



Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Design and Access Statement

June 2018

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Vattenfall Wind Power Ltd

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June 2018

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Revision	A

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1 Introduction

1.1 Project Brief

- 1.1.1 Thanet Extension Offshore Wind Farm (the Project) is a proposed extension to the existing Thanet Offshore Wind Farm off the Kent Coast. The Project is being developed by Vattenfall Wind Power Ltd (VWPL).
- 1.1.2 Consent is being sought from the Secretary of State for Business, Environment and Industrial Strategy. Subject to approval, it is anticipated that the construction of the offshore wind farm and associated onshore electrical infrastructure will take up to four years to complete.

1.2 Purpose of this document

- 1.2.1 The purpose of this Design and Access Statement (DAS) is to demonstrate the evolution and rationale of the design of the onshore components of the Project comprising the landfall, the onshore cable route and the onshore substation. It describes how the design has been influenced by the technical and operational requirements of the wind farm electrical infrastructure. The design approach incorporates comments received during pre-application consultation under Sections 42, 47 and 48 of the Planning Act 2008, as well as outputs from the Environmental Impact Assessment.
- 1.2.2 The DAS supports the application for a Development Consent Order (DCO) submitted to the Planning Inspectorate (PINS) by VWPL. The DAS should be read in conjunction with the onshore chapters of the Environmental Statement (Documents 6.3.1 *et seq*).
- 1.2.3 Existing policy set out within the Overarching National Policy Statement for Energy (NPS EN-1) makes clear the requirements for good design in energy projects. The DAS provides a tool to communicate how the requirements for good design and access provisions have been considered.
- 1.2.4 There is no specific guidance provided for the preparation of Design and Access Statements in relation to Nationally Significant Infrastructure Projects (NSIPs). This DAS has therefore been produced in line with the Commission for Architecture and the Built Environment guidelines (CABE, 2007). The bullet points below set out the key parameters set out in the CABE guidelines:
- use – what is the purpose of the development and how it will fit within the surrounding environment;
 - amount – size and volume of the development and its constituent elements;
 - layout – the relationship between the development, and surrounding buildings;
 - scale – the physical size and shape of the proposed development;

- landscaping – how mitigation proposals will be applied to screen the development from wider views; and
- appearance – the physical look of the development specifically the design and materials;
- access – inclusive of construction and operational traffic and how crossings over roads and watercourses will be achieved.

1.3 Project Description

1.3.1 The DAS focuses on the onshore elements of the Project, landward from Mean High Water Springs (MHWS). The electricity generated offshore by the wind turbine generators (WTGs) will be brought to shore by the offshore export cables. These cables will make landfall at Pegwell Bay Country Park, south of Cliffsend village. From there the onshore cables would head south-west to a new onshore substation on the site of the former Port of Richborough. This new substation would be connected to a National Grid 400kV substation at Richborough Energy Park by underground cable.

1.3.2 This proposed onshore infrastructure is required to in order to connect the Project to the 400kV national electricity transmission network and is set out in detail in the Project Description: Onshore (Environmental Statement, Volume 3, Chapter 1, Document Ref: 6.3.1). Table 1.1 below sets out the primary infrastructure associated with the onshore elements of the Project.

Parameter	Maximum design envelope
Seawall extension (if required)	18.5 m seaward extension to a maximum width of 155m
Total number of onshore cable circuits	4 (12 individual cables) plus 8 fibre optic cables
Total length of onshore cable	2.6 km
Transition Joint Bay (TJB)	48 m ² per TJB (4 TJB maximum) at a maximum height of 2.3 m
Above ground cable berm height (if required)	1.2 m
Above ground cable berm height (if required)	Average width 15.3 m, extending to 28 m width for cable joint bays
Above ground cable berm length (if required)	725 m within the Pegwell Bay Country Park

Parameter	Maximum design envelope
Substation	Operational area 41000m ² ; area of main building 50m x 30m; maximum height 14m

Table 1.1 – key project parameters for onshore infrastructure

Landfall options

- 1.3.3 Three landfall installation options have been assessed as part of the Environmental Statement. These are as follows:
- 1.3.4 Option 1 – Horizontal Directional Drilling (HDD) from the TJBs onshore would exit beyond the intertidal saltmarsh, a minimum of 100m offshore. The TJBs would be buried underground and from that point cables would run underground to the onshore substation
- 1.3.5 Option 2 – Cables would be installed above ground to avoid disturbing the historic landfill at Pegwell Bay Country Park. To enable this a new permanent extension to the seawall would be created to allow cables to be brought above ground from the intertidal area prior to reaching the landfill. TJBs would be above ground covered by a berm up to 2.3m in height. Cables would then be installed in a berm up to 1.2m high through Pegwell Bay Country Park, before being buried for the remaining distance to the onshore substation.
- 1.3.6 Option 3 – As with option 1, TJBs and cables would be installed underground, however in this option cables would be trenched through the intertidal area and through the seawall, as opposed to using HDD.
- 1.3.7 These options each lead to different design and access considerations and, where required, are referred to separately in the discussion of the key parameters set out in paragraph 1.2.4 and illustrated in Figures 1.1 to 1.3 .



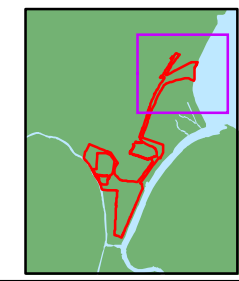
THANET EXTENSION OFFSHORE WIND FARM

Figure 1.1
Onshore Cable Route:
Landfall Option 1

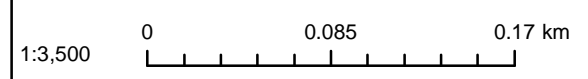
Legend

- Onshore Red Line Boundary
- Offshore Red Line Boundary
- Onshore Infrastructure (Indicative locations)
- Construction and laydown area
- Possible access
- HDD exit pits
- Landfall Area 350 m from seawall
- Temporary work area for HDD
- Transition pit cofferdam extent
- Cable corridor
- Transition Pit -12 x 22 m

Datum: OSGB 1936
Projection: BNG



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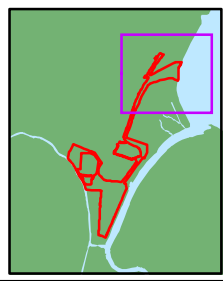
THANET EXTENSION OFFSHORE WIND FARM

Figure 1.2
Onshore Cable Route:
Landfall Option 2

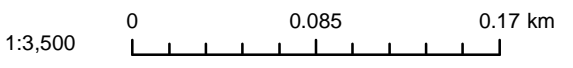
Legend

- Onshore Red Line Boundary
- Offshore Red Line Boundary
- Onshore Infrastructure (Indicative locations)
- Construction and laydown area
- Possible access
- Rock armour replacement area
- Temporary works area trenching
- Sea defence extension possible area
- Sea defence extension possible cofferdam extent
- Landfall Area 350 m from seawall
- KWT Crossing 5 x 54 m
- Cable corridor
- Subsea Cable Installation Area - 19 m
- Transition Pit Area -12 x 46 m
- Transition Pit -12 x 22 m

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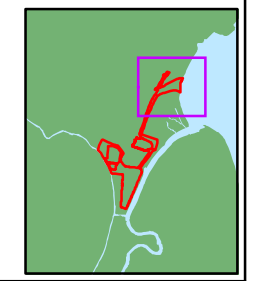
THANET EXTENSION OFFSHORE WIND FARM

Figure 1.3
Onshore Cable Route:
Landfall Option 3

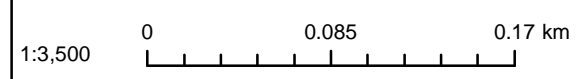
Legend

- Onshore Red Line Boundary
- Offshore Red Line Boundary
- Onshore Infrastructure (Indicative locations)
- Construction and laydown area
- Possible access
- Temporary works area trenching
- Sea defence extension possible area
- Sea defence extension possible cofferdam extent
- Landfall Area 350 m from seawall
- Transition pit cofferdam extent
- Cable corridor
- Subsea Cable Installation Area - 19 m
- Transition Pit - 12 x 22 m

Datum: OSGB 1936
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Figure 1.3

2 Policy framework

2.1 Framework

2.1.1 This section provides a summary of the main planning policies relevant to the Project and associated DCO documents. It includes a summary of the national policy and guidance relevant to the Project. A detailed appraisal of planning policy has been carried out within the Planning Statement (Document 8.4).

2.2 National Policy

2.2.1 The UK Government has produced three National Policy Statements (NPSs) under the Planning Act 2008 that are relevant to the onshore infrastructure for the Project:

2.2.2 Overarching NPS for Energy EN-1, July 2011 (DECC, 2011a);

2.2.3 NPS for Renewable Energy Infrastructure (EN-3, July 2011) (DECC, 2011b); and

2.2.4 NPS for Electricity Networks Infrastructure (EN-5, July 2011) (DECC, 2011c).

2.2.5 The NPSs establish the national need for a particular type of major infrastructure, together with a series of criteria relating to the benefits and impacts of a development. Potential benefits include a development's contribution to meeting the need for energy infrastructure, job creation and any long-term or wider benefits. Potential adverse impacts include any long-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.

2.2.6 The Project is an offshore generating station with a capacity in excess of 100MW and is therefore classified as an NSIP, requiring development consent under the Planning Act 2008. Under the Planning Act 2008 it is possible to include development associated with the generating station within the boundaries of the DCO. VWPL has included all the offshore and onshore infrastructure and grid connection elements of the Project within the DCO.

3 Site selection

3.1 Overview

- 3.1.1 Environmental, social and technical considerations have been integral to informing the design development of the Project. The design of the Project has been further informed through consultation inputs from statutory and non-statutory stakeholders.
- 3.1.2 The site selection process included the landfall, cable route and onshore substation. The criteria and approach to the site selection strategy is set out below and is further detailed in the Site Selection and Alternatives chapter of the Environmental Statement (Document 6.1.4).

3.2 Site selection

- 3.2.1 The approach taken to the site selection for Thanet Extension has been based on early engagement with a wide range of stakeholders, landowners and occupiers, together with a range of electrical, engineering, ecological and socio-economic appraisals. Stakeholder engagement has been a key aspect of the project design, each phase of consultation undertaken being designed to provide opportunities for stakeholders to review and provide information to VWPL in the development of Thanet Extension, influencing the relevant spatial and project design decisions that have been taken to date in the process of project development.
- 3.2.2 The process of site selection, and the associated consultation that has informed the project design is further illustrated in Figure 3.1 below, with the detailed design changes and the rationale for them in Table 3.1. It is important to note that whilst the site selection process has been described as a linear approach, the reality of any project development is that this site selection is a complex, iterative not necessarily follow this linear narrative. Decisions on site selection are required at various stages to enable the project to progress and are based on the best information available at the time.

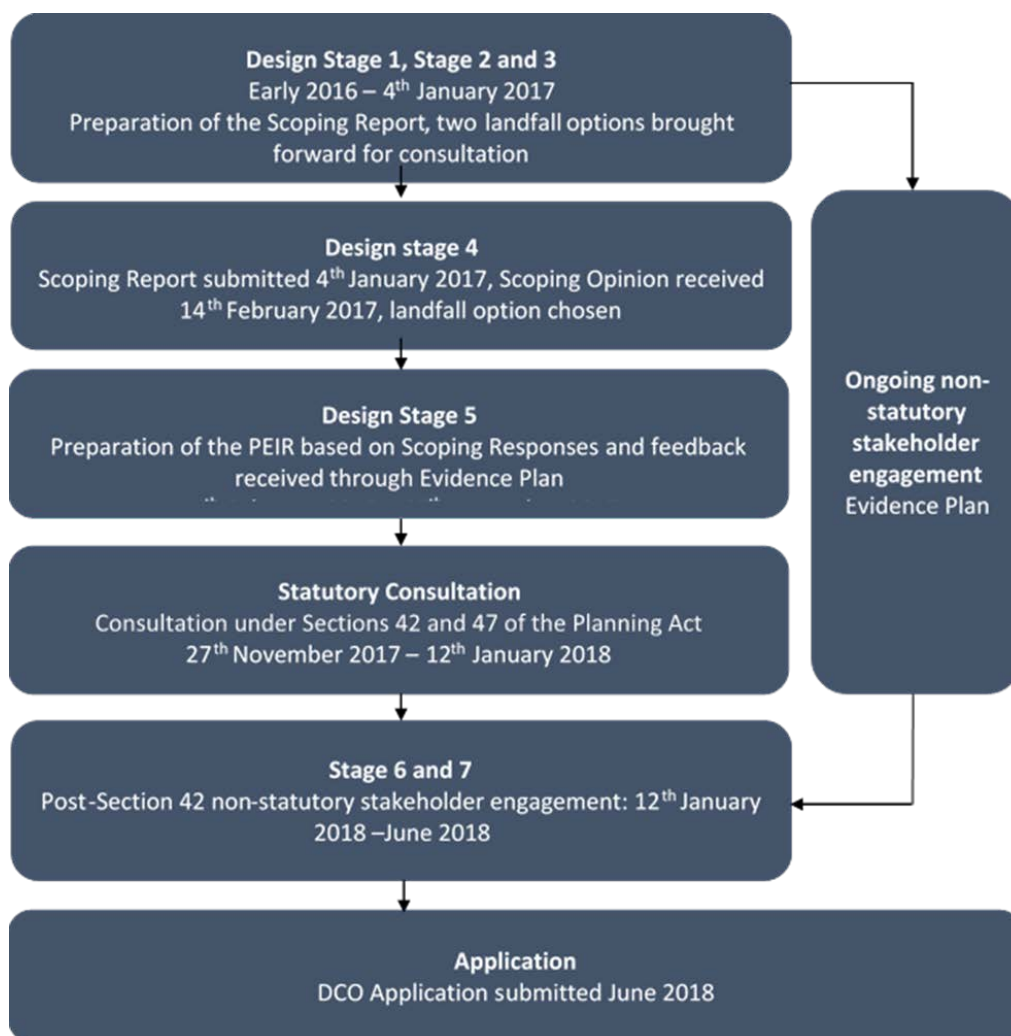


Figure 3.1 Thanet Extension site selection, consultation and design process

3.2.3 Table 3.1 sets out the key site selection and design decisions made throughout the development of Thanet Extension. These decisions have led to the definition of the principle elements of the onshore infrastructure (landfall, cable route and onshore substation), the design of which is discussed in greater detail in Section 4.

Table 3.1 Key stages of Site Selection

Stage	Measure	Description	Rationale
<i>Project design refinements of relevance to site selection</i>			

Stage	Measure	Description	Rationale
1	Identification of the offshore array area	The offshore array area was defined through following The Crown Estate requirements for extension projects as well as offshore constraints mapping and assessment	This approach identified a suitable area for offshore wind development and helped define offshore design parameters.
2	Identification of regional landfall area of search	Identification of wide search area for the project landfall locations which were Joss Bay, Sandwich Bay and Pegwell Bay.	Consideration of grid connection locations and possible offshore cable routes led to the selection of these options.
3	Refinement of landfall areas of search	Refinement from three landfall area options (comprising seven indicative routes) through to two landfall area options (Sandwich Bay and Pegwell Bay) brought forward in the scoping report following engineering appraisals and confirmation of the grid connection location.	Refinement of options in order to narrow the area of interest for a more focused scoping exercise. Joss Bay was dropped primarily due the technical constraints of a connection in this location.
4	Refinement of landfall options	Refinement from two landfall options (with indicative routes) presented during Scoping and subsequent consultation, through to single landfall location (Pegwell Bay) defined following scoping responses and appraisals.	Consultation responses from the Scoping Opinion and detailed assessment of the two landfall options concluded that Pegwell Bay was favoured for the vast majority of receptor groups including onshore ecology, traffic, engineering and landscape.

Stage	Measure	Description	Rationale
5	Refinement of onshore cable routes	Consideration of multiple onshore cable routes from the chosen landfall option, inclusive of indicative route presented in the scoping report to define two final onshore options for PEIR. Expansion from initial indicative route proposed in the scoping report to multiple routes and then further refinement following detailed environmental, social and engineering constraints to two final options for consideration at PEIR.	A change of onshore substation location from Richborough Energy Park to the former Richborough Port (due to space constraints at the original location) narrowed down route options. Uncertainty regarding the success of long horizontal directional drills further reduced route options.
6	Refinements of the proposed offshore development boundary (array)	The north-western extent of the proposed array boundary brought forward as part of the PEIR has been reduced in size to limit interaction with the 'North East Spit' pilotage and landing station as well as other shipping and navigation interests.	Consultation responses from PEIR identified a particular area of concern relating to the available sea room for vessel maneuverers to the west of the array area.
6	Refinement of the proposed offshore export cable corridor (OECC).	A cable exclusion zone was introduced around the approaches to Ramsgate Harbour to ensure permanent infrastructure was not installed.	Concerns were raised in PEIR consultation regarding the installation of cables around Ramsgate harbour and offshore designations.
6		The nearshore section of the OECC has been tapered towards the landfall location	The landfall location crosses designated areas and

Stage	Measure	Description	Rationale
		to limit the area potentially affected by works within the intertidal and shallow subtidal areas.	therefore was reduced to limit potential impacts.
6	Refinement of the proposed onshore development boundary (substation)	The land footprint to the south of the proposed substation location was increased in spatial extent	This extension was to allow for the relocation of local business interests currently occupying the onshore substation site and the associated temporary construction compound.
6	Refinement of the proposed onshore development boundary (landfall)	Long-term access from the Pegwell Bay Country Park through to the proposed landfall location was removed	To reduce interaction with local business interests and visitors arriving by vehicle.
6		The landfall installation options have been expanded to include the option to install cable ducts under the sea wall forming the boundary of the Pegwell Bay Country Park via Horizontal Directional Drilling	These options would reduce the interaction with the saltmarsh and sea wall, however they rely on the acceptability of trenching the landfill that underlies Pegwell Bay Country Park.
6		The landfall alternative options brought forward as part of the PEIR have been refined to remove the larger of the two sea wall extensions (as proposed in the PEIR).	To reduce the maximum extent of the permanent saltmarsh loss.
6		The landfall alternative options brought forward as	To reduce long-term effects on the saltmarsh habitats.

Stage	Measure	Description	Rationale
		part of the PEIR have been refined and updated to remove the option to position the TJBs within the saltmarsh.	
6		The landfall alternative options brought forward as part of the PEIR have been refined and updated to include clear reference to the use of a cofferdam during any work on the sea wall.	To ensure that contaminant pathways are adequately controlled.
6	Refinement of the proposed onshore cable route options	The onshore cable alternative options brought forward as part of the PEIR have been refined to remove the proposal to cross the Nemo Interconnector cable	Consultation responses commented on the potential visual impact of this option so this route option was removed in order to limit landscape and visual effects on Pegwell Bay Country Park.
6		The section of Sandwich Road formerly included within the proposed development boundary has been removed	The requirement to install cables down Sandwich Road was not required in light of the removal of the Nemo Interconnector crossing described above. In addition further technical assessment of the installation of cables in Sandwich Road concluded that this option was not suitable (Document ref: 6.1.4.1)
6		The onshore cable route installation options have	This design decision was made on the basis of

Stage	Measure	Description	Rationale
		<p>been updated to include the option of installing the cable within trenches within the Pegwell Bay Country Park rather than in above-ground berms, to reduce the long-term effects within the Pegwell Bay Country Park.</p>	<p>consultation responses and is subject to further site investigation and detailed design.</p>
6		<p>The onshore red line boundary has been refined in a number of locations.</p>	<p>The onshore boundary was subject to a full review in order to reduce effects within the cable corridor.</p>
6		<p>The potential onshore cable routes in the Richborough Energy Park location have been refined.</p>	<p>Following further discussions with stakeholders these route were defined to clearly account for the location(s) of existing and proposed infrastructure in the Richborough Energy Park.</p>

4 Project design

4.1 Overview

4.1.1 This section is structured in line with the CABE guidelines and considers the use, amount, layout and scale, landscaping and appearance of the landfall, cable route and substation. Access is considered separately in Section 5 of this DAS.

4.2 Landfall

4.2.1 The landfall is located within Pegwell Bay Country Park, south of Cliffsend. Works at the landfall are expected to be undertaken over an 18 month period. Where the landfall installation options set out in a paragraph 1.3.3 *et seq* differ under the parameters below, these are individually discussed.

Use

4.2.2 The purpose of the landfall is to bring the offshore export cables to shore and connect to the onshore cables. It is at this point where these two cable types would be jointed within a Transition Joint Bay (TJB). Offshore export cables would be pulled by a winch onto land.

Amount

4.2.3 Up to 4 separate TJBs would be constructed at the landfall to accommodate the jointing of up to 4 offshore cable circuits to the onshore cables.

4.2.4 All landfall options will require a temporary works area to facilitate the construction of the TJB or in the case of option 1, an HDD entry pit.

4.2.5 For landfall option 2 a new permanent seawall extension would be required and an above ground berm to accommodate both TJBs and cables.

4.2.6 Options 2 and 3 would both require a temporary cofferdam to provide a safe, dry, working environment for installation of the cables from the intertidal to the Country Park. This would be removed upon completion of the works.

Layout

4.2.7 Figures x.x to x.x set out the indicative layouts for the three landfall installation options. Due to the linear nature of the works the permanent layout will always start at the coastline with the offshore export cables, followed by the TJBs and then the onward onshore cables.

4.2.8 The position of the above ground TJBs required for option 2 would be designed to avoid wherever possible existing paths so as to minimise the effect of the berm on recreational users.

Scale

4.2.9 The TJBs will be individual concrete structures occupying no more than 48 m² with dimensions up to 12 m long, 4 m wide by 2.5 m deep.

4.2.10 For landfall option 2 the TJBs would be installed above ground in a berm up to 2.3 m in height. The width of the berm could be in the order of up to 45 m width which would accommodate the maximum of 4 TJBs and a slope of 1:5. Option 2 would also require a permanent extension to the sea wall, extending up to 18.5 m from the existing sea wall alignment, with a width of up to 155 m.

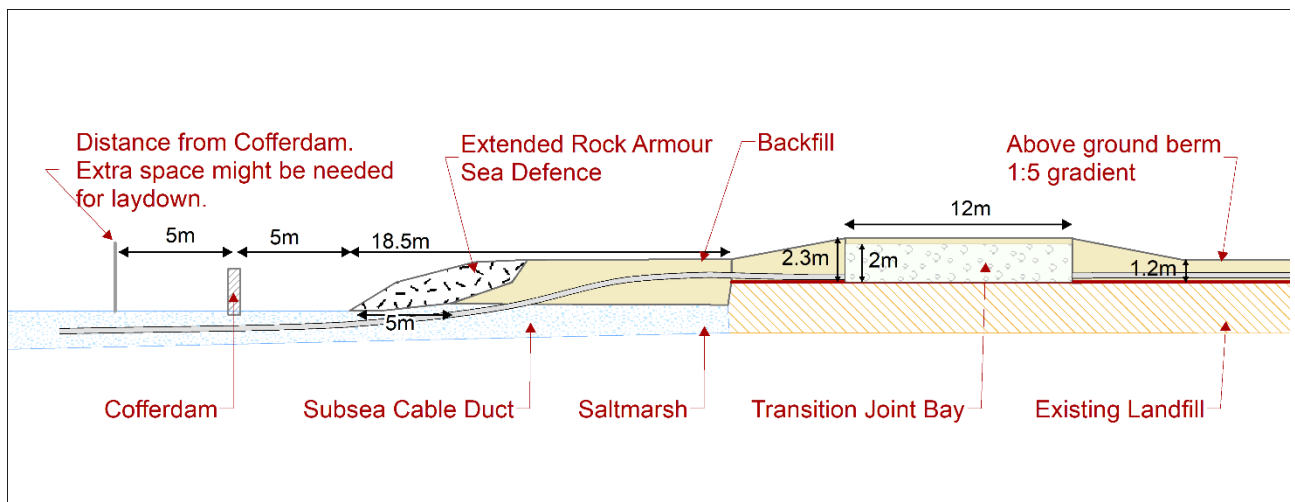


Figure 4.5 Cross Section of above ground TJB

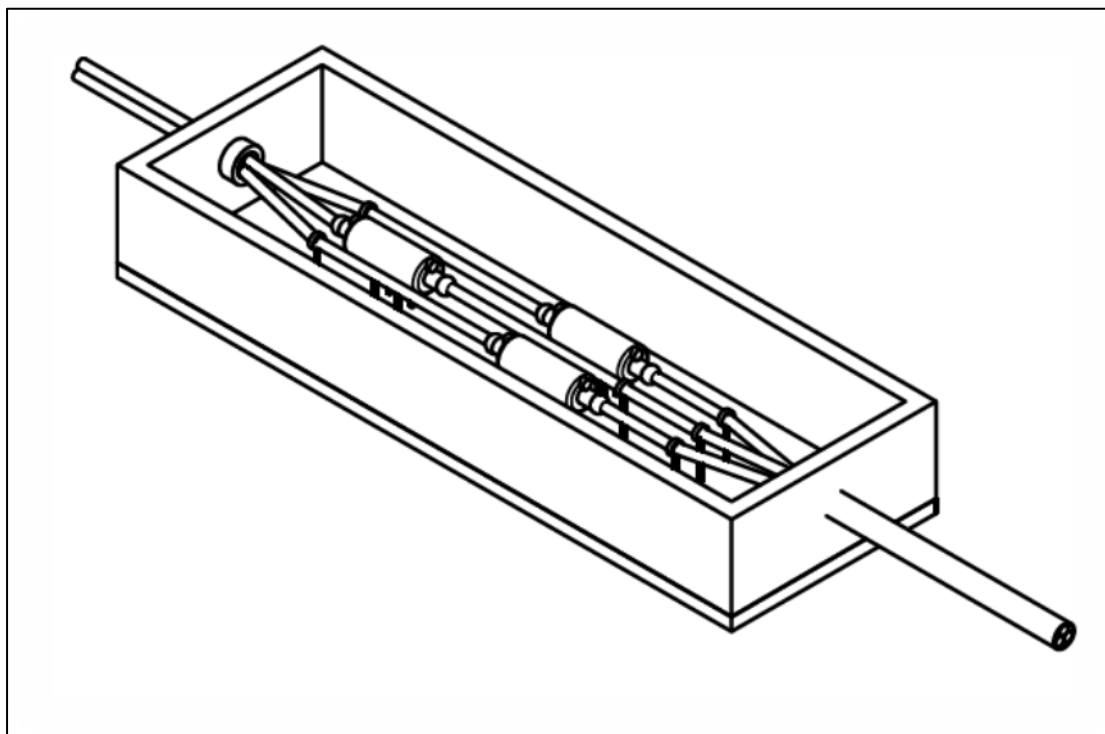


Figure 4.6 Indicative transition joint bay

Landscaping

4.2.11 For landfall options 1 and 3, where all infrastructure will be buried underground, landscaping will be principally focused on reinstatement of existing vegetation, fencing and paths. Reinstatement to the previous condition of the land in the case of undergrounding is a commitment set out in the Landscaping and Ecological Management Plan (LEMP), document ref: 8.7.

4.2.12 The LEMP also describes the considerations for enhancement measures, primarily for biodiversity, which could be delivered alongside the reinstatement of the project.

4.2.13 The sea wall extension required for option 2 would be landscaped to match the existing sea wall, with a similar rock gradient from the land-side down to the intertidal saltmarsh. The additional land area created (up to 1398.9 m²) would be landscaped to match the surface of the existing England Coastal Path.

4.2.14 The berm to accommodate the TJBs would be landscaped with slopes of approximately 1:5m. The potential for its use as a viewpoint across the Country Park and the intertidal area may be explored through the details LEMP, subject to approval of landowners and the relevant planning authority.

4.2.15 The covering of the berm has not yet been defined although suggestions are provided in the LEMP for subsequent approval following detailed design. The existing berm through the Country Park, the Nemo Link interconnector, has been landscaped with virgin chalk with the expectation that over time it will naturally seed with chalk grassland species. This process is likely to take a considerable amount of time and whilst this option remains available for the Thanet Extension berm, other landscaping approaches may be preferable. The including encouraging colonisation with local grassland species by covering the berm with nutrient poor soil with the potential to enhance this process through seeding.

Appearance

4.2.16 Where the landfall infrastructure is buried the appearance following reinstatement should be largely similar to that currently experienced. Where scrub or grassland has had to be cleared during construction there will inevitably some period of regrowth, however habitat management would ensure a successful reinstatement to the extent that after three years the effect of the works would be difficult to identify.

4.2.17 For option 2, the appearance of the berm depends considerably on the landscaping approach preferred by the relevant statutory consultees and approved in the final LEMP. The landscaping of the berm will, wherever possible, be designed to fit in with the nature contours of the Country Park, although it is acknowledged that the area is relatively flat. There would be an opportunity for the TJB berm to be made a feature of in this relatively flat landscape, which could create a focal point for visitors wishing to take advantage of this relative increase in height for views across the bay.

4.3 Above ground cable route

4.3.1 This section considers specifically the cable route between the TJBs and the boundary of Pegwell Bay Country Park and Stonelees Nature Reserve (NR) where, under landfall option 2, cables would be installed above ground in a berm.

Use

4.3.2 The onshore cables are used to transmit electricity from the TJBs to the onshore substation and from there onwards to the National Grid 400 kV connection point at Richborough Energy Park.

4.3.3 An above ground cable route would be required for landfall option 2, should it be determined that it is not feasible to bury cables within the historic landfill under Pegwell Bay Country Park.

4.3.4 The onshore electrical cables and associated telecommunications cables would be buried within a berm. This would be required in order to not disturb the landfill and to protect the cables.

Amount

4.3.5 The above ground cable route would run from the TJBs to the boundary of Pegwell Bay Country Park and Stonelees NR. This is farthest extent of the landfill and from this point cables would be laid underground.

Layout

4.3.6 The Thanet Extension berm would run predominantly alongside the recently constructed Nemo Link interconnector berm. This is discussed further under the landscaping parameter paragraphs 4.3.9 – 4.3.10)

Scale

4.3.7 The berm would be up to 1.2 m in height and approximately 15 m wide (allowing for a 1:5 slope). Where the berm crosses existing paths or public rights of way it would be widened to allow for a shallower slope, ensuring inclusive access is maintained across the Country Park. Further information is provided under 'Access' (Section 5)

4.3.8 Joint bays will be required at intervals along the onshore cable route. These differ from TJB's as they joint sections of onshore cable together, rather than onshore and offshore cables. Should a joint bay be required within the Country Park under option 2 this would be covered by a berm up to 2.3m in height and approximately 22m wide (allowing for a 1:5 slope). Any joint bays would be sited away from existing paths to ensure the appropriate access can be maintained.

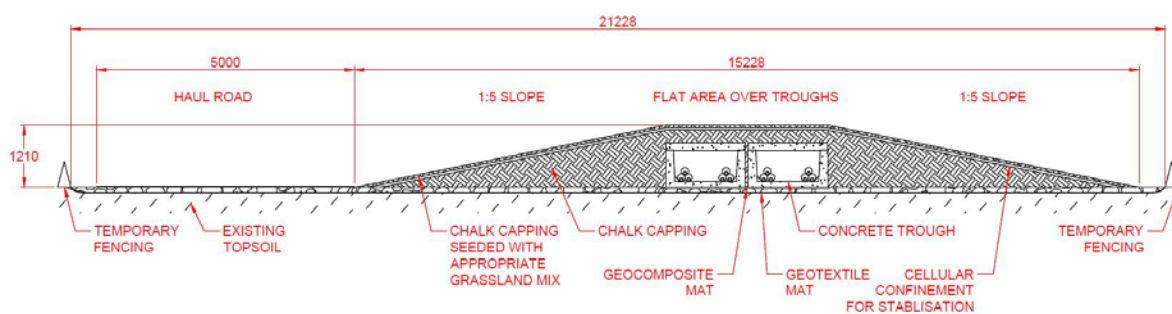


Figure 4.7 Cross section of above ground cable berm

Landscaping

4.3.9 The landscaping of the above ground cable berm will be defined in the LEMP which is secured in the draft DCO.

- 4.3.10 Whilst covering of the berm has not yet been defined, potential options are provided in the outline LEMP, submitted with the application, which will be subject to approval following detailed design. The existing berm through the Country Park, the Nemo Link interconnector, has been landscaped with virgin chalk with the expectation that over time it will naturally seed with chalk grassland species. This process is likely to take a considerable amount of time and whilst this option remains available for the Thanet Extension berm, other landscaping approaches may be preferable. The including encouraging colonisation with local grassland species by covering the berm with nutrient poor soil with the potential to enhance this process through seeding.
- 4.3.11 The profile of the landscaping where the berm runs in parallel to the Nemo Link interconnector will also be considered as part of the LEMP. There is sufficient space within the red line boundary for Thanet Extension to consider a range of options to avoid a perceived 'double hump' running along the edge of the Country Park. The final profile would be subject to agreement with the Nemo Link interconnector asset owners and the relevant statutory stakeholders, but would include consideration of the land between the two berms and how the two structures function together in the landscape.

Appearance

- 4.3.12 The appearance of the berm depends considerably on the landscaping approach preferred by the relevant statutory consultees and approved in the final LEMP. Given the relatively low height (1.2 m) and the commitment to agree suitable landscaping through the LEMP, the berm can be designed to sit within the landscape, its appearance becoming less conspicuous over time. That time period is in a large part dependant on the approach to landscaping, with some methods (e.g. seeding) providing a quicker end result but potentially at the expense of biodiversity when compared with what could be achieved through natural colonisation.

4.4 Underground cables

- 4.4.1 This section considers the underground cables which under landfall options 1 and 3 would run from the TJBs to the onshore substation, and under landfall option 2 from the boundary of Pegwell Bay Country Park and Stonelees Nature Reserve.

Use

- 4.4.2 The onshore cables are used to transmit electricity from the TJBs to the onshore substation and from their onwards to the National Grid 400 kV connection point at Richborough Energy Park.

Amount

- 4.4.3 Up to 4 cable circuits and associated telecommunications would be installed in up to 4 trenches. The trenches would be up to 1.5 m deep and around 1 m wide (if individual trenches are used). Cable circuits would be spaced to maintain the required thermal separation, which is ultimately dependent on the cable types installed.
- 4.4.4 Joint pits and link boxes will also be required along the cable route. These will also be installed underground. Separate lengths of onshore cables will be jointed together and up to four joint pit locations are anticipated.

Layout

- 4.4.5 For landfall options 1 & 3 the onshore cables would run underground from the TJBs to the onshore substation. From the onshore substation cables would be installed using HDD under the A256 into Richborough Energy Park up to the National Grid 400 kV substation.
- 4.4.6 For landfall option 2 cables would run underground from the boundary of Pegwell Bay Country Park and Stonelees NR. From this point on to the connection at the National Grid 400kV substation, installation methods would mirror those of options 1 & 3 i.e. all cables undergrounded.

Scale

- 4.4.7 The onshore cable route requires a working width of 30 m to install up to 4 cable circuits and associated telecommunications cables including space for a haul road, soil and equipment storage and appropriate fencing. Where individual trenches are used these will be up to 1.5 m deep and approximately 1 m wide, spaced to ensure suitable thermal separation between the cables. The permanent width required for the cables will be approximately 12 m.

[insert cross section]

Landscaping

- 4.4.8 As the cables and associated infrastructure will be buried underground, landscaping will be principally focused on reinstatement of existing vegetation, fencing and paths. Reinstatement to the previous condition of the land is a commitment set out in the Landscaping and Ecological Management Plan (LEMP), Document Ref: 8.x7.
- 4.4.9 In some cases, for instance where trees are removed and cannot be replaced over the cables (due to the need to protect the cables from roots) small scale landscape changes will arise, however these have not been assessed as leading to significant effects (Chapter 2: LVIA, Document Ref: 6.3.2)

Appearance

4.4.10 In the medium to long term the appearance following reinstatement should be largely similar to that currently experienced. Where scrub or grassland has had to be cleared during construction there will inevitably some period of regrowth, however habitat management (as secured through the outline LEMP) would ensure successful reinstatement.

4.4.11 Where cables are installed through existing areas of hardstanding (for example through the current British Car Auctions site or within Richborough Energy Park, changes in appearance will be minimal as soon as reinstatement has concluded.

4.5 Onshore substation

Use

4.5.1 The onshore substation is required to transform the voltage of the electricity from the Offshore Wind Turbine Generators or Offshore Substation (as required according to transmission voltage) up to 400 kV for transmission on the National Grid electricity transmission network. Filtering and reactive compensation equipment may be located at the substation to ensure that the wind farm complies with the technical requirements to connect to the National Grid. The substation also accommodates switchgear and associated protection and control equipment to allow safe operation of the wind farm connection.

Amount

4.5.2 The onshore substation is likely to consist of:

- 4 x three phase reactors – to provide additional reactive power compensation to the wind farm connection;
- 4 x Static Synchronous Compensators (STATCOM), Static Var Compensator (SVC) or equivalent – to provide variable reactive power to meet NGET technical connection requirements;
- 2 x transformers – to increase export HVAC voltage (up to a maximum of 220 kV) up to the National Grid transmission voltage of 400 kV;
- 4 x harmonic filters – to meet power quality connection requirements; each filter will comprise capacitors, reactors and resistors together with interconnecting conductors;
- Control building – housing the main switchboard, SCADA and protection equipment;
- Access roads – approximately 6 m wide for O&M access to equipment;
- Associated connections between equipment via overhead busbar and cabling, including buried earthing system; and

- Ancillary infrastructure such as a car park and welfare facilities.

Layout

4.5.3 The layout of the onshore substation is subject to detailed design following consent. An envelope approach has been taken to determine the maximum parameters of key infrastructure.

4.5.4 A number of constraining elements will help determine the technical solution required for the substation layout, these include:

- Access from the private road off the A256 roundabout
- Onshore cables entering the substation in the north east corner of the site
- The requirement to HDD under the A256 from the west of the site.

Size

4.5.5 The largest equipment within the onshore substation will be the substation building, with a maximum height of 14 m above existing ground level. All other equipment (e.g. transformers, switchgear) will not exceed a height of 12.5 m above existing ground level. The total land requirement for the onshore substation to the perimeter fence is 41,000 m², as well as a 20,000 m² temporary construction area.

Landscaping

4.5.6 The substation site is currently well screened from most locations due to existing mature trees along the A256. The site is located on a brownfield site in an industrial setting and therefore does not introduce significantly different infrastructure to that already found in the vicinity, particularly at the adjacent Richborough Energy Park.

4.5.7 Whilst not considered to be necessary due to the absence of sensitive receptors it is noted through consultation with Dover District Council that tree planting to the north of the substation site could be proposed as specific visual enhancement. Screen planting at the substation site is proposed to be introduced to screen views from the Richborough Roundabout/Ramsgate Road (A256) (Viewpoint 1) but would also strengthen existing screening from more distant views further to the north such as from Pegwell Promenade and Shellness.

4.5.8 Mitigation planting for the substation would comprise the establishment of woodland belts in strategic locations around the site where practicable. These would complement existing woodland blocks and belts, increasing their depth and extent to ensure robust screening, and eventually form enclosure from almost all visual aspects.

- 4.5.9 Screen planting will be designed to comprise a mix of fast growing species typical to the area specifically selected for their long-term screening potential. Tree species will also be selected for site suitability, local species context and biodiversity value. A larger percentage of evergreen species will be included in the areas defined specifically as screening woodland with a more balanced mix of deciduous / evergreen native species in other areas of proposed woodland, increasing the biodiversity value of the planting. A dense understorey of shrubs including a high percentage of evergreen species will also be included throughout the woodland structure.
- 4.5.10 Further details of the proposed landscaping are secured in the outline LEMP (Document 8.7) and would be approved as part of the Substation Landscaping Scheme secured by requirement in the draft DCO (Document 3.1).

Appearance

- 4.5.11 The substation will consist of above ground electrical infrastructure primarily housed outside and a control building which, depending on details design choices, may include switchgear.
- 4.5.12 The building would likely be clad in keeping with the surrounding industrial land use and positioned in line with the technical requirements of the final substation design.
- 4.5.13 The site was, in part, chosen as it is already heavily screened, particularly in the summer when the deciduous trees and east and west boundaries are in leaf. The only clear view of the site is from the A256 roundabout, both from cars and from users of the England Coastal Path which in this location is routed away from the coast. To supplement the existing screening, further planting is proposed along the northern boundary. Whilst this will take time to mature, after 15 – 25 years a substantial band of screening will enclose the site even further.

5 Access

5.1 Overview

- 5.1.1 Permanent access arrangements have been considered in respect of the impacts on recreational users and to those maintaining the project.
- 5.1.2 Effects on recreational users (members of the public) will primarily be limited to Pegwell Bay Country Park and Stonelees NR. Outside of these areas no public rights of way or publicly accessible land will be affected by the project.
- 5.1.3 Operational access to the onshore substation and occasionally to the TJBs and joint bays will be required. The locations of these accesses have been carefully considered to minimise effects on recreational users and highways. Planned maintenance or inspections will result in very low levels of traffic.

5.2 Recreational users

Overview

- 5.2.1 For landfall options 1 & 3 which result in infrastructure buried entirely underground, access across Pegwell Bay Country Park and Stonelees NR would be reinstated as existing following construction. Opportunities to improve access within the Country Park will be discussed with landowners and statutory bodies.
- 5.2.2 For landfall option 2, requiring a section of above ground berm, further consideration of the requirements for inclusive access have formed a key part of the Access Management Strategy (document 8.x).
- 5.2.3 The project is committed to ensuring that visitors are able to enjoy a level of accessibility that is no less than that enjoyed today. This is in line with 3.3 Kent County Council's Countryside and Coastal Access Improvement Plan (CCAIP) and the provision of facilities and services for disabled people is covered by the Equality Act 2010. Most relevant to this strategy is the provision in section 20(4) stating:

"The second requirement is a requirement, where a physical feature puts a disabled person at a substantial disadvantage in relation to a relevant matter in comparison with persons who are not disabled, to take such steps as it is reasonable to have to take to avoid the disadvantage."

Existing access

- 5.2.4 There are a variety of accessibility standards exhibited by the current paths within the Country Park and NR. Those likely to be affected by the project include:
- The England Coastal Path (ECP) which runs around the perimeter of the Country Park and is stone-surfaced (metalled) path.

- The RR15 cycle path which crosses the red line boundary within the Country Park and is stone-surfaced (metalled).
- Mown grass paths across the Country Park which represent the majority of accesses likely to be impacted by the project. While these paths are on flat ground, they are prone to undulations and are softer than the metalled paths. As such, they will present some difficulties to self-powered wheel chair and mobility scooter users.
- Minor paths which are not maintained and are uneven with tussocked vegetation, suitable only for able-bodied users. These represent the majority of paths within Stonelees NR (with the exception of the ECP).

Accessibility standards

5.2.5 Acceptable accessibility standards vary in relation to the geographical nature of the land, with lower standards acceptable in an open country, semi-wild setting compared to an urban, formal setting. The Countryside for All – Physical Access Standards are defined for four settings:

- Urban and formal;
- Urban fringe and managed;
- Rural and working; and
- Open country, semi-wild and wild land.

5.2.6 The category most appropriate category for paths within the Country Park is that of 'urban fringe and managed' setting. For Stonelees NR the 'rural and working' setting may be applicable but, as this entails a lower standard of provision, it is proposed that the 'urban fringe and managed' standards will also be applied.

5.2.7 The key elements of the standard relevant to Pegwell Bay Country Park and the Stonelees NR are:

- Path Surface - must be hard and firm with very few loose stones (none bigger than ten millimetres);
- Path Width – 1,200 mm minimum width;
- Width Restrictions – 815 mm minimum width for no more than 300 mm along the length of path – 1,000 mm width for no more than 1,600 mm along the length of the path;
- Barriers - No stiles, steps, fences, hedges etc. blocking the path;
- Ramp Gradient - 1:12 maximum;

- Rise of ramps - Where the place is steeper than 1:20 (i.e. a ramp), a level, resting place should be provided. The maximum height rise between landings should be no more than 830 mm.

Table 5.2 Maximum distance between landings for 830 mm vertical climb

Gradient	Maximum Distance Between Landings
1:18	14.94
1:16	13.28
1:14	11.62
1:12	9.9

- Cross Slope - 1:45 maximum;
- Steps – ten millimetres maximum;
- Surface Break - Breaks in path surface as in boardwalks, grates, grills etc. should be no more than 12 mm measured in the direction of travel along the path;
- Clear Walking Tunnel - A tunnel clear of overhanging or encroaching vegetation, and other obstructions should be a minimum of 1,200 mm wide and 2,100 mm high;
- Passing Place - There should be a passing place every 100 m along the path. The minimum width of the path should be 1,500 mm for 2,000 mm along the length of the path; and
- Resting Places - There should be a resting point every 200 m along the path. Each resting point should have a seat or perch which is placed on surfaced, level ground. Resting points should be set back from the path and, in addition to the path width, be at least 1,200 mm wide and 1,500 mm long.

5.2.8 The Countryside for All standards do not include guidance on the appropriate length of landings on a slope. However, Scottish Natural Heritage has also published widely respected standards under its Paths for All partnership. The standards state that the minimum length and width of landings on ramps should be 1,500 mm and 1,200 mm, respectively (Paths for All & Scottish Natural Heritage, 2016). It is proposed that these standards will be adopted for any necessary landings within the Thanet Extension works.

Permanent access arrangements

5.2.9 The measures set out below cover the measures the project will follow to ensure the accessibility standards described above are met. This will ensure that accessibility is, as far as possible, retained at the current standards found across the Country Park and NR following the reinstatement and landscaping for the project.

5.2.10 Access arrangements during construction are set out in the Access Management Strategy (Document Ref: 8.4).

Ramped bund crossings

5.2.11 If the above ground installation option is selected up to four bund crossings will be required. These will be constructed to a gradient of not greater than 1:12 and a minimum width of three metres to allow access for maintenance vehicles. A landing of not less than 1,500 mm length will be included on each side of the ramp, with a further landing of at least 1,500 mm on top of the bund.

5.2.12 The ramps will have a compacted stone surface, with a wearing layer surface of stone not greater than ten millimetres.

England Coast Path/ Thanet Coast Path

5.2.13 The ECP in the vicinity of the landfall site will be reinstated to a compacted stone surface, with a maximum surface stone size of ten millimetres. The reinstated width will be a minimum of three metres.

5.2.14 The ECP in Stonelees Nature Reserve will be reinstated as a green surface path, in keeping with the rest of the paths on the reserve.

5.3 Operations and Maintenance Access

5.3.1 Access to the cable route during the O&M phase for planned maintenance would be limited to site visits to inspect TJBs and joint bays. These inspections are likely to be carried out on foot but may require vehicular access from time to time (with the exception of Stonelees NR where vehicular access for regular maintenance is to be avoided).

5.3.2 Vehicular access points have been identified to minimise effects on recreational users and on highways. A proposal to use the existing public access into the Country Park car parks for O&M purposes was included in the Preliminary Environmental Information Report (PEIR) which was provided for formal consultation in November 2017. However, this has been removed to avoid unnecessary impacts on users of the Country Park.

5.3.3 The accesses retained for O&M are as follows:

- Access into Pegwell Bay Country Park would be taken from an existing point of access previously used during the construction of the Nemo Link interconnector and for management of the Country Park. This access is gated and stone surfaced up to the point where it crosses the Nemo Link berm.
- Access into the Bay Point Club may be taken using the existing access road into the car park, however in order to minimise any potential effects on users of the club (however minor), it is proposed to retain a new access gate off Sandwich Road. This access (once off the highway) would not be surfaced but does allow vehicles to cross the playing fields in order to access cable joint bays.
- Access into the onshore substation is described below.

5.4 Onshore substation

- 5.4.1 The access into the onshore substation will be taken off the existing private road to the north of the site.
- 5.4.2 This ensures there are no further interactions with the ECP (which at this point runs alongside the A256) or with traffic using the dual carriageway.
- 5.4.3 The precise location of the access will be determined during detailed design and will be set out as part of the Substation Landscaping Scheme, secured by requirement in the draft DCO. The final location will take into account of the proximity to the A256 roundabout and the other users of the private road including British Car Auctions.