



Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

**Saltmarsh Mitigation, Reinstatement and
Monitoring Plan**

June, 2018, Revision A

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Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Saltmarsh Mitigation, Reinstatement and Monitoring Plan

June, 2018

Drafted By:	GoBe Consultants
Approved By:	Helen Jameson
Date of Approval	June 2018
Revision	A

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Author: GoBe Consultants Ltd

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Revision and Approvals					
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List of Abbreviations

Abbreviation	Definition
DAFOR	Dominant, Abundant, Frequent, Occasional, Rare
HDD	Horizontal Directional Drilling
HVADC	High Voltage Direct Alternating Current
MMO	Marine Management Organisation
NNR	National Nature Reserve
PEIR	Preliminary Environmental Information Report
SAC	Special Area of Conservation
SMRMP	Saltmarsh Mitigation, Reinstatement and Monitoring Plan
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
Thanet Extension	Thanet Extension Offshore Wind Farm
TJBs	Transition Joint Bays
TOWF	Thanet Offshore Wind Farm
VWPL	Vattenfall Wind Power Ltd

1. Overview

1.1. Context

- 1.1.1. This document is the Saltmarsh Mitigation, Reinstatement and Monitoring Plan (SMRMP) for the proposed Thanet Extension Offshore Windfarm (Thanet Extension). This document is being submitted to the Thanet Extension EIA Evidence Plan Technical Review Panel for agreement in advance of the final application being submitted in support of the Thanet Extension project and reflects the final project description as amended following the Section 42 consultation on the Preliminary Environmental Information Report (PEIR).
- 1.1.2. Saltmarsh habitat is valued due to its flood and coastal defence function and ecosystem and conservation importance, as well as its role in pollution control, waste disposal and the maintenance of water quality. It supports various vegetation, large numbers of both rare and abundant invertebrates and provides feeding and roosting areas for a large number of migrant, over-wintering and breeding birds. The Saltmarsh habitat present on site is of specific value given its identification as a supporting habitat of the Thanet Coast and Sandwich Bay Special Protected Area (SPA), Sandwich Bay and Hacklinge Marshes Special Site of Scientific Importance (SSSI), and Sandwich Bay RAMSAR¹. It is noted that the saltmarsh does not form a designated feature of the Sandwich Bay Special Area of Conservation (SAC).

1.2. Objective

- 1.2.1. The objective of this SMRMP is to outline the actions needed to ensure that the development will minimise the temporary effect due to construction activities on the saltmarsh area within the proposed installation site of the Thanet Extension export cable. This falls under the pre- and post-construction conditions within the deemed Marine Licence (dML). This will be achieved through the application of appropriate mitigation, the success of which will be monitored post-construction. Any permanent loss of saltmarsh will be addressed in a separate document through further consultation with the relevant stakeholders. This document will provide information on the following areas, and is structured accordingly:
- Brief overview of the Thanet Extension project and proposed cable installation options;
 - Overview of the worst-case scenario;
 - Details of installation procedures and requirements;
 - Brief overview of consultation responses received to date;
 - Details of the existing saltmarsh habitat and previous surveys;

¹ A RAMSAR Site is a wetland site designated of international importance under the RAMSAR Convention.

- Mitigation measures which will be in place to preserve the saltmarsh habitat;
- Outline of the proposed pre-construction baseline survey; and
- Details of post-construction monitoring and reinstatement requirements.

2. Project Overview

2.1. Thanet Extension Offshore Wind Farm

- 2.1.1. Vattenfall Wind Power Ltd (VWPL) is proposing the development of Thanet Extension. If successful, the project would be located approximately 8 km offshore in the proximity of the operational Thanet Offshore Wind Farm (TOWF). Thanet Extension would have a generating capacity of up to 340 MW with the electricity being exported from the array to the landfall location via an export cable corridor. Landfall denotes the location where the offshore cables are brought ashore and connected to the onshore cables at Transition Joint Bays (TJBs). Landfall for Thanet Extension is at Pegwell Bay and passes over/ through saltmarsh and mudflats before entering the Country Park.
- 2.1.2. The proposed method for the installation of the export cable through the saltmarsh will depend on the final design of the onward/ onshore cable. Three designs are currently being proposed for the landfall cable installation. Option 1 involves drilling, via Horizontal Directional Drilling (HDD), from the Country Park underneath the existing sea wall and at least 100 m seaward into the intertidal zone (Figure 2.1). Option 2 involves open trenching through the saltmarsh and an 18.5 m seaward extension of the sea wall to allow the cables to be installed in a surface laid berm with TJBs in the Country Park (Figure 2.2) whilst option 3 involves burial of the TJBs in the Country Park using open trenching through the saltmarsh with no extension of the sea wall (Figure 2.3). Both options 2 and 3 require the installation of a temporary cofferdam within the saltmarsh area.

2.1.3. The different design options are due to the difference in height of the country park compared to the intertidal area containing the saltmarsh (a height differential of approximately 3 m). This is combined with the presence of an historic landfill site on which the Country Park is located. As a result, the TJBs will be either buried within the Country Park (option 1 and 3), if ground conditions allow, or surface laid within a berm in the Country Park (option 2). The perimeter of the Country Park is characterised by a rock armour wall which it is understood acts as a buffer between the historic landfill and the surrounding environment; it is understood that it does not represent an Environment Agency managed sea defence but that it does form a defence of the material within the landfill. If the TJBs can be buried within the Country Park (option 1 and 3) there will be a limited need to amend the perimeter of the Country Park. If the TJBs are surface laid within the Country Park there may be a need to adjust the perimeter of the Country Park seaward by a maximum of 18.5 m in order to accommodate the necessary increase in height from the cable burial within the saltmarsh to the surface of the Country Park. More detail on each landfall design can be found in ES, Volume 3, Chapter 1: Project Description (Onshore) (Document Ref: 6.3.1).

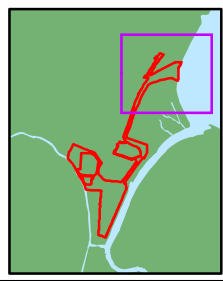


THANET EXTENSION OFFSHORE WIND FARM

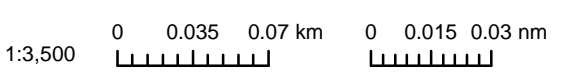
Figure 2.1
Onshore Cable Route:
Landfall Option 1
(Indicative Locations).

- 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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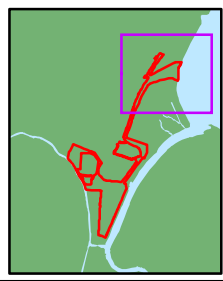


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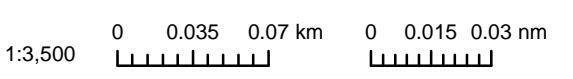
Figure 2.2
Onshore Cable Route:
Landfall Option 2
(Indicative Locations).

- Legend**
- Onshore Red Line Boundary
 - Offshore Red Line Boundary
 - Onshore Infrastructure (Indicative)
 - 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
 - Transition Pit Area -12 x 46
 - Transition Pit -12 x 22 m

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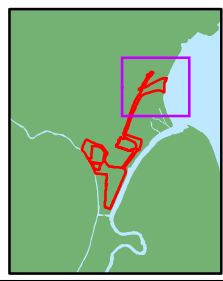


THANET EXTENSION OFFSHORE WIND FARM

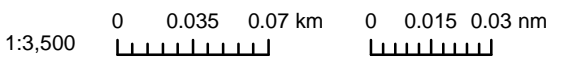
Figure 2.3
Onshore Cable Route:
Landfall Option 3
(Indicative Locations).

- Legend**
- Onshore Red Line Boundary
 - Offshore Red Line Boundary
 - Onshore Infrastructure (Indicative)
 - 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
 - Transition Pit -12 x 22 m

Datum: OSGB 1936
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2.2. Worst-case Scenario

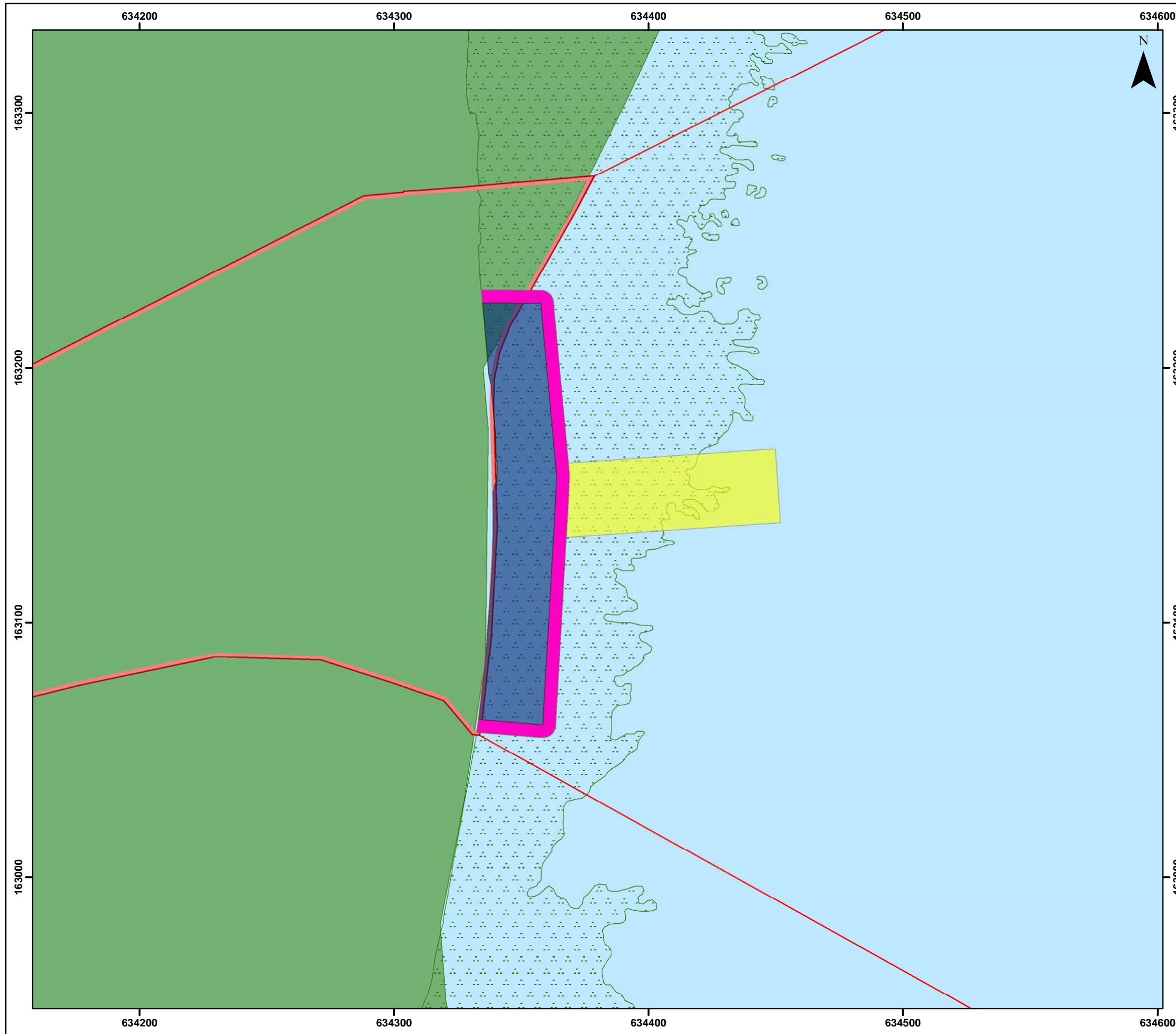
- 2.2.1. For the purpose of this mitigation plan the worst-case scenario for temporary disturbance to saltmarsh habitat is assessed. The worst-case scenario encompasses the open trenching operation required for option 3 (Figure 2.3) and the largest cofferdam construction area required.
- 2.2.2. HDD will bypass the saltmarsh habitat by drilling underneath the saltmarsh and exiting out in the intertidal area (Figure 2.1). The drilling fluid is anticipated to be bentonite, which is a natural clay water based material and any spillage will be dealt with according to the Code of Construction Practice (Document Ref: 8.1)
- 2.2.3. The worst-case temporary disturbance due to the export cable installation by the open trench method is estimated to effect 7,376 m² of saltmarsh north of the Stour, approximately 0.67% of the total saltmarsh habitat within the SSSI (using the assumptions presented in Table 1). This worst-case scenario is based on no seaward extension of the sea defence (Figure 2.3), four export cables with a layout as shown in Figure 2.5 and the cofferdam required for sea defence alternations, as shown in Figure 2.6. The works will be undertaken between April to September to avoid the October to March period which is sensitive to the golden plover and turnstone features of the Thanet Coast and Sandwich Bay SPA.

Table 1: Summary of the maximum cable installation parameters within the saltmarsh habitat.

Parameter	Maximum design scenario assessed
Maximum trench length (per cable)	85 m
Maximum trench width (per cable)	1 m
Maximum trench depth (per cable)	1-3 m
Maximum area of saltmarsh impacted by trenching (4 cables)	340 m ²
Maximum width of appropriate tracking and displaced saltmarsh storage area adjacent to the trenches (4 cables) (See Figure 2.5 for layout)	25 m
Maximum area impacted by appropriate tracking and displaced saltmarsh storage area adjacent to the trenches (4 cables)	2,125 m ²
Overall temporary impact footprint (4 cables plus tracks)	*2,396 m ²
% of saltmarsh area impacted by trenching	0.22%
Area enclosed by construction cofferdam	3,868 m ²
Maximum area of construction tracking around cofferdam	1,112 m ²
Total area of temporary impact on saltmarsh during cable installation	7,376 m ²
Total % of saltmarsh area (as defined by **Environment Agency Saltmarsh Survey 2016) impacted during cable installation	0.67%

*Shape of trench length is not a rectangle. **Saltmarsh within Thanet Coast and Sandwich Bay SPA.

2.2.4. Figure 2.4 displays the landfall, open trench area and cofferdam area which falls within the saltmarsh habitat. The maximum design scenario has been over cautious with respect to the total area of impact for the cable installation. It should be noted that the maximum trench length extends 85 m seaward of the cofferdam and construction tracking area. This ensures coverage of the maximum width of saltmarsh within the landfall RLB (situated to the north of the open trench area in Figure 2.4). Due to the level of uncertainty for the landfall construction this maximum scenario ensures the fullest extent of temporary disturbance is accounted for.

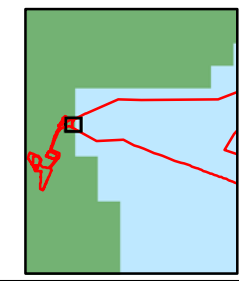


THANET EXTENSION OFFSHORE WIND FARM

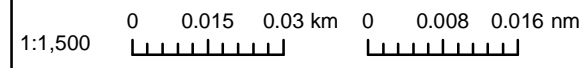
Figure 2.4
Maximum area of disturbance within the Sandwich Bay to Hacklinge Marshes SSSI.

- Legend**
- Onshore Red Line Boundary
 - Offshore Red Line Boundary
 - Indicative seaward cofferdam area
 - Indicative cable trench temporary disturbance area
 - Indicative construction tracking area
 - Saltmarsh extents (EA data)

Datum: OSGB 1936
Projection: BNG



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2.2.5. The numbers of transits expected are detailed in Volume 3, Chapter 1: Project Description (Onshore) (Document Ref: 6.3.1) and Chapter 8: Traffic and Transport (Document Ref: 6.3.8). Approximate equipment, vehicles and procedures for each phase are as follows:

- Up to six tracked backhoe excavators for cable control during pull in and excavation for cable protection;
- Dumper truck for material/roller transport;
- During cable landing, a single backhoe excavator is required to transit alongside the cable route for cable control and to place and remove the cable rollers;
- During cable installation backhoe excavators are required to access alongside the cable route to excavate and backfill the cable trench. An excavator is also used to lift and control the cable during these operations; and
- A service crane and other lifting/ loading vehicles to deliver, install and remove the cofferdam required for the works with the potential of 40 movements by large vehicles.

2.2.6. During saltmarsh works all vehicles will be confined to the temporary access trackways to avoid ground compaction.

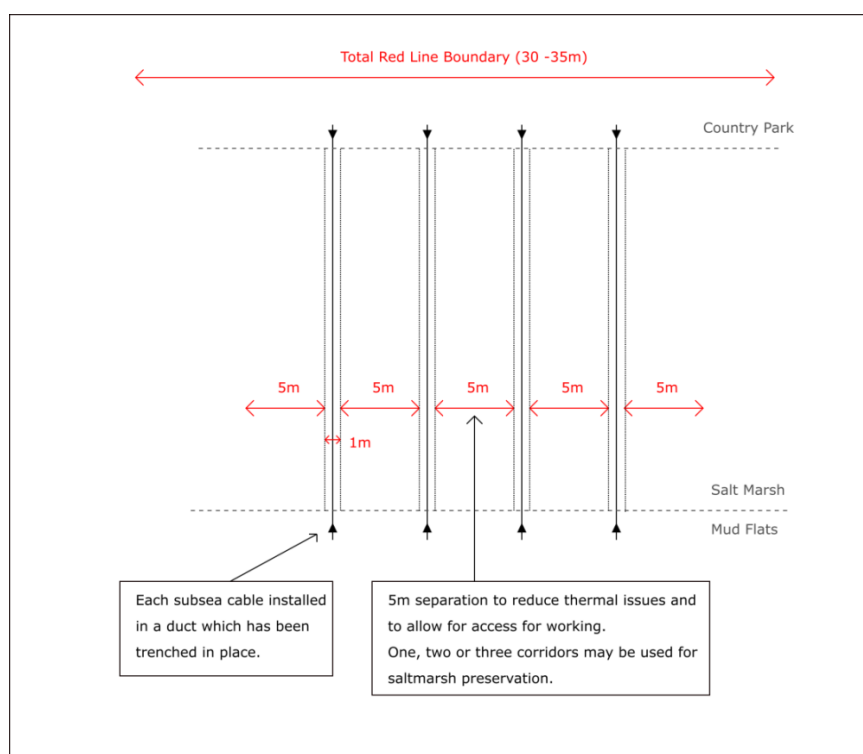


Figure 2.5: Proposed layout of the export cables as they transfer from offshore to onshore. Extracted from Volume 2, Chapter 1: Project Description (Offshore) (Document Ref: 6.2.1).

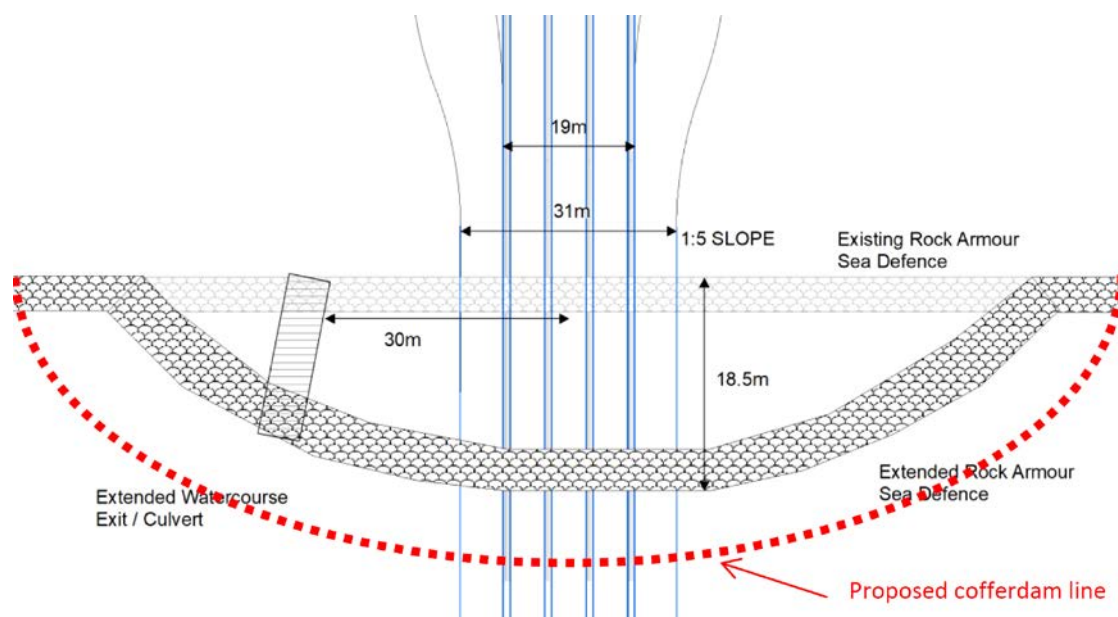


Figure 2.6: Proposed cofferdam layout for open trenching cable installation. If option 2 is taken forward the sea defence would be extended seawards by a maximum of 18.5 m. If option 3 is taken forward the sea defence would remain in its existing position.

2.3. Works Procedure

Site mobilisation

- 2.3.1. For cable installation via open trenching, access is required to the saltmarsh to install the cable ducts for the subsea cables to be pulled through. This process will cause disturbance to the saltmarsh due to the excavation of a maximum of four trenches into which the ducts will be installed. These trenches will be deep enough to enable the cables to be buried to at least 1 m within the saltmarsh. Disturbance will also be caused by vehicle access for reinstatement. Suitable running boards or mats will be laid on the saltmarsh to minimise the damage from vehicles. Diagrams of the proposed landfall site plans which require open trenching can be seen in Figure 2.6. Note that this diagram shows the basic outcome of both Option 2 and 3 for landfall as stated in the Onshore Project Description (Document Ref: 6.3.1). For option 3 the sea wall will remain in its current position. If option 2 is taken forward the sea wall will be extended forward.

2.3.2. Both option 2 and 3 require the installation of a cofferdam on the seaward side of the existing sea defence. This is to enable the sea wall to be dismantled to allow trenching activities to access the country park. The cofferdam is primarily being installed to mitigate against any leachate from the historic landfill which may be exposed to the intertidal environment when the sea defence is opened. A proposed layout of the cofferdam can be seen in Figure 2.7. The cofferdam will be constructed of metal sheets piled into the saltmarsh area and will enclose all sea wall construction activities. It will enable cable trenching to reach the sea defence without having an opening directly between the landfill and intertidal environment. The maximum area of saltmarsh enclosed by the installation of the temporary cofferdam will be 3,868 m².



Figure 2.7: Illustration of sheet piling used for intertidal cofferdams (Sheet Piling UK Ltd).

2.3.3. Site enabling works:

- Ensure that pre-installation saltmarsh surveys have been undertaken and passed on for consideration and review by Natural England, the Marine Management Organisation (MMO) and Thanet District Council, as necessary;

- Ensure that the areas to be used for works avoid any deep or mature creek features where possible;
- Ensure that the site is clear of breeding birds by having an Ecological Clerk of Works (ECoW) inspect habitats to determine the presence of any nesting activity (typically March – July). If active nests are identified for key species, the commencement of works in the vicinity of the nest site will be delayed until the nest is no longer in use or appropriate mitigation is put in place under the advice of the ECoW;
- Hand rake beach litter (e.g. drift wood which is an important habitat for terrestrial invertebrate species) which is within the upper area of saltmarsh to move it outside of the working corridor to minimise impacts on terrestrial invertebrates; and
- Undertake a photographic survey to illustrate the current (i.e. pre-commencement) condition of the working area.

Work site establishment:

- Erect fencing along the line of the working zone of the saltmarsh, visibly segregating the saltmarsh areas that are to remain untouched by the works (an ecologist should advise as to locations and placement of protective fencing);
- Install cofferdam around the sea defence where cables will transition from the saltmarsh to the Country Park.
- Mark out the corridors for storage and preservation of saltmarsh/topsoil/turf, cable pulling, track ways for plant and machinery and trench excavation, taking into account the working widths; and,
- Lay and secure (this is particularly important low in the tidal frame where matting could be washed away if not appropriately secured) appropriate matting (bog mats) along access trackways to prevent plant and equipment sinking into saltmarsh and to prevent damage to the saltmarsh resulting from the weight and movement of the vehicles.

Trench excavation (within the saltmarsh):

- Cable trench within the area of recognised saltmarsh will be excavated alongside the cable ducting using either conventional mechanical excavators adapted for working on soft soils (low ground pressure excavators). Further down the shore suitable alternatives (such as a spider plough) will be agreed in advance of construction;
- Excavated material will be placed to one side for re-use;
- The excavation of the trench should be carried out in such a way as to maintain the sediment profile (e.g. surface sediments should be replaced at the surface and not mixed with those excavated from the bottom of the cable trench);

- Once the trench is opened and stabilised the cable ducting can be laid within. Trenching should start from the seaward end of the works, backfilling sections as soon as possible, to minimise the potential for pollution pathways via ground/surface water;
- A temporary cofferdam will be required to stabilise the trench and keep surface water from entering the trench during excavation. Ground water will be pumped out and processed as stated in the contaminated land and ground water Plan; and
- Alongside the use of a cofferdam, Bentonite plugs may be used to prevent transport of any polluted water from the former landfill area through the saltmarsh.

Cable pull in:

- In preparation for the subsea cables being hauled ashore, the works area will be marked off with a tape or a buoy line to protect the site and the public;
- Position cable rollers and winches in the designated areas;
- On the rising tide, a shallow water cable laying vessel will move into position as close to the saltmarsh as the tidal conditions allow;
- The cables will be laid from the vessel to the shore as a bundle, this may involve small support vessels such as RIBs, divers and floats in the intertidal area along with pull-in lines from winches and cable rollers leading up to the saltmarsh area;
- A hauling rope will be installed between the pulling device, located with the Country Park, and a cable end on the vessel running through the ducting within the saltmarsh to the TJB;
- The cable will be pulled in from the vessel moored at the edge of the intertidal area through the ducting within the saltmarsh to the TJB;
- Depending on the state of the tide, the intervening distance between the vessel and the saltmarsh may be predominantly water (noting that MHW is 'below' the sea wall), entirely dry (with the installation vessel resting on the seabed) or more probably a combination of both scenarios. The cable bundle will be supported at the sea surface by floats attached as the cables leave the vessel, and supported on rollers placed on the seabed where it is above the water line;
- The cable bundle will be hauled towards the ducting within the saltmarsh area before passing through to the TJB with floats being removed as necessary. When sufficient length of each cable has been passed to the shore to allow for its correct alignment for jointing to the land cable, it will be secured in the TJB;
- Once the cable bundle has been secured at the TJB and tested to confirm that no damage has occurred during the installation process, the intertidal bundle will be manoeuvred into its correct alignment. For cable sections still afloat, the manoeuvring will be accomplished using workboats, before the remaining floats are removed and the cables allowed to sink to the seabed; and,

- Any cables on dry land leading up to the ducting will be manoeuvred using excavators, or similar, prior to burial.

2.3.4. Access points will be identified prior to starting construction.

Cable burial:

- Cable within the intertidal area is to be placed in a trench and buried using spoil initially taken from the trench, taking care to maintain the profile of the sediment.

De-mobilisation:

- On completion of trench backfilling in the saltmarsh area on the seaward side of the TJB, a post-and-rail or post-and-wire fence will be erected around the area subject to works, similar to that erected around the Thanet Offshore Wind Farm cables during installation. Appropriate signage will be fixed to the fence warning that the land may be unstable.
- De-mobilise the site, inclusive of the seaward cofferdam², taking care to leave it clear of any debris from the works;
- Photographic survey will be undertaken to demonstrate the condition of the site directly following installation works; and
- Methods to ensure reinstatement of the saltmarsh habitat will be followed as described in Section 7.2.

² Subject to the final design, to be agreed post-consent, the landward cofferdam may be left buried in situ within the Pegwell Bay Country Park to act as a permanent mitigation structure between the contents of the landfill and the marine environment. This would result in a more permanent barrier than is currently in place.

3. Consultation

3.1. Evidence Plan

3.1.1. Consultation received during meetings held under the Thanet Extension Evidence Plan has been recorded in minutes agreed with the relevant stakeholders, and recorded within the Thanet Extension Evidence Plan [Document Ref: 8.5]. Table 2 below provides a brief summary of those consultation responses received during Evidence Plan meetings of relevance to this saltmarsh mitigation, reinstatement and monitoring plan or saltmarsh habitats more broadly.

Table 2: Evidence Plan comments relating to saltmarsh habitat.

Reference	Date	Stakeholder	Comment
BE013	26-05-17	Environment Agency	Proposed that the WFD assessment should be a standalone document and include priority habitats (including saltmarsh). Sediment disturbance and potential impacts on BWs may need to be assessed,
BE015	26-05-17	Natural England Kent Wild Life Trust Environment Agency	Agreed that the saltmarsh to the south of the existing cables is more stable but has lower biodiversity to than to the north of the cables. Therefore, if the cable were to go through the south this would be less damaging and therefore a preferred approach when compared to the more diverse habitat to the north.
BE026	04-10-17	Natural England RSPB Environment Agency	Two different TJB options being taken forwards into PEI. Both will result in a permanent loss of saltmarsh. It was noted that is it not a designated feature of the European sites.
HFR028	23-08-17	Environment Agency Thanet District Council	All the engineering options for bringing the cabling ashore will require the construction of new rock armour defences to create an area in front of the landfill for the cables to be buried in order to rise onto the top of the country park; this will avoid the need for any excavation within the former landfill. This will require some land take from the saltmarsh, which is a SSSI. A concern for the EA would be the loss of the saltmarsh habitat. VWPL stated that engineering solution would look to reduce the land take within the salt-marsh as much as possible. The preference of the EA would be to keep the existing sea defences in place. TDC agreed to this position.

3.2. Section 42

- 3.2.1. Consultation received during the statutory Section 42 consultation period, held between 27th November 2017 and 12th January 2018, meetings held under the Thanet Extension Evidence Plan has been recorded in minutes agreed with the relevant stakeholders, and recorded within the Thanet Extension Evidence Plan (Document Ref: 8.5).
- 3.2.2. Table 3 below provides a brief summary of those consultation responses received during Evidence Plan meetings of relevance to this saltmarsh mitigation, reinstatement and monitoring plan or saltmarsh habitats more broadly.

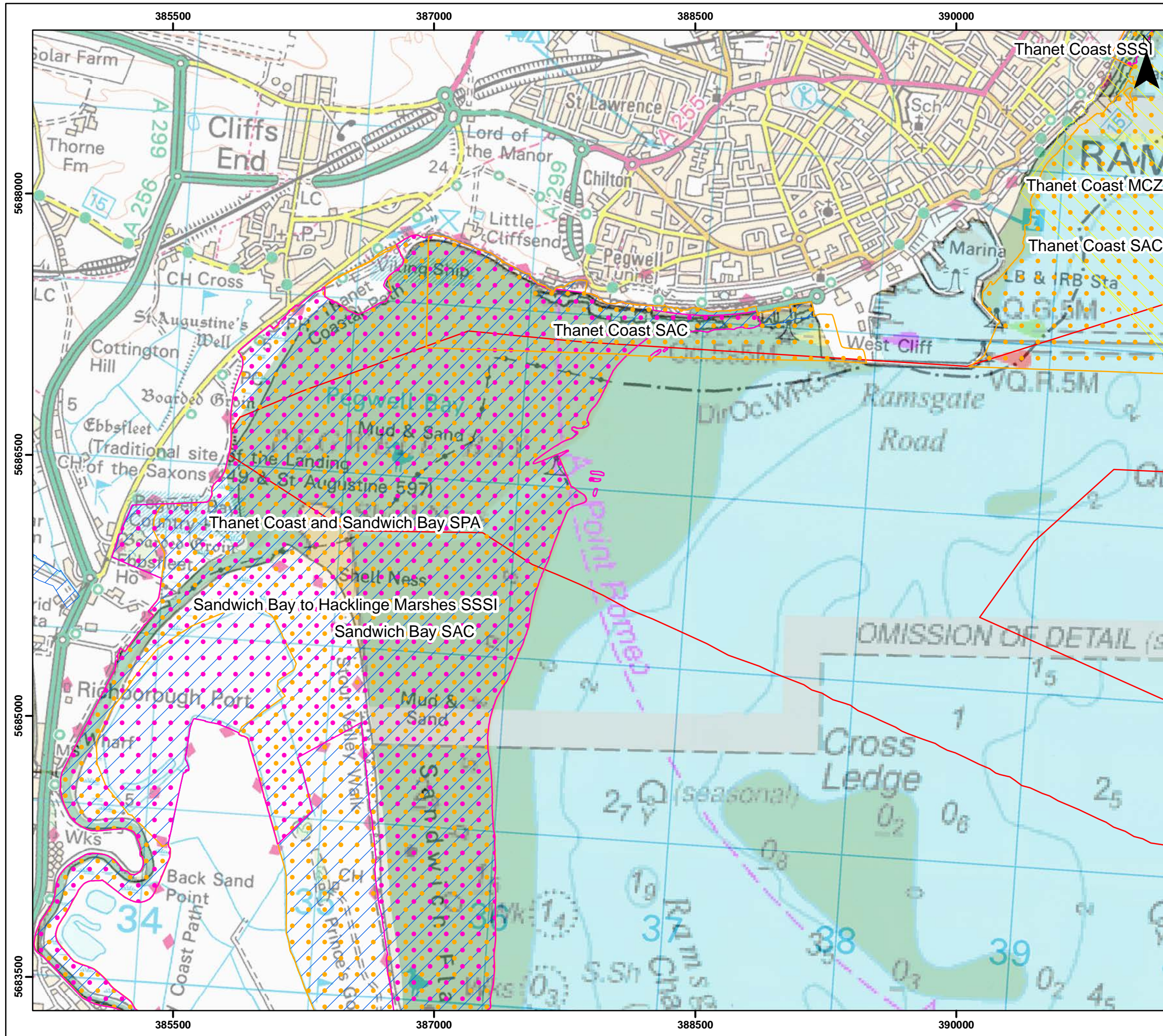
Table 3: Section 42 consultation comments relating to the saltmarsh habitat at the landfill site.

Reference	Date	Stakeholder	Comment
Volume 2, Chapter 8 (Document Ref: 6.2.8), Table 8.4	January 2018	Natural England	Cofferdam: Further information needs to be provided on the expected size and specification and the installation method of a cofferdam, particularly as it will be occurring within the saltmarsh habitat.
Volume 2, Chapter 8 (Document Ref: 6.2.8), Table 8.4	January 2018	Natural England	The saltmarsh is considered an important supporting habitat for the Thanet Coast and Sandwich Bay SPA species. As a result, the large amounts of disturbance and proposed permanent loss of saltmarsh within the bay is of concern, particularly on the effects of SPA birds.
Volume 2, Chapter 5, (Document Ref: 6.2.5), Table 5.5	January 2018	Natural England	The permanent loss or relocation of up to 4,811 m ² of Saltmarsh in an area designated as an SPA and SSSI.
Volume 2, Chapter 5, (Document Ref: 6.2.5), Table 5.5	January 2018	Natural England	A Phase 1 intertidal habitat survey is mentioned in paragraph 5.4.5 and states the scope was agreed in the evidence plan meetings. The only surveys we can see are in vol4 annex 5-1 and it doesn't seem to go into detail about saltmarsh quality?
Volume 2, Chapter 5, (Document Ref: 6.2.5), Table 5.5	January 2018	Natural England	Despite the quality of the saltmarsh north of the river Stour being of a "lower quality" it still represents an important habitat to a range of species and should not be disregarded.
Volume 2, Chapter 5, (Document Ref: 6.2.5), Table 5.5	January 2018	Natural England	Direct disturbance to the intertidal area from cable installation operations, including in the saltmarsh - It would be good to provide an overall area figure here. Using a spider plough like the one utilised during TOWF would also be a good method to consider. Shouldn't the tracking of vehicles be also considered and added here?
Volume 2, Chapter 5, (Document Ref: 6.2.5), Table 5.5	January 2018	Dover District Council	Assumptions on the impact on the saltmarsh during construction can surely be more defined due to previous experience.

4. Existing Saltmarsh Habitat and Previous Surveys

4.1.1. The proposed landfall site consists of an area of saltmarsh within Pegwell Bay. The proposed landfall site overlaps with the Thanet Coast and Sandwich SPA and Sandwich Bay to Hacklinge Marshes SSSI and is located close to several other designated conservation sites (Figure 4.1):

- Sandwich Bay Special Area of Conservation (SAC);
- Thanet Coast (SAC);
- Thanet Coast and Sandwich Bay RAMSAR designation; and
- Sandwich and Pegwell Bay National Nature Reserve (NNR).

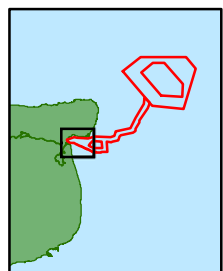


THANET EXTENSION OFFSHORE WIND FARM

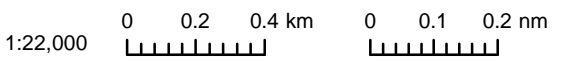
Figure 4.1
Relevant Designated Sites at the landfall location.

- Legend**
- Offshore Red Line Boundary
 - Special Protection Area
 - Special Area of Conservation
 - Marine Conservation Zones
 - Sites of Special Scientific Interest

Datum: ETRS 1989
Projection: UTM31N



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Drg No	TEOW_SMRMP_Fig_4.1			Figure 4.1
Rev	0.1	Date	25/05/2018	
By	DP	Layout	N/A	

Figure 4.1: Thanet Extension export cable landfall site in relation to designated areas.

- 4.1.2. Saltmarsh is common throughout Pegwell Bay and is present throughout the proposed cable installation site. The quality of the saltmarsh increases to the south of the Stour, with patchier, less diverse assemblages being found to the north of the Stour. Pegwell Bay saltmarsh is not a recognised feature of the Sandwich Bay SAC. However, it is included as a supporting habitat for roosting and feeding activity for the designated bird species golden plover and turnstone within the Thanet Coast and Sandwich Bay SPA/ RAMSAR and is also a feature of the Sandwich Bay to Hacklinge Marshes SSSI.
- 4.1.3. Previous baseline surveys of the saltmarsh were undertaken during the Thanet Offshore Wind Farm Environmental Statement. Saltmarsh recovery surveys following the TOWF cable installation indicated that the saltmarsh returned to its pre-construction status within two years (Haskoning UK Ltd., 2012). It has also been confirmed through discussion in the evidence plan (12th July 2017) that the saltmarsh in the proposed landfall site is well established and characterised by *Spartina* and less diverse than the areas to the north, which are characterised by *Salicornia*, or areas to the south of the River Stour.

5. Mitigation Measures

- 5.1.1. The measures listed in Table 4 will reduce the potential effects of the cable installation works within the saltmarsh to a minimum. As noted previously this document addresses construction phase temporary effects only; mitigation with regards permanent loss will be addressed elsewhere.

Table 4: Mitigation and Management Controls

Topic	Mitigation and Management Controls	Document References
<p>Pollution prevention</p>	<ul style="list-style-type: none"> • Appropriate bunding will be used around any fuel, lubricant or chemical storage areas, and spill kits should be available in case of an emergency. • Vehicles and equipment will have integral drip trays, or the use of plant nappies should be employed. • All plant and equipment working in the vicinity of the shore line shall be clean on delivery. If not, all tracks, wheels etc. will be thoroughly cleaned before entering the working area. • Equipment/ vehicles will be switched off when not in use. • If potentially contaminated material is found on site which has not been previously identified, work will cease until the material has been characterised and appropriate measures have been identified to dispose of it. 	<p>Code of construction practice for onshore</p> <p>PEMMP for offshore works</p>
<p>Ecology</p>	<ul style="list-style-type: none"> • Work will not take place outside of April – September to avoid impacts on wintering birds. • Prior to construction starting within the saltmarsh habitat a baseline survey will be undertaken by ecologists to provide an up to date data set that will form the basis of post-construction monitoring. • A suitably qualified Ecological Clerk of Works (ECoW) will be employed for the duration of the construction period. The ECoW will oversee the implementation of the LEMP and check that the works comply with applicable wildlife legislation and the relevant commitments. Prior to construction commencing a breeding bird survey (focussing on Schedule 1 species) will be conducted by the ECoW. The findings will inform if construction can commence and if any additional mitigation is required. • Pre- and post-work photo surveys (using GPS) will be undertaken along the cable route and access routes. • The working width associated with the cables installation, within the red line boundary, will be kept to a minimum to reduce disturbance to adjacent land. 	<p>Code of construction practice for onshore</p> <p>SMRMP</p> <p>Volume 3, Chapter 5: Biodiversity (Document Ref: 6.3.5)</p>

Topic	Mitigation and Management Controls	Document References
	<ul style="list-style-type: none"> • If breeding birds are found on site at any time work will stop and advise will be sought from the ECoW before work can recommence. • Once the cable has been buried, the soil will be backfilled using all reasonably practicable efforts to maintain the substrate profile. • Monitoring surveys of the affected saltmarsh will be undertaken for five years as described in Section 6. 	
Transport and access	<ul style="list-style-type: none"> • The working area along the cable route, including the saltmarsh area, will be fenced to ensure public safety and that the area affected by the works is limited. • Access routes will be marked and temporary ground protection, such as matting, will be used as necessary to prevent equipment sinkage and damage to the saltmarsh and intertidal area resulting from weight and movement of vehicles. • Access to the cable route crossing the saltmarsh will be limited to that required for the specific saltmarsh cable operations only 	SMRMP
Training	<ul style="list-style-type: none"> • Site briefings, toolbox talks and task-specific risk assessments will be undertaken to ensure that all personnel are aware of the potential risks to the environment and the relevant mitigation or management measures. 	SMRMP

6. Proposed Pre-Construction Baseline Survey

6.1.1. A baseline survey on the condition of the saltmarsh must be conducted prior to construction to determine the post-construction regeneration of the saltmarsh and any changes in species abundance and diversity that may occur due to the disturbance. A baseline survey is also required to identify if any reinstatement work is needed. The outline of the baseline survey is proposed below.

- 6.1.2. The survey should take place at the optimum time, likely to be June/ July, to enable easier speciation of flowering plants. The survey will consist of three evenly distributed 200m transects running along the shoreline perpendicular to the proposed export cable route. These transects should be placed so that the proposed export cable route is situated as close to half way as possible. This enables the survey to represent the salt marsh conditions equally around the cable post-construction. A 1m² quadrat will be placed every 20m along each transect and its GPS position recorded.
- 6.1.3. The survey will record an estimated percentage cover of each plant species using a 20cm² grid scale within the quadrat. The DAFOR scale will be used to semi-quantitatively sample the saltmarsh and provide an estimate of the relative abundance of each species. For each of the three transects a series of photographs will be taken at the same location as the quadrats.

7. Post-construction Monitoring and Reinstatement

7.1. Monitoring

- 7.1.1. Surveys will follow the same procedure as stated in the baseline survey. An initial post-completion monitoring survey will be undertaken following reinstatement of soil to ground level. Surveys will be undertaken on a monthly basis for 1 year following installation and once yearly up to 5 years' post-installation, or until recovery is agreed with Natural England in line with the SMRMP.
- 7.1.2. Monitoring reports will be produced at the end of each year. These will report on the progress of saltmarsh recolonisation in terms of overall coverage and species composition. If necessary, recommendations will also be made with regard to implementation of other saltmarsh recolonisation techniques.

7.2. Reinstatement

- 7.2.1. Two options could be considered for reinstatement of the saltmarsh following cable installation:
1. Replanting via the replacement of the removed turf by seeding or artificial transplantation.
 2. Natural recolonisation where tides naturally disperse seeds and propagules throughout the marsh, allowing pioneer species to take advantage of newly exposed patches within the saltmarsh.
- 7.2.2. Option 2 is the preferred option following reviews of manuals, guidance and its use in similar projects in this location, including the installation for the Nemo Link cable.

- 7.2.3. The advice of Natural England will be sought on the success of the saltmarsh restoration on receipt of each monitoring report and it will be asked to advise as necessary if it considers that natural recolonisation is unsuccessful. It is anticipated that after year 1, 25% of bare ground coverage would be achieved with a similar annual rate of colonisation thereafter. After three growing seasons, cover of less than 66% would be a trigger for considering the need for introduction of seeding material to supplement the natural recolonisation of the saltmarsh. It is anticipated that after 5 growing seasons the success would be measured by vegetation cover being at least at 95% of pre-excavation levels, with evidence of on-going colonisation; or strong evidence emerging from monitoring vegetation cover is recovering to the 95% levels.
- 7.2.4. Material for seeding the saltmarsh will be selected from sources agreed with Natural England. A method statement will be submitted for approval by Natural England and Kent Wildlife Trust and any licence necessary will be sought.
- 7.2.5. Guidance for survey methodology, monitoring and re-instatement procedures was gained from Haskoning UK Ltd., 2012.

8. References

Haskoning UK Ltd (2012), 'Thanet Offshore Wind Farm Saltmarsh Recovery Monitoring Survey 2012'

Sheet Piling (UK) Ltd, "Case Study: Temporary Sheet Pile Pipe Pull Trench Cofferdam, Easington", [Online]. Available: https://www.sheetpilinguk.com/case_study/temporary-sheet-pile-pipe-pull-trench-cofferdam-easington/. [Accessed: 05/03/2018].