. EDF Energy's primary concern was that installation works through the Coralline Crag could impact on the structural integrity of the sea defences at Sizewell. In response to this, the Applicant has undertaken extensive work to refine the routing to avoid potential impacts to the Coralline Crag. This work was not completed in time to inform the East Anglia ONE North Scoping Report (SPR 2017), therefore a broad landfall AoS was used at that time. This work has informed Phase 2 of the cable corridor routing process outlined in **section 4.7.4.3**.

4.7.4.3 Phase 2 - refinements of offshore cable corridor since Scoping

67. Several refinements have been made to the East Anglia ONE North offshore cable corridor since the submission of the East Anglia ONE North Scoping Report (SPR 2017). The refinements have been made as a result of additional information becoming available, particularly relating to ongoing studies at the landfall and further consultation with the Crown Estate in relation to Area for Lease (AfL) applications. Generally, refinements of the offshore cable corridor fall into two categories;
- Refinements to the offshore cable corridor identified through consultation with The Crown Estate; and
 - Refinements to the approach to landfall informed through further work on landfall site selection.

4.7.4.4 Refinements to offshore cable corridor

68. In January 2018, East Anglia ONE North Limited submitted an Agreement for Lease (AfL) application for the area of the East Anglia ONE North offshore cable corridor.
69. Following consultation on this, a small amendment was made to the East Anglia ONE North offshore cable corridor. The reason for this adjustment was to allow two wrecks that were initially within the boundary of the offshore cable corridor to be fully outside of the corridor, and also to remove a deviation in the northern boundary. This is illustrated in **Figure 4.3**.

4.7.4.5 Refinements to the approach to landfall

70. As outlined in **section 4.7.4.2**, EDF Energy raised concerns in relation to potential impacts to an important offshore geological formation (Coralline Crag). The Coralline Crag is an exposed area of rock which underpins coastal processes along this section of the coastline which are critical to the water cooling processes for Sizewell B. The AoS presented at Scoping allowed

flexibility for refinement of cable routeing once further information on the Coralline Crag was available.

71. A desk based study, using information provided by EDF Energy, was undertaken to investigate construction methodologies which would avoid physical impacts to the Coralline Crag. This study is summarised in **section 4.8.1** and the results were used to inform landfall and nearshore engineering decisions which required refinement of the offshore cable corridor in the nearshore area.
72. The results of the desk-based assessment identified that the preferred routeing option would be to the south of the exposed Coralline Crag as this allowed for co-location of the export cables for both the proposed East Anglia ONE North and East Anglia TWO projects and allows the greatest flexibility for routeing. In order to route to the south of the Crag it was identified that export cables would need to be routed to the south of the Concerto Seg-S cable which comes on shore to the north of Thorpeness through the southern extent of the Crag. The offshore export cables would then need to cross the Concerto Seg-S cable. An engineering feasibility study identified that there was insufficient corridor width in the approach to landfall at the south of the Crag to allow for export cable installation, routeing and cable crossing, therefore an updated AfL was submitted to The Crown Estate which included an extension to the south of the offshore cable corridor. This extension is shown in **Figure 4.3** and **Figure 4.4**.
73. As part of this process, it was also identified that the northern boundary of the offshore cable corridor at the approach to landfall could be reduced as cable installation in this area was not being progressed and would not be required for anchoring of vessels. The reduction in the northern boundary of the offshore cable corridor provides a larger buffer between the offshore cable corridor and Sizewell B and planned Sizewell C New Nuclear Power Station infrastructure, as well as Galloper and Greater Gabbard offshore wind farm export cables. Updates to the offshore cable corridor near the landfall are shown in **Figure 4.4**

4.8 Landfall and Nearshore Site Selection and Alternatives

4.8.1 Constraints Mapping and Engineering Feasibility

74. A constraints mapping and engineering feasibility study was conducted to identify the most appropriate location for the East Anglia ONE North and East Anglia TWO offshore export cables to make landfall.
75. Mapping of policy and environmental constraints at or near the shoreline identified potential landfall locations based on the following key parameters:
 - Avoiding areas with European, national and local ecological designations;
 - Avoiding landscape and cultural heritage designations; and

- Avoiding areas with substantial infrastructure or land use e.g. nuclear energy land and infrastructure associated with its operation, housing and coastal defences.
76. Possible landfall locations identified were between Sizewell A (Sizewell Beach) and Thorpeness.
77. A feasibility study was commissioned to review the landfall options in terms of construction. This included a review of beach and sea bed geology, tides and currents, fishing and anchorage interactions, potential access for cable vessels and cable protection requirements. In order to assess the movement and stability of the shoreline and shallow subtidal areas, and the effects of coastal management plans over the next 50 years, a coastal stability study was also commissioned.
78. The study showed that the coastline's main uncertainty associated with the area is in terms of longer term change in coastal processes, alongside change in sea levels related to climate change. It was considered that the available information allowed a good assessment of the area in terms of present day trends of erosion, but that some caution has to be taken in extrapolating these trends into the future. The study was also able to quantify appropriate set back distances from the cliff line depending on where a future landfall location is chosen. This was proposed on a conservative precautionary approach. The Applicant has committed to setting back the landfall transition bays to the potential 100-year erosion prediction line.

4.8.2 Identification of Offshore Cable Corridor Landfall Routeing Options

79. To determine a suitable offshore cable corridor and landfall location, the following key considerations were included:
- Environmental and policy constraints;
 - Avoidance of physical impacts (as far as possible) to the Coralline Crag formation in order to avoid impacts to the hydrodynamic processes underpinning EDF Energy's cooling infrastructure and the nearshore sandbank systems;
 - Maximise distance (as far as possible) between offshore cable installation and EDF Energy's intake structures to minimise risk of suspended sediment impacting on cooling water;
 - Avoid surface laid offshore cable protection or offshore cable crossings in shallow waters (<20m) as far as possible, with consideration of HDD to avoid shallow waters and the intertidal zone; and
 - Minimise interactions with existing assets.

80. In addition to the consideration above, cable routeing options took into account engineering constraints such as:
- Potential locations of suitable onshore HDD compounds;
 - Achievable HDD length;
 - The availability of sufficient space available for offshore export cables to maintain a suitable separation; and
 - The availability of sufficient space for offshore cable installation (including anchor spread of installation vessels) whilst maintaining an appropriate safety buffer with existing sub-sea cables.
81. Following the receipt of detailed information on the extent of the Coralline Crag from EDF Energy (**Figure 4.4**), an exercise was undertaken to identify potentially viable cable routeing options. The key purpose was to identify routes where physical impacts to the Coralline Crag could be avoided or minimised, therefore the exercise predominantly looked at the potential to route around or underneath the Coralline Crag. In parallel an exercise was undertaken looking at onshore constraints to ensure that any landfall location was viable from both an offshore and onshore perspective. This work is summarised here.
82. The exercise looked at the landfall as a whole, and determined that in terms of physical processes, the offshore cable corridor at the nearshore can be split into three distinct zones:
- The area of the corridor north of the Coralline Crag outcrop – this is characterised by the central and southern sections of the Sizewell Bank and is where the export cables of the Greater Gabbard and Galloper Offshore Wind Farms are located, making landfall just south of Sizewell B;
 - The central area of the corridor – this is dominated by the outcrop of Coralline Crag; and
 - The area of the corridor south of the Coralline Crag outcrop – this is characterised by the sediment of the ness at Thorpeness.
83. Initially, the routeing exercise identified eight potential routes within the three zones for consideration. It was determined that routes to the south of the Coralline Crag option was the most viable option. Full details of the routeing selection process is provided below.
84. Routeing the offshore cables to the south of the Coralline Crag was deemed the most viable option as the seabed in this area is relatively unconstrained, and there is the flexibility to achieve avoidance of the Coralline Crag using shorter

HDD lengths which increases their feasibility. Whilst this option would require interaction with the Concerto Seg-S telecommunication cable relatively close to shore, it would allow for crossing of Galloper Offshore Wind Farm and Greater Gabbard Offshore Wind Farm cables further offshore (and in deeper water) than the north options. There would also be more available space to minimise interactions with other cables. This option is also furthest from Sizewell power stations intakes and unlikely to result in effects due to suspended sediment. The seabed in this area is also anticipated to be more suitable for burial.

85. Whilst there were onshore constraints associated with the HDD location for the southern options, feasible options have been identified that would allow for HDD to reach the seabed area to the south of the Coralline Crag and avoid impacts.
86. The preferred solution for installing the offshore export cable is to HDD from the onshore landfall location to the south of the Coralline Crag, this may also include HDD under a small section of the southern extent of the Coralline Crag. The HDD exit location would be in an area to the south of the Coralline Crag where it is anticipated seabed sediment would be suitable for cable burial. Further geophysical survey and engineering investigations will be developed to consider the above matters, leading to a final cable installation location and construction method.
87. In this location, the potential for suspended sediment to effect Sizewell intake structures is reduced as the separation from Sizewell is increased to approximately 3.5km. The EIA considers the potential effects of cable installation on Sizewell infrastructure within **Chapter 7 Marine Geology, Oceanography and Physical Processes**.
88. It was concluded that the option of routeing to the south of the Coralline Crag presented the preferred environmental, policy and engineering option and was compatible with commercially viable onshore landfall locations identified through a separate landfall selection process. The offshore cable corridor was refined (as outlined in **section 4.7.4.5**) to include sufficient width to permit offshore export cable installation along this route (**Figure 4.3** and **Figure 4.4**).

4.8.3 Onshore Landfall Refined Area of Search

89. The Landfall Refined Area of Search (as shown on **Figure 4.5** – a version of the indicative onshore development area provided for public consultation in June / July 2018 that has subsequently been superseded by the proposed onshore development area as shown on **Figure 6.2**) is a short section of the Suffolk coastline north of Thorpeness. The site was deemed to be the preferred location for the following reasons:

- The landfall has the potential to accommodate onshore cable requirements for both the proposed East Anglia ONE North and East Anglia TWO projects to connect to the grid in the vicinity of Sizewell and Leiston;
- There is the potential to avoid impacts on the SSSI designated at Sizewell Cliffs (Leiston - Aldeburgh SSSI) through the use of HDD;
- There is potential to avoid impacts on the Coralline Crag rock formation offshore from the coastline through the use of HDD, and thereby reduce the potential impact on coastal processes in the area (and avoid any impacts on the safe operation of Sizewell B nuclear power station's intake and outfalls);
- There is sufficient space in the identified area to accommodate set back from the cliff line to reduce risk associated with coastal erosion over the 100-year modelled scenario; and
- There is potential to avoid amenity impacts associated with access to, and walks along, the beach through the use of HDD.

4.9 Onshore Site Selection and Alternatives

4.9.1 Onshore Substation(s) Location

4.9.1.1 Site Selection Process – definition of terms

90. The areas of search for the onshore substation site selection process have followed a chronological progression of increasing refinement. Different terms are used to describe each stage of refinement. **Plate 4.1** illustrates the terminology used at each stage of site selection study area refinement.
91. The onshore substation zones named in the Onshore Substation Site Selection RAG Assessment (**Appendix 4.1**) were re-named at the phase 2 PID consultation event. The re-naming of the substation zones was as per the following:
- Zone 1 (previously Zone E3)
 - Zone 2 (previously Zone E4)
 - Zone 3 (previously Zone E2)
 - Zone 4 (previously Zone E1)
 - Zone 5 (previously Zone W3)
 - Zone 6 (previously Zone W2)
 - Zone 7 (previously Zone W1)
92. The Broom Covert, Sizewell site is referred to as Zone 8.

Plate 4.1 Site Selection Refinement Terminology for the Proposed East Anglia ONE North Project (and East Anglia TWO) by Work Phase or Consultation Phase



4.9.1.2 Onshore Substations Site Selection Study Area

93. The location of the proposed East Anglia ONE North substation (the onshore substation) and the National Grid substation and associated infrastructure is driven by the agreement with National Grid for a grid connection in the vicinity of Sizewell and Leiston, Suffolk. Further work was required to determine the suitability of identified land parcels for siting of substation infrastructure.

4.9.1.2.1 Site Selection Principles

94. Following the grid connection agreement, economic and efficiency principles were used to begin to define the onshore substation(s) site selection study area. The requirement for an economic and efficient solution are defined in the NPS EN-1, the National Grid's Guidelines on Substation Siting and Design (The Horlock Rules) ³ (National Grid undated) and the Electricity Act 1989 ('EA89', HM Government 1989). Review of these guidance and legislations documents resulted in the following aims:

- Onshore substation(s) to be positioned as close to the existing National Grid overhead lines as possible to reduce the requirement for cabling; and
- Onshore substation and National Grid substation to be positioned as close as possible to each other to meet an efficient and economic system (co-location).

95. In order to identify the most appropriate location to site the onshore substation, the Horlock Rules have been taken into consideration. These guidelines document National Grid's best practice for the consideration of relevant constraints associated with the siting of the onshore substations and were taken into account as outlined within **Table 4.5**:

Table 4.5 Application of Horlock Rules to Onshore Substation(s)

National Grid's Approach to Design and Siting of Substations (Overall System Options and Site Selection)	Onshore substation considerations
In the development of system options including new substations, consideration must be given to environmental issues from the earliest stage to balance the technical benefits and capital cost requirements for new developments against the consequential environmental effects, in order to keep adverse effects to a reasonably practicable minimum	Environmental constraints and opportunities have been considered throughout the development phase of the proposed East Anglia ONE North project and reported within the PEIR, and will be subsequently further detailed within the ES.

³ National Grids rules designed to assist those responsible for siting and designing substations to mitigate the environmental effects of such developments

National Grid's Approach to Design and Siting of Substations (Overall System Options and Site Selection)		Onshore substation considerations	
Amenity, Cultural or Scientific Value of Sites			
The siting of new National Grid Company substations, sealing end compounds and line entries should as far as reasonably practicable seek to avoid altogether internationally and nationally designated areas of the highest amenity, cultural or scientific value by the overall planning of the system connections.		<p>Internationally and nationally designated sites have been avoided and the onshore substation is not located within a:</p> <ul style="list-style-type: none">- National Park;- AONB;- Heritage Coast;- World Heritage Site;- Ramsar Site;- SSSI;- National Nature Reserve;- SPA; and/or- SAC. <p>Consideration has also been given to historic sites with statutory protection. See Chapter 24 Archaeology and Cultural Heritage for further details.</p>	
Local Context, Land Use and Site Planning			
Areas of local amenity value, important existing habitats and landscape features including ancient woodland, historic hedgerows, surface and ground water sources and nature conservation areas should be protected as far as reasonably practicable.		<p>Areas of local amenity value in the location of the onshore substation have been protected as far as reasonably practicable as part of the site selection process. See Chapter 30 Tourism, Recreation and Socio-Economics for further details.</p> <p>Consideration has been given to existing habitats and landscape features including ancient woodland (e.g. Grove Wood), historic hedgerows, surface and ground water sources and nature conservation areas (e.g. County Wildlife Sites). See Chapter 22 Onshore Ecology for further details.</p>	
The siting of substations, extensions and associated proposals should take advantage of the screening provided by land form and existing features and the potential use of site layout and levels to keep intrusion into surrounding areas to a reasonably practicable minimum.		The onshore substation benefits from relatively substantial existing hedgerows and woodland blocks within the local area (e.g. Grove Wood and Laurel Covert). These provide a level of mitigation of landscape and visual effects from the outset and can be strengthened with planting proposals during the construction phases of the proposed East Anglia ONE North project to ensure robust screening. See Chapter 29 Landscape and	

National Grid's Approach to Design and Siting of Substations (Overall System Options and Site Selection)	Onshore substation considerations
	<p>Visual Impact Assessment for further details.</p> <p>In addition, the proposed East Anglia ONE North project has made a further commitment to incorporate effective, appropriate and suitable landscape screening and planting (as part of the ongoing onshore substation design refinement) in order to reduce landscape and visual impacts, as well as any indirect impacts upon the setting of heritage assets (an Outline Landscape and Ecological Management Plan (OLEMS) will be prepared and submitted with the DCO application).</p>
<p>The proposals should keep the visual, noise and other environmental effects to a reasonably practicable minimum.</p>	<p>Visual, noise and other environmental effects have been minimised as far as possible through the site selection. See Chapter 29 Landscape and Visual Impact Assessment and Chapter 25 Noise and Vibration for further details.</p> <p>Noise reduction technology and design approach is discussed in Chapter 25 Noise and Vibration. Suitable mitigation measures will be incorporated in the detailed onshore substation design to ensure that noise emissions will not exceed the permitted noise levels to be agreed in principle with the Environmental Health Officer at Suffolk Coastal District Council.</p>
Design	
<p>In the design of new substations or line entries, early consideration should be given to the options available for terminal towers, equipment, buildings and ancillary development appropriate to individual locations, seeking to keep effects to a reasonably practicable minimum.</p>	<p>Landscape and visual impact will be minimised by avoiding the use of tall structures and buildings wherever possible. The onshore substation will be subject to detailed design post consent.</p>
<p>Space should be used effectively to limit the area required for development consistent with appropriate mitigation measures and to minimise the adverse effects on existing land use and rights of way, whilst also having regard to future extension of the substation.</p>	<p>The permanent footprint for the onshore substation is based on maximum preliminary layouts. More space-efficient solutions may be developed during the detailed design process; if so, this would reduce the area required for development.</p>
<p>The design of access roads, perimeter fencing, earth shaping, planting and ancillary development should form an integral part of the site layout and design to fit in with the surroundings</p>	<p>The design of access roads, perimeter fencing, earth shaping, planting and ancillary development will be subject to final detailed design, however these will be designed in accordance with principles of the Design and Access Statement</p>

National Grid's Approach to Design and Siting of Substations (Overall System Options and Site Selection)		Onshore substation considerations
		(DAS) (to be prepared and submitted with the DCO application) to minimise impacts on surroundings.
Line Entry		
<p>In open landscape especially, high voltage line entries should be kept, as far as possible, visually separate from low voltage lines and other overhead lines so as to avoid a confusing appearance.</p> <p>The inter-relationship between towers and substation structures and background and foreground features should be studied to reduce the prominence of structures from main viewpoints. Where practicable the exposure of terminal towers on prominent ridges should be minimised by siting towers against a background of trees rather than open skylines.</p>		<p>Modifications to the existing overhead line structures adjacent to the National Grid substation would be required. The net new number of pylons required to accommodate the works is one, and will be in close proximity to the existing pylon (to the north of the National Grid substation). The design approach taken would be confirmed at detailed design phase, post consent but would be in keeping with the existing substation design as presented in Chapter 6 Project Description.</p>

96. Within the aims outlined in **Table 4.5**, NPS EN-1 and EA89, a number of objectives were identified that set a framework of site selection principles which the site selection process seeks to adhere to:

- Avoid residential titles (including whole garden) where possible;
- Avoid direct significant impacts to internationally and nationally designated areas (e.g. SACs, SPAs, and SSSIs etc.);
- Minimise significant impacts to the special qualities (LDA 2016) of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (**Appendix 4,2** and discussed in **Chapter 3 Policy and Legislative Context** and **Chapter 29 Landscape and Visual Impact**);
- Minimise disruption to landowners, services, road users and residents generally, prioritising voluntary (rather than compulsory powers of) acquisition and minimising disruption during construction;
- Minimise interaction with mature woodland;
- Avoid physical interaction with land and assets owned by EDF Energy to reduce consenting and land transaction risks associated with interfering with a statutory undertaker and nuclear operator's rights;
- The onshore cable corridor / route (and therefore consideration of onshore substation(s) and landfall siting) should be kept as straight and as short as practicable;

- Minimise the number and length of HDDs (see **Chapter 6 Project Description** for further details);
- Minimise the number of crossings of assets (e.g. utilities) (assessed on a case-by-case basis); and
- All other policy and environmental constraints were considered on a case-by-case basis (with consideration of appropriate mitigation).

4.9.1.2.2 Initial Consultation with EDF Energy

97. The Applicant commenced communications with EDF Energy in May 2017 while in consultation with the LPAs regarding the definition of the onshore substation(s) site selection study area and in parallel with National Grid's CION process. Consultation with EDF Energy included discussions on the availability of land within the EDF Energy estate for inclusion within the Onshore Site Selection Study Area for siting of substations, as shown in **Table 4.6**.

Table 4.6 Initial Engagement with EDF Energy Regarding Definition of the Onshore Substation(s) Site Selection Study Area

Date	Who with	Discussions
11 th May 2017	SPR / EDF	Introductory meeting focussing on onshore matters
19 th July 2017	SPR / NGET / EDF	Sizewell B and Leiston A sites Sizewell C New Nuclear Power Station Substation footprint
19 th October 2017	SPR / EDF	Offshore coastal processes and geology
14 th November 2017	SPR / EDF	Offshore technical group meeting
8 th February 2018	SPR / EDF	Offshore technical group meeting 2 Landfall Onshore surveys and data sharing

98. EDF Energy provided clarifications at the initial definition of the onshore substation(s) site selection study area, that any land associated with the Sizewell C New Nuclear Power Station development was not available for voluntary acquisition. A large proportion of this land has been allocated to provide ecological compensation and mitigation for reptiles associated with potential ecological impacts associated with the Sizewell C New Nuclear Power Station development. Discussion with EDF Energy confirmed that work in these areas is already underway. EDF Energy were therefore unwilling to voluntarily grant rights which would allow the Applicant to select any EDF Energy land for onshore substation(s) and grid connection infrastructure given the importance

of this area to the future development of the Sizewell C New Nuclear Power Station.

99. The Applicant would therefore be required to rely upon seeking and exercising powers of compulsory acquisition over EDF Energy land for onshore substation(s) siting through the DCO process. EDF Energy (specifically EDF Energy Nuclear Generation Limited, operator of Sizewell B Nuclear Power Station), holds a Generation Licence and as such is a statutory undertaker. EDF Energy Nuclear Generation Limited also holds a Nuclear Site Licence for Sizewell B Nuclear Power Station. Section 127(2) of the Planning Act 2008 places restrictions on the compulsory acquisition of land held by statutory undertakers for the purpose of their undertaking. Such compulsory acquisition will require a certificate from the Secretary of State confirming that there will be no serious detriment to the carrying out of the undertaking, with or without land being replaced. EDF Energy has advised the Applicant that it is unable to accept the imposition of compulsory acquisition powers over its land given their need to protect the safety and security of Sizewell B Nuclear Power Station. As such, significant objections were likely to be raised by EDF Energy to the Applicant's s DCO application which would require the necessary compulsory acquisition of EDF Energy land.
100. Given EDF Energy's position, the Applicant considered that it would be unable to obtain voluntarily granted rights over the EDF Energy land, and the availability of compulsorily acquisition carried a significant risk due to the complication of their statutory undertaker status. Since EDF Energy land is required for the development of Sizewell C New Nuclear Power Station, and would not therefore be available within any reasonable timescale, it was excluded from the onshore substation(s) site selection study area.

4.9.1.2.3 Use of Magnox (Sizewell A) Land

101. Sizewell A land is owned by the Nuclear Decommissioning Authority and leased to Magnox Limited, who is tasked with the decommissioning of the Sizewell A site. The property rights are therefore complex and no party alone would be able to grant the necessary rights if a substation site would be located on this land.
102. The Sizewell A Site Summary – Lifetime Plan (2006) outlines that Sizewell A decommissioning work will not be complete until 2125 (with Care & Maintenance preparations due to complete by 2025). This area will not therefore be available when the proposed East Anglia ONE North project would need to commence construction. The construction of the onshore substation would have to be undertaken on land which is yet to be decommissioned and where there is the potential for construction to compromise the Sizewell A decommissioning works. The development of the onshore substation required

for the proposed East Anglia ONE North project could therefore not be developed on the Sizewell A land.

103. The Sizewell A (Magnox) land was therefore excluded from the onshore substation(s) site selection study area.

4.9.1.2.4 Defining the Onshore substation(s) site selection study area

104. The initial site selection study area (which was originally defined as far east as Aldeburgh Road) was extended westward following a request from Suffolk County Council and Suffolk Coastal and Waveney District Council in July 2017 to look further west by potentially crossing Aldeburgh Road. This area was previously excluded due to the potential interaction with residential titles or mature woodland. Suffolk County Council and Suffolk Coastal and Waveney District Council requested the extension westward as it was suggested that siting substations east of Aldeburgh Road would potentially have adverse impacts on the landscape associated with the Suffolk Coast and Heaths AONB (see **Table 4.2**).
105. It was acknowledged by the Applicant and the LPAs that the onshore substation(s) site selection study area should be large enough to ensure that a robust variety of alternative sites were identified and considered. Whilst it was identified that crossing Aldeburgh Road would potentially act as a significant constraint, and that extension westwards could be counter to the achievement of economy and efficiency, the Applicant undertook an assessment to extend the onshore substation(s) site selection study area to investigate alternative sites that would avoid potentially impacting on the landscape associated with the Suffolk Coast and Heaths AONB.
106. The onshore substation(s) site selection study area was therefore extended westward to capture the general area around the tension pylon north of Grove Wood (initially identified by National Grid during early consultation as a technically feasible connection point), doubling the westward extent of the onshore substation(s) site selection study area in proximity to the overhead lines. The onshore substation(s) site selection study area was not extended further west than the general area of the pylon north of Grove Wood due to the continuation of a similar dispersion of residential properties and similar land uses to the southwest along the overhead pylon line. In addition, further extension was deemed to be unnecessary given alternative sites within the extended onshore substation(s) site selection study area were identified as available.
107. The onshore substation(s) site selection study area was expanded to a 1km buffer either side of the overhead line route into Sizewell. This was to ensure

that any potential options, at a less economic and efficient distance from the overhead line, would still be captured and considered.

108. Review of this initial onshore substation(s) site selection study area (including a 1km buffer of the overhead lines up to the tension pylon north of Grove Wood) considered land use, high-level environmental constraints (such as nature conservation designations, Historic Environment Records, Environment Agency Flood Zone 2 and 3, and Public Rights of Way) and existing residential areas. Land use throughout this area is broadly similar, with large scale arable fields separated by scattered properties and small settlements.
109. The buffer defined in the process above was then expanded to follow field boundaries. This exercise was a desk-based GIS analysis supported by validated shapefiles and layers providing the boundary for the onshore substation(s) site selection study area. The following areas were then excluded (in terms of possibly locating onshore substations):
 - Residential properties and titles (including gardens);
 - International and national nature conservation designation sites; and
 - Any areas listed as Flood Zone 3.
110. Following this exercise, the onshore substation(s) site selection study area was presented to the LPAs in September 2017. Clarifications were also made regarding the non-inclusion of EDF reptile mitigation land (associated with Sizewell C New Nuclear Power Station; later referred to as Broom Covert, Sizewell site), and Magnox land (associated with Sizewell A) within the onshore substation(s) site selection study area. This onshore substation(s) site selection study area (as shown on **Figure 4.6**) was presented within the Scoping Report in November 2017 (SPR 2017) and through informal pre-application consultation to Parish Councils within the boundary of the onshore substation(s) site selection study area and at the November 2017 Public Information Days.

4.9.1.3 Definition of Onshore Substation(s) Zones

111. Onshore Substation Zones were identified within the onshore substation(s) site selection study area to refine down into potential locations for onshore substations. To establish the Onshore Substation Zones within the onshore substation(s) site selection study area, further consultation with the LPAs was undertaken in July 2017 via the Site Selection Expert Topic Group (ETG). The ETG indicated that an appropriate buffer should be applied to residential properties as a proxy for the minimisation of potential impacts associated with noise and visual impacts. This would enable identification of suitable land parcels / areas for infrastructure.

112. A target buffer of 250m from residential properties was applied following consultation with Suffolk Coastal and Waveney District Council at the July 2017 Site Selection ETG. The onshore substation(s) site selection study area was subdivided into zones based on available space for co-location of the onshore substation and the National Grid substation, whilst minimising interaction with the 250m buffer on residential properties as much as is possible. It is recognised that substation locations may encroach into this buffer once a final arrangement is determined, but identifying the buffer at this stage enabled the identification of substation zones for further investigation. Seven onshore substation zones were initially identified. These onshore substation zones are shown in **Figure 4.7**.
113. The seven zones were not delineated by the 'hard' boundary as illustrated in **Figure 4.7**. Each zone had flexibility contained within it to enable the onshore substations to be location according to field boundaries and delineation of land parcels. Zones were drawn and illustrated to aid consultation with members of the public, as shown at Public Information Days (as per **section 4.5.1**).
114. Site visits of those identified zones were conducted in July and August 2017. These visits were primarily to provide an understanding of the baseline landscape character and to understand the capacity for the landscape in these areas to accommodate onshore substation(s).

4.9.1.3.1 Onshore Substation(s) Site Selection RAG Assessment

115. A desk-based Red / Amber / Green (RAG) methodology was used as one of the tools to inform onshore substation site selection. This was considered appropriate to compare a number of substation zones for siting of similar infrastructure. A RAG assessment of this type enables a clear and direct comparison between each substation zone. RAG is a standard assessment tool used in the pre-EIA process to enable the comparison of sites based on common criteria and to assess the potential risks to proposed development options.
116. Development considerations captured within the RAG assessment were archaeology / heritage, ecology, landscape, hydrology and hydrogeology, engineering, community, landscape and visual, property and planning applications. Proximity to each of these development considerations was considered to influence the RAG scoring for each development consideration (e.g. proximity to a cultural heritage asset was used a proxy for the potential impact on the cultural heritage setting of that asset). The RAG assessment was undertaken by a team of specialists comprising engineers, land agents, EIA consultants, landscape, archaeology and ecological experts. The RAG system which ranks the influence of the consideration on future development, either

using defined parameters, professional judgement, or assessing the issue relative to the other potential options.

117. The methodology identified development considerations equally, i.e. there was no weighting of different development considerations applied relatively to each other so as not to prioritise particular environmental parameters and to consider all parameters as equally important. Whilst weighting was not incorporated in the RAG assessment findings, professional judgement, and feedback through the consultation process on the RAG assessment criteria, RAG scoring and appropriate buffers to environmental considerations was taken into consideration to inform the assessment.
118. The results of the RAG assessment were submitted to the LPAs in November 2017 via the Onshore Substation Site Selection RAG Assessment report (see **Appendix 4.1** and **section 4.9.1.3.5** below for further details on this RAG Assessment). The results of the substation zones RAG assessment were further discussed and presented to these stakeholders during a site visit and workshop in December 2017. The RAG assessment does not identify the chosen onshore substation site, rather it is a tool that allows a number of sites to be compared and the most acceptable sites identified at the time to progress to further assessment stages.
119. During consultation at the December 2017 site visit and workshop, the LPAs expressed concern that siting substations in the eastern half of the onshore site selection study area could have a significant impact on the Suffolk Coast and Heaths AONB and recommended that crossing Aldeburgh Road be formally assessed for engineering feasibility. In addition, the LPAs requested that the additional cost to the Applicant of the length of cable route should be discounted from the RAG assessment as this should not be a factor associated with site selection.
120. During the December 2017 site visit and workshop, the Applicant suggested that the potential to remove woodland to the south of Aldringham Court Nursing Home to facilitate the potential to cross Aldeburgh Road and access the identified substation zones to the west of Leiston could be fully investigated. The suitability of the western substation zones versus the eastern substation zones (delineated by Aldeburgh Road) could therefore be investigated.
121. Identified actions from the December 2017 workshop and site visit agreed with the LPAs were to investigate the engineering feasibility of crossing Aldeburgh Road if woodland was removed and to assess the potential impact on the Suffolk Coast and Heaths AONB if substation(s) were to be sited in or adjacent to it.

4.9.1.3.2 Onshore Substations Suffolk Coast and Heaths AONB Impact Appraisal

122. The Suffolk Coast and Heaths AONB impact appraisal (**Appendix 4.2**) used the 'natural beauty' indicators (LDA Design 2016) as indicators for landscape qualities of the AONB. Each substation zone was assessed against each 'natural beauty' indicator assessing the magnitude of change to the special quality and potential effect on the AONB special qualities. The appraisal concluded that if the substation(s) were to be sited in or immediately adjacent to the AONB then there are likely to be significant effects on the special qualities of the AONB, and if sited within the western substation zones, there is likely to be no significant effects on the special qualities of the AONB.

4.9.1.3.3 Policy Assessment of NPS EN-1 and NPPF Relating to Areas of Outstanding Natural Beauty

123. NPS-EN1 states that *"National Parks, the Broads and AONBs have been confirmed by the Government as having the highest status of protection in relation to landscape and scenic beauty"* and that development consent may only be granted in these areas in *"exceptional circumstances"*.
124. The National Planning Policy Framework (NPPF) states that *"planning permission should be refused for major developments in these designated areas except in exceptional circumstances where it can be demonstrated they are in the public interest. Consideration of such application should include an assessment of:*
- *The need for the development, including in terms of national considerations, and the impact of consenting or not consenting it up on the local economy;*
 - *The cost of, and scope for, developing elsewhere outside the designated area or meeting the need for it in some other way, taking account of the policy on alternatives set out in Section 4.4; and*
 - *Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."*
125. The NPPF does not contain specific policies for NSIPs (for which particular considerations apply, determined in accordance with the decision making framework set out in the Planning Act 2008 and relevant NPSs) but may be considered an important and relevant matter to the examination of the DCO application.
126. Part 15 of the NPPF is titled 'Conserving and Enhancing the Natural Environment'. Its paragraph 170 sets out the manner in which planning policies and decisions should contribute to and enhance the natural environment. In relation to consideration of Landscape and Visual matters, criteria (a) and (b) of NPPF paragraph 170 are the most pertinent:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); and

b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.

127. Paragraph 172 of the NPPF goes on to set out that: “Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues”.
128. Any assessment based on existing policy would therefore conclude that planning permission for development in the AONB should be refused or proceed only in exceptional circumstances and with significant moderation or mitigation of any impacts,

4.9.1.3.4 Aldeburgh Road Crossing Engineering Feasibility

129. Following an engineering feasibility review, it was deemed feasible to cross Aldeburgh Road if woodland was removed south of Aldringham Court Nursing Home. The precise swathe of woodland required to be removed is not yet determined, but the Applicant has committed to reducing the cable route width as much as possible at this location and has undertaken early engineering work which has allowed the Applicant to commit to an onshore cable route width of 16.1m (for the proposed East Anglia ONE North project only) or 27.1m total width for both the proposed East Anglia ONE North and East Anglia TWO projects at this location (reduced from the 50m onshore cable route width in non-restricted locations by removing adjacent spoil stockpiles to outside the constrained area).

4.9.1.3.5 Updated Substation Zones RAG Assessment

130. The Suffolk Coast and Heaths AONB impact appraisal and policy appraisal of NPS EN-1 regarding AONBs and Aldeburgh Road crossing engineering feasibility results were presented to the LPAs as well as stakeholders from Natural England, the Environment Agency, Historic England, the Suffolk Coast and Heaths AONB and the RSPB at a site visit and workshop in February 2018.
131. The Onshore Substation Site Selection RAG Assessment was updated following the AONB impact appraisal and Aldeburgh Road crossing engineering feasibility reports (creating an addendum, and subsequent second version, of the Onshore Substation Site Selection RAG Assessment). These amendments were borne of further information received from the LPAs regarding cable

routing principles (e.g. that length of onshore cable route and associated HGV movements should be removed as they are a proxy for cost considerations that should not be included as part of the RAG assessment); and further clarifications received from National Grid Electricity Transmission (NGET) regarding available infrastructure.

132. For the onshore substation RAG assessment this resulted in the following amendments to the parameters:
- **CHANGE:** Proximity to mature woodland
Requirement to alter score any of the western zones to Red score associated with cable route swathe interacting with removal of mature woodland
 - **CHANGE:** number of landowners parameter only triggers an Amber score for more than one landowner
 - **REMOVAL:** HGV's generated from cable routing
 - **REMOVAL:** Total length of cable routing required from landfall
 - **REMOVAL:** Properties required to CPO or removal by private treaty
133. The same updates that were applied to the onshore substation RAG assessment (associated with crossing Aldeburgh Road) were changed in relation to the application to the National Grid substation RAG assessment. These included:
- **CHANGE:** Proximity to mature woodland
Requirement to alter score any of the western zones to Red score associated with cable route swathe interacting with removal of mature woodland
 - **CHANGE:** number of landowners parameter only triggers an Amber score for more than one landowner
 - **REMOVAL:** Properties required to CPO or removal by private treaty
134. These updates are not reflected in the Onshore Substation Site Selection RAG Assessment presented in **Appendix 4.1**. Only the final development considerations agreed with the Site Selection ETG (as per the above) are presented.
135. The update identified three substation zones as scoring equally (see **Appendix 4.2** for further details on this RAG Assessment). These substation zones were located (see **Figure 4.7** for reference):
- East of Aldringham (Zone 4);

- West of Knodishall Church village (Zone 6); and
 - Northeast of Friston (Zone 7).
136. The NPS-EN1 guidance states that *“if the IPC [now the Planning Inspectorate] concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the IPC’s decision”*.
137. It was communicated to stakeholders at the February 2018 site visit and workshop that locating substations within any of the eastern substation zones would be likely to result in significant, including adverse, effects on a number of the special qualities of the AONB. The NPS-EN1 and NPPF state that consent in the AONB can only be granted in exceptional circumstances. The Applicant has identified scope for developing the proposed East Anglia ONE North project outside the AONB designated area, in accordance with the policy on alternatives outlined in NPS-EN1. Given that viable and consentable alternatives exist (based on the work undertaken to date) no exceptional circumstances exist for siting of the substation(s) within any of the eastern substation zones situated within or immediately adjacent to the Suffolk Coast and Heaths AONB.
- 4.9.1.3.6 Onshore Substation(s) Location**
138. The updated Onshore Site Selection RAG Assessment report plus the work streams associated with understanding the potential impacts on the Suffolk Coast and Heaths AONB and the Aldeburgh Road woodland crossing enabled the Applicant to enter a decision-making process with a view on the most favourable substation zone. The Applicant is required to take a balanced view toward site selection and the decision is based on a range of factors including deliverability, legal requirements, planning policy, technical engineering constraints, technical assessments (such as planning policy, landscape and visual impacts and ecology) and with the benefit of knowledge gained on SPR’s previous projects. The culmination of the various work streams as described in **section 4.9.1.3** enabled the Applicant to decide that the substation zone northeast of Friston (Zone 7) as the selected zone to be taken forward. This decision was communicated to all statutory consultees in April 2018; and communicated to the public via Public Information Days in May 2018.
- 4.9.1.3.7 Zone 7 Substation Further Studies**
139. Following confirmation of the decision to proceed with Zone 7, the LPAs were provided with further information to support this decision:

- A high-level assessment of obtaining access for construction traffic to the Zone 7 substation zone (**Appendix 4.3**); and
 - High-level Landscape and Visual Impact and mitigation comparison of Zone 7 versus substation zones in the east (**Appendix 4.4**).
140. The Traffic and Access – Substation Zone 7 Appraisal concluded that an initial review of highway geometry demonstrates that there are feasible access routes to the Zone 7 substation zone.
141. The Summary Note on Landscape and Visual Impact and Mitigation concluded that development of the substations in Zone 7 appeared from a high-level LVIA to have significant effects on fewer landscape and visual receptors overall, when compared to eastern zones.

4.9.1.4 Zone 7 substation micro-siting options

4.9.1.4.1 Substation micro-siting

142. Following the decision to locate the onshore substation(s) within Zone 7, a process of micro-siting was undertaken to refine the best location for the two onshore substations (one substation for the proposed East Anglia ONE North project and one for the proposed East Anglia TWO project) and the one National Grid substation within the substation zone.
143. The design assumptions made for micro-siting within Zone 7 are as described within **Appendix 4.1**.
144. Six options for the micro-siting / co-location of two onshore substations and one National Grid substation were identified and presented to stakeholders at a site selection workshop with statutory consultees held in June 2018. The exercise was informed by the development considerations mapping used throughout the Onshore Substation Site Selection RAG Assessment, survey data and desk-based data available.
145. The six options considered are presented in **Figure 4.8** to **Figure 4.13**.
146. The primary driver for the co-location and micro-siting of the three substations (two onshore substations and one National Grid substation) is landscape and visual impact. The proximity of Friston village to the south of Substation Zone 7, and views from it toward the substation infrastructure, as well as views from surrounding isolated properties, all favour a co-location of all three substations in close proximity to one another (i.e. Option 1). This maximises the potential of the surrounding woodland areas (Grove Wood, Old World Wood and Laurel Covert) to provide a natural screening effect to nearby visual receptors (as identified in **Appendix 4.4**) and to utilise these woodland blocks for a sympathetic planting scheme.

147. Siting of substations outwith the woodland areas would bring in visual receptors from the residential settlements of Friston, Knodishall, Knodishall Hall and local rural dwellings; users of the local Public Right of Way network; and motorists on the local road network an almost unobstructed view of the substation(s) and this option was therefore rejected.
148. The landform to the west of Grove Wood is relatively flat and gently undulating, with the landform to the north of the zone rising gradually and providing some visual containment. The high-level LVIA assessment (**Appendix 4.4**) identified notable opportunities for deliverable and effective mitigation in the form of new woodland planting by connecting to existing mature woodland blocks with further woodland planting and strengthening the existing hedgerow network.
149. It is considered that with the arrangement proposed in Option 1 (**Figure 4.8**) that landscape mitigation could be secured more effectively and is capable of being delivered and effective over the long term as part of a landscape masterplan. Siting of the substations outwith the arrangement proposed in Option 1 (any of the other Option 2-6) would not have the same capacity to deliver an effective mitigation. This allowed the Applicant to define the Substation Refined Area of Search as shown on **Figure 4.5**.
150. The Substation Refined Area of Search was presented to statutory consultees at the site selection workshop on 7th June 2018. Consultees were in agreement that the proposed location of the substations (with some further refinement associated with engineering refinement and appropriate buffers applied to woodland areas) would be suitable to progress for the assessment.

4.9.1.5 Proposed Substation Site Arrangement – Grove Wood, Friston

151. At the end of June 2018, a project decision was made to further microsite the onshore substations which required the partial removal of a small section of woodland on the south western corner of Laurel Covert to enable the arrangement shown in **Figure 4.14**. The reasons for this arrangement are:
- Parallel alignment of the East Anglia ONE North and East Anglia TWO onshore substations with the National Grid substation to improve constructability and interconnection;
 - Maximising the separation distance between the village of Friston and onshore substations;
 - Greater land availability for onshore cable route installation for an onshore cable route that approaches the onshore substations from the south (as opposed to from the east looping around Grove Wood);

- Avoidance of onshore cable route (as it approaches from the south, rather than the east) passing beneath the existing overhead lines to reduce construction activity health and safety risks);
 - Provision of additional separation between the East Anglia ONE North and East Anglia TWO onshore substations and Grove Wood, providing the opportunity for additional planting if required; and
 - Provision of additional space for Construction Consolidation Sites in the immediate vicinity of the East Anglia ONE North and East Anglia TWO onshore substations.
152. The proposed arrangement will require the removal of a small section of woodland associated with Laurel Covert, however this will not remove the natural screening effect provided by the mature woodland block as woodland is intended to be removed only from the 'internal' edge of Laurel Covert.
153. The proposed arrangement of the East Anglia ONE North onshore substation, East Anglia TWO onshore substation and National Grid substation is presented in **Figure 4.14**. This is included within the Proposed Onshore Development Area.
- 4.9.1.6 Phase 3.5 consultation and consideration of Broom Covert, Sizewell
- 4.9.1.6.1 Phase 3.5 consultation
154. A new phase (phase 3.5) of pre-application consultation was undertaken in response to LPA non-statutory responses from the phase 3 consultation to further consider a potential substation site on the EDF Energy estate. In parallel with this request, during consultation with EDF Energy in August 2018 they indicated that they may be prepared to release a parcel of land on the corner of Sizewell Gap Road and Lovers Lane to the Applicant for a potential substation location if suitable alternative mitigation land was identified and delivered for the purposes of the Sizewell C New Nuclear Power Station development, and there was no additional risk, cost or programme implications to EDF Energy in the development of the Sizewell C New Nuclear Power Station.
155. The Broom Covert, Sizewell land is located within the Suffolk Coast and Heaths AONB and is currently being used as a site to translocate protected wildlife in preparation for the Sizewell C Nuclear Power Station development. EDF Energy has been working closely in recent years with Suffolk Wildlife Trust and Natural England to establish this agreed ecological mitigation area.
156. Phase 3.5 enabled the Applicant to engage with local communities and consultees on the opportunity to consider this alternative substation site at Broom Covert, Sizewell (Zone 8) in parallel with our proposals for a substation site at Grove Wood, Friston. In addition, this phase of consultation was used to

communicate additional information on the Grove Wood, Friston site, particularly regarding additional information from National Grid on connection to the electrical transmission network, likely HGV transport routes on the local road network work and proposals for SuDS ponds to facilitate substation drainage works.

153. As part of the Phase 3.5 consultation, a proposed substation(s) site arrangement was prepared to enable a comparison between the two substation sites (see **Figure 4.15**). Extensive discussions with EDF Energy on the availability and deliverability of the Broom Covert, Sizewell site were also undertaken, as outline in **Table 4.7**.

Table 4.7 Engagement with EDF Energy Regarding Potential Broom Covert, Sizewell Alternative Substations Location

Date	Who with	Discussions
22 August 2018	SPR / EDF	Discussions on technical and commercial matters regarding the availability of Broom Covert, Sizewell and the need for replacement reptile mitigation land
31 August 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
7 September 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
12 September 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
19 September 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
21 September 2018	SPR / EDF / Natural England Suffolk Wildlife Trust	Discussions on replacement reptile mitigation land
27 September 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
12 October 2018	SPR / EDF	Discussions on commercial matters regarding the availability of Broom Covert, Sizewell
22 November 2018	SPR / EDF	Discussions on technical and commercial matters regarding the availability of Broom Covert, Sizewell and the need for replacement reptile mitigation land

154. As a responsible developer, the Applicant takes a balanced view towards site selection at all times using its industry leading legal advisors who draw on national planning guidance and industry leading technical advisors, in addition

to its own project experience, notably in the successful development of East Anglia ONE and East Anglia THREE Offshore Wind projects.

155. The Applicant received over 600 responses to Phase 3.5 consultation from members of the public, local interest groups and statutory stakeholders. Feedback was received in relation to the Grove Wood, Friston, site and the Broom Covert, Sizewell site. This consultation has for the Broom Covert site highlighted concerns regarding proposed substation impacts on the Suffolk Coast and Heaths Area of AONB and therefore compliance with National Policy.
156. NPS EN-1 sets out the criteria to be applied to determine whether 'exceptional circumstances' can be demonstrated to justify major development within the AONB. It is the Applicant's view that a feasible alternative site for the substation has been identified outside of the AONB, at Grove Wood, Friston, therefore such exceptional circumstances do not apply.

4.9.1.6.2 Onshore Substations Site Comparison

157. In order to further assess the Grove Wood, Friston and Broom Covert, Sizewell substation sites, the Applicant undertook a consideration of land requirements; critical path programme; key policy; design / construction; operations; and commercial viability / cost in parallel with the phase 3.5 consultation. The Applicant's project experience and knowledge of the sites has been applied in reaching judgements on each of these criteria in order to ensure balanced, robust and transparent conclusions are reached based on the above considerations.
158. Significant differences between the two substation sites:
- Presence of Broom Covert, Sizewell within the Suffolk Coast and Heaths AONB, contrary to NPS EN-1 and NPPF policy, a significant consenting risk to the project. A suitable alternative to siting within the Suffolk Coast and Heaths AONB exists (Grove Wood, Friston) and therefore exceptional circumstances do not exist to site within the AONB.
 - The Broom Covert, Sizewell site is located within the AONB (which is contrary to the NPS EN-1 policy) and siting in the Broom Covert, Sizewell site is likely to result in significant effects on some of the special qualities of the AONB;
 - Significant risk of Compulsory Acquisition Powers not being available to SPR at the Broom Covert, Sizewell site (due to the proximity to Sizewell B Nuclear Power Station and Galloper Offshore Wind Farm statutory undertaker land and the use of the site as reptile mitigation land for the proposed Sizewell C New Nuclear Power Station development.

- The need to secure replacement reptile mitigation land for the Sizewell C New Nuclear Power Station development on a voluntary basis, without the ability to secure land by compulsory acquisition (as land would need to be secured prior to SPR's compulsory acquisition rights being made available).
- Additional costs incurred in laying an additional 6km cable length to Grove Wood, Friston.

159. The Applicant's internal review was presented to the LPAs, Friston Parish Council and Leiston-cum-Thorpe Town Council at meetings in December 2018 to communicate the decision-making process and onshore substation site selection decision.

4.9.1.7 Substation Site Selection Decision

160. The Applicant has undertaken an extensive range of site selection studies in order to fully appraise the onshore substation site selection, and in particular the Grove Wood, Friston and Broom Covert, Sizewell sites including:

- Onshore Substations Site Selection RAG Assessment;
- Onshore Substations Suffolk Coast and Heaths AONB Impact Appraisal;
- Policy Assessment including NPS EN-1 Relating to Areas of Outstanding Natural Beauty; and
- Consultation Phase 3.5; and
- The Applicant's consideration of land requirements; critical path programme; key policy; design / construction; operations; and commercial viability / cost.

161. The Broom Covert, Sizewell site presents policy challenges toward gaining consent which outweigh the increased cost of further cabling to the Grove Wood, Friston site.

162. Specifically, the Broom Covert, Sizewell site is within an AONB and at a sensitive location due to the AONB being both narrow in width and having already had its landscape character influenced and adversely affected by the development of large-scale energy generation and transmission infrastructure in the immediate vicinity. Development, including screening and mitigation, at Broom Covert, Sizewell, is likely to have a significant effect on openness, tranquillity, views and character of the AONB. This erosion of the special qualities and the small scale of this part of the AONB increases its sensitivity to further effects. The Grove Wood, Friston, site lies outside the AONB and is not in a locally designated landscape.

163. It is the Applicant's position, in accordance with policies set out in NPS-EN1 and based on extensive advice and stakeholder engagement that the Grove

Wood, Friston site offers the most appropriate option for the siting of the East Anglia ONE North onshore substation.

4.9.2 Onshore Cable Route

4.9.2.1 Onshore Cable Refined Area of Search

164. The location of the onshore cable corridor is driven by the location of the onshore substation and the location of the landfall (**section 4.8**) to the proposed substation site (**section 4.9.1**).

165. The onshore cable routeing followed the same framework of site selection principles as the onshore substation site selection process:

- Avoid residential titles (including whole garden) where possible;
- Avoid direct significant impacts to internationally and nationally designated areas (e.g. SACs, SPAs, and SSSIs etc.);
- Minimise significant impacts to the special qualities (LDA 2016) of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty (**Appendix 4.2** and discussed in **Chapter 3 Policy and Legislative Context** and **Chapter 29 Landscape and Visual Impact Assessment**);
- Minimise disruption to landowners, services, road users and residents generally, prioritising voluntary (rather than compulsory powers of) acquisition and minimising disruption during construction;
- Minimise interaction with mature woodland;
- Avoid physical interaction with land and assets owned by EDF Energy to reduce consenting risk associated with interfering with another DCO proposal (statutory undertaker);
- The onshore cable corridor / route (and therefore consideration of substation and landfall siting) should be kept as straight and as short as practicable;
- Minimise the number and length of HDDs (see **Chapter 6 Project Description**);
- Minimise the number of crossings of assets (e.g. utilities) (assessed on a case-by-case basis); and
- All other policy and environmental constraints have been considered on a case-by-case basis (with consideration of appropriate mitigation).

4.9.2.2 Constraints Mapping and Engineering Feasibility

166. Detailed constraints mapping work within the onshore substation(s) site selection study area was used to refine the onshore substation(s) site selection study area to Grove Wood, Friston following identification of the substation site and landfall locations.

167. Key international and national environmental constraints sourced from the public domain were mapped as part of the Onshore Substations Site Selection RAG Assessment (**Appendix 4.1**). These included AONB, SSSIs, SACs, SPAs, Scheduled Monuments and Grade I, II and II* Listed Buildings (including Historic Environment Records). Local environmental constraints were then identified including areas of mature woodland. Potential route corridors, based on environmental constraints were identified.
168. In parallel, an engineering feasibility study considered how cables could, in practice, route around, through or under existing infrastructure.
169. An iterative and multidisciplinary approach incorporating engineering, constructability, cost, environmental, landowner, community, and stakeholder considerations was used in the development of cable corridor options. A series of internal proposed East Anglia ONE North and East Anglia TWO projects team workshops were held to ensure each of the factors were considered effectively.
170. Various stages of site selection work which have led to the identification of the preferred option for the onshore cable route. These stages were:
- Identification and characterisation of the onshore substation(s) site selection study area;
 - Refinement of the onshore cable corridors into a study area (shown at Scoping stage);
 - Production of the chosen Onshore Cable Corridor Refined Area of Search;
 - Review of the preferred Onshore Cable Corridor Refined Area of Search; and
 - Production of the Onshore Cable Corridor Refined Area of Search option for PEIR consultation.
171. Following consultation on the PEIR, the onshore cable corridor will be reviewed and a final onshore cable route option produced for the Project and its environmental assessment to be set out in the ES.
172. The identification of potential onshore cable corridor, in consultation with LPAs and relevant statutory consultees, allowed the onshore substation(s) site selection study area to be refined to an Onshore Cable Corridor Refined Area of Search (**Figure 4.5**). The Onshore Cable Corridor Refined Area of Search was formulated as follows:
- Designated areas within these corridors, including areas of SSSI, SPA and Ancient Woodland, were removed;

- The towns of Thorpeness, Sizewell, Leiston, Coldfair Green, Knodishall and Friston, as well as isolated residential properties and titles were also removed;
- The narrowest section of the 'Leiston – Aldeburgh SSSI' and the 'Sandlings SPA' was identified for the potential crossing location to reduce potential impacts on these designated sites. This has resulted in a significant route north from the landfall location to avoid interaction with key international and national environmental constraints;
- The site of the 'Leiston - Aldeburgh SSSI' and the 'Sandlings SPA' crossing was widened to increase routeing flexibility in this area (the Applicant has discussed the option of HDD at this location to reduce potential impacts on the SSSI and SPA with statutory and non-statutory consultees);
- Routeing across the woodland (and identified removal of trees) to the south of Aldringham Court Nursing Home as this is the only identified location where the cable route can cross Aldeburgh Road (**section 4.9.1.3.4**). The Applicant has committed to reducing the cable swathe to 16.1m for the proposed East Anglia ONE North project only or 27.1m for both the proposed East Anglia ONE North and East Anglia TWO projects at this location to retain as many trees as possible at this location, reduce impacts on heritage setting on the Grade II listed building (Raidsend);
- Opening out the potential cable route around Grove Wood so that a cable route could potential retain the option to route from the north or from the south to maximise flexibility; and
- Widening out of the Onshore Cable Corridor Refined Area of Search where possible to the edge of land boundaries to maximise potential for the landfall compound, construction consolidation sites and HDD compounds.

4.9.2.3 Proposed Onshore Cable Corridor

173. The potential onshore cable corridors associated with each substation location were assessed as part of the Onshore Substations Site Selection RAG Assessment from a technical and environmental perspective (cost having been excluded following recommendations by the Site Selection ETG through consultation).
174. In June 2018, The Applicant committed to cable routeing to the substation(s) to the south of Grove Wood, thereby excluding the option to the north of Grove Wood. This decision was made for these reasons:
- Separation of construction works for the onshore substations from the existing overhead line and the overhead line realignment works required to be undertaken by National Grid to accommodate the onshore substations grid connection;

- Allowing the onshore substations to be located slightly further north east away from the village of Friston (cabling around the north and west of Grove Wood would require the substation to be located further west); and
- The onshore cable route would enter the southern boundary of the East Anglia ONE North and East Anglia TWO onshore substations, exit the northern side of the East Anglia ONE North and East Anglia TWO onshore substations and into the southern boundary of the National Grid substation, thereby minimising the lengths of the cable required.

4.9.3 Proposed Onshore Development Area

175. Where possible, consultation responses to the PEIR will form the basis of further project design refinement and micro-siting associated with the offshore infrastructure, landfall, onshore cable route, onshore substation and National Grid infrastructure; and associated public highway accesses, offsite highway improvement works, landscape bunding, landscape planting, siting of CCSs, etc.
176. The results of consultation, discussions with landowners and the environmental baseline surveys will enable the Onshore Cable Corridor Refined Area of Search to be refined to a typical 70m onshore cable corridor that will be micro-sited to avoid environmental and landowner constraints, which will form part of the Proposed Onshore Development Area presented within the ES.
177. The typical 70m width will incorporate a typical working width of 32m, required to allow cables to be installed using open cut techniques and be carefully micro-sited within the limits of deviation to minimise their environmental impact.
178. The working width of 32m incorporates sufficient spacing between cable trenches to maintain their electrical performance and provides room for storage for excavated material and safe passage of construction personnel and vehicles along a haul road beside the trenches.. These areas of land within the working width would be required through the construction phase but would be reinstated to previous use in the operational phase, where possible.
179. At certain locations where space is constrained, the need for special trenchless construction techniques may be identified. These locations are potentially at environmentally sensitive areas, roads and utility crossings (see **Chapter 6 Project Description** for further details). These locations are currently still undergoing engineering design and will be fully detailed in the ES.

4.10 Summary

180. The site selection process for the East Anglia ONE North windfarm site and offshore cable corridor was an iterative one involving the consideration of

technical and environmental constraints through initial zone selection undertaken by The Crown Estate, the ZAP process and further detailed site specific studies conducted by The Applicant. These processes involved consultation with a range of stakeholders and the collation of existing and site specific data in order to refine broad areas of search into the boundaries for the offshore development area.

181. For the onshore infrastructure (i.e. landfall, onshore cable route, onshore substation and National Grid infrastructure location) the site selection process was also an iterative one involving the consideration of technical constraints, environmental effects and deliverability. Each part of the site selection and refinement process has been consulted on to date, and feedback from these consultations has been instrumental in determining the Proposed Onshore Development Area.
182. With regard to the potential new access locations to the Proposed Development Area, the consultation under Section 42 (local authorities and other bodies), Section 44 (landowners and other land interests) and Section 47 (the local community) of the Planning Act 2008 as well as informal consultation by the project team has provided an opportunity for stakeholders to review these locations and provide feedback on them to the Applicant for consideration for inclusion within the ES.
183. **Table 4.8** gives an overview of the site selection decisions that have been discussed throughout **section 4.7, 4.8 and 4.9**.

Table 4.8 Strategic Project Alternatives Considered

Infrastructure element	Options considered	Decision	Main environmental benefits
East Anglia ONE North windfarm site	n/a iterative refinement process based on initial strategic R3 zone selection	n/a	n/a
Offshore cable route	n/a All routeing based on constraints	n/a	n/a
Landfall	Initial landfall search area was Sizewell Village to Thorpeness. The area was then divided into sectors with the following sites taken	South (Thorpeness)	Avoids interaction with the offshore Coralline Crag and interaction with operation of Sizewell B Nuclear Power Station cooling water intake / outlet,

Infrastructure element	Options considered	Decision	Main environmental benefits
	forward: North (Sizewell Beach) Centre (Sizewell Hall / Dower House) South (Thorpeness)		allows co-location of the proposed East Anglia ONE North and East Anglia TWO projects and reduces total amount of area directly impacted. It avoids populated areas and those at risk of coastal erosion as far as possible.
Onshore cable route	The route of the onshore cable route is largely determined by the location and configuration of the onshore substations at PEIR stage. Refinement of Onshore Cable Refined Area of Search based upon design principles listed in section 4.5.6.1 was undertaken. The preferred onshore Cable Refined Area of Search was an onshore cable corridor as shown in Figure 4.5 .		
Onshore substation	Zones 1 – 8	Zone 7	This option maximises the potential of the surrounding woodland areas (Grove Wood and Laurel Covert) to provide a natural screening effect from nearby visual receptors (as identified in Appendix 4.4); and to utilise these woodland blocks for a sympathetic planting scheme whilst considered likely to have no significant effects on the special qualities of the Suffolk Coast and Heaths AONB.
National Grid infrastructure	The location was largely determined by the location and configuration of the onshore substations and requirement for proximity to the National Grid overhead line modifications.		
National Grid connection point	An appraisal of appropriate connection options was undertaken and from this a short list of preferred onshore connection points. A grid connection offer was made by National Grid for a connection point in the vicinity of Sizewell and Leiston and this was accepted by ScottishPower Renewables in		

Infrastructure element	Options considered	Decision	Main environmental benefits
	December 2017.		
National Grid overhead realignment works	The location was largely determined by the location and configuration of the onshore substations. The options considered are limited to adjacent to the proposed National Grid substation and the National Grid overhead line modifications and the National Grid temporary works areas.		

184. This site selection and assessment of alternatives chapter explains the process that has informed the proposed project design presented in **Chapter 6 Project Description** and shown in **Figure 4.1 to 4.14**. The design and parameters set out in **Chapter 6 Project Description** have been taken forward for assessment within technical chapters.

4.11 References

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