



NORTH FALLS

Offshore Wind Farm

PRELIMINARY ENVIRONMENTAL INFORMATION REPORT

Chapter 4 Site Selection and Assessment of Alternatives

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Contents

- 4 Site Selection and Assessment of Alternatives 9
 - 4.1 Introduction 9
 - 4.2 Key components of North Falls..... 9
 - 4.3 Legislation, policy and guidance 9
 - 4.4 Site selection process 14
 - 4.5 Consultation..... 15
 - 4.6 Project alternatives 30
 - 4.6.1 Offshore Transmission Network Review 33
 - 4.7 Collaboration with other projects..... 33
 - 4.8 Identification of the North Falls array areas 34
 - 4.9 Grid Connection..... 36
 - 4.10 Identification of the landfall search area 36
 - 4.10.1 Dovercourt 37
 - 4.10.2 Frinton-on-Sea to Clacton-on-Sea 37
 - 4.10.3 Jaywick 37
 - 4.11 Offshore export cable corridor site selection 38
 - 4.12 Interconnector cable corridor site selection 40
 - 4.13 Onshore substation 40
 - 4.13.1 Area of search 41
 - 4.13.2 Long list options..... 41
 - 4.13.3 Comparative assessment and short-listing process 43
 - 4.13.4 Further studies, and identification of a preferred option..... 44
 - 4.14 Onshore cable route 45
 - 4.14.1 Initial cable corridor identification..... 45
 - 4.14.2 Combined cable corridor site selection, in collaboration with VEOW. 47

4.14.3	Ongoing cable corridor refinement and corridor identification north of the A120	48
4.14.4	Onshore cable corridor(s) for PEIR.....	49
4.15	Summary	50
4.16	References	52

Tables

Table 4.1	Legislation, policy and guidance considered during the site selection and assessment of alternatives process.....	10
Table 4.2	Consultation responses	17
Table 4.3	Alternatives considered	30
Table 4.4	Further studies undertaken to inform the onshore substation site selection exercise	44
Table 4.5	Summary of alternatives and preferred options selected.....	50

Figures (Volume II)

Figure 4.1	Array areas site selection
Figure 4.2	Potential development array
Figure 4.3	Cable landfall site selection
Figure 4.4	Offshore cable corridor selection – preliminary area of search
Figure 4.5	Offshore cable corridor area of search with hard constraints removed
Figure 4.6	Offshore cable corridor preliminary options
Figure 4.7	Offshore cable corridor refinement
Figure 4.8	Onshore substation site selection - area of search

Figure 4.9 Onshore substation site selection - long list options

Figure 4.10 Onshore substation site selection - onshore substation zone (preferred option)

Figure 4.11 Onshore cable corridor site selection - combined cable corridors

Figure 4.12 Onshore cable corridor site selection - refined combined cable corridors

Figure 4.13 Onshore cable corridor site selection - preferred combined cable corridor

Figure 4.14 Onshore cable corridor site selection - cable route north of the A120

Figure 4.15 Onshore cable corridor site selection - preferred onshore cable corridor(s)

Appendices (Volume III)

Appendix 4.1 North Falls Site Selection Golden Rules

Glossary of Acronyms

AfL	Agreement for Lease
AONB	Area of Outstanding Natural Beauty
BEIS	Department for Business, Energy and Industrial Strategy
CAA	Civil Aviation Authority
CfD	Contracts for Difference
CIAL	Corridor Identification and Approval for Linear Activities
CION	Connection and Infrastructure Options Note
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
EIA	Environmental Impact Assessment
EN-1	Overarching National Policy Statement for Energy
EN-3	National Policy Statement for Renewable Energy
EN-5	National Policy Statement for Electricity Networks
ES	Environmental Statement
ETG	Expert Topic Group
EU	European Union
GGOW	Greater Gabbard Offshore Wind Farm
GGOWL	Greater Gabbard Offshore Winds Limited
GWF	Galloper Offshore Wind Farm
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Assessment
IMO	International Maritime Organisation
LNR	Local Nature Reserve
MCA	Maritime and Coastguard Agency
MCZ	Marine Conservation Zone
MMO	Marine Management Organisation
MoD	Ministry of Defence
NCN	National Cycle Network
NFOW	North Falls Offshore Wind Farm Limited
NNR	National Nature Reserves

NPS/s	National Policy Statement/s
NSIP	Nationally significant infrastructure project
OFTOs	Offshore Transmission Owners
OSP/s	Offshore substation platform/s
OWF/s	Offshore wind farm/s
PEIR	Preliminary Environmental Information Report
PRoW	Public Rights of Way
RAG	Red Amber Green Assessment
RSPB	Royal Society for the Protection of Birds
RYA	Royal Yachting Association
SAC	Special Area of Conservation
SPA	Special Protection Area
SPZs	Source Protection Zones
SSSI	Site of Special Scientific Interest
TSS	Traffic Separation Scheme
UKHPI	UK Habitats of Principal Importance
VEOW	Five Estuaries Offshore Wind Farm Limited

Glossary of Terminology

Array areas	The two distinct offshore wind farm areas (including the 'northern array area' and 'southern array area') which together comprise the North Falls offshore wind farm.
Array cables	Cables which link the wind turbine generators with each other and the offshore substation platform(s).
Cable circuit	A bundle which could comprise three power cables; three telecommunications cables; and one earth cable
Interconnector cable	Cable between the northern and southern array areas
Interconnector cable corridor	The corridor of the seabed between the northern and southern array areas within which the interconnector cable will be located.
Landfall	The location where the offshore export cables come ashore.
Landfall search area	Locations being considered for the landfall, comprising the Essex coast between Clacton-on-Sea and Frinton-on-Sea.

National Grid connection point	The grid connection location for the Project. National Grid are proposing to construct new electrical infrastructure to allow the Project to connect to the grid, and this new infrastructure will be located at the National Grid connection point.
Offshore cable corridor	The corridor of seabed from array areas to the landfall within which the offshore export cables will be located.
Offshore export cables	The cables which bring electricity from the array areas to the landfall.
Onshore cable corridor(s)	Onshore corridor(s) within which the onshore export cables and associated infrastructure will be located. A final onshore cable route for which consent will be sought will be selected from within these corridor(s).
Onshore export cables	The cables which take the electricity from landfall to the onshore substation. These comprise High Voltage Alternative Current (HVAC) cables, buried underground.
Onshore project area	The boundary within which all onshore infrastructure required for the Project will be located (i.e., landfall; onshore cable route, accesses, construction compounds; onshore substation and National Grid substation extension), as considered within the PEIR.
Onshore scoping area	The boundary within which all onshore infrastructure required for the Project will be located, as considered within the North Falls EIA Scoping Report.
Onshore substation	A compound containing electrical equipment required to transform and stabilise electricity generated by the Project so that it can be connected to the National Grid.
Onshore substation zone	Area within which the onshore substation will be located.
The Applicant	North Falls Offshore Wind Farm Limited (NFOW).
The Project Or 'North Falls'	North Falls Offshore Wind Farm, including all onshore and offshore infrastructure.

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 assessment of alternatives undertaken by North Falls Offshore Wind Farm Limited (NFOW; the Applicant) to define the North Falls offshore and onshore project areas.
2. North Falls is an extension to the existing Greater Gabbard Offshore Wind Farm (GGOW) and was identified during the extension leasing round launched by The Crown Estate in 2017 and finalised in 2019 (see Section 4.8).

4.2 Key components of North Falls

3. North Falls will comprise the following main offshore components:
 - Wind turbines and their associated foundations;
 - Offshore substation platform/s (OSP/s) and associated foundations; and
 - Subsea cables and cable protection – offshore export cables, array cables and interconnector cables.
4. The main onshore components of North Falls will include:
 - Cable landfall, where the offshore export cables are brought ashore;
 - Onshore export cables;
 - Onshore substation.

4.3 Legislation, policy and guidance

5. The site selection process for offshore wind farms (OWFs) in the UK is governed by the existing legislative, policy and guidance framework for the development of electrical infrastructure and for environmental assessment within the UK (see Chapter 3 Policy and Legislative Context (Volume I) for more information). The key pieces of legislation, policy and guidance which set the framework for site selection and the assessment of alternatives for OWFs in the UK are summarised in Table 4.1 below.
6. The Planning Act 2008 makes provision for National Policy Statements (NPSs). NPSs are designed to set the policy framework for determination of nationally significant infrastructure project (NSIP) applications. The three NPS which are relevant to North Falls are:
 - The Overarching NPS for Energy (NPS EN-1) (DECC, 2011a);
 - The NPS for Renewable Energy Infrastructure (NPS EN-3) (DECC, 2011b), which covers nationally significant renewable energy infrastructure (including offshore generating stations in excess of 100 MW); and
 - The NPS for Electricity Networks Infrastructure (NPS EN-5) (DECC, 2011c), which covers the electrical infrastructure associated with an NSIP.

7. It is noted that the NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5) are in the process of being revised. A draft version of each NPS was published for consultation in September 2021 (Department for Business Energy and Industrial Strategy (BEIS), (2021a), BEIS, (2021b) and BEIS (2021c), respectively). The final NPS were not available at the time of writing this PEIR and will be considered in the Environmental Statement (ES), if available.

Table 4.1 Legislation, policy and guidance considered during the site selection and assessment of alternatives process

Legislation, policy & guidance	Details
Legislation	
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017	<p>The consideration of alternatives and major design decisions made during the development of a project has been part of Environmental Impact Assessment (EIA) Legislation since the adoption of the original EIA directive in UK law under the European Union (EU) EIA Directive 85/337/EEC (as amended by Directives 97/11/EC, 2003/35/EC and 2009/31/EC).</p> <p>The original Infrastructure Planning (Environmental Impact Assessment) Regulations (2009) required the applicant to provide “an outline of the main alternatives studied by the applicant or appellant and an indication of the main reasons for his choice, taking into account the environmental effects”.</p> <p>The new EIA Regulations (2017) update the wording slightly but do not significantly change the position. The 2017 Regulations, at Schedule 4, paragraph 2, require an 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”.</p>
The Electricity Act 1989	<p>Schedule 9 of The Electricity Act 1989 sets out the obligations for a generation installation to mitigate the effects on the environment, including “shall have regard to...preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest”.</p> <p>In addition, Section 9 of the Act sets out the duties of an electricity distributor that are relevant to the site selection process, including that “It shall be the duty of an electricity distributor to develop and maintain an efficient, co-ordinated and economical system of electricity distribution”.</p>
The Planning Act 2008	The Planning Act 2008 (as amended by the Marine and Coastal Access Act 2009, the Localism Act 2011, the Growth and Infrastructure Act 2013, and the Infrastructure Act 2015) is the primary legislation that established the legal framework for applying for, examining and determining applications for NSIPs taking into account the guidance in NPSs.
National Policy	
Overarching NPS for Energy (EN-1) (2011)	The Overarching NPS for Energy (EN-1) is clear that although “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” (paragraph 4.4.1), in the execution of a competent EIA

Legislation, policy & guidance	Details
	<p>"applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied" (paragraph 4.4.2).</p>
<p>Draft Overarching NPS for Energy (EN-1) (2021) [currently under consultation]</p>	<p>The text quoted from the current Overarching NPS for Energy (EN-1) above remains unchanged within the Draft Overarching NPS for Energy (EN-1). Despite that, the following provision has been added to the set of guiding principles upon which the Secretary of State applies weight to alternatives:</p> <p>"Only alternatives that can meet the objectives of the proposed development need be considered" (paragraph 4.2.13).</p> <p>Draft NPS EN-1 has also been updated to reflect revised policy in relation to co-ordination with other projects, and states that "<i>The current approach to connecting offshore wind has resulted in individual radial connections developed project-by-project. While this may continue to be the most appropriate approach for some areas with single offshore wind projects that are not located in the proximity of other offshore wind infrastructure, it is expected that for regions with multiple windfarms a more coordinated approach will be adopted wherever possible</i>" (paragraph 3.3.51) and "<i>...where possible the preference should be for coordination of onshore transmission, offshore transmission, and offshore generation and interconnector developments.</i>" (paragraph 3.3.57). Co-ordination with other projects as part of North Falls' site selection process is discussed further in Section 4.6.</p>
<p>NPS for Renewable Energy Infrastructure (EN-3) (2011)</p>	<p>The NPS for Renewable Energy Infrastructure (EN-3), which relates to renewable energy generation infrastructure (transmission infrastructure is covered by EN-1 and EN-5) states that, in relation to consideration of alternatives, the "<i>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 [Infrastructure Planning Committee] IPC [now the Secretary of State], ...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 renewable energy infrastructure</i>" (paragraph 2.1.3). NPS EN-3 outlines that for offshore project areas, the IPC (now the Secretary of State) 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.</p>
<p>Draft NPS for Renewable Energy Infrastructure (EN-3) (2021) [currently under consultation]</p>	<p>The text quoted from the current NPS EN-3 above remains unchanged within the updated draft.</p> <p>As per draft NPS EN-1, draft NPS EN-3 has also been updated to reflect an expectation that where appropriate and feasible projects should seek a "<i>more co-ordinated approach to transmission from multiple offshore windfarms to onshore networks..., compared with a radial connection approach for single windfarm projects</i>" (paragraph 2.22.15), as discussed further in Section 4.6.</p>
<p>NPS Electricity Networks Infrastructure (EN-5) (2011)</p>	<p>The NPS for Electricity Networks Infrastructure (EN-5) states that, in relation to consideration of alternatives, "<i>the choices which energy companies make in selecting sites reflect their assessment of the risk that the IPC [now the Secretary of State], following the principles set out in paragraph 4.1.1 of EN-1, will not grant consent in any given case</i>" (paragraph 2.2.1).</p>

Legislation, policy & guidance	Details
Draft NPS Electricity Networks Infrastructure (EN-5) (2021) [currently under consultation]	<p>Section 2.2 of the Draft NPS Electricity Networks Infrastructure (EN-5) has been rewritten. Draft EN-5 highlights the constraints on site selection imposed by “i) the location of new generating stations or other infrastructure requiring connection to the network, and/or ii) system capacity and resilience requirements determined by the Electricity System Operator” (paragraph 2.2.1), together with the Government’s legally-binding Net Zero commitment and directs the Secretary of State to consider these in the decision-making process.</p> <p>Whilst the revised NPS EN-5 directs that ‘Applicants retain substantial control over routing and site selection within the identified macro-level location or development zone’, this does not “exempt Applicants from their duty to consider and balance the site-selection considerations [place in the local landscape, including characteristics such as local topography and/or the possibilities for screening of infrastructure], much less the policies on good design and impact mitigation detailed in Sections 2.7-2.14” (paragraph 2.2.2).</p>
Planning Inspectorate Advice Note Seven: EIA	The Planning Inspectorate Advice Note Seven suggests the EIA needs to explain “the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment” (paragraph 9.3).
Planning Inspectorate Advice Note Nine: Rochdale Envelope	The Rochdale envelope enables and facilitates a degree of flexibility within the project design at consent. Planning Inspectorate Advice Note Nine: Rochdale Envelope states “ <i>The need for flexibility is identified in a number of National Policy Statements (NPS) which suggest the Rochdale Envelope as an approach to address uncertainties inherent to the Proposed Development e.g., changing market conditions. However, Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for National Networks all stress the need to ensure that the significant effects of a Proposed Development have been properly assessed</i> ” (paragraph 1.3).
BEIS Energy White Paper	The BEIS (now Department for Energy Security and Net Zero (DESNZ)) Energy White Paper (2020) sets out how the UK will clean up its energy system and reach net zero emissions by 2050, reiterating the UK Government target of achieving 50GW of offshore wind by 2030, of which North Falls could make a significant contribution (see Chapter 3 Need for the Project, Volume I). Seeking the appropriate balance between environmental, social and economic costs is a key component of the white paper.
Marine Policy Statement	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.
East Marine Plans	The approach taken to offshore wind renewable energy infrastructure and subsea cabling outlined in the plan and associated policies. With specific reference to subsea cabling, engagement has been undertaken to understand potential impacts on navigation lanes and deep water channels, with the offshore cable corridor subsequently adapted to minimise impact.
The Crown Estate’s Cable Route Protocol	The Cable Route Protocol comprises a set of principles and requirements for offshore wind developers in the planning of offshore export cable routes. Compliance with these principles and requirements is secured within the offshore array Agreement for Lease (AfL). Compliance with these requirements must be demonstrated within the Corridor Identification and Approval for Linear

Legislation, policy & guidance	Details
	Activities (CIAL) document which will accompany an application to The Crown Estate for a transmission assets AfL.
National Planning Policy Framework (NPPF)	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 as a relevant and important matter.
Tendring District Local Development Plan	Tendring District Local Plan 2013-2033 and Beyond: North Essex Authorities' Shared Strategic Section 1 was formally adopted in January 2021, with Section 2 – which contains the Tendring-specific policies – formally adopted in January 2022. The Local Plan sets out the local planning policies which are a material consideration during the assessment of development proposals. These proposals sit within the framework of national planning policies set out the NPPF.
Guidance	
EIA Guide to Shaping Quality Development (Institute of Environmental Management and Assessment (IEMA))	<p>IEMA's EIA Guide to Shaping Quality Development states that considering the key environmental and consenting risks alongside the engineering requirements of a project can influence design in many ways. The earlier the interaction commences, the more likely it is that cost effective, positive outcomes will be achievable. This can be considered in several ways:</p> <ul style="list-style-type: none"> • The review of site selection of alternative development sites to avoid key sensitive receptors; • Alternating the layout to work within a site's existing natural systems; • Amending the design of a specific aspect of the development to manage impacts; • Specifying construction techniques to avoid effects on receptors; and • Changing materials to reduce volume and/or transport impacts.
The Horlock Rules	In order to identify the most appropriate location to site the onshore substation, National Grid's Guidelines on Substation Siting and Design ('The Horlock Rules') (National Grid Company (NGC), 2006) are considered. These guidelines document National Grid's best practice for the consideration of relevant constraints associated with the siting of onshore substations.
The Holford Rules	National Grid employs the Guidelines on overhead line routing. Since the formulation of the original Rules, formal requirements for environmental assessment have been introduced. Whilst environmental assessment for overhead lines addresses wider topics than the visual amenity issue on which the Rules concentrate, they remain a valuable tool in the selecting and assessing potential route options as part of the environmental assessment process. While there will be no overhead lines in the North Falls design envelope, the Holford Rules provide the context for the National Grid connection point. They also inform the North Falls project decision to select buried rather than overhead cables.

4.4 Site selection process

8. The siting, design and refinement of the North Falls offshore and onshore project areas has followed a site selection process, taking account of environmental, physical, technical, commercial and social considerations and opportunities, as well as engineering requirements. The details of the approach taken to select the array areas; offshore cable corridor; landfall search area; onshore cable corridor(s) and onshore substation locations are provided in Sections 4.8 to 4.14. The aim was to identify project areas that would be environmentally acceptable, deliverable and consentable, whilst also enabling, in the long term, the benefits of being economic and efficient.
9. A multi-disciplinary design team was formed to undertake the site selection process, which included a team of specialists comprising engineers, planners, land advisors, landscape architects, legal and Environmental Impact Assessment (EIA) consultants.
10. The site selection process commenced with the identification of an extension to the existing GGOW in 2019 (discussed further in Section 4.8). Then National Grid advised that the grid connection search area was in the region of the Tendring Peninsula (Section 4.9), which enabled a site selection process to be undertaken to identify a landfall search area (discussed in Section 4.10), and subsequent identification of the offshore cable corridor to connect the North Falls array areas and landfall search area (Section 4.11).
11. In December 2021, National Grid provided informal confirmation that the grid connection location for North Falls would be at a location in the vicinity of Ardleigh, to the north-west of Tendring Peninsula between Colchester and Manningtree. This enabled the site selection process for the onshore substation location (Section 4.13) and onshore cable route (Section 4.14). Plate 4.1 provides an overview of the North Falls site selection process. While Plate 4.1 depicts the site selection process as being linear, in reality, the North Falls site selection process has been an iterative process undertaken and informed by the Project's ongoing EIA studies, with decisions being made in consideration of multiple factors from different disciplines (including onshore and offshore) in parallel, throughout the site selection process.

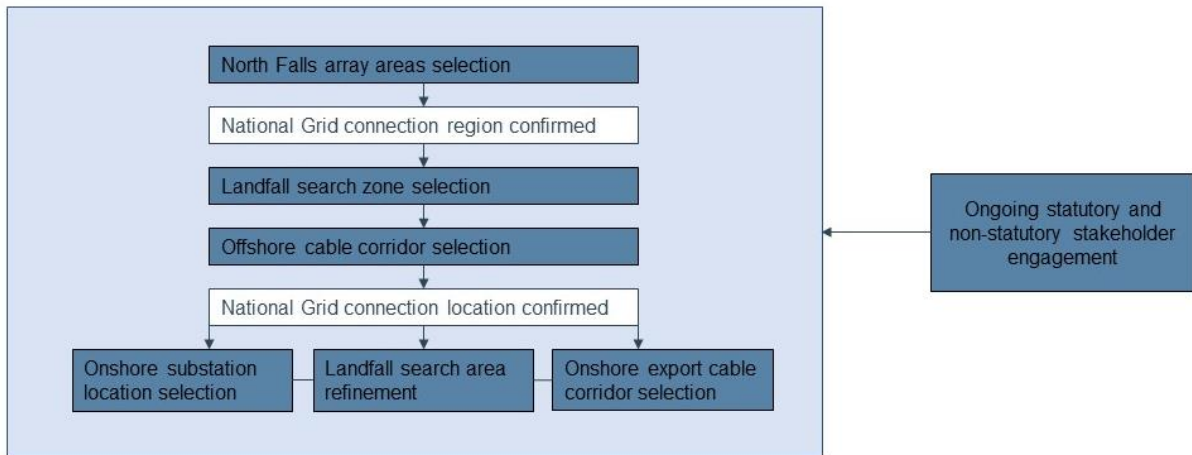


Plate 4.1 Overview of the North Falls site selection process

12. The project's site selection process was underpinned by a set of 'golden rules'. These are a set of assumptions and principles which set the framework for the site selection exercise, and which will be adhered to throughout the process. Whilst an extensive range of other environmental and technical parameters have also been considered during site selection, the golden rules represent the starting point for identifying viable options for the location of infrastructure. They are not an exhaustive list of the constraints considered, as these vary depending on the infrastructure element and were updated as the site selection progressed. Rather the golden rules serve as a starting point for the process to ensure there was a common set of rules which underpin the different studies and assessments which comprise the North Falls site selection process.
13. The golden rules have been derived using best practice guide for site selection, including The Crown Estate's Cable Route Protocol, the National Grid's Horlock Rules (for the siting of substations) and Holford Rules (for the siting of transmission infrastructure), as well as NPS EN-1, EN-3 and EN-5 and other relevant planning considerations.
14. The golden rules are presented in Appendix 4.1 (Volume III).

4.5 Consultation

15. The Applicant has undertaken pre-application engagement with stakeholders, communities and landowners throughout the site selection process, in order to seek input to the North Falls site selection process, as well as to communicate key project updates. The golden rules were extensively shared with statutory stakeholders, either during Expert Topic Groups (ETG) or during dedicated sessions, to ensure no constraint or filter was overlooked.
16. The key consultation to date relating to site selection and assessment of alternatives is summarised in Table 4.2. The feedback received has been considered in refining the project location and design. Table 4.2 provides a summary of how the consultation responses received to date have influenced the approach that has been taken.

17. This chapter will be updated following consultation on the PEIR, in order to produce the final assessment that will be submitted with the Development Consent Order (DCO) application. Full details of the consultation process will also be presented in the Consultation Report that forms part of the DCO application.

Table 4.2 Consultation responses

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
Maritime and Coastguard Agency (MCA) Trinity House	May 2018	A consultation event held with marine consultees around the initial array boundaries	<ul style="list-style-type: none"> • TH and MCA highlighted a major issue with the western part of the northern section of the array boundary, which at that time overlapped the Sunk Traffic Separation Scheme (TSS) North traffic lane and buffer zone (shown in Figure 4.2, Volume II). • The Recommended Route for ferries in the southern section of the PDA was discussed. From the traffic review this has fallen out of use. • Potential mitigation measures were reviewed. Consistency with what is already built in terms of layouts was highlighted as important, both to allow for SAR access 	In response to feedback from the MCA and TH, the northern array boundary was significantly reduced. Discussed further in Section 4.8.
Ministry of Defence (MoD) Civil Aviation Authority (CAA) National Federation of Fishermen's Organisations Natural England Suffolk Coast and Heath Area of Outstanding Natural Beauty (AONB) The Wildlife Trusts	November 2018	A consultation event (led by The Crown Estate) appraising constraints around the area sought for the array areas from North Falls	<p>Comments were raised regarding the following topics:</p> <ul style="list-style-type: none"> • Detection of turbines by air defence radar • Requirement for aviation warning lighting • Cumulative impacts with fishermen • Impacts on designated sites • Visual impacts • Cumulative effects of underwater noise • Displacement of international vessels/ navigation safety • Impacts on coastal process due to export cables • Socio-economic impacts • Cumulative/in-combination effects on ornithology • Comments from stakeholders that export cables should have been included in The Crown Estate's consultation 	<p>These issues are addressed in the following PEIR chapters (Volume I):</p> <ul style="list-style-type: none"> • Detection of turbines by air defence radar – Chapter 17 Aviation and Radar • Requirement for aviation warning lighting – Chapter 17 Aviation and Radar • Cumulative impacts with fishermen – Chapter 14 Commercial Fisheries • Impacts on designated sites – European sites are assessed in the Report to Inform Appropriate Assessment (RIAA) and the Marine Conservation Zone (MCZ) is assessed in the MCZ Assessment (MCZA Stage 1 Report) • Visual impacts – Chapter 29 Seascape, Landscape and Visual Impact Assessment (SLVIA)

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
Chamber of Shipping Historic England Whale and Dolphin Conservation Suffolk County Council Royal Society for the Protection of Birds (RSPB)				<ul style="list-style-type: none"> Cumulative effects of underwater noise – Chapter 12 Marine Mammals and Chapter 11 Fish and Shellfish Ecology Displacement of international vessels/ navigation safety – Chapter 15 Shipping and Navigation Impacts on coastal process due to export cables – Chapter 8 Marine Geology Oceanography and Physical Processes Socio-economic impacts – Chapter 31 Socio-Economics Cumulative/in-combination effects on ornithology – Chapter 13 Offshore Ornithology <p>With regards to comments that export cables should have been included in The Crown Estate's consultation, The Crown Estate produced a Cable Route Protocol as part of the plan-level Habitats Regulations Assessment (HRA) process. This protocol has been adhered to during the selection of the North Falls offshore cable corridor (discussed further in Section 4.11).</p>
Harwich Haven Authority Historic England Natural England MCA	January – February 2021	Consultation on five offshore cable corridor options (see Figure 4.6, Volume II, and Section 4.11).	<p>Harwich Haven Authority were opposed to an offshore cable corridor which would pass through the pilot boarding and entrance to the Harwich Deep Water Channel.</p> <p>Historic England noted that there was insufficient information available at the stage of selecting the offshore</p>	<p>The selection and refinement of the offshore cable corridor in response to the feedback received is discussed in Section 4.11.</p> <p>Consideration of the Trinity House buoyage and navigable water depths and feedback from RYA will be considered in the Navigational Risk Assessment to be completed post-PEIR and submitted with the</p>

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
Marine Management Organisation (MMO) MoD (Defence Infrastructure Organisation (DIO)) Port of Felixstowe Port of London Authority RSPB Royal Yachting Association (RYA) Trinity House The Wildlife Trusts			<p>cable corridor, which was prior to undertaking geophysical surveys.¹</p> <p>Natural England noted that their preference was likely to be the northern route (B) since it avoids sites designated for benthic features (although noting, as with the other proposed routes, this northern route will have some impact on the Outer Thames Estuary Special Protection Area (SPA)).</p> <p>MCA preferred the southern options, with advice provided on how the options could be improved (discussed via meeting).</p> <p>MMO – no response.</p> <p>MoD stated they had no concerns with any of the route options.</p> <p>Port of Felixstowe were opposed to a cable corridor which passes through the Sunk Pilot Area and approaches to Harwich Haven and the Port of Felixstowe, particularly in the South Shipwash area.</p>	DCO application (discussed further in Chapter 15 Shipping and Navigation (Volume I)).
MCA Trinity House Harwich Haven Authority Natural England	February 2021	Individual presentations of offshore cable corridor site selection process to date, refinement process and written consultation.	<p>Port of London Authority stated that of the 5 routes proposed, route South A posed the least risk to safety of navigation. The Port of London Authority was strongly opposed to North A and B, and South B routes and slightly opposed to the central route RSPB – no response</p>	

¹ It is standard practice for site selection to precede offshore surveys

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
Harwich Haven Authority Historic England Natural England MCA MMO MoD (Defence Infrastructure Organisation (DIO)) Port of Felixstowe Port of London Authority RSPB RYA Trinity House The Wildlife Trusts	February – March 2021	Consultation responses provided by stakeholders.	<p>RYA raised no preference of the route options and provided advice on aspects to be included in the Navigational Risk Assessment</p> <p>Trinity House raised concerns regarding the proximity of potential cable corridors to Trinity House buoyage. It was suggested any cable should be at least 200m from such buoyage, however, there may be an option for Trinity House to temporarily move/remove a buoy (with early consultation), to allow for cable laying activities to take place. The other main concern relates to navigable water depth reduction caused by cable protection. Trinity House recommends any reduction to navigable water depths within shipping lanes should be avoided.</p> <p>The Wildlife Trusts welcome an offshore cable corridor that avoids Kentish Knock East MCZ and Margate and Long Sands Special Area of Conservation (SAC).</p>	
Harwich Haven Authority Historic England Natural England MCA MMO	March 2021	Communication by NFOW to key stakeholders of the selected offshore cable corridor taking into account the feedback outlined above.	<p>Harwich Haven Authority responded with concerns which were subsequently discussed by meeting (see below)</p> <p>No further responses were received</p>	See Section 4.11, and Chapter 5 Project Description (Volume I).

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
MoD (Defence Infrastructure Organisation (DIO)) Port of Felixstowe Port of London Authority RSPB RYA Trinity House The Wildlife Trusts				
Harwich Haven Authority	March 2021	Meeting to discuss feedback on the offshore cable corridor	Harwich Haven Authority advised that they were due to start dredging the approach channel adjacent to the selected corridor. The Authority would be more content if the final route was within southern half of the current 1km cable corridor width.	While it is not yet possible to commit to reducing the offshore cable corridor width adjacent to the Harwich Haven Authority's proposed dredging area, this request is noted and where practicable, this request will be accommodated.
Essex County Council Tendring District Council Natural England The Wildlife Trusts	March/April 2021	Project update and communication by NFOW to key stakeholders of the initial site selection process of the landfall search area	N/A	See Section 4.10, and Chapter 5 Project Description (Volume I).
Natural England, Environment	January 2022	Consultation on the site selection 'golden rules', i.e.,	Essex County Council noted that Essex communities would only want disturbance once and it is Essex County	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
Agency and Essex County Council		those principles which underpin the site selection process, and the landfall site selection process.	<p>Council's preference for North Falls and Five Estuaries to collaborate.</p> <p>Essex County Council noted that traffic and transport impacts should be more explicit in the substation golden rules.</p> <p>Natural England noted that noted that Hog's Fennel and the Fishers estuarine moth are key features of the Site of Special Scientific Interest (SSSI) at the landfall and should be avoided.</p> <p>Natural England raised concerns around sinkholes and frac-outs resulting from Horizontal Directional Drilling (HDD) works. Also advised that the applicant would need to be certain of there being no possibility of sinkholes or assess the potential impact of them within the EIA.</p> <p>Environment Agency referred to a Natural England study on Martlesham Creek (Deben Estuary) where a mud breakout smothered bird feeding grounds.</p> <p>Environment Agency requested that groundwater aquifer/resources be considered within the Golden Rules as stresses on water supply is increasingly becoming an issue with development in the south-east.</p> <p>Comments from Natural England:</p> <p>We would advise that the North Falls Site Selection Principles should demonstrate consideration for avoiding all internationally and nationally designated sites. Similarly, locally designated and important sites should also be considered and avoided, where possible. Furthermore, we would also advise avoiding significant impacts to nationally designated landscapes, and also</p>	See Sections 4.13, 4.14 and Appendix 4.1 (Volume III).

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<p>impacts to National Trails, coast paths, and Public Rights of Way (PRoWs). We would also wish to see consideration of the following key criteria: agricultural land, local strategies, and any Nature Recovery Networks. We would also wish to see climate change impacts and adaptations considered within the Golden Rules.</p> <p>Holland Haven Marshes SSSI is notified primarily for its watercourses and bodies, and as such should be safeguarded against pollution from any works that take place there. Please also see our comments below regarding the possibility of sinkholes, their impacts and contingency.</p> <p>Offshore cable corridor</p> <p>1.1 (2nd Bullet Point) “Avoid, or minimise direct impact to, designated/protected environmental sites, including SACs and MCZs, where possible”. We note that this Principle does not mention Sites of Special Scientific Interest (SSSIs), Special Protection Areas (SPAs), Ramsar Sites etc, which we would wish to see included here.</p> <p>1.2 Other Offshore cable corridor Principles:</p> <ul style="list-style-type: none"> • We would wish to see the project avoid the use of any cable protection within any SAC, MCZ, or coastal SSSI, where possible • Be positioned to allow for climate change adaptation <p>Landfall</p> <p>2.1 (1st Bullet Point) “Avoid direct significant impacts to internationally and nationally designated areas (e.g., SACs, SPAs, and SSSIs etc.)” We note that this Principle</p>	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<p>does not mention Ramsar Sites, National Nature Reserves (NNRs) etc. Please include all internationally and nationally designated areas here.</p> <p>2.2 Other Landfall Principles</p> <p>There are a number of other principles which we would advise should be included for Landfall, as follows:</p> <ul style="list-style-type: none"> • Avoid significant impacts to nationally designated landscapes (i.e., Areas of Outstanding Natural Beauty (AONB)/National Parks/Heritage Coasts/Heritage Landscapes • Avoid impacts to National Trails, Coast Paths, and PROWs • Avoid significant impacts to mature woodland, historic, ancient woodland, ancient and veteran trees • Be positioned to allow for climate change adaptation <p>Onshore cable corridor(s)</p> <p>3.1 (3rd Bullet Point) “Avoid direct significant impacts to internationally and nationally designated areas (e.g., SACs, SPAs, and SSSIs etc.). We note that this Principle does not mention Ramsar Sites or NNRs etc. Please include all internationally and nationally designated areas here.</p> <p>3.2 (4th Bullet Point) “Avoid direct significant impacts to mature woodland and historic woodland.”</p> <p>This should also consider ancient woodland.</p> <p>3.3 Other Principles</p>	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<p>There are a number of other principles which we would advise should be included for the Onshore Cable Corridor(s), as follows:</p> <ul style="list-style-type: none"> • Avoid locally designated and important sites (e.g., Local Wildlife Sites, LNRs) • Avoid significant impacts to nationally designated landscapes (i.e., AONB/National Park/Heritage Coast/Heritage Landscapes) • Avoid impacts to National Trails, Coast Paths, and PRowS • Consider any local strategies, Nature Recovery Networks etc. <p>Onshore substation</p> <p>4.1 The identification of potential onshore substation options should also adhere to the following principles:</p> <ul style="list-style-type: none"> • Avoid locally designated and important sites (e.g., Local Wildlife Sites, LNRs) • Avoid significant impacts to nationally designated landscapes (i.e., AONB/National Park/Heritage Coast/Heritage Landscapes) • Avoid impacts to National Trails, Coast Paths, and PRowS • Avoid best and most versatile agricultural land i.e., Agricultural land classification 3 • Consider any local strategies, Nature Recovery Networks etc. • Minimise the hedgerows • Minimise the loss of waterbodies • Avoid ancient woodland <p>We note that should landfall be located at Holland Haven Marshes SSSI, then the North Falls project propose to</p>	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<p>use HDD under the SSSI. The SSSI is a water-dependant site and, therefore, Natural England would prefer for any application to HDD under, rather than open trench through, this site. As frac outs or bentonite breakouts are reasonably commonplace during HDD operations, Natural England would expect North Falls to present a detailed Management Plan, with mitigation for any potential impacts, at the time of application. Please also refer to our earlier response to the Draft Minutes for the North Falls Site Selection Consultation Meeting (email sent 28 January 2022) regarding the possibility of sinkholes, their potential impact, and including contingency for sink holes in any contingency plan.</p> <p>We would also wish the project to ensure that the features of interest of this SSSI will not be adversely affected by any project-related activities, and request that any grassland affected by the project should be restored after completion of any works.</p> <p>Comments from Historic England:</p> <p>We welcome that the electrical infrastructure will all avoid scheduled ancient monuments and listed buildings.</p> <p>We recommend the golden rules should also include avoidance of any non-designated heritage assets that are of the equivalent significance as scheduled ancient monuments and listed buildings but which are currently not designated, as identified by local authorities and Historic England.</p> <p>The project should also seek to minimise the impact (and thus harm) on all non-designated heritage assets, and in terms of the cumulative impact of other schemes (i.e.,</p>	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<p>National Grid and/or Five Estuaries). This will be achieved by early assessment, and by early evaluation in the case of buried archaeological remains, to establish the significance of any archaeological remains that might be affected by the infrastructure.</p> <p>In terms of the permanent, 'built' (above ground and visible) infrastructure, and in terms of the cumulative impact of other schemes (i.e., National Grid and/or Five Estuaries), every effort should be made to avoid and/or minimise any impact on the setting of designated heritage assets, as well as on historic landscapes.</p> <p>In general, and in all cases, we would recommend that engineering solutions are sought, and used in the scheme, that minimise the extent of the required infrastructure, thus, to minimise the extent of any impacts on the historic environment.</p>	
Environment Agency Natural England Historic England Tendring District Council Essex County Council	April 2022	Consultation on onshore substation site selection process and initial outputs (up to short list).	<p>Natural England recommending considering the following datasets during the site selection process:</p> <ul style="list-style-type: none"> • Great Crested Newt (GCN) Pond Survey 2017-19 data • GCN Class Survey Licence Returns • Granted European Protected Species Applications for the following: GCN, Bat, Cretaceous, Invertebrate, other mammal (e.g., water vole/badger), plant and reptile • Habitats for UK Protected Species • British Trust for Ornithology (BTO) dataset (if available) • National Biodiversity Network (NBN) Atlas for protected species data 	See Section 4.13.

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			<ul style="list-style-type: none"> • GCN Risk Zones – Natural England open data set • Local Biodiversity Information Service. • Core Sustenance Zones (CSZ) <p>And to ensure the following key issues are considered:</p> <ul style="list-style-type: none"> • Veteran Trees • Functional Linked Land (FLL) • GCN Risk Zones <p>And to consider the following opportunities:</p> <ul style="list-style-type: none"> • Biodiversity net gain • Green infrastructure • Farming and Wildlife Advisory Group (FWAG) East and Essex Wildlife Trust <p>Historic England recommends that the historic environment record (HER) should be included in the RAG assessment.</p> <p>Essex County Council requested protected lanes be considered within the RAG assessment.</p> <p>Essex County Council Highways keen to engage on access studies.</p>	

Consultee	Date / Document	Engagement	Stakeholder responses / comments	Where addressed in the PEIR
			Essex County Council archaeology suggested portable antiquities be considered.	
Environment Agency Natural England Historic England RSPB National Highways Tendring District Council Essex County Council	June 2022	Consultation on onshore cable corridor(s) site selection process and initial outputs (up to short list).	Natural England's position that the main benefit of a shared corridor between North Falls and Five Estuaries would be to minimise disruption but acknowledged that as the projects are independent to construct at the same time may be more difficult than for other OWFs. Essex County Council strongly advise combined consultation for both projects. Historic England pointed out that more sharing of infrastructure minimised the harm to the historic and archaeological environment.	See Section 4.14.

4.6 Project alternatives

18. A number of strategic-level project location and design alternatives have been considered as part of the site selection and assessment of alternatives process, shown in Table 4.3.

Table 4.3 Alternatives considered

Alternatives considered	Considerations	Conclusions
Non-radial export options	The project assessed within this PEIR is based around a radial connection for exporting electricity from the array areas to the National Grid. This has been identified by NFOW as the only current viable option for ensuring that the project can be built out by 2030 to meet the Government's offshore wind capacity targets of 50GW by 2030 (HM Government, 2022). However, NFOW have reviewed the possibility for alternative, non-radial options for exporting electricity from the array areas. These options are discussed in more detail in Section 4.6.1 below.	An onshore radial connection is the project assessed within this PEIR.
Landfall near Sizewell and associated offshore cable corridor	Cable route passed close to Orford Inshore MCZ and through the Outer Thames Estuary SPA providing comparable environmental constraints to the selected cable route. Landfall zone in the Sizewell area is highly constrained by existing GGOW and Galloper Wind Farm (GWF) export cables, East Anglia ONE North and TWO (now consented) export cables, Sizewell A and B nuclear power stations and a large geological feature driving the local coastal processes. Onshore cable routes were also constrained by existing and planned infrastructure. Substation location options were also constrained by the Suffolk Coast and Heaths Area of Outstanding Natural Beauty, villages and proposed substations for East Anglia ONE North and TWO and the existing and proposed nuclear power station works.	Taking account of the various constraints, National Grid moved the grid offer away from this region and instead to the Tendring Peninsula.
Alternative landfall options within the Tendring Peninsula	A site selection study was undertaken in February 2021 to identify the optimum landfall location along the Tendring peninsula. This exercise included a review of eight options between Harwich and Jaywick on the Tendring coast. Through a process of engineering and	A landfall search area located between Clacton-on-Sea and Frinton-on-Sea (to be further refined prior to the project's DCO submission to a single landfall location).

Alternatives considered	Considerations	Conclusions
	<p>environmental review, this was narrowed down to three options, which form the basis of the landfall search area assessed within this PEIR. The alternative options are discussed in more detail in Section 4.10.</p>	
<p>A range of offshore cable corridor options to the Tendring Peninsula</p>	<p>Section 4.11 describes the analysis of offshore cable corridor options, in consultation with key stakeholders</p>	<p>The current offshore cable corridor was selected to minimise interaction with environmental designated sites and interaction with shipping routes and dredging associated with Harwich Haven Authority.</p>
<p>Alternative onshore substation options</p>	<p>The site selection exercise described in Section 4.13 identified an initial 16 options for the location of the project's onshore substation within 3km of the project's informal grid connection point. These options were reviewed and assessed in order to identify a single preferred area in which the project's onshore substation is proposed to be located, which form the basis of the onshore substation zone assessed within this PEIR. An extensive list of environmental, engineering, planning and land criteria were used in defining the onshore substation zone.</p>	<p>An onshore substation zone located approximately 2km to the east of the village of Arleigh (to be further refined prior to the Project's DCO application submission to a narrower onshore substation footprint).</p>
<p>Alternative onshore cable corridor(s) options</p>	<p>The site selection exercise described in Section 4.14 identified a number of alternative onshore cable corridor(s) options for connecting the landfall search area to the onshore substation zone, including:</p> <ul style="list-style-type: none"> • Seven 400m-wide 'southern' options and three 400m-wide 'northern' options; • Five alternative refined 204m wide onshore cable corridor(s) connecting the landfall search area to the A120; • Three alternative 204m-wide onshore cable corridor(s) connecting the A120 to the onshore substation zone; • Three alternative 204m-wide onshore cable corridor(s) options around Thorpe-le-Soken. <p>These options were reviewed and assessed in order to identify as far as possible a single preferred 204m-wide</p>	<p>204m-wide onshore cable corridor(s) connecting the landfall search area to the onshore substation zone. Optionality has been retained for assessment in this PEIR in one area, around Thorpe-le-Soken, where three alternative onshore cable corridor(s) have been retained for further assessment. The onshore cable corridor(s) will undergo further refinement prior to the Project's DCO application.</p>

Alternatives considered	Considerations	Conclusions
	<p>onshore cable corridor(s), to assess within this PEIR. An extensive list of environmental, engineering, planning and land criteria were used in defining the onshore cable corridor(s).</p>	
<p>Overhead lines along the onshore cable route from landfall to onshore substation</p>	<p>Overhead lines were considered as an alternative option to buried cables for routing onshore export cables from landfall to the project's onshore substation. The key considerations in regard to this decision were:</p> <ul style="list-style-type: none"> • The potential visual impacts associated with above ground overhead lines; • The potential environmental effects associated with above ground infrastructure versus buried, below ground infrastructure. 	<p>The environmental benefit of burying cables as opposed to overhead lines and pylons is a significant reduction of permanent visual impacts, therefore buried cabling was selected.</p>
<p>Cable installation technique (onshore)</p>	<p>Alternative methods of cable duct installation within the onshore cable corridor(s) have been considered. NFOW have considered that in order to keep the onshore cable corridor(s) as narrow as possible, open cut trenching is the preferred method for duct installation for the onshore export cables. However, a review of obstacles along the route has been undertaken and, where sufficient engineering certainty is known at this stage to commit to specific duct installation techniques, alternative 'trenchless' techniques have been selected for duct installation in order to avoid certain obstacles or mitigate the potential impacts on certain receptors. Obstacles and receptors have been identified through engineering design and the EIA process, and include watercourses, major and selected sensitive minor roads, railway lines, designated sites for nature conservation, woodland UK Habitat of Principal Importance, and sensitive hedgerows.</p> <p>The proposed crossing schedule, including details of which techniques are proposed for obstacles and receptors identified along the route, can be seen in Appendix 5.1 (Volume III).</p>	<p>Open cut trenching is used as the primary installation technique, with trenchless techniques (e.g., HDD), to be used preferentially at certain obstacles and receptors. The techniques which are proposed to be used for each obstacle and receptor identified along the route can be seen in Appendix 5.1 (Volume III).</p>

4.6.1 Offshore Transmission Network Review

19. The assessment undertaken within this PEIR has been undertaken on the basis of the project being developed within a radial electrical connection from the array areas to the National Grid. This option is being developed and is the only currently viable option for ensuring the project can be designed and built out in order to meet the Government's offshore wind capacity targets of 50GW by 2030 (HM Government, 2022).
20. Notwithstanding this, North Falls along with four other projects in East Anglia: Five Estuaries Offshore Wind Farm project (herein 'Five Estuaries'), National Grid Electricity Transmission's Sea Link, National Grid Ventures' EuroLink and Nautilus are working together and exploring the potential for offshore coordination as part of the Offshore Transmission Network Review (OTNR) "Early Opportunities" workstream, with a view to identifying a Pathfinder Project. The agreement to explore grid-related opportunities was formalised in a statement published in July 2022 as part of the Offshore Transmission Network Review².

4.7 Collaboration with other projects

21. The draft revised Overarching National Policy Statement for Energy (EN-1) and draft revised National Policy Statement for Renewable Energy (EN-3) identify a need for "*a more co-ordinated approach to transmission from multiple offshore windfarms to onshore networks*" (BEIS, 2021b). Although these draft NPS have not, at the time of writing, been formally published in their final versions, NFOW have proactively considered other projects to seek opportunities for co-ordination during the project design process.
22. The key project on which co-ordination has been sought is Five Estuaries. This project, a proposed extension to the existing Galloper Offshore Wind Farm (GWF), is located to the east of North Falls and adjacent to the existing GWF within the southern North Sea. Five Estuaries is also seeking to connect to the National Grid via export cables connecting its array areas to the coast within the Tendring peninsula, and onward to a connection to the National Grid near the village of Ardleigh, between Colchester and Manningtree. The project's outline development programme is understood to be similar to that proposed by North Falls. North Falls have also received stakeholder feedback that collaboration on shared working footprints between the two projects would be desirable (see Section 4.5).
23. In light of this potential overlap, the projects have sought to co-ordinate in relation to the proposed onshore transmission infrastructure where practicable. This has included collaborating on a combined onshore cable corridor(s) study to select onshore cable corridor(s) which would be capable of accommodating the construction of the onshore infrastructure for both projects (see Section 4.14

² Joint statement from NFOW, VEOW and National Grid: Commitment to exploring coordinated network designs in East Anglia - GOV.UK (www.gov.uk)

below); the identification of an onshore substation zone by North Falls capable of accommodating onshore substations for both projects; and the sharing of certain EIA data in order to inform a common baseline for assessment. The two projects are independent and will remain so for the purposes of seeking DCOs, Contracts for Difference (CfD) and for the sale of transmission assets to Offshore Transmission Owners (OFTOs) under The Electricity (Competitive Tenders for Offshore Transmission Licences) Regulations 2015 (co-ordinated by Ofgem). Under the current regulatory regime, the projects are therefore not able to fully share infrastructure. However, co-ordination, especially onshore in order to minimise effects, continues to be undertaken where practicable.

24. The details of how co-ordination between North Falls and Five Estuaries has been undertaken during the Project's site selection process is set out in Sections 4.13 and 4.14 below.
25. Co-ordination with other projects in addition to Five Estuaries, including those listed under Section 4.6.1, has not been possible for North Falls to date, due to the early stages of development of these projects. Further opportunities for co-ordination, if they arise, will be explored in advance of the Project's DCO application.

4.8 Identification of the North Falls array areas

26. As discussed in Section 4.1, North Falls is an extension to the GGOW (Figure 4.1, Volume II), which is located off the coast of Suffolk, England and was commissioned in 2012. In February 2017, The Crown Estate launched an opportunity for owners of existing wind farms to apply for project extensions and NFOW was one of a number of developers that applied for an Agreement for Lease (AfL) to develop an extension to an existing offshore wind farm. NFOW and Greater Gabbard Offshore Winds Limited (GGOWL) are owned by a consortium of SSE Renewables Ltd and RWE Renewables UK Ltd.
27. The AfL applications identified areas of interest for each of the proposed extension OWFs. Subsequently, The Crown Estate undertook a plan level Habitats Regulations Assessment (HRA) of all the OWF extension applications received (The Crown Estate, 2019). The plan-level HRA ascertained that the plan, including North Falls (formerly 'Greater Gabbard Extension'), would not have an adverse effect on the integrity of any European Site, either alone or in combination with other plans or projects. NFOW was awarded seabed rights by The Crown Estate in August 2019 to progress the extension and seek planning consent.
28. Key criteria set by The Crown Estate's extension process which influenced the site selection process of the North Falls array areas, included the fact that wind farm extensions must share a boundary with the existing (parent) wind farm; and that the proposed wind farm to be extended must be constructed and fully operational at the date of the application.
29. GGOW was previously extended from its eastern boundary by GWF (Figure 4.1, Volume II), which has been operational since 2018. The starting point for the North Falls array areas selection was therefore that it had to be an extension to the north, west and/or south of GGOW, taking into account a range of existing constraints, discussed further below.

30. GGOW is comprised of two array areas, separated by the Sunk Traffic Separation Scheme (TSS) East (Figure 4.1, Volume II). North Falls is therefore also comprised of two separate array areas (the 'northern array area' and 'southern array area') to allow for the TSS.
31. In addition to the existing wind farms and TSS described above, the following constraints were considered during the site selection process:
 - Aggregate dredging grounds;
 - Harbour approach channel dredging areas;
 - Disposal sites;
 - Anchorage areas;
 - Military areas;
 - Cables;
 - Pipelines;
 - Nature conservation designations;
 - Oil and gas infrastructure;
 - Wind resource;
 - Metocean data; and
 - Bathymetry and predicted ground conditions.
32. The northern array area of North Falls was primarily defined by the following constraints (shown in Figure 4.1, Volume II):
 - The GGOW boundary to the south;
 - The GGOW and GWF existing cables to the north-east;
 - An aggregate production area to the north-west; and
 - The TSS to the west and south of the northern array area.
33. The southern array area is defined by the following constraints (Figure 4.1, Volume II):
 - The GGOW and GWF boundaries to the east;
 - TSS to the north and west; and
 - Aggregate production area to the south.
34. A small section in the south west of the southern array area was removed from the boundary to avoid cable crossings in the Kentish Knock East MCZ.
35. The array areas were designed to maximise capacity within the various constraints outlined above. In order to achieve this objective, an AfL with an area of 150km² was sought from The Crown Estate. Inter-turbine spacing of 7D (7 times the rotor diameter) downwind and 5D crosswind is required. With rotor diameters ranging from 164m and 337m, this facilitates up to 72 of the smallest turbines and 40 of the largest turbines in the design envelope (discussed further in Chapter 5 Project Description, Volume I). Maximising capacity is a key factor

in the assessment of alternatives, driven by a range of national targets and policies, in particular reaching 50GW of electricity generation from offshore wind by 2030 (discussed further in Chapter 2 Need for the Project and Chapter 3 Policy and Legislative Context, Volume I).

4.9 Grid Connection

36. National Grid is responsible for operating the electricity transmission network in England and Wales. The Connection and Infrastructure Options Note (CION) process is the mechanism used by National Grid to evaluate potential transmission options for generation projects to identify a suitable connection point, in line with their obligation to develop and maintain an efficient, coordinated and economic electricity transmission network. 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.
37. The CION process for North Falls commenced in March 2019 and concluded in April 2021 when National Grid provided North Falls with a draft CION offer for connection at a new 'East Anglia Coastal' substation. No confirmed location for the new substation was provided within the CION offer. However, in January 2021 National Grid provided North Falls with an informal understanding that the location of the new substation will be within the Tendring Peninsula. Subsequently, in December 2021 National Grid informally provided North Falls with confirmation that the new substation would be located in land east of the village of Ardleigh in Tendring district, Essex. NFOW have used this information as the basis of the site selection process for North Falls.
38. To date, no formal location for the new East Anglia Coastal substation has been made to NFOW. Since 2021, National Grid have developed proposals for the East Anglia Coastal substation as part of their East Anglia Green Energy Enablement (GREEN) proposals for upgrading the grid infrastructure within East Anglia. The East Anglia GREEN project is proposed to facilitate the transfer of power from the East Anglia region to the rest of the network thereby enabling connection of offshore wind generation, nuclear power generation and interconnectors which are expected into East Anglia by 2035. National Grid published a Scoping Report for the project in November 2022, which detailed proposals for a new substation to be located due north of the existing Lawford substation, east of the village of Ardleigh. NFOW are anticipating that this is the location at which North Falls will connect to the grid.

4.10 Identification of the landfall search area

39. The first step in identifying suitable locations for the project's transmission infrastructure is to identify a location where offshore export cables can be brought ashore (i.e., the cable landfall).
40. To determine the optimum location for cable landfall, the project needs to be in possession of information regarding the location in which it will be able to connect into the National Grid. Following National Grid's informal confirmation that the Project will connect into a new substation located within the Tendring

peninsula, North Falls commissioned a study to identify suitable locations for making cable landfall on the Tendring peninsula between the Stour and Colne Estuaries.

41. An initial desk-based exercise was undertaken to identify potential landfall locations along the Tendring coastline. As a first step, the study sought to identify broad areas in which cable landfall could be undertaken. International sites for nature conservation (European and Ramsar sites) and built-up areas on the coastline were removed from the search area. Once these constraints were removed, three areas along the Tendring district coastline were identified as providing potentially suitable locations for bringing cables ashore (see Figure 4.3, Volume II):
 - Dovercourt;
 - Frinton-on-Sea to Clacton-on-Sea; and
 - Jaywick
42. These three options were then subject to a desk-based engineering and environmental review to identify key technical feasibility and environmental constraints associated with each. The key findings are summarised below.

4.10.1 Dovercourt

43. Located immediately south of Harwich, this landfall location comes ashore in proximity to Hamford Water SPA and busy shipping channels. Onshore, the area would overlap with a potential historic landfill.

4.10.2 Frinton-on-Sea to Clacton-on-Sea

44. This location has the capacity for multiple possible landfall locations along its length and is relatively unconstrained offshore. The key constraint of this option is the presence of Holland Haven Marshes Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) across its length, immediately seaward of an existing sea wall. This designation could be crossed effectively by the use of Horizontal Directional Drilling (HDD) to install cables at the landfall (discussed further in Chapter 5, Project Description, Volume I).

4.10.3 Jaywick

45. To reach this option offshore export cables would need to route through Blackwater, Crouch, Roach and Colne Estuaries MCZ. Once onshore, the Clacton Cliffs and Foreshore geological SSSI would need to be crossed, although this could be crossed effectively by the use of HDD to install cables at the landfall. This option is narrow and constrained by residential properties on both sides.
46. Through comparative assessment, the Frinton-on-Sea to Clacton-on-Sea area was identified as the least constrained landfall location and was taken forward as the landfall search area for further assessment.

4.11 Offshore export cable corridor site selection

47. Following agreement of the wind farm array areas with The Crown Estate (Section 4.8), and identification of the grid connection search area (Section 4.9) and the corresponding landfall search area (Section 4.10), NFOW undertook site selection of the offshore cable corridor.
48. The first stage of the site selection exercise was to identify a broad 'area of search', in accordance with The Crown Estate's Cable Route Protocol (2019), in which the offshore cable corridor could be located to join the array areas to the landfall search area (Figure 4.4, Volume II).
49. The following hard constraints were then discounted from the area of search (Figure 4.4, Volume II):
 - Anchorages;
 - Dredging areas; and
 - Dumping grounds.
50. NFOW then sought to identify a number of offshore cable corridor options based on the following key principles:
 - Selection of the most direct route from array to preferred landfall search area, in balance with the other key principles;
 - Space for the following export cable parameters:
 - The offshore cable corridor width is 1km to accommodate;
 - Four export cable circuits;
 - Minimum spacing of 50m and an optimum spacing of 200m between export cable circuits. This spacing is based on ensuring there is enough space for installation and future repair if needed, as well as ensuring sufficient spacing to avoid thermal issues;
 - Sufficient room to micro-site around possible seabed obstructions identified during the EIA and pre-construction surveys;
 - Avoid or minimise direct impact to designated environmental sites where practicable, in accordance with The Crown Estate's cable route protocol;
 - Minimise impact on other sea users and navigational safety;
 - Avoid routing through significant sandbank features where a practicable alternative exists;
 - Avoid routing through licensed aggregate dredging areas, disposal sites, explosives dumping grounds and anchorages, in accordance with the hard constraints removed from the area of search;
 - Avoid routing through offshore oil and gas sites subject to a lease agreement with The Crown Estate, to include offshore fields and infrastructure (including pipelines and offshore platforms);
 - Avoid locations, including wrecks, known to be of archaeological importance where practicable;

- Avoid routing within the offshore array development boundaries of existing operational offshore project areas and those currently in planning or under construction;
 - Minimise the number of subsea cable/pipeline crossings required; and
 - Consider options that could minimise the cable infrastructure ‘footprint’ by working with other known developers who may be considering a similar route (subject to being able to make realistic assumptions about other developers’ proposals).
51. Northern, central and southern offshore cable corridor options between the array areas and landfall search area were identified by NFOW, following constraints mapping. Both of the north and south cable corridor options, also had two spurs where the export cables could leave the array areas, providing five options in total (North A, North B, Central, South A and South B; shown in Figure 4.6, Volume II). These options were then issued to key nature conservation, shipping and navigation stakeholders, the MoD and Historic England (Section 4.5) in accordance with The Crown Estate’s cable route protocol and order to obtain feedback on each option.
 52. Key consultee feedback included a recommendation to avoid the Margate and Long Sands SAC and the Kentish Knock East MCZ (i.e. the central and southern route options). This directed NFOW towards the northern corridor options, however issues with the northern corridors were raised by the shipping and navigation stakeholders and so this was subject to further consultation.
 53. The additional consultation with shipping and navigation stakeholders led to further refinement of the North B offshore cable corridor to avoid areas of heavy traffic for Ultra Large Container Vessels. This resulted in the final offshore cable corridor (‘North C’), shown in Figure 4.7 (Volume II).
 54. The proposed offshore cable corridor begins at the north west corner of the southern array area and crosses the main Sunk TSS south shipping channel at an angle as close as possible to perpendicular, to minimise disruption to the TSS.
 55. The corridor then turns north, running adjacent to the Margate and Long Sands SAC and routes between two areas of the Outer Thames Estuary SPA boundary, as to the extent this was practicable. After rounding the tip of the SAC, the corridor remains as far south as possible to minimise interaction with an International Maritime Organisation (IMO) ‘Area to be Avoided’ in the centre of the Sunk Outer precautionary area, as well as avoiding overlap with anchorage areas and a dredging channel for the approaches to Harwich Haven.
 56. Further to the west, the corridor moves slightly to the north to route around disposal sites and an anchorage area, while keeping south of the Harwich Ultra Large Container Vessel channel. After rounding the tip of the disposal site, the cable corridor routes southwest to the landfall search area, minimising overlap with areas of shallow water which represent engineering challenges to access with cable installation vessels. The cable corridor then turns to head to the landfall search area, crossing the shallow water in the most direct route possible.

4.12 Interconnector cable corridor site selection

57. The proposed array interconnector cable corridor is aligned roughly in a north/south orientation between the northern and southern array areas.
58. The interconnector cable corridor was selected to route between the western boundary of GGOW and the eastern boundary of the Sunk North TSS to minimise disruption to the existing OWF and shipping. The corridor also aims to further minimise disruption to shipping by crossing in a perpendicular alignment to the Sunk East TSS (Figure 4.1, Volume II).

4.13 Onshore substation

59. Following the provision of an informal grid connection location by National Grid in December 2021, NFOW has undertaken a site selection exercise to identify the optimum location for an onshore substation.
60. As outlined in Paragraph 19, NFOW has sought to identify suitable options for the project's onshore infrastructure that can accommodate either the North Falls project alone or combined infrastructure for North Falls and the Five Estuaries project. The onshore substation site selection exercise has therefore, from the outset, sought to identify options which would fulfil the objectives of both projects. This process is ongoing as the project continues to be refined, prior to submission of the DCO application.
61. The site selection exercise has sought to identify the most "*economical and efficient*" option, as described in Section 9 of the Electricity Act 1989, by taking into account, "*the environmental, social and economic effects and including, where relevant, technical and commercial feasibility*" as set out in the draft NPS EN-1 (BEIS, 2021a). The requirements are articulated in more detail in Schedule 9 of the Electricity Act 1989, which places a duty on all transmission and distribution licence holders, in formulating proposals for new electricity networks infrastructure, to "*have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and ... do what [they] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.*"
62. The onshore substation site selection exercise undertaken was multi-disciplinary, iterative and consultative, seeking to ensure a breadth of information was used to inform the identification of locations for the project's infrastructure.

4.13.1 Area of search

63. The first stage of the site selection exercise was, as described in The Crown Estate's Cable Route Protocol (2019)³, to identify a broad 'area of search' in which the project's onshore substation could be located. This area of search was defined by taking into account initial high level technical feasibility and environmental parameters in order to identify an area in which the onshore substation could potentially be located.
64. In order to delineate an area of search, the following principles were applied:
- All land within 3km of the Project's provisional grid connection point (located approximately 2km east of the village of Ardleigh, see Section 4.9) has been considered⁴;
 - From this 3km search area, the following high-level constraints have been applied:
 - Excluding all land more than 20km of the landfall search area⁵;
 - Excluding all population centres of over 5,000 inhabitants⁶;
 - Excluding all international designated sites for nature conservation (Ramsar sites) and sites on the UK National Sites Network (SAC / SPA); and
 - Excluding all national landscape designations (AONB);
 - Where other significant elements of linear built infrastructure (i.e., A-roads, railways, etc.) isolate parcels of the 3km buffer which would be too small to site options in, these have also been removed.
65. The area of search is shown in Figure 4.8 (Volume II).

4.13.2 Long list options

66. Following identification of an area of search, a constraints mapping exercise was undertaken to identify an initial 'long list' of potential options for the location of the onshore substation.
67. The following list of constraints were considered during the constraint mapping exercise:
- SPAs;

³ Note that although the Cable Route Protocol was devised to provide a framework for the identification of offshore transmission infrastructure, The Crown Estate's Cable Route Identification & Leasing Guidelines (2021) 'strongly encourages' use of the same site selection process outlined in the Cable Route Protocol during the identification of onshore transmission infrastructure.

⁴ This maximum distance of 3km is set in order to minimise the length of cable between the project's onshore substation and the grid connection point. Minimising this distance is necessary to minimise the general impacts from cabling, to minimise electrical losses which improves overall system efficiency, reduce/eliminate the need for additional equipment to compensate for losses and to minimise the overall cost of the connection. The 3km distance was selected on the basis of previous project and industry experience.

⁵ This threshold of 20km was used to define the onshore scoping area to limit the general impacts and electrical losses arising from extensive electrical cabling onshore.

⁶ Using ONS Built-Up Area dataset (2011).

- SACs;
 - Ramsar sites;
 - SSSIs;
 - LNR;
 - National Nature Reserves (NNR);
 - AONBs;
 - National Parks;
 - Country Parks / Registered Parks and Gardens;
 - Ancient woodland;
 - UK Habitats of Principal Importance (UKHPI);
 - RSPB reserves;
 - Main rivers;
 - Flood Zones 2 & 3;
 - Conservation areas;
 - Listed buildings;
 - Scheduled monuments;
 - Historic landscape;
 - LiDAR data (if available) for identifying unknown buried heritage;
 - Antiquity find spots;
 - Historic landfill sites;
 - Source Protection Zones (SPZs);
 - Agricultural land classification;
 - Heritage Coast;
 - Key settlements (OS Built up areas);
 - Residential properties plus 250m disturbance buffers around them;
 - Main roads (A roads and B roads);
 - Railways;
 - Public Rights of Way (PRoW);
 - National Cycle Network (NCN) routes;
 - Tourist attractions (e.g. golf course, caravan parks); and
 - Planning applications and extant planning permissions.
68. Consultation with the site selection ETG on the long list options and the site selection process was undertaken in April 2022, as outlined in Section 4.5. This

consultation sought feedback on the above list of constraints, which was used to review and updated the list of constraints considered.

69. Using these constraints, parcels of less 'constrained' land were identified within the area of search, which had the space to potentially accommodate onshore substation infrastructure for the North Falls and the Five Estuaries projects. This includes space for two project onshore substation platforms, and associated landscaping and biodiversity net gain, access and drainage requirements. These options are shown in Figure 4.9 (Volume II).

4.13.3 Comparative assessment and short-listing process

70. The long list of options were subject to a detailed comparative 'Red-Amber-Green (RAG)' assessment process to assess the constraints and opportunities of each option. This process involved a detailed technical review of each option by engineering, environmental, planning and land professionals in order to identify the relative constraints for each option. Each option was assessed against an extensive list of technical criteria (>50), such as risk of flooding, ease of access from the public highway, degree of buried site archaeological potential, etc. Higher risk or unfeasible options were given a 'red' rating against different technical criteria, whilst those with medium risks were coded 'amber' and those with the least risk were assigned 'green'.
71. Once all options had been assessed the relative number of 'red' and amber' risks for each were compared and the least constrained options identified. Initially, options were ruled on the following bases:
 - Potentially not consentable due to conflict with an applicable policy or because environmental mitigation is unlikely to reduce an effect to a non-significant level,
 - Potentially not technically feasible, or
 - Challenging to secure land rights for.
72. Key risks identified with those options which were not considered further at this stage included:
 - Construction traffic would need to route past sensitive receptors on the local highway network to reach the option;
 - The option is within 100m of sensitive noise receptors;
 - Land subject to planning allocations is present;
 - Extensive known buried heritage present within option;
 - Slopes of >1 in 30 in areas of the option;
 - Connection to potential onshore cable routes is heavily constrained, with extensive additional cabling required; and
 - Connection to National Grid substation likely to be heavily constrained, with extensive additional cabling required.

73. As a result, three options were discounted from further consideration. The remaining options were subject to further consideration, as well as amendments and refinement to avoid some of the constraints considered in the review.

4.13.4 Further studies, and identification of a preferred option

74. The RAG assessment exercise identified a series of uncertainties regarding the degree of risk / opportunity with the short-listed options. NFOW then sought to reduce these uncertainties by commissioning a series of studies. The studies undertaken are outlined in Table 4.4.

Table 4.4 Further studies undertaken to inform the onshore substation site selection exercise

Study	Description
Landscape site walkover	A walkover of the short-listed options to assess: <ul style="list-style-type: none"> • Baseline landscape character and landscape susceptibility to change; • Landscape designations; • Principal visual receptors; • Physical suitability of site for substation and mitigation.
Substation access strategy	A desk-based exercise to identify potential access routes to 10 options identified as 'inaccessible' from the public highway during the long list RAG assessment. The purpose of the exercise was to confirm whether potential access routes from the public highway to these options exist, and then to ensure these potential access routes are included in the RAG assessment so they can be assessed by other topics.
Heritage assessment	A detailed assessment of Historic Environment Record (HER) data for the onshore substation options, to identify the potential for known and unknown buried heritage within each option footprint, and to improve understanding of the relative risk of encountering sensitive archaeology at each option.
Extended Phase 1 Habitat Survey	A walkover survey of the short listed options to identify the protected species potential of the habitats present. In particular, the following were searched for: <ul style="list-style-type: none"> • Veteran trees; • Habitat condition; • Field signs of badgers; • Suitable habitat for roosting and commuting / foraging bats; • Suitable habitat for great crested newts; • Suitable habitat for hazel dormice; • Suitable habitat for water voles / otters; • Suitable habitat for common reptile species; • Suitable habitat for nesting birds; • Presence of invasive / non-native species.
Drainage assessment	A review of each short listed option to identify potential options for drainage management, to understand whether gravity-fed drainage is feasible, where options would drain into and what other drainage solutions would be required in the event that a gravity-fed solution is not available.
Utilities	A review of utilities data for each short listed option.
NPS Sensitivity Test	A review of the preferred option(s) against the provisions in National Policy Statements which set the planning policy for the project (EN-1, EN-3 and EN-5, including the draft revised NPS).

75. Following the conclusion of these studies, the RAG assessment work was reviewed and updated and then the options subject to further comparative assessment in order to identify a preferred option.
76. The preferred option selected represents a 'zone' (herein the 'onshore substation zone') covering two of the options identified during the initial long-listing process. By combining two options, some of the key constraints around the sites' buried archaeology potential could be avoided, whilst retaining flexibility in the project's design envelope at this stage, in advance of outline engineering design work.
77. The onshore substation zone identified through this process is an approximately 60ha area located either side of Ardleigh Road to the east of the village of Ardleigh in Tendring district, Essex. The zone is bounded by minor roads to the west and north, field boundaries to the north-east and south, the upper reaches of the Tenpenny Brook to the east and the existing Lawford substation site to the west. The zone is entirely comprised of flat-lying arable land in current use and has no internal boundary features. The nearest property is approximately 250m to the east, and the nearest settlement is the village of Little Bromley, approximately 1km to the east. The onshore substation zone is shown in Figure 4.10 (Volume II).

4.14 Onshore cable route

78. In parallel with the landfall refinement and onshore substation site selection work, a process to identify the onshore cable corridor(s) for the project was undertaken. This process can be broadly split into three phases of site selection:
 1. Initial cable corridor identification;
 2. Combined cable corridor site selection, in collaboration with Five Estuaries Offshore Wind Farm Limited (VEOW);
 3. Ongoing cable corridor refinement and corridor identification north of the A120.
79. These three phases of site selection have all been undertaken using the project's 'golden rules', as described in Appendix 4.1 (Volume III). As with other elements of the transmission infrastructure site selection process described above, this process has adhered to the recommendations regarding site selection described within the NPSs (and the draft NPSs) (especially EN-1 and EN5) and the Electricity Act 1989.

4.14.1 Initial cable corridor identification

80. An initial exercise was undertaken to identify broad, 400m wide corridors during Spring/Summer 2021. At this time the project was not in receipt of a formal grid connection location and corridors were identified based on assumptions regarding the potential maximum extent of transmission infrastructure required. The purpose of this exercise was to identify key high-level constraints which potentially would rule out cable routing from certain areas in order to start to narrow the scope of ongoing environmental studies.

81. The broad corridors sought to connect the project's initial landfall search zone (see Section 4.10) with land bounded by the Great Eastern Rail Line to the north-west of the Tendring peninsula, whilst also potentially serving grid connection points along this route.
82. For the generation of initial broad corridors, the following principles were used:
- Routing should be kept as straight and as short as practicable – avoiding tight bends;
 - Avoid residential titles (including whole garden) where practicable;
 - Avoid direct significant impacts to internationally and nationally designated areas (e.g., SACs, SPAs, Ramsar sites, NNRs and SSSIs);
 - Avoid direct significant impacts to mature woodland and ancient woodland;
 - Avoid scheduled ancient monuments and listed buildings;
 - Avoid historic or active landfill sites;
 - Minimise the number and length of trenchless crossings;
 - Minimise the number of crossings of assets (e.g., utilities);
 - Minimise the number of road and rail crossings;
 - Minimise the number of hedgerow crossings; and
 - Minimise the number of watercourse crossings and number of ponds affected.
83. In addition to the principles above, all onshore cable corridor(s) options need to be technically and economically feasible and to that end are subject to a constructability review as part of the site selection process.
84. This exercise generated ten 400m wide onshore cable corridor(s) options between the landfall search area and land in the north-west of the Tendring peninsula.
85. These options were subject to an initial engineering and environmental 'RAG' assessment, following the approach outlined in Section 4.13. The RAG assessment exercise proceeded to identify a series of high or 'red' constraints associated with some of the options identified, including:
- Areas of steep slopes (>1 in 12) along routes, for which construction options are likely severely restricted;
 - Significant pinch points around aggregations of constraints at obstacles crossing points;
 - Excessive number of watercourse / woodland (including ancient woodland) / local wildlife site crossings;
 - Multiple crossings of the Holland Haven Marshes SSSI;
 - Extended cable corridor length; and
 - Presence of planning allocations, planning applications and extant planning permissions.

86. Options with increased numbers of high or ‘red’ constraints were removed at this stage, and five 400m wide onshore cable corridor(s) options were retained for further consideration. These options were then used broadly as the basis for certain elements of environmental data collection onshore to inform the Project’s PEIR.

4.14.2 Combined cable corridor site selection, in collaboration with VEOW

87. As outlined in Paragraph 19, following the publication of the draft NPS EN-1 and EN-3, stakeholder feedback and also taking into account common goals around realising project efficiencies, NFOW and VEOW agreed that both parties would engage in a collaborative exercise around identifying North Falls and Five Estuaries (herein ‘the Projects’) onshore export cable infrastructure. Following this agreement, NFOW and VEOW jointly undertook a combined cable corridor study to look at the potential for identifying a single onshore cable corridor(s) option for connecting the projects’ landfall to land to the north-west of the A120 within the Tendring peninsula.
88. At the outset of the study in summer 2021, an informal grid connection location had not been provided by National Grid, however this was provided during the study’s progress and was therefore used to determine the output of the process.
89. The combined cable corridor study involved the following steps, each of which is described below:
- Undertaking an exercise to combine the wider corridors defined by each project to date into a single, 500m wide set of corridors;
 - Refining the 500m wide corridors down to 204m-wide corridors;
 - Undertaking a ‘RAG’ assessment of the 204m-wide corridors, to select a single preferred 204m wide corridor option.

4.14.2.1 *Combining North Falls and Five Estuaries corridors*

90. Both project’s initial cable corridors, overlaid onto each other combined into a single set of 500m wide corridors. This meant widening the corridors generated previously for North Falls. The combined corridors can be seen in Figure 4.11 (Volume II).

4.14.2.2 *Refining the 500m wide corridors down to 204m-wide*

91. Cable corridors were then sought to be refined to 204m, a width identified by NFOW and (VEOW as a suitable worst case envelope for construction of the two projects side by side using open cut trenching methods.
92. During the process of refining the 500m corridors, additional information was used to inform the refinement, including:
- Consideration of potential grid connection locations between landfall and land to the north-west of the A120 within the Tendring peninsula;
 - Engineering review of potential pinch points;
 - Initial landowner feedback along the routes.

93. These considerations led to the following set of amendments to the cable corridors during the refinement process:
- Western cable corridor around Holland Brook removed due to strategic allocations (planning constraints (surrounding Holland-on-Sea / Little Clacton)) and constrained pinch point between the railway line and Holland Brook determined, following engineering review, to be too narrow to achieve successful crossing;
 - Western cable corridors refined to take into account pinch points around residential properties;
 - North-eastern cable corridors north of Thorpe-le-Soken move further from properties due to perceived landowner concern;
 - Northern corridors amended to connect with potential grid connection points;
 - Corridors amended around pinch points at residential properties, watercourses, reservoirs, railway line, woodlands.
94. The refined combined corridors can be seen in Figure 4.12 (Volume II).
- 4.14.2.3 *'RAG' assessment of the 204m-wide corridors to select a single preferred 204m-wide corridor option*
95. The refined cable corridor options were then subject to a 'RAG' assessment following the methodology outlined in Section 4.13. This assessment identified a preferred option ('East 2'), on the following basis:
- 0.45km shorter than any other option (reduced disruption and reduced cost);
 - Fewest number of pinch points (i.e., 'spatial constraints') (three) along route;
 - Joint fewest number of main rivers crossed (one);
 - Joint fewest number of residential areas across route needing to be navigated (one); and
 - All other environmental criteria being equal between the corridor options.
96. The outcome of the combined cable corridor study was to identify a preferred onshore cable corridor(s) option which connects the cable landfall area to the land to the north-west of the A120 within the Tendring peninsula. The preferred option is shown on Figure 4.13 (Volume II).

4.14.3 Ongoing cable corridor refinement and corridor identification north of the A120

97. Following the completion of the combined cable corridor study, further ongoing refinement has taken place, as the project's onshore data collection has continued to gather data to inform cable corridor refinement, and as further engineering assessments have fed into the feasibility.
98. In addition, a separate cable corridor site selection study was undertaken for North Falls to identify a cable corridor to connect the combined cable corridor from the A120 to the North Falls onshore substation zone (see Section 4.14.3.2).

4.14.3.1 *Further cable corridor refinement*

99. North Falls commissioned a series of further engineering studies of the onshore cable corridor(s) in order to ensure its technical feasibility. These included:
- Widening the combined cable corridor near the coast, to accommodate the project's cable landfall zone;
 - Reviewing all obstacle crossings, and selecting a preferred method and alternative crossing method for each (see Crossing Schedule, Appendix 5.1, Volume III);
 - Widening the corridor at more complex obstacle crossings (e.g., railways, major 'A' roads), where an up to 243m-wide corridor is required to accommodate the potential thermal requirements of cable buried at greater depth (i.e., up to 10m);
 - Retaining cable corridor flexibility around Thorpe-Le-Soken to seek to minimise potential indirect effects upon the Hamford Water SAC;
 - Adding temporary construction compounds to the onshore cable corridor(s);
 - Widening the cable corridor around buried utilities to accommodate required stand-off distances requested by utility companies;
 - Widening the cable corridor to take account of other identified planning and environmental constraints, including woodland parcels and planning application boundaries.

4.14.3.2 *Cable corridor study north of the A120*

100. The cable corridor study north of the A120 sought to identify onshore cable corridor(s) options from the combined cable corridor from the A120 to the North Falls onshore substation zone. At the outset of the study, multiple options were still being considered for the onshore substation zone.
101. The approach to identification and assessment of cable corridors north of the A120 followed that undertaken for the combined cable corridor. Three initial 204m wide options were identified, and then refined in line with the wider changes to the combined cable corridor outlined in Section 4.14.3.1. These options are shown in Figure 4.14 (Volume II). The options were then subject to comparative environmental, engineering, planning and land 'RAG' assessment.
102. Following this review, the option with the fewest high or 'red' risks ('CR01') was selected as the preferred option. The key red risks identified for other options include cable length, the number of complex obstacle crossings required, and the feasibility of connecting into onshore substation zones under consideration by North Falls and Five Estuaries.

4.14.4 Onshore cable corridor(s) for PEIR

103. Following the conclusion of these onshore cable corridor site selection exercises, a set of onshore cable corridor(s) have been identified for assessment within the PEIR.

104. The onshore cable corridor(s) include predominantly a single combined cable corridor connecting the landfall search area to the onshore substation zone, including the following parameters:
- Minimum 204m wide;
 - Maximum 243m wide (at trenchless crossing locations / complex crossings);
 - Suitable to accommodate temporary works for two projects (North Falls and Five Estuaries);
 - Includes three corridor options at land immediately north of Thorpe-le-Soken, to accommodate flexibility when crossing land in proximity to Hamford Water SAC and Thorpe-le-Soken settlement;
 - Includes land for temporary construction compounds;
 - Includes a decision about the envelope of crossings techniques to be assessed at each obstacle (e.g., roads, rail, utilities, watercourses, sensitive habitats, etc.).
105. NFOW are in the process of identifying land required to facilitate the project's temporary construction and permanent operational accesses required to access the cable corridor, and these will be included within the boundary within the project's DCO application.
106. Further cabling will also be required within the East Anglia GREEN Proposed Substation location area as shown on Figure 1.2 (Volume II) in order to connect the onshore substation to the National Grid. The location of this cabling will be refined further in advance of the Project's DCO application, following confirmation of the precise grid location by National Grid.
107. The onshore cable corridor(s) considered within this PEIR are shown on Figure 4.15 (Volume II).

4.15 Summary

108. The site selection process for North Falls has been continuous since the project's inception and has been closely aligned with the project EIA process. The process has been iterative, multi-disciplinary and consultative, seeking to gather as much engineering, environmental, planning, land and stakeholder input to ensure informed decisions about site selection are made early in the project design process.
109. A summary of the key decisions made during the site selection process is provided in Table 4.5.

Table 4.5 Summary of alternatives and preferred options selected

Infrastructure element	Alternatives assessed	Preferred option
Offshore cable corridor	<p>The following alternative offshore cable corridors (shown on Figure 4.6, Volume II) were considered:</p> <ul style="list-style-type: none"> • North A; • North B; 	North C (Figure 4.7, Volume II).

Infrastructure element	Alternatives assessed	Preferred option
	<ul style="list-style-type: none"> • (following consultation) North C; • Central; • South A; and • South B. 	
Landfall search area	Alternative areas at (Figure 4.3, Volume II): <ul style="list-style-type: none"> • Jaywick • Clacton-on-Sea to Frinton-on-Sea • Dovercourt 	Clacton-on-Sea to Frinton-on-Sea (Figure 4.3, Volume II).
Onshore cable corridor(s)	Ten initial 400m onshore cable corridor(s) between the landfall search area and the A120. Seven 204m-wide combined onshore cable corridor(s) capable for supporting infrastructure substations for two projects Three options north of the A120.	A single, 204 – 243m wide cable corridor connecting the landfall search area to the onshore substation zone.
Onshore substation zone	Eight potential options for locating infrastructure for onshore substations for two projects	One 60ha 'zone' in land located along Ardleigh Road east of the village of Ardleigh.

110. The process is ongoing, and further site selection activities are proposed between now and the submission of the Project's DCO application. These include:

- Refining the PEIR onshore cable corridor(s) down into a final 'onshore cable route' within which the project's temporary construction working width and onshore export cables will be located;
- Refining the cable landfall search area down to a final landfall location and final landfall HDD compound location;
- Outline design of the onshore substation; and
- Identification of a location for the onshore substation and associated infrastructure within the onshore substation zone.

4.16 References

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