AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement – Volume 4 – Non-Technical Summary

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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1. INTRODUCTION

1.1.1.1. AQUIND Limited ('The Applicant') is proposing to construct and operate an electricity interconnector between France and the UK known as AQUIND Interconnector ('the Project'). Electricity interconnectors are the physical links which allow the transfer of electricity across borders.

1.1.1.2. The Project comprises a new marine and onshore High Voltage Direct Current ('HVDC') power cable transmission link between Normandy in France and Eastney, Hampshire, converter stations in both England and France, and infrastructure necessary to facilitate the import and export of electricity between both countries and Fibre Optic Cable ('FOC') infrastructure.

1.1.1.3. This document relates to the Proposed Development, which includes that part of the Project located within the UK and the UK Marine Area, for which development consent is sought (the 'Application').

1.1.1.4. This document is the Non-Technical Summary ('NTS') of the Environmental Statement ('ES') Volume 4 (APP-030) which has been prepared in accordance with Regulation 14(2)(e) and Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the 'EIA Regulations'). The ES reports the findings of the Environmental Impact Assessment ('EIA') and assesses the likely significant effects of the Proposed Development. The purpose of this NTS is to provide:

- A description of the Proposed Development;
- A description of the reasonable alternatives studied by the Applicant;
- A summary of the consultation process;
- An overview of the EIA methodology;
- A summary of the environmental baseline;
- An outline of the mitigation identified to avoid or reduce any potential adverse effects; and
- A summary of the likely significant effects after mitigation.

1.1.1.5. Further information on the Proposed Development and the full ES is available from the Planning Inspectorate ('PINS') website: https://infrastructure.planninginspectorate.gov.uk/projects/south-east/aquind-interconnector/

1.1.1.6. The ES is presented in four volumes:

- Volume 1: Main Text (APP-116 to APP-145);

- Volume 2: Figures (APP-146 to APP-347);
- Volume 3: Technical Appendices (APP-348 to APP-486); and
- Volume 4: Non-technical Summary (this document).

1.1.1.7. This NTS has been updated since submission of the ES in November 2019. It takes account of updated information presented in the ES Addendum (document reference 7.8.1).

2. LEGISLATIVE FRAMEWORK

2.1.1.1. The Secretary of State ('SoS') for Business, Energy and Industrial Strategy ('BEIS') has directed that the Proposed Development should be treated as development for which development consent under the Planning Act 2008 (as amended) is required. Therefore, prior to construction and operation, the Applicant must make an application under the Planning Act 2008 for a development consent order ('DCO').

2.1.1.2. The Application is submitted to the SoS for BEIS, who will examine the Application using appointed inspectors from the Planning Inspectorate. The Planning Inspectorate will make a recommendation on whether a DCO for the proposed Development should be granted, and the SoS will make the final decision.

2.1.1.3. The EIA has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

2.1.1.4. The EIA process has been co-ordinated with environmental assessments required under other regulatory regimes, including:

- Water Framework Directive assessment (APP-372 and APP-437);
- Habitats Regulations Assessment (APP-491 to APP-501);
- Flood Risk Assessment (APP-444); and
- Marine Conservation Zone Assessment (APP-381).

3. DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1. PURPOSE OF THE PROPOSED DEVELOPMENT

3.1.1.1. The Proposed Development will facilitate the import and export of electricity between the UK and France. The purpose of the Project is to make a significant contribution towards increasing the cross-border capacity between the UK and France (providing a net capacity of 2,000 megawatts ('MW')[1].

3.1.1.2. Interconnectors improve competition in the energy markets, deliver security and flexibility of energy supply in both countries as well as helping to address issues of climate change by enabling the integration of more renewable energy sources into national transmission and distribution systems.

3.1.1.3. In particular. during the first 25 years of its operation, it is expected to deliver net socio-economic benefits to Europe of €1.3 billion (in present value terms and net of the development, capital and operating costs associated with the Project). The Project will benefit the UK on all aspects of the "energy trilemma" by reducing wholesale electricity prices (delivering a total benefit of €2.2 bn for GB consumers). In addition, it is expected to generate tax revenue for the Treasury and local authorities and create new employment opportunities during the construction and operation of the Proposed Development.

3.1.1.4. The net CO_2 emissions due to construction and operation of the Proposed Development, over its minimum 40 year lifespan, are expected to be approximately minus 1,272,000 tonnes CO_2 equivalents (tCO_2e), due to the change in emissions from the generation plant due to energy transfers between UK and France.

[1] *Each circuit will have the export capacity of 1037.5MW and the import capacity of around 1000MW, net of transmission and conversions losses. Such an arrangement provides at least 50% power, as the two circuits are designed to be completely electrically independent, with no overlapping equipment or services. Throughout this Application, the Project's capacity is referred to as 2000MW.*

3.2. SUMMARY OF THE PROPOSED DEVELOPMENT

3.2.1.1. The components of the Project, that is both the French and UK elements of AQUIND Interconnector, are schematically shown on Plate 1. The UK components of AQUIND Interconnector, known as the Proposed Development, is comprised of Onshore and Marine Components:

3.2.2. ONSHORE COMPONENTS IN UK:

- Works at the existing Lovedean Substation in Hampshire to facilitate the connection of the Proposed Development to the National Electricity Transmission System ('NETS');
- Underground high voltage alternating current ('HVAC') Cables, connecting Lovedean Substation to the proposed Converter Station;
- A newly constructed Converter Station comprising a mix of buildings and outdoor electrical equipment and associated infrastructure and the Telecommunications Buildings;
- Two pairs of underground Onshore HVDC Cables, each pair accompanied by a smaller diameter FOC, to run from the Converter Station to Mean Low Water Springs ('MLWS') at the Landfall site in Eastney (near Portsmouth), approximately 20 km in length; and
- Infrastructure to join the Onshore and Marine HVDC Cables together at the Landfall, and two Optical Regeneration Stations ('ORS') (one for each circuit) housed in separate buildings.

3.2.3. MARINE COMPONENTS IN THE UK:

- Two pairs of Marine HVDC Cables, each pair accompanied by a smaller diameter FOC, within the Marine Cable Corridor from Landfall at Eastney to the UK/France Exclusive Economic Zone ('EEZ') Boundary Line (approximately 109 km in length).

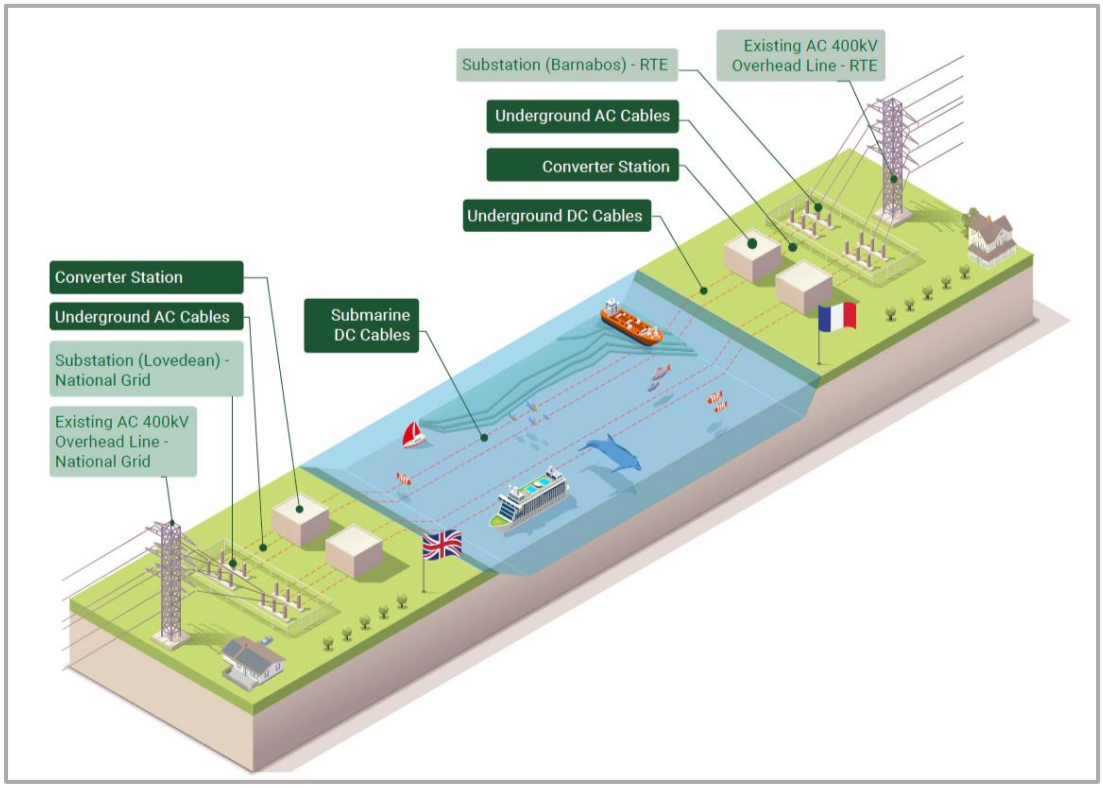

Plate 1 – AQUIND Interconnector Project components

3.3. APPROACH TO ALTERNATIVES

3.3.1.1. As part of the iterative design process, a number of options were identified for the following components of the Proposed Development:

- UK Grid Connection location;
- UK Converter Station location;
- Onshore Cable Corridor route;
- UK Landfall Location; and
- Marine Cable Corridor route.

3.3.1.2. The process of considering the options and their selection has been multidisciplinary, taking into account electrical, civil engineering, geotechnical, environmental, planning, construction, social and access considerations. It has also taken into account the land affected and the exploration of all reasonable alternatives. A high-level summary of the reasonable alternatives considered and the options chosen is provided below.

3.3.1.3. Supplementary information on alternatives has been provided within Appendix 3 of the ES Addendum (Supplementary Alternatives Chapter) (document reference 7.8.1.3). This is to provide further clarity in respect of the reasonable alternatives considered by the Applicant and the comparison of environmental effects in relation to them.

3.3.2. UK GRID CONNECTION

3.3.2.1. The Applicant requested National Grid Electricity transmission ('NGET') perform a feasibility study to identify potential grid connection locations in the South-East of England. The conclusion of the feasibility study undertaken was that Lovedean was the most suitable connection point for the Proposed Development. This conclusion was supported by work undertaken to produce the Connection and Infrastructure Options Note ('CION').

3.3.2.2. The Applicant's assessment of the reasonable alternatives focused on considering a connection at Chickerell, Bramley or Lovedean.

3.3.2.3. A connection at Chickerell was discounted for the following reasons:

- there was no realistic prospect of a connection to Chickerell delivering the same infrastructure capacity and the benefits associated with that infrastructure capacity in the same timescale as the Proposed Development; and
- that a connection to Chickerell would not have been commercially viable in light of the significant increased cost for both the Applicant and NGET, and in addition that the land surrounding the existing Chickerell Substation, taking into account the proximity of the surrounding settlements and the flatter topography of the land closer to the coast, was not suitable for the proposed interconnector, particularly when compared to the availability and topography of land surrounding the Lovedean Substation.

3.3.2.4. With regard to the Applicant's comparison between the options of connecting at Bramley or Lovedean:

- Lovedean Substation was determined to be preferable from a site suitability perspective. In particular the potential loss of ancient woodland associated with the proposals for a connection to Bramley was considered by the Applicant to be a major constraint and it was noted that the loss of ancient woodland would be an environmental impact difficult, if not impossible, to entirely surmount, and would likely mean the proposals would be contrary to the planning policies relating to ancient woodland applicable to the interconnector when determined.

- In the best case, Bramley Substation would take two years longer than a connection to Lovedean, and potentially up to three years longer. Accordingly, it is the Applicants view that there was no realistic prospect of a connection to Bramley delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as a connection to Lovedean Substation whilst continuing to utilise underground onshore cables.
- The capital costs for a connection at Bramley Substation, being estimated as £260m more than a connection to Lovedean, would have added a considerable cost to the proposals.
- The additional length of the onshore cable route required to facilitate a connection to Bramley Substation was considered to represent much more than an incremental increase in the likely environmental impacts and included impacts on the South Downs National Park, ancient woodland, designated heritage and ecological assets and various water based receptors. The general consensus of the project team was that those additional impacts could not be mitigated entirely, and to do so would add more cost and technical complexity to the proposals, presenting an unacceptable level of risk.

3.3.2.5. For all of the above reasons, the Applicant determined that Lovedean was the preferred reasonable alternative for the grid connection point and proceeded with NGET in relation to the connection offer for a connection at Lovedean Substation, whilst continuing the development and refinement of the wider proposals for the Proposed Development.

3.3.3. CONVERTER STATION LOCATION

3.3.3.1. Following the identification of Lovedean Substation as the grid connection point, optioneering was undertaken to refine the siting of the Converter Station within a 2 km search area. The key considerations included technical, accessibility, environmental and social constraints. Five sites were initially identified and reviewed in consultation with the local planning authorities and South Downs National Park Authority ('SDNPA').

3.3.3.2. Two options were subsequently shortlisted, Option A and Option B (see Plate 3). These two options were preferred from an environmental and technical perspective, and were presented at the non-statutory consultation.

3.3.3.3. Option B (shown on Plate 3) was selected as the preferred Converter Station location following the non-statutory consultation, taking into account the responses received and further environmental and technical assessments. A key driver behind the selection of Option B was its reduced landscape and visual effects, in part due to the distance from SDNP and the screening opportunities provided by the existing topography.

3.3.4. ONSHORE CABLE CORRIDOR

3.3.4.1. Following an early strategic decision underground cables were proposed to avoid the permanent significant adverse landscape and visual impacts associated with overhead lines.

3.3.4.2. Onshore cable routes were initially developed based on the six shortlisted potential Landfall locations. Then, following the reduction to three potential Landfall sites, potential routes were developed using modelling within the existing highway network.

3.3.4.3. In light of its engineering feasibility and the initial observations of environmental constraints including traffic impacts, a route from Eastney to Lovedean (Route 3D) was recommended to be progressed to a further detailed assessment to identify any unknown constraints. In case it would not be possible to construct Route 3D, a secondary route, East Wittering to Lovedean (Route 1D) was also progressed (see Plate 4).

3.3.4.4. Route 3D was selected as the preferred onshore cable route (alongside Eastney as Landfall) to Lovedean Substation. Although the route potentially has a greater impact, but temporary in nature, on local residents because of traffic disruption, when balanced against the much lower number of potential environmental impacts (associated with the shorter route, construction programme and long-term effects) Route 3D was preferred.

3.3.4.5. Further refinement of the Onshore Cable Corridor has been ongoing taking into account feedback received during the non-statutory and statutory consultations undertaken and stakeholder engagement.

3.3.5. UK LANDFALL LOCATION

3.3.5.1. A preliminary desk study was undertaken by the Applicant to identify the potential Landfall locations alongside the selection of the grid connection point. The search area extended across the South Coast of England, bounded by West Bay, Dorset in the southwest and Bognor Regis, West Sussex in the southeast.

3.3.5.2. A ranking exercise was undertaken of each potential Landfall site based on engineering parameters of the nature of the beach, topography and marine approach. Following this, and the confirmation of Lovedean Substation as the grid connection point, nine sites that scored well and were considered to be within a reasonable distance (35 km) of the grid connection point were visited and evaluated in more detail. This exercise resulted in a shortlist of three sites taking into account technical and environmental constraints, namely Eastney, East Wittering and Hayling.

3.3.5.3. With a much shorter onshore cable route and fewer environmental constraints, Eastney was selected as the preferred Landfall location (see Plate 4).

3.3.6. MARINE CABLE CORRIDOR

3.3.6.1. The Marine Cable Corridor was developed following a preliminary high-level study. A study area was made based on the extremes of the potential landfalls within the UK and France. Marine constraints were mapped included dredging areas, aggregate extraction, offshore wind farms, transport/shipping activity, cables and pipelines, wrecks and obstructions, rock outcrops and Marine Protected Areas.

3.3.6.2. A number of changes to the route were developed and are illustrated by the green, blue and red routes illustrated in Plate 5.

3.3.6.3. The blue route was selected as the preferred Marine Cable Corridor as it was significantly shorter (see Plate 5). The shorter length reduced the environmental impacts, seabed occupation, and construction period length (with reduced health and safety risks and reduced impacts on other sea users).

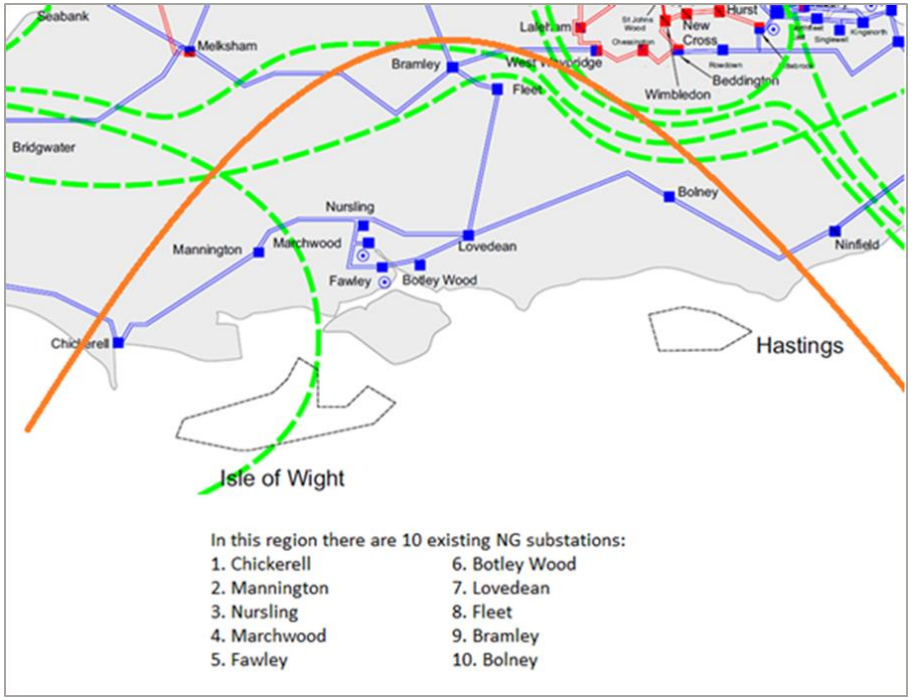

Plate 2 - England South Coast Map showing the region

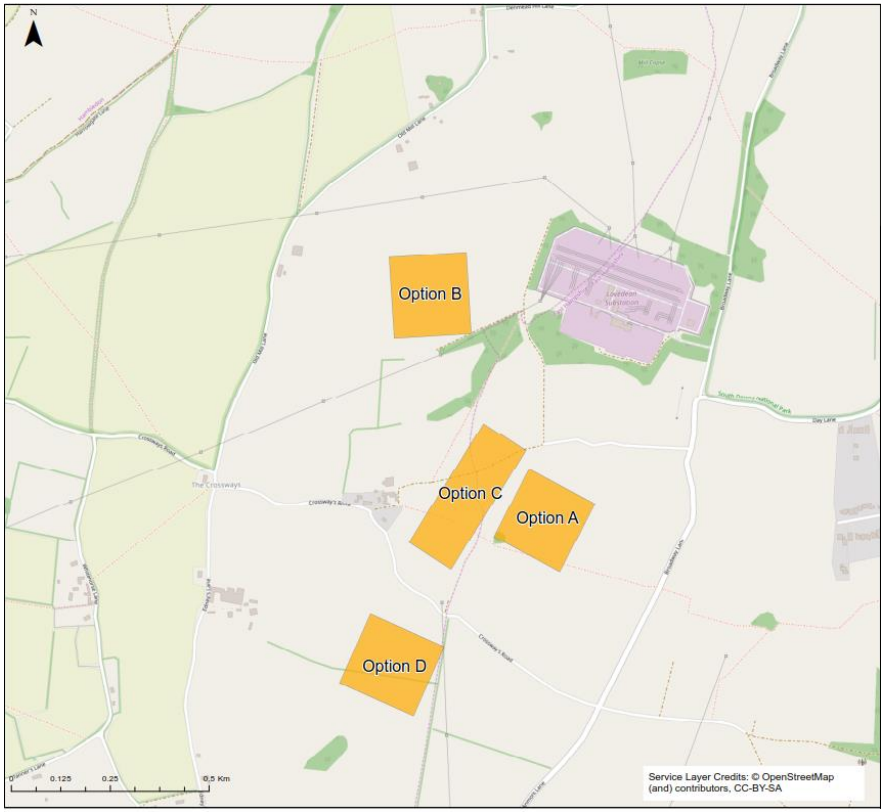

Plate 3 - Potential Converter Station Options

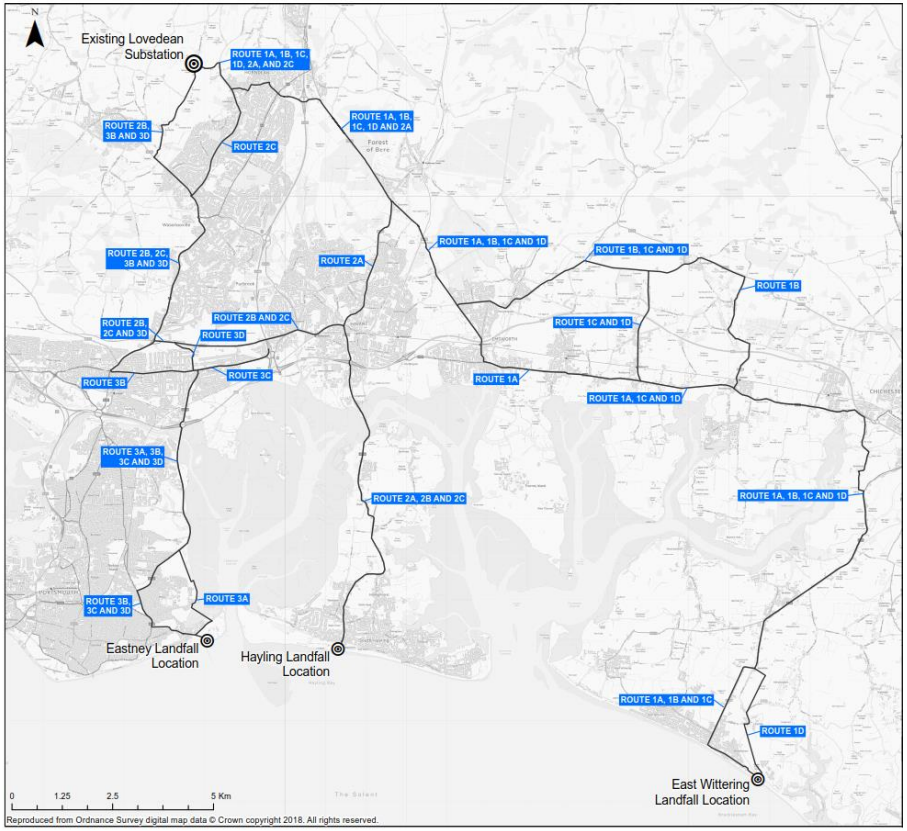

Plate 4 – Onshore HVDC Cable Route Options (Feb 2017)

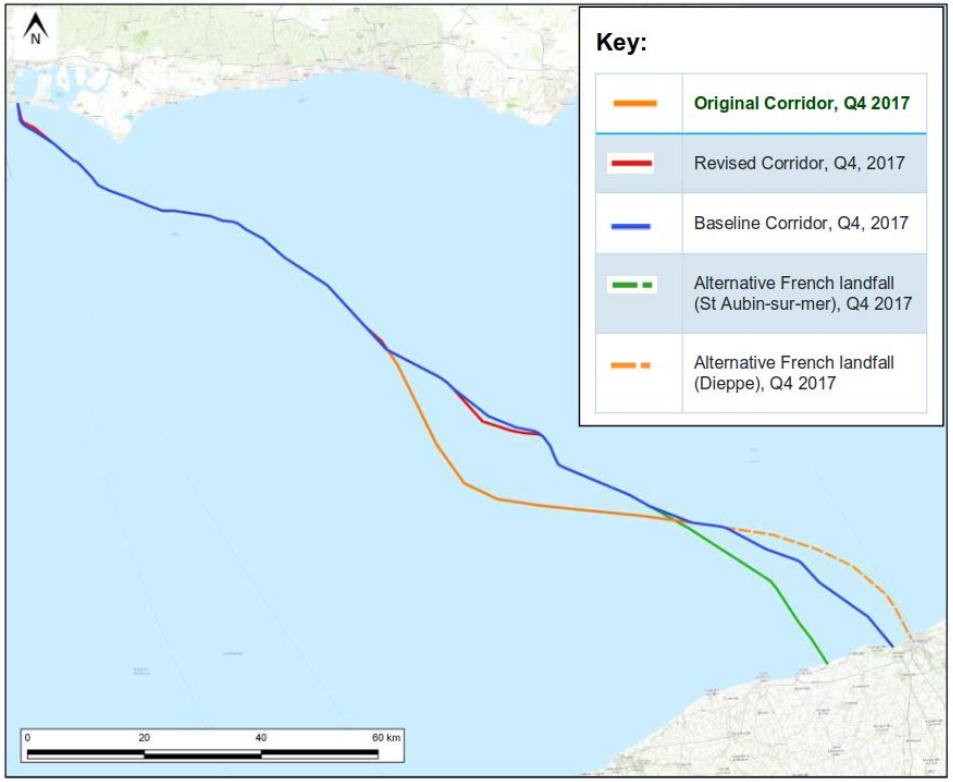

Plate 5 - Marine Cable Corridor Options

3.4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.4.1.1. The Proposed Development broadly comprises marine and onshore components. The marine components of the Proposed Development are within the UK Marine Area. The UK Marine Area is defined as the area between the Mean High Water Spring ('MHWS') mark to the limit of the UK/France EEZ Boundary Line. The Onshore Components of the Proposed Development are all elements of the Proposed Development above the MLWS mark, landward towards the existing Lovedean Substation. The Proposed Development will be contained within the Order Limits (see Plate 6 for Onshore Components and Plate 7 for Marine Components).

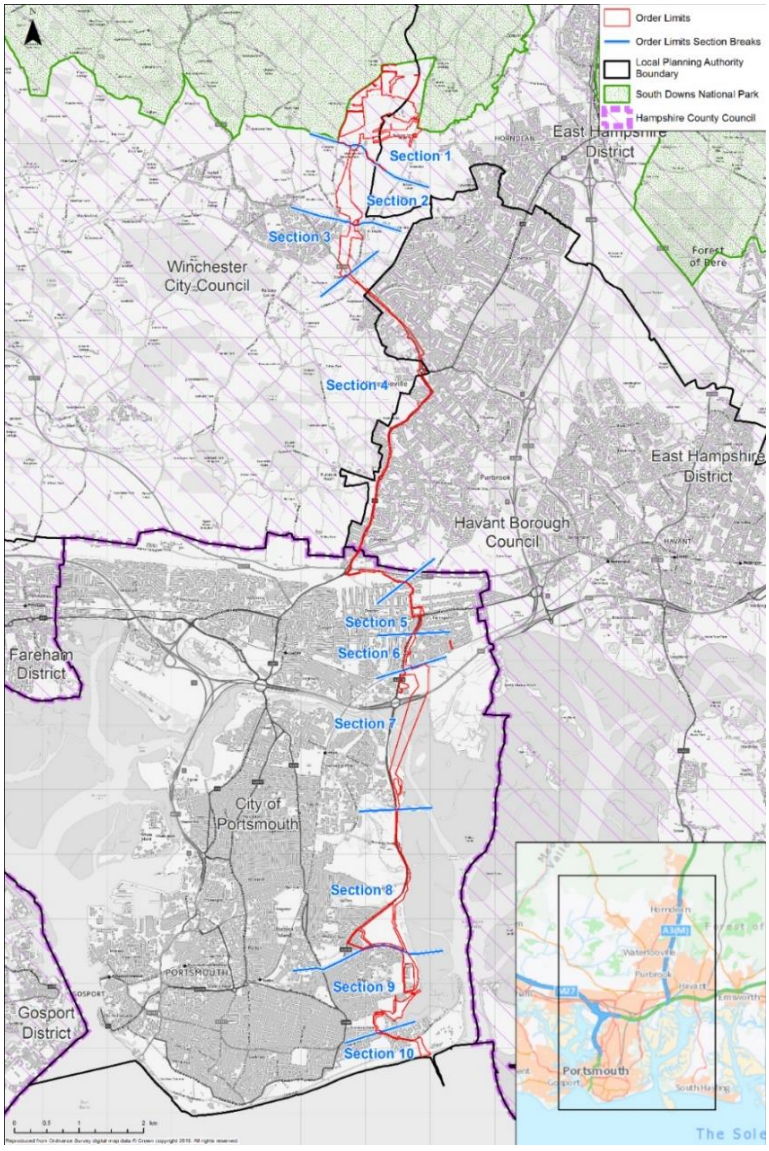

Plate 6 – The Order Limits for the Proposed Development, showing the Sections of the Onshore Cable Corridor

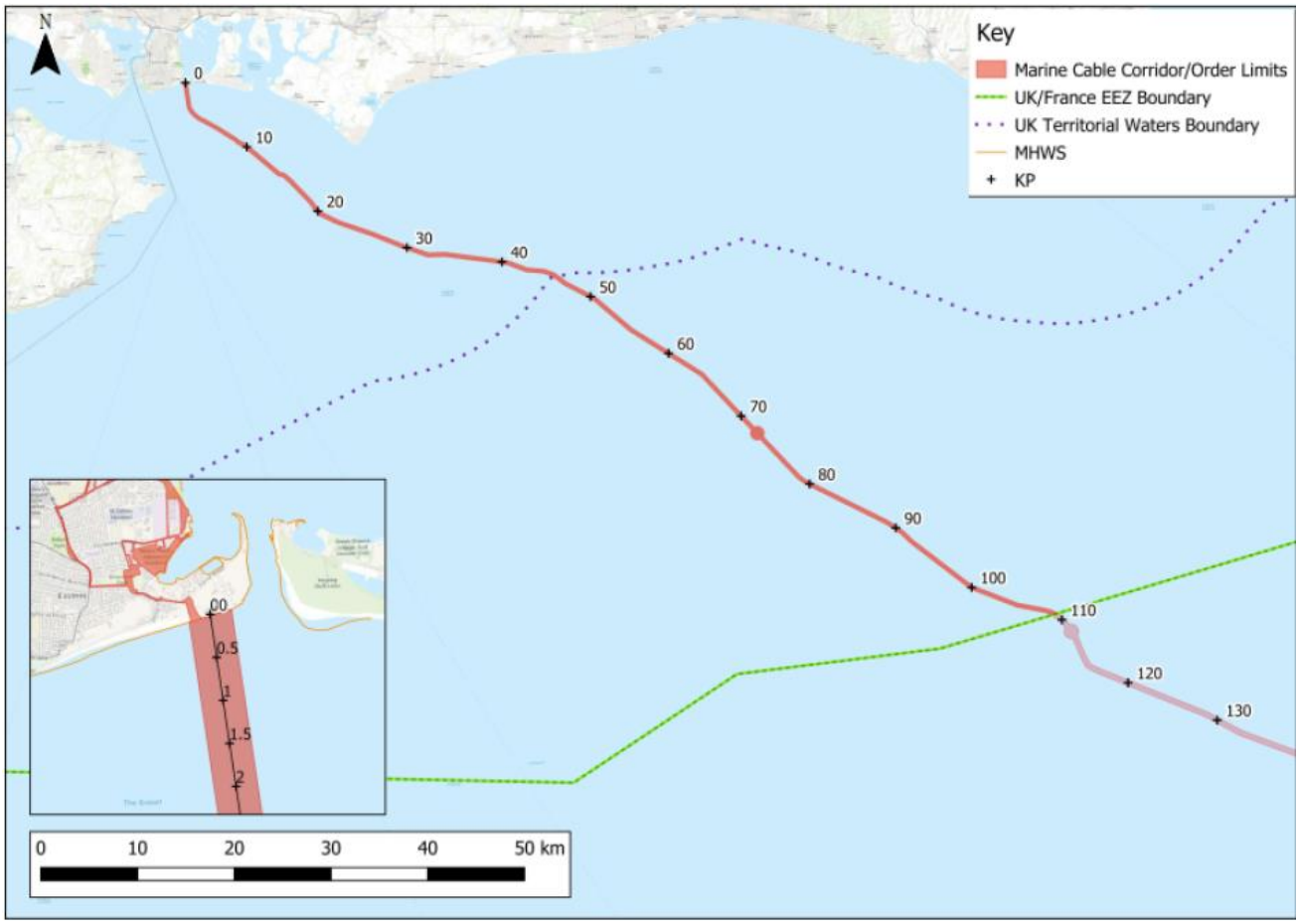

Plate 7 – The Order Limits for the Proposed Development, showing the Marine Cable Corridor

3.4.2. CONVERTER STATION AREA

3.4.2.1. The Converter Station Area is located to the west of Lovedean Substation. The Converter Station will convert electricity from HVDC to HVAC and vice versa. It will occupy an area of approximately 200 m x 200 m located within a securely fenced compound, within a larger area, referred to as the Converter Station Area. This is the area of land identified to accommodate:

- the Converter Station and associated equipment;
- the connection between the HVAC Cables and the National Electricity Transmission System ('NETS') at Lovedean Substation;
- the HVAC Cable Corridor to accommodate the HVAC Cables and FOC between the Converter Station and Lovedean Substation;
- the HVDC Cable Corridor to accommodate the HVDC cables and FOC from the Converter Station southwards;

- a Works Compound and Laydown Area;
- an Access Road and associated haul roads;
- surface water drainage and associated attenuation ponds;
- landscape and ecology measures;
- utilities such as potable water, electricity and telecommunications; and
- the compound comprising the two Telecommunications Buildings and associated equipment.

3.4.2.2. Following the statutory consultation, and the outcome of ongoing assessments and consultation with the local planning authorities, a small scale change to the location of the Converter Station was considered resulting in a potential second micro-sited option The two options, Option B(i) (blue) and B(ii) (green) are illustrated on Plate 8. Both options are included within the Application and are assessed in the Environmental Statement.

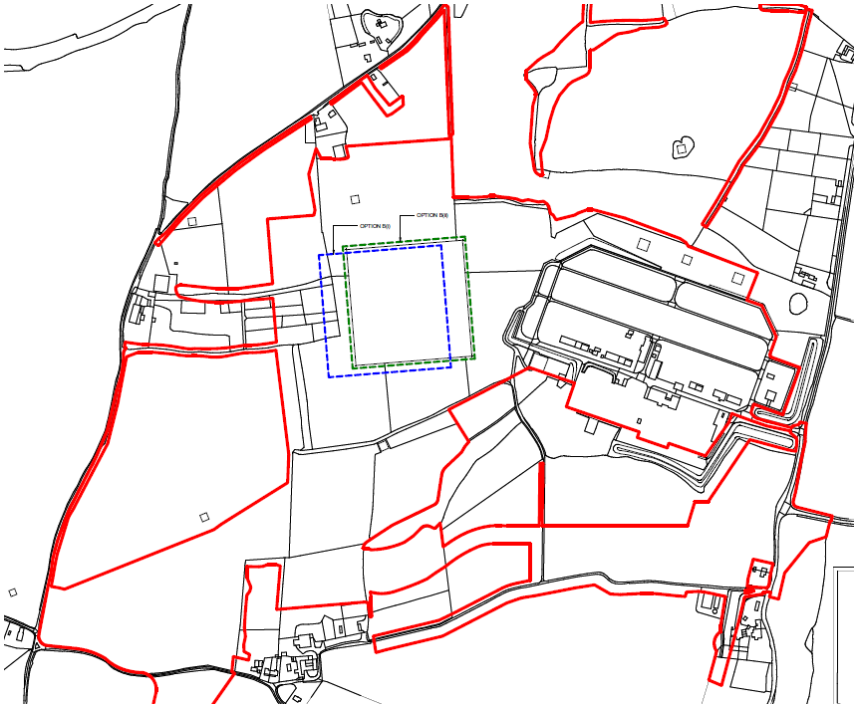

Plate 8 - Converter Station locations (two options, Option B(i) blue and B(ii) green)

3.4.2.3. Within each option, zones are identified where the buildings and electrical equipment may be located which are subject to maximum height restrictions. The buildings and electrical equipment that may be located in each of the identified zones are included

within a requirement in the Order, with each type of building subject to maximum parameters regarding its massing (i.e. the three dimensional form of the building).

3.4.3. HVAC CABLES AND NATIONAL GRID CONNECTION WORKS

3.4.3.1. Additional electrical infrastructure will be provided at Lovedean Substation as part of the Proposed Development. Two HVAC cable circuits will run from the Converter Station to Lovedean Substation (buried, typically at a depth of 900 mm). One connection bay is proposed to the western side, and the other to the eastern side of the substation for each cable circuit.

3.4.4. ONSHORE CABLE CORRIDOR

3.4.4.1. The Onshore Cable Corridor is located between the UK Landfall at Eastney and the proposed Converter Station, located to the west of Lovedean Substation. Two HVDC cable circuits will be installed within the Onshore Cable Corridor. Each cable circuit will contain two HVDC cables and one FOC.

3.4.4.2. For the majority of the route the Onshore Cables will be installed in cable ducts placed in excavated trenches spaced at approximately 5 m. There will be one trench for each circuit, with each circuit potentially being installed at separate times. The works in urban areas will include the installation of Onshore Cable ducts within the highway boundary, considering the environmental and engineering constraints on site.

3.4.4.3. A review of the installation rate assumptions has been undertaken since the submission of the 2019 ES to re-test their robustness and, as a result, amendments have been made to the assumptions. Whilst amendments have included a more detailed breakdown of the installation rates, overall the average installation rate outlined in Chapter 3 (Description of the Proposed Development) (APP-118) has not changed (approximately 18 m to 30 m per day in urban areas and approximately 50 m per day in rural areas). In roads with heavy service congestion, the duct installation rate is anticipated to be 12 m per day, and in open country/agricultural land it is anticipated to be 50 m per day. The overall time anticipated to be required to construct the Proposed Development has therefore not changed as a result of the review of the assumptions.

3.4.4.4. Joint Bays will be required at points along the route, and these will be used for pulling the cable through the cable ducts before joining one section of cable to another. Link Boxes or Link Pillars will be located next to the Joint Bays. Link Boxes will be underground, whereas Link Pillars will be above ground. Link Pillars are normally used on agricultural land, and are approximately 1 m x 1 m x 0.6 m.

3.4.4.5. There are six locations along the Onshore Cable Corridor where the ducts will be installed by Trenchless Techniques, such as Horizontal Directional Drilling ('HDD'), which is a technique for installing the Cable ducts that do not require the excavation of a trench, enabling infrastructure to be routed beneath sensitive locations with limited disruption.

3.4.5. LANDFALL

3.4.5.1. The Landfall forms the transitional area between the Onshore Cables and Marine Cables. The Landfall is located at Fort Cumberland car park, south of Fort Cumberland Road in Eastney.

3.4.5.2. The Marine Cables will come onshore via HDD from surface boreholes within the intertidal area. The HDD installation method, a trenchless technology that involves drilling into the ground to create a bore with a generally horizontal profile, will be used along a planned pathway thus avoiding open trenching techniques.

3.4.5.3. Two Transition Joint Bays will be required at the Landfall in the car park at Fort Cumberland Road to join the Marine Cables to the Onshore Cables. Once constructed these will be below ground structures and will leave no visual presence.

3.4.5.4. To amplify the signal of the FOC between the French and UK converter stations, up to two ORS are to be located within Fort Cumberland Car Park at Eastney.

3.4.5.5. The compound for the ORS will have a maximum size of 18 m x 35 m. Inside the compound, there will be the provision for parking for up to two vehicles for maintenance purposes. It is necessary for the two ORS buildings to be located approximately 10 m apart.

3.4.5.6. Each ORS will have dimensions of up to 10 m long x 4 m wide x 4 m high.

3.4.6. MARINE CABLE CORRIDOR

3.4.6.1. The total length of the Marine Cable Corridor is approximately 109 km. The Marine Cables will consist of four HVDC cables, installed for the majority of the route as two HDVC circuits. Two FOC will be laid together with the Marine Cables in a shared trench (one FOC per HDVC circuit).

3.4.6.2. Two types of preparation will be required prior to the installation of the Marine Cable, comprising the clearance of obstacles and/or seabed features, and the construction of crossing structures over in-service cables crossed by the Proposed Development.

3.4.6.3. The Marine Cables will be laid via a vessel and will be pulled overboard and on to the seabed. Depending on the burial technique adopted, trenching/burial of cables can be at the same time, before or after cable lay.

3.4.6.4. The depth to which the Marine Cables will be buried is dependent on local seabed characteristics, and the risk and probability of likely hazards (i.e. snagging by fishing gear/anchors). Where it is not possible to bury the cable under the seabed to the target depth, non-burial protection will be required which may typically consist of rock or concrete mattresses being placed over the cable to protect it.

3.4.7. CONSTRUCTION PROGRAMME

3.4.7.1. The construction is likely to take approximately three years to complete, indicatively from Quarter 3 ('Q3') 2021 to Quarter 2 ('Q2') 2024. Indicative marine and onshore construction programmes are included in Table 2. The construction programme includes marine seabed preparation, Marine and Onshore Cable installation (including at the Landfall), Converter Station construction and commissioning.

3.4.7.2. The construction programme takes into account a number of constraints, including traffic management, environmental considerations and public activities and events.

Table 2 - Indicative construction programme

Activity	Indicative Programme (Q = Quarter)
MARINE	
Marine Cable Seabed Preparation	2021-2023
Marine Cable Installation (including remedial protection)	2022-2023
HDD Landfall Installation	2021-2023
ONSHORE	
Converter Station Construction	Q3 2021 – Q1 2024
Onshore HVDC Route Construction/ Cable Installation	Q3 2021 – Q4 2023
HDD and Landfall Construction	Q3 2021 – Q4 2023
Converter Station Commissioning	Q4 2023 – Q2 2024

4. EIA METHODOLOGY

4.1.1.1. The key steps of the EIA process followed by the Applicant are presented below:

- **Scoping:** An EIA Scoping Report was submitted to PINS on 29 October 2018. An EIA Scoping Opinion was received from PINS on 7 December 2018;
- **Preliminary Environmental Information Report ('PEIR'):** A publicly available report, establishing the baseline data and carrying out a preliminary evaluation of the potential impact of the Proposed Development was submitted on 27 February 2019. Public consultation subsequently took place between 27 February and 29 April 2019; and
- **Preparation of ES and Submission of the Application:** Detailed assessment of the likely significant effects and mitigation measures for the Proposed Development are reported in the ES. The ES is formally submitted to the SoS as part of the Application (this is the current stage of the EIA process).

4.1.1.2. The over-arching objective of the EIA process is to assess the impact of the Proposed Development on the environment, categorise the effects and identify mitigation and monitoring measures to avoid and/or reduce those effects where possible.

4.1.1.3. The impacts from construction, operation and decommissioning of the Proposed Development have been assessed. Throughout this document, decommissioning is considered in parallel with the Construction Stage. Decommissioning impacts are generally considered to be similar to construction or of smaller magnitude than construction, therefore this is a worst-case assessment. The impacts arising from operation of the Proposed Development consider repair and maintenance activities.

4.1.1.4. The resulting effects on receptors can be adverse (negative) or beneficial (positive). The interaction between the sensitivity or importance of a receptor and the magnitude of the potential impact produces the significance of the environmental effect, which can range from negligible, minor, moderate to major.

4.1.1.5. Significant effects are generally considered to be moderate or greater. However, this does vary between topics dependant on the specific methodologies used (more information is provided in the ES). Where a significant adverse effect is predicted, the Applicant has worked with the EIA technical specialists to incorporate mitigation measures which aim to avoid or reduce the effect identified, or to reduce the likelihood of the impact occurring. A Mitigation Schedule (APP-489) for both the onshore and marine elements of the Proposed Development is provided as part of the Application.

4.1.1.6. The potential for cumulative effects and transboundary effects are also considered in the ES. The cumulative effects are comprised of the intra-project and inter-project effects. These can be considered as:

- Intra-project effects are two or more effects from the same project (i.e. the Proposed Development) which impact on the same receptor.
- Inter-project effects are effects which could arise or increase because of the effects of the development and another development.
- Transboundary effects are those which could be experienced in another country as a result of the development.

5. CONSULTATION

5.1. INTRODUCTION

5.1.1.1. The Applicant has carried out extensive consultation with stakeholders and interested parties prior to statutory consultation and is continuing engagement through various progress meetings and discussions. The key periods of consultation are outlined in Table 2.

Table 1 - Consultation Periods

Consultation Period	Comments
Non-statutory consultation (January 2018 - February 2018)	• The purpose of this consultation was to introduce the Proposed Development. • The feedback received was used to inform the siting of the Converter Station within the Converter Station Area, design considerations of the Converter Station, refinements to the Marine Cable Corridor, additional Onshore Cable Corridor alternatives and suggestions for mitigation.
Town and Country Planning Act/Marine Coastal Access Act – EIA Scoping (Spring 2018)	• The Proposed Development was initially planned to be consented under different regimes, the Town and Country Planning Act 1990 for the onshore elements and the Marine Coastal Access Act 2009 for the marine elements. This consultation was completed with the aim of deciding the scope of the environmental impact assessment. • Scoping opinions were received from the local planning authorities East Hampshire District Council ('EHDC'), Havant Borough Council ('HBC'), Winchester City Council ('WCC') and Portsmouth City Council ('PCC') and Marine Management Organisation ('MMO'). These scoping opinions have informed the scope of the environmental assessments.
Development Consent Order - EIA scoping consultation (October 2018)	• During the development of the Project it was concluded that the most appropriate consenting strategy was through a DCO and a direction was obtained from the SoS confirming that the Proposed Development is considered to be of national significance and is development for which development consent is required.

Consultation Period	Comments
	• Following the issue of that direction and in preparation for the submission of the Application, a request for a scoping opinion was made to the SoS. • The Planning Inspectorate consulted with prescribed consultees to form a scoping opinion and a scoping opinion was received on 7 December 2018, providing guidance on the topics, and impacts, to be assessed in the ES.
Statutory consultation (27 February 2019 - 29 April 2019)	• The aim of the statutory consultation was to obtain views on the Proposed Development from the local community and key consultees. • Comments were received on a number of aspects of the Proposed Development, including site selection, the landscape and visual amenity of the Converter Station, disruption to highways and traffic management, impacts from increased suspended sediments and to fish, recreational angling and commercial fish interests. A series of alterations and refinements were made to the Proposed Development as a result of the responses received.
Post-PEIR consultation (April 2019 - October 2019)	• Ongoing engagement with key stakeholders until DCO submission.

5.2. STATUTORY CONSULTATION

5.2.1.1. Statutory consultation on the Proposed Development took place for more than eight weeks between 27 February and 29 April 2019.

5.2.1.2. The proposals for the Proposed Development were presented in a consultation brochure and a consultation questionnaire provided an opportunity for people to have their say. A range of technical reports and materials, including the PEIR, were also made available. All materials could be accessed online via the AQUIND Consultation website (https://aquindconsultation.co.uk/) throughout the duration of the consultation period, as well as at locations in the locality of the where the Proposed Development is to be located.

5.2.1.3. The consultation sought views from a range of stakeholders, including local authorities, government bodies, marine users, landowners and anyone who may be affected by the Proposed Development. The applicant held public exhibition events which gave an opportunity for members of the public to speak to members of the project team, ask questions and raise their concerns. Further to this, the Applicant met with a number of local community and stakeholder groups to discuss the proposals, provide more information and answer questions.

5.2.1.4. The Consultation Report (AS-004) setting out the issues raised in the consultation and a summary of updates to the design process as a result of feedback received, is presented within the overall DCO Application.

6. PHYSICAL PROCESSES

6.1. BASELINE

6.1.1.1. The water depth of the Marine Cable Corridor ranges from 0 m at the UK coastline to a maximum of 60 – 70 m and it shallows to 40 m at the UK/France Boundary (as shown in Plate 9). The Channel is an epicontinental funnel shaped sea linking the Atlantic Ocean and the North Sea. At its widest it is 240 km narrowing to 33.3 km in the Dover Strait. Tidal variation within the Channel is driven largely by waves travelling in a north-eastward direction to the southern North Sea. The Channel's funnelling effect amplifies the tidal range from less than a metre at sea to greater than 6 m.

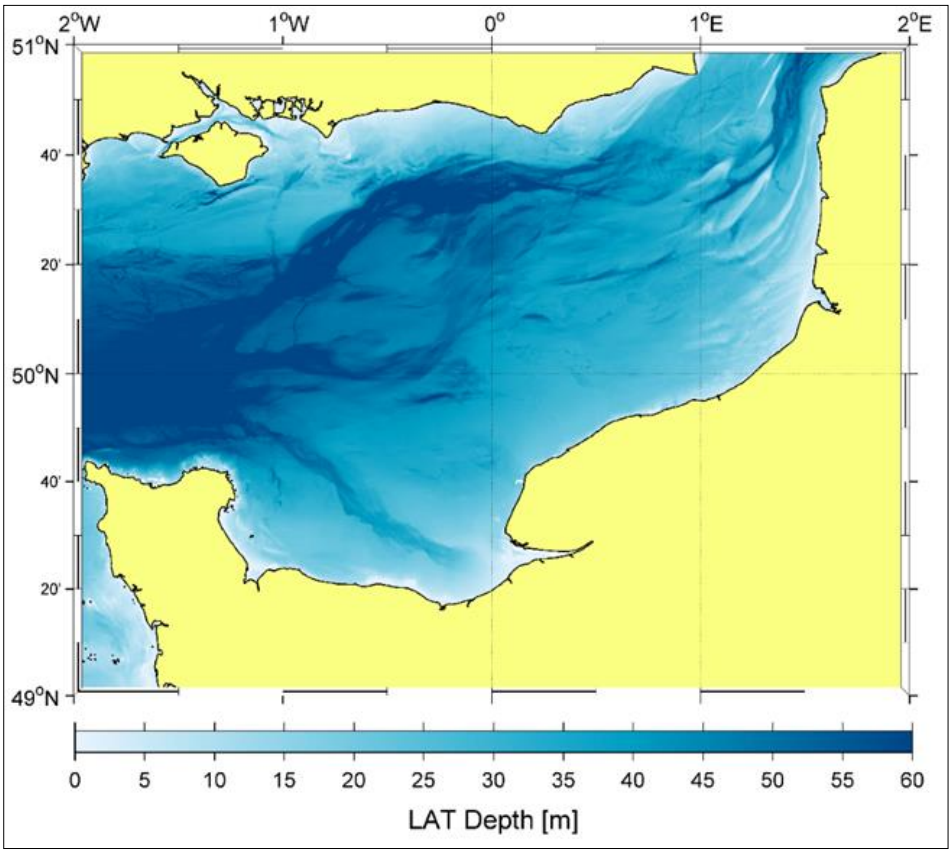

Plate 9 - Bathymetry of the wider Channel. Source: AIMS (2018)

6.1.1.2. The Channel is situated at the downwind end of one of the windiest seas in the world, resulting in severe wave conditions and high average values of wave energy. Sediments on the seabed surface along the offshore portions of the Marine Cable Corridor are predominantly sands and gravels with occasionally more fine material at depth. Further inshore, there is an increase in fine grained (silt and clay) material observed in surface sediments.

6.2. POTENTIAL IMPACTS

6.2.1.1. The potential impacts on physical processes assessed during both construction and operation relate to:

- Physical disturbance to seabed geology and morphology through alteration of bedform features and impacts on flow patterns;
- Impacts to local sediment regimes through impacts on flow patterns and increases in suspended sediment concentrations; and
- Impacts upon coastal and marine processes and the sediment transport regime.

6.3. PROPOSED MITIGATION

6.3.1.1. Based on the assessment, no additional mitigation measures to minimise impacts from the Proposed Development upon the physical environment were identified as being required beyond those already embedded into the design.

6.4. RESIDUAL EFFECTS

6.4.1.1. The assessment process identified that there would be no significant residual effects on physical processes as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

7. MARINE WATER AND SEDIMENT QUALITY

7.1. BASELINE

7.1.1.1. There has been significant improvement in water quality within UK waters over the last couple of decades, due to the implementation of European Directives. Waterbodies within proximity to the Proposed Development are achieving good or moderate status against the Water Framework Directive ('WFD') parameters. There are four water bodies which have connectivity with the Marine Cable Corridor. These include the Isle of Wight East, Solent, Langstone Harbour and Portsmouth Harbour.

7.1.1.2. These waterbodies within 1 nautical mile of the coast near Eastney are of good or moderate quality despite being affected by activities along the coast. Beyond 1 nautical mile, the Channel is supplied with oxygen-rich water originating from the Atlantic. The waters are characterised as shallow and well mixed with seasonal changes in temperature and salinity.

7.1.1.3. The sediment quality is generally good. Slightly elevated levels of arsenic were detected at a couple of sampling locations. However, elevations are not at concentrations that cause significant concern.

7.2. POTENTIAL IMPACTS

7.2.1.1. The potential impacts on marine water and sediment quality assessed during both construction and operation relate to:

- Temporary increase in suspended sediment concentrations; and
- Resuspension of contaminated sediment.

7.3. PROPOSED MITIGATION

7.3.1.1. Based on the assessment, no additional mitigation measures to minimise impacts from the Proposed Development upon marine water and sediment quality beyond those already embedded into the design were identified as being required.

7.4. RESIDUAL EFFECTS

7.4.1.1. The Marine WFD assessment (APP-372) concluded that the marine activities associated with all stages of the Proposed Development will not prevent the waterbodies from meeting their environmental objectives, and will not impact their current status, or prevent improvement of their status in the future.

7.4.1.2. The assessment process identified that there would be no significant residual effects on marine water and sediment quality as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

8. INTERTIDAL AND BENTHIC HABITATS

8.1. BASELINE

8.1.1.1. Intertidal habitats present at Eastney include shingle banks, sedimentary habitats, rocky shore habitats and vegetated shingle (shown in Plate 10). The intertidal zone is the area located between the high and low tidal marks.

Plate 10 - Vegetated Shingle located west of the Marine Cable Corridor

8.1.1.2. Subtidal habitats present within the Marine Cable Corridor include mobile fine sands, mixed sediments, coarse sediments, and subtidal rock. The subtidal zone is located below the low tidal mark. A single area of reef habitat potentially qualifying as Annex I habitat under the Habitats Directive was identified, although this habitat is not within any designated or proposed protected area (shown in Plate 11).

Plate 11 – Reef habitat

8.2. POTENTIAL IMPACTS

8.2.1.1. The potential impacts on intertidal and benthic habitats assessed relate to:

- Direct seabed disturbance and temporary habitat loss during construction;
- Temporary increase in suspended sediment concentrations during construction;
- Deposition of sediment (smothering) during construction;
- Impacts from the resuspension of contaminated sediment during construction;
- Disturbance due to operation and maintenance activity;
- Permanent habitat loss from the Proposed Development; and
- Heat emissions during operation.

8.2.1.2. An assessment was also undertaken to investigate potential impacts on features of Marine Conservation Zones.

8.3. PROPOSED MITIGATION

8.3.1.1. Additional mitigation measures have been identified to reduce potential effects resulting from the Proposed Development on benthic habitats including:

- A survey of the seabed will be undertaken prior to construction. Should any Annex I reef habitat be identified in areas where construction activities are due to take place, the potential impacts will be reduced where possible through small changes to the route of the cable to avoid the habitat.
- The pre-construction survey would also be used to identify any areas of brittlestar beds present within the Marine Cable Corridor, so that disposal of dredge material avoids these habitats.

8.4. RESIDUAL EFFECTS

8.4.1.1. The assessment process identified that there would be no significant residual effects on intertidal and benthic habitats as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

8.4.1.2. The Marine Conservation Zone assessment (AP-381) concluded that there would be no significant effects on the Marine Conservation Zone features, or any processes on which the conservation of any protected feature of a Marine Conservation Zone is (wholly or in part) dependent.

9. FISH AND SHELLFISH

9.1. BASELINE

9.1.1.1. A range of both fish and shellfish species are present within the Channel. Langstone Harbour and the surrounding area is an important habitat for oysters and juvenile fish, especially bass. The areas further offshore within the UK Marine Area include important spawning grounds for herring.

9.1.1.2. A number of fish and shellfish of conservation importance to the UK are also present within the UK Marine Area. These include salmon, black seabream, sea horses, European eel, sea lamprey and both allis and twaite shad.

9.2. POTENTIAL IMPACTS

9.2.1.1. The potential impacts on fish and shellfish assessed included:

- Temporary habit disturbance and loss during construction;
- Temporary increase in suspended sediments and smothering during construction;
- Entrainment of eggs/larvae during construction;
- Noise and vibration during construction;
- Habitat disturbance during operation;
- Electromagnetic Fields ('EMF') during operation; and
- Permanent habitat loss during operation.

9.3. PROPOSED MITIGATION

9.3.1.1. Mitigation measures were all embedded into the design, including the use of HDD under Langstone harbour to remove effects on sensitive fish and shellfish.

9.4. RESIDUAL EFFECTS

9.4.1.1. The assessment process identified that there would be no significant residual effects on fish and shellfish receptors as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

10. MARINE MAMMALS AND BASKING SHARKS

10.1. BASELINE

10.1.1.1. In comparison with the rest of the UK, the diversity and number of large marine species in the study area of the eastern Channel is low. The main species present include harbour porpoise, bottlenose dolphin, common dolphin, minke whale, grey seal and harbour seal.

10.2. POTENTIAL IMPACTS

10.2.1.1. The potential impacts on marine mammals and basking sharks assessed during both construction and operation were all associated with the potential effects of increased noise.

10.3. PROPOSED MITIGATION

10.3.1.1. Based on the assessment, no additional mitigation measures to minimise effects from the Proposed Development upon marine mammals and basking sharks beyond those already embedded into the design were identified as being required.

10.4. RESIDUAL EFFECTS

10.4.1.1. The assessment process identified that there would be no significant residual effects on marine mammals and basking sharks as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

11. MARINE ORNITHOLOGY

11.1. BASELINE

11.1.1.1. Overall abundance of seabirds and inshore wintering waterfowl in UK waters within the Channel is relatively low. However, the diversity of species is high and the Channel is an important area during migration.

11.1.1.2. There is little suitable habitat for cliff-nesting seabirds in the region surrounding the Proposed Development. However, there are a number of nationally and internationally important tern and gull colonies present on the sand and shingle beaches, saltmarshes and offshore islets of the southern English coastline. A number of nationally important estuarine and coastal wintering sites are also present for inshore wintering waterfowl.

11.2. POTENTIAL IMPACTS

11.2.1.1. The potential impacts on marine ornithology assessed during both construction and operation relate to:

- Disturbance and displacement;
- Indirect effects due to seabed disturbance and/or loss of prey availability; and
- Exposure to surface hydrocarbons or chemicals due to accidental spills.

11.3. PROPOSED MITIGATION

11.3.1.1. Based on the assessment, no additional mitigation measures to minimise effects from the Proposed Development upon marine ornithology beyond those already embedded into the design were identified as being required.

11.4. RESIDUAL EFFECTS

11.4.1.1. The assessment process identified that there would be no significant residual effects on marine ornithology receptors as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

12. COMMERCIAL FISHERIES

12.1. BASELINE

12.1.1.1. The fishing practices vary considerably within the footprint and vicinity of the Proposed Development. Data on fisheries was collected from a wide variety of sources, including consultation with local fishermen which identified the presence of UK, French, Dutch and Belgium fisheries that operate within the vicinity of the Proposed Development.

12.1.1.2. Inshore areas (within the UK 12 nautical mile limit) are dominated by smaller fishing vessels with a limited operational range and which operate a number of gear types including potting, longlining and netting.

12.1.1.3. The offshore areas (beyond the UK 12 nautical mile territorial limit up to the UK/France EEZ Boundary Line) is fished by a number of nationalities including French, Belgian and Dutch vessels. These vessels use a range of gear types including dredges, seine nets, and demersal trawls targeting a number of fish species such as scallops, herring and flatfish.

12.2. POTENTIAL IMPACTS

12.2.1.1. The potential impacts on commercial fisheries assessed during both the construction and operation relate to:

- Complete/temporary loss or restricted access to established fishing grounds;
- Complete/temporary displacement of fishing activity into other areas;
- Interference to normal fishing activities;
- Navigational safety issues for fishing vessels;
- Permanent/temporary increased steaming times; and
- Obstacles on the seabed.

12.3. PROPOSED MITIGATION

12.3.1.1. In addition to the embedded mitigation measures, additional mitigation measures proposed to minimise impacts on onshore fisheries include:

- Minimising the period of time the cable is left exposed, where possible;
- Establishment of an Inshore Fisheries Working Group; and
- Potential over-trawlability assessment in the Solent for some inshore fisheries.

12.4. RESIDUAL EFFECTS

12.4.1.1. The assessment process identified that there would be no significant residual effects on commercial fisheries as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

13. SHIPPING, NAVIGATION AND OTHER MARINE USERS

13.1. BASELINE

13.1.1.1. There are various ports and small harbours located within close proximity to the Marine Cable Corridor. The Port of Portsmouth is the closest port which is a major naval base. In addition, the port accommodates commercial vessels such as passenger ferries. Langstone Harbour is located north of Eastney and is mainly utilised by fishing and recreational vessels. Following consultation, it was noted that dredgers also frequent this harbour.

13.1.1.2. In the summer study period, there was an average of 444 unique vessels recorded per day within the vicinity of the Marine Cable Corridor, dropping to 299 per day in the winter. These vessels included fishing, military, dredger, tug, passenger, cargo, tanker, recreational, offshore and other vessel types. Anchoring and dredging are primarily associated with the Saint Helens anchorage area and Nab dredging area respectively.

13.2. POTENTIAL IMPACTS

13.2.1.1. A Navigation Risk Assessment was undertaken and the potential impacts on shipping, navigation and other marine uses assessed during both construction and operation included:

- Increased vessel to vessel collision risk;
- Disruption to navigation including vessel routeing/timetables; port arrivals/departures; fishing activities; marine aggregate dredging activities; military exercises; recreational activities and recreational angling (including charter fishing);
- Risks to Marine Cables including anchor dragging, emergency anchoring, vessels foundering, dropped objects and fishing gear snagging;
- Vessel foundering onto Marine Cables (exposed cables during construction);
- Dropped object from vessel onto Marine Cables (exposed cables during construction); and
- Fishing gear snagging on Marine Cables (exposed cables during construction).

13.2.1.2. The following impacts were assessed during operation in addition to the above:

- Vessel grounding due to reduced under keel clearance;

- Increased collision risk during repair, maintenance and surveys; and
- Magnetic compass interference.

13.3. PROPOSED MITIGATION

13.3.1.1. Additional mitigation measures in addition to those embedded into the design of the Proposed Development include:

- minimising the length of time any section of cable is left exposed;
- further methods to identify the cable laying operation within the Dover Strait Traffic Separation Scheme to be shared with Dover Straits Channel Navigation Information Service;
- targeted circulation of information to ports, ferry operators and local sailing clubs;
- avoidance of key sailing races; and
- further communication with the Maritime and Coastguard Agency regarding potential magnetic compass deviations, including test results proving the extent of deviation following the cable-laying operation.

13.4. RESIDUAL EFFECTS

13.4.1.1. The assessment process identified that there would be no significant residual effects on shipping, navigation and other marine users as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

14. MARINE ARCHAEOLOGY

14.1. BASELINE

14.1.1.1. A number of features of archaeological potential have been identified on the seabed. During the assessment process new knowledge has been gathered, highlighting one core location which preserves a peat unit. Peat is useful as it preserves a record of the past.

14.1.1.2. A total of 387 seabed features have been identified within the Marine Cable Corridor. Two features have been identified as records of wreck sites, whilst another two features may be of anthropogenic origin. The two wrecks consist of steamship *Corbet Woodwall* and a broken up unidentified steamship. The remaining 383 anomalies are of uncertain origin, but of possible archaeological interest. Currently, no maritime or aviation sites within the Marine Cable Corridor are subject to statutory protection.

14.2. POTENTIAL IMPACTS

14.2.1.1. The potential impacts on marine archaeology assessed during both construction and operation were:

- Direct and indirect impacts on known and unknown assets (including potential seabed prehistory, maritime and aviation receptors); and
- Direct impacts on known and potential seabed prehistory receptors, and maritime and aviation receptors from use of anchors by vessels.

14.3. PROPOSED MITIGATION

14.3.1.1. Mitigation measures have been recommended to ensure that the archaeological value of the area is maintained. All known wreck sites will be avoided, and features of possible archaeological interest will be avoided where possible through cable routing. A protocol will be agreed to mitigate construction effects in the event of any unexpected archaeological discoveries during installation. The protocol will include small adjustments to the Marine Cable Route and the creation of temporary Archaeological Exclusion Zones to prevent activities impacting identified locations of marine heritage interest.

14.4. RESIDUAL EFFECTS

14.4.1.1. The assessment process identified that there would be no significant residual effects on marine archaeology receptors as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

15. LANDSCAPE AND VISUAL AMENITY

15.1. BASELINE

15.1.1. LANDSCAPE CHARACTER

15.1.1.1. Key features identified in the vicinity of the Proposed Development for the landscape character assessment included the setting of SDNP, landscape character areas associated with the county, district and city local authorities as well as local landscape features, for example vegetation, landform and Public Rights of Way ('PRoW').

15.1.2. VISUAL AMENITY

15.1.2.1. Based on the likely extent of the visibility of the Proposed Development, desk based and field surveys identified a range of visual receptors including:

- Residential receptors;
- Transport receptors;
- Recreational and visitor receptors;
- Educational receptors; and
- Industrial and retail receptors.

15.1.2.2. A number of representative viewpoints were agreed with the local authorities and SDNPA. Photographs have been taken at these locations.

15.2. POTENTIAL IMPACTS

15.2.1.1. The Landscape and Visual Amenity assessment considered the potential impacts associated with the Proposed Development during construction, operation and decommissioning on landscape character and visual amenity. This included:

- The Converter Station at Lovedean and associated infrastructure (including the Access Road, up to two Telecommunications Buildings with FOC, security fencing, temporary Works Compound and Laydown Area) and movement of vehicles during all three stages of the Proposed Development;
- Construction works associated with the Onshore Cables from the Converter Station at Lovedean to the Landfall at Eastney; and
- ORS buildings at Eastney, construction of underground infrastructure, temporary vehicular routes for construction vehicles, temporary Works Compound and Laydown Area and construction vehicle movements.

15.3. PROPOSED MITIGATION

15.3.1.1. Mitigation measures for landscape and visual receptors have been embedded into the design. These measures include:

- The design of the Converter Station structure and associated infrastructure;
- Landform and drainage; and
- Planting, both replacing vegetation and additional planting to provide screening for new structures at the Converter Station and ORS(s) including a long-term management strategy.

15.3.1.2. General mitigation includes a number of measures during construction that would be managed under the Outline Onshore CEMP and expected to form an important part of efforts to control construction impacts on landscape character and visual amenity.

15.4. RESIDUAL EFFECTS

15.4.1.1. The assessment of the Proposed Development on landscape and visual amenity concluded that:

- Section 1 Lovedean (Converter Station Area): Significant adverse effects are predicted on landscape character, associated local landscape features, the setting of SDNP and visual receptors during construction. As planting matures, the significance of many effects would reduce and would not be significant after 10 years. Effects would remain significant on landscape character of the area and some immediate residents within a 1.2 km radius of the Converter Station Area, and on some recreational and transport users over very localised sections of PRoW and roads within a 3 km radius of the Converter Station Area after 20 years. At decommissioning there would be significant effects on some landscape character areas, the setting of the SDNP and local landscape features, as well as on some residents, recreational and transport users over the duration of the works.
- Section 2 to 9 – Onshore Cable Corridor: Significant adverse effects are predicted in Section 4 on some landscape and urban character areas and some local landscape features during construction only. There would be also be significant adverse effects on visual amenity and visual receptors (residential, recreational, educational and church worshippers) in Section 4 as a result of longer duration of construction at certain locations, due to slower installation rates where there are constraints. Operational effects relating to the Onshore Cable Corridor were scoped out.

- Section 10 – Eastney (Landfall): Significant adverse effects are predicted on landscape features (including tranquillity, footpaths, National Cycle Route 2 and openness) and on visual amenity and visual receptors including residents, recreational and transport users during construction. Significant adverse effects are predicted on landscape features (openness), residents and recreational users immediately after construction and on commencement of operation. After 10 years, as planting matures there would be no significant effects at Section 10 – Eastney (Landfall). At decommissioning, there would be significant effects on tranquillity, immediate residents, recreational and transport users for the period of the activities.

16. ONSHORE ECOLOGY

16.1. BASELINE

16.1.1.1. The Proposed Development crosses the boundary between an agricultural environment at Lovedean, through suburban areas of Waterlooville, to the urbanised environment of Portsmouth. Most semi-natural habitat is present in agricultural areas where arable land and grasslands are present, enclosed by hedgerows, with occasional woodland, scrub and broadleaved trees. A notable feature is lowland meadow, a botanically rich habitat supporting many wildflower species, located at Denmead (shown on Plate 12). In the south both suburban and urban areas are present. These areas include amenity grassland, ornamental hedgerows and trees. Scrub is present in unmanaged and neglected areas, and grassland in playing fields, parks and common land. Intertidal habitats are present within Langstone Harbour and at Eastney Beach.

Plate 12 – Denmead Meadows grassland sward

16.1.1.2. Adjacent areas support statutory designated sites, principally the Chichester and Langstone Harbours Special Protection Area ('SPA') that provides habitat for important wintering and breeding bird populations. Further sites that are functionally linked to the SPA (Solent Wader and Brent Goose Strategy sites) lie within the Proposed Development. Non-statutory Sites of Importance for Nature Conservation ('SINCs') are also present, and the Proposed Development crosses Milton Common, Soake Farm and Kings Pond SINCs. Milton Common consists of a wide range of habitats including grasslands, scrub, semi-natural coastal habitats and seasonally or permanently waterlogged areas. Kings Pond is located directly next to Denmead Meadows and supports two grassland habitat types, semi-improved neutral grassland and unimproved neutral grassland.

16.1.1.3. In addition to birds using intertidal habitats and areas that are functionally linked, protected and notable species are known to be present, including breeding birds in terrestrial habitats, bats and badgers. Reptiles and hedgehogs were not recorded during baseline surveys however on a precautionary basis were considered in the assessment.

16.2. POTENTIAL IMPACTS

16.2.1.1. The potential impacts on onshore ecology features assessed relate to:

- Installation of the Onshore Cables and construction of the Converter Station, with associated works within the Converter Station Area, and the Landfall. Activities have the potential to impact ecological features and biodiversity as a result of the:
  - loss or degradation of habitats, such as the lowland meadow habitat and Denmead Meadows, and the disturbance of protected and notable species, such as bats;
  - Increase of noise and vibration and disturbance of protected species;
  - Increase in pollutants including dust, deposition and waterborne pollutants;
  - Increased light spill (including during night time working); and
  - Increased works traffic and air pollution.
- Operation of the Converter Station at Lovedean, with increases in noise and vibration and potential light spill during maintenance.

16.3. PROPOSED MITIGATION

16.3.1.1. Effects during the construction stage on Chichester and Langstone Harbour SPA and its wintering intertidal bird community will be avoided by restricting works within the winter season, defined as October to March (the period when SPA birds such as Brent goose arrive from their breeding grounds).

16.3.1.2. Landscape planting will create habitats to offset those lost, especially to the Converter Station whose footprint will lead to loss of habitat. In addition, the Onshore Outline CEMP will include measures to offset potential impacts of the construction stage, including measures to prevent waterborne pollution and emission of dust, restriction of night-time working to avoid disturbance to bats and appointment of an Environmental Clerk of Works to oversee the implementation of these measures and with the power to stop work and change site practices as required.

16.3.1.3. Further measures will be put in place to offset specific impacts and their potential effects on Denmead Meadows and Kings Pond SINC in addition to all areas of unimproved neutral grassland, comprising:

- Soil horizon preservation and preservation of grassland turf to ensure maintenance of conditions for re-growth of meadow vegetation;
- Ground protection through the use of bog matting and / or temporary membranes to ensure vegetation regrowth; and
- Seed harvesting to allow re-seeding following completion of construction or decommissioning works.

16.3.1.4. Further mitigation proposed includes:

- Replacement of hedgerows removed and protection of retained trees;
- Improvement of grassland through application of green hay;
- Closure of badger setts under licence;
- Hand searching and safe removal of hedgehogs from construction areas; and
- Precautionary methods of working to avoid reptile mortality or injury.

16.4. RESIDUAL IMPACTS

16.4.1.1. The assessment process identified that there would be no significant residual effects on ecological features as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

16.4.1.2. A Habitats Regulations Assessment Report (APP-491 to APP-504) has been undertaken and forms part of the Application. The assessment determined the Proposed Development will not adversely affect the integrity of the European site or the European offshore marine site.

17. SOILS AND AGRICULTURAL LAND USE

17.1. BASELINE

17.1.1.1. Agricultural land affected by the Proposed Development extends to around 65 ha in total. There is one main soil type identified throughout, comprising medium clay loam or silty clay loam topsoil over heavier loam or clay subsoils. The soils are mostly imperfectly to poorly drained. Agricultural land is mostly moderate quality, with some good quality land affected. A total of 10 farm holdings will be impacted by the Proposed Development.

17.2. POTENTIAL IMPACTS

17.2.1.1. The potential impacts on soils and agricultural land use assessed relate to:

- Temporary and permanent loss of agricultural land during construction;
- Loss of or damage to soils during construction;
- Reinstatement of agricultural land from temporary laydown areas during operation; and
- Reinstatement of soil profiles over the Onshore Cable Route during operation.

17.3. PROPOSED MITIGATION

17.3.1.1. Mitigation includes the handling of soils to be excavated along the Onshore Cable Route to prevent mixing of topsoil and subsoil. A Soil Resources Plan will be prepared to reduce or prevent loss of or damage to the soil resource.

17.3.1.2. There is no mitigation available for the direct permanent loss of agricultural land. The Applicant intends on negotiating mitigation measures for farm holdings on a case by case basis.

17.4. RESIDUAL EFFECTS

17.4.1.1. The assessment process identified that there would be significant adverse residual effects due to the temporary loss of agricultural land and the temporary impacts on five farm holdings and the permanent impacts on three holdings.

18. GROUND CONDITIONS

18.1. BASELINE

18.1.1.1. The Onshore Cable Corridor and the Converter Station Area pass a variety of geologies. The superficial (upper) geology includes Head, River Terrace Deposits and Raised Marine Deposits. The bedrock (lower) geology includes the London Clay Formation, the Lambeth Group and Chalk. These geologies have different abilities to store and transport groundwater.

18.1.1.2. There are a number of potential sources of contamination within 500 m of the Order Limits. These potential sources of contamination include current and historical, mineral extraction, sites, landfills, local authority pollution prevention controls, discharge consents and previous industrial land uses. The key receptors that could be impacted include construction/maintenance workers and adjacent site users, groundwater and surface water, mineral reserves and below ground services.

18.2. POTENTIAL IMPACTS

18.2.1.1. The potential impacts on ground conditions assessed relate to:

- Exposure of contaminated soils and groundwater and removal of contaminated soils during construction and operation;
- Spills associated with construction work; and
- Deterioration of concrete due to aggressive ground conditions during operation.

18.3. PROPOSED MITIGATION

18.3.1.1. In the main, the proposed mitigation measures are outlined in the Onshore Outline CEMP. For example, these measures include:

- Adherence to pollution prevention guidance and best practice;
- A watching brief to identify both ‘solution features’ (a geological hazard) and unexpected contamination when excavating areas of potential risk;
- Good working practices such as sealing and covering stockpiles of contaminated soils and safe discharge of water from excavations;
- Appropriate provision of hygiene and welfare facilities and protective clothing for construction workers;

- Measures in relation to installation of cable ducts and trenching;
- Chemicals will be reviewed before being used on-site and included within the contractor's methods statements; and
- Should significant unexpected contamination be encountered that the EA will be informed on the extent and nature of any contamination.

18.3.1.2. Additional mitigation measures are required for the section of the proposed route through Milton Common due the nature of the landfill and will include protection of the public from dust and odour, maintenance of existing gas protection measures, reinstatement of the engineered landfill cap, and mitigation of the risk of landfill gas migration along the Onshore Cable Route.

18.4. RESIDUAL EFFECTS

18.4.1.1. The assessment process identified that there would be no significant residual effects on ground conditions as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

19. GROUNDWATER

19.1. BASELINE

19.1.1.1. The Onshore Cable Corridor and the Converter Station Area pass over a mixture of geologies. The geologies have a wide range of permeabilities, that is how easily water can move through the rock. The geology which is the most permeable in the Order Limits is Chalk, and includes 'karst' features. Geological units which have a middling permeability are composed of loose materials, like sand, such as the River Terrace Deposits. Low permeable geologies such as Head are present in the Order Limits. The London Clay Formation is also located in the Order Limits, this rock has a very low permeability which restricts groundwater flow.

19.2. POTENTIAL IMPACTS

19.2.1.1. The potential impacts on groundwater assessed relate to:

- Converter Station construction and operation;
- Trench construction and operation; and
- HDD alignment construction and operation.

19.3. PROPOSED MITIGATION

19.3.1.1. The proposed mitigation includes a number of components to manage the quantity of groundwater within the aquifers and to prevent adverse effects to the quality of the aquifers.

19.3.1.2. To protect the quality of the chalk aquifer the construction design includes grouting of the surface karst (a pathway from the surface to the aquifer) at the Converter Station Area prior to any earthwork movements.

19.3.1.3. Trenching in Sections 2 and 3, in the vicinity of the Kings Pond (shown on Plate 13) and Denmead Meadows, will be undertaken and scheduled to complete between August and November to avoid the highest groundwater levels expected mid-winter. The trenches will be installed at end of the summer to ensure groundwater is at its lowest elevation to avoid groundwater dewatering during construction.

19.3.1.4. Additional mitigation measures have been added to address the risk of encountering currently unknown geological features.

Plate 13 - Kings Pond

19.4. RESIDUAL EFFECTS

19.4.1.1. Significant residual effects, of direct, temporary and short-term nature, are predicted during the construction stage associated with the potential requirement for dewatering of chalk groundwater aquifers in Section 4, 5, 6 and 7 during construction of the Onshore Cable Route (if required). The effect is predicted to be moderate adverse on various chalk aquifers (the naming of the chalk aquifers differs between the sections). There are no other significant groundwater effects anticipated during construction and operation of the Proposed Development.

20. SURFACE WATER RESOURCES AND FLOOD RISK

20.1. BASELINE

20.1.1.1. A number of watercourses, potential watercourse crossings and works in close proximity to watercourse structures; including culvert and flood defences, have been identified within the Order Limits.

20.1.1.2. The watercourses within the Order Limits form part of the Potwell Tributary or Langstone Harbour WFD surface water/transitional water bodies, for which a WFD assessment has been undertaken (see Plate 14).

Plate 14 – Langstone Harbour

20.1.1.3. A number of isolated areas within the Order Limits have been identified as being at risk of flooding from a number of sources. The sources of flood risk are generally tidal, from rivers, from surface water or rain and from groundwater. Both current day and future flood risk scenarios, which account for climate change, are considered.

20.1.1.4. Various water infrastructure is present throughout the Order Limits including; clean water supply (Portsmouth Water), public and highway surface water wastewater drainage (Southern Water and Highways Authorities), public combined and foul wastewater drainage (Southern Water).

20.2. POTENTIAL IMPACTS

20.2.1.1. The potential impacts on surface water resources and flood risk assessed during both construction and operation relate to:

- Surface water receptors with regards to surface water drainage patterns;
- Water supply and wastewater infrastructure; including drinking water supply network, public and private sewage (surface water and foul) drainage networks;
- Surface water receptors with regards to water quality; and
- Human receptors, including construction workers, with regards to the flood risk profile.

20.3. PROPOSED MITIGATION

20.3.1.1. Mitigation measures for the impacts identified on surface water resources and flood risk include measures within the design, such as the use of HDD under certain watercourses.

20.3.1.2. Mitigation measures outlined in the Onshore Outline CEMP include construction principles that the appointed designer and contractor will be required to follow to ensure that the predicted impacts are managed to reduce any residual effects in relation to flood risk and surface water quality.

20.3.1.3. Consents or exemptions will be required prior to works being undertaken with approval from appropriate regulators to demonstrate that appropriate construction practices and methodologies will be in place as part of the construction activities to manage the predicted impacts within the flood risk and surface water environment.

20.3.1.4. Other mitigation relevant to the surface water resources and flood risk environment includes proposed surface water management at the Converter Station Area and ORS', with tidal flood resilience measures proposed at the ORS. It is also recommended for information on areas at risk of flooding to be included within the Health and Safety File to enable the operator to appropriately manage any risk of flooding to staff during operation.

20.4. RESIDUAL EFFECTS

20.4.1.1. The assessment process identified that there would be no significant residual effects on surface water resources and flood receptors as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

20.4.1.2. The Onshore WFD assessment (APP-437) concluded that the impacts of the Proposed Development are compliant with the WFD when the mitigation measures are taken into account, as provided in the Onshore Outline CEMP.

21. HERITAGE AND ARCHAEOLOGY

21.1. BASELINE

21.1.1.1. The setting of above ground heritage assets could be affected by the Proposed Development near the Converter Station Area at Lovedean and the proposed ORS at the Landfall. There are 21 Grade II listed buildings and one Grade II* listed building in the 2 km study area around the Converter Station. Fort Cumberland Scheduled Monument, which also contains three Grade II and one Grade II* listed building is located near to the Landfall.

21.1.1.2. The Proposed Development has the potential to affect archaeological remains of all periods from the prehistoric to post-medieval, with potential in places for palaeoenvironmental remains (deposits within alluvial silts and clays which can provide information about past environments).

21.1.1.3. The potential for any below ground archaeological remains to have survived is dependent on the extent of the historic building development. The archaeological survival is expected to be high in the Converter Station Area and the northern extent of the Onshore Cable Corridor, which lie in rural land. Surveys have identified some potential enclosure ditches in the Converter Station Area, together with a number of potential pits of possible prehistoric date (of potentially medium or high heritage significance) along with potential later medieval/post-medieval field boundaries and ridge and furrow (of likely low heritage significance).

21.2. POTENTIAL IMPACTS

21.2.1.1. The potential impacts on heritage and archaeology assessed include:

- Partial or complete loss of buried heritage assets during construction;
- Partial or complete removal of surviving historic hedgerows during construction; and
- Permanent changes to the setting of above ground heritage assets due to the presence of permanent new structures during operation (including potential impact to Fort Cumberland Scheduled Monument within the vicinity of the Landfall) (setting is the way in which the asset is understood and experienced).

21.3. PROPOSED MITIGATION

21.3.1.1. The approach to mitigation for any below-ground archaeological remains discovered during construction of the Proposed Development depends on the level of risk identified in certain locations. In areas of potential archaeological survival, trial trench evaluation will be carried out before construction to identify the nature of potential archaeological remains that could be affected. Depending on the results, mitigation would take the form of targeted excavation or a watching brief (during construction) to preserve by record any archaeological remains. Although rare, in the unlikely event that archaeological remains of very high (national) significance are identified, there may be a requirement, where practicable, for their preservation in the original location in which it was deposited. A watching brief would be required within urban areas where the cable corridor would divert away from existing highways (i.e. on adjacent roadside verges/hardstanding). This would ensure that any archaeological assets were not removed without record.

21.4. RESIDUAL EFFECTS

21.4.1.1. The assessment process identified that there would be no significant residual effects on heritage and archaeology as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

22. TRAFFIC AND TRANSPORT

22.1. BASELINE

22.1.1.1. Several highways, bus corridors, cycle routes and public rights of way across the study area could be impacted by the Proposed Development.

22.1.1.2. Routes which could be directly impacted include:

- Day Lane and Lovedean Lane (at its most northern extent) are rural roads with no footways;
- The B2150 Hambledon Road is the principal link between Denmead and Waterlooville with a continuous shared-use path for cyclists;
- The A3 London Road / Portsmouth Road is a key corridor for the Star Bus service between Horndean and Cosham, with dedicated bus priority measures;
- The A2030 Eastern Road is one of three strategic road links into Portsea Island and forms an off-carriageway route for National Cycle Network ('NCN') 222; and
- The Moorings Way to Furze Lane bus link also forms part of NCN 222 and is an important local bus route connecting Portsmouth College, the University of Portsmouth Langstone Sports Complex and the city centre.

22.1.1.3. PRoW likely to be impacted by the construction of the Converter Station and Onshore Cable Corridor are primarily located within Sections 1 and 2. These include: Footpaths 4 and 13. At the junction with Day Lane / Lovedean Lane is the Monarch's Way long-distance path.

22.1.1.4. Roads that could be affected by traffic redistribution include:

- Sections of the strategic road network (A3(M), M275 and A27 Havant Bypass);
- Classified roads (B2150 Hulbert Road, B2177 Portsdown Hill, A2030 Havant Road, A2047, A288, A3); and
- Key distributor roads that link residential areas or provide access to SRN / classified roads (i.e. Anchorage Road, Burrfields Road, Dundas Lane, Havant Road, Park Lane, St Mary's Road, Stakes Road, Stakes Hill Road, Stubbington Avenue, Tangier Road and Tempest Avenue).

22.2. POTENTIAL IMPACTS

22.2.1.1. The potential impacts on traffic and transport assessed during construction were:

- Severance;

- Traffic delay;
- Pedestrian and cycle amenity;
- Fear and intimidation;
- Abnormal loads;
- Accidents and safety; and
- Public Transport.

22.2.1.2. It is important to note that the potential impacts are temporary and of relative short duration.

22.3. PROPOSED MITIGATION

22.3.1.1. The additional mitigation measures proposed include:

- Provision of a traffic management programme detailing the timing of the works. This would account for seasonal events and major events to avoid clashing; prohibiting or limiting works during school terms in certain locations; night-time and weekend working in traffic sensitive locations; and avoiding multiple construction locations in the same area to reduce the cumulative effects of traffic redistribution across the wider study area.
- Provision of a Construction Worker Travel Plan to promote sustainable travel choices. Measures could include shuttle buses from key transport hubs such as railway stations; promoting the use of car-pooling and lift sharing amongst workers that travel to and from a similar area; and travel Information Notice Boards to help employees make informed choices.
- Provision of a Framework Construction Traffic Management Plan (APP-450 Rev002) relating to the routing and timing of movements of construction related traffic and a Framework Traffic Management Strategy (APP-449 Rev 002), which identifies traffic management measures and limitations in respect of when works may be carried in locations along the Onshore Cable Route to reduce impacts and prevent intra-development cumulative impacts.

22.4. RESIDUAL EFFECTS

22.4.1.1. Significant residual adverse effects are anticipated in the vicinity of the Converter Station Area (within Section 1 and 2) during construction (and decommissioning) of the Proposed Development due to a combination of severance, changes to pedestrian and cycle amenity, traffic delay and fear and intimidation.

22.4.1.2. Significant residual adverse effects are anticipated in the vicinity of the Onshore Cable Corridor and the wider study area, within Sections 3-10, during construction (and decommissioning) of the Proposed Development due to a combination of severance, changes to pedestrian and cycle amenity, traffic delay, fear and intimidation and accidents and safety.

23. AIR QUALITY

23.1. BASELINE

23.1.1.1. Background pollutant levels in the area covered by the Proposed Development are generally low. Within the City of Portsmouth there are areas where concentrations of NO_2 and NO_x are elevated due to road traffic, and this is reflected by the presence of five Air Quality Management Areas ('AQMA's). The closest is Portsmouth AQMA No. 9 located within Section 8 of the Proposed Development.

23.2. POTENTIAL IMPACTS

23.2.1.1. The potential impacts related to air quality assessed relate to:

- Air quality impacts resulting from the construction activities related to demolition, earthworks, construction and the movement of mud/dust on vehicle wheels;
- Air quality impacts resulting from the construction activities including construction traffic emissions, non-construction related traffic emissions due to the use of alternative routes and combustion of diesel as fuel in power generators; and
- Air quality impacts resulting from the operation of permanently installed back-up diesel generators including impacts at designated ecological sites.

23.3. PROPOSED MITIGATION

23.3.1.1. A series of mitigation measures are proposed to address locations where risks associated with construction dust have been identified. The mitigation measures include:

- Implement a Dust Management Plan which includes measures specified in best practice guidance;
- Record all dust and air quality complaints, identify the cause and take appropriate measures to reduce emissions; and
- Complete daily inspections in specific areas to monitor dust, for example is dust present on cars and windowsills.

23.3.1.2. Mitigation for traffic effects is embedded into the Proposed Development as the predicted effects are temporary in nature.

23.4. RESIDUAL EFFECTS

23.4.1.1. The assessment process identified that there would be no significant environmental effects related to air quality as a result of the construction, decommissioning and operation (including repair and maintenance) of the Proposed Development.

24. NOISE AND VIBRATION

24.1. BASELINE

24.1.1.1. There are a number of sensitive receptors in the area of the Converter Station, along the Onshore Cable Corridor and at the Landfall. These include residential areas and educational facilities, amongst others.

24.1.1.2. The baseline noise climate has been measured at the Converter Station and Landfall areas. As the Converter Station is located in a rural area, although close to the Lovedean Substation, with few other noise sources close by, the noise levels are relatively low. The Landfall area is suburban where there are more sources of noise and, consequently, the noise levels in this area are higher than at the Converter Station.

24.2. POTENTIAL IMPACTS

24.2.1.1. The potential impacts of noise and vibration assessed relate to:

- Construction noise and vibration associated with the Converter Station and Telecommunications Building(s);
- Construction noise and vibration from the Onshore Cable Corridor;
- Construction noise and vibration associated with the ORS at Landfall;
- Change in noise levels on the surrounding road network resulting from construction vehicles and redistribution of traffic from road/lane closures; and
- Operational noise from the Converter Station and ORS' at Landfall.

24.3. PROPOSED MITIGATION

24.3.1.1. The construction noise and vibration assessment considers a range of embedded mitigation including best practice measures and those specific to individual construction activities. For example, 2 m high site hoarding on the perimeter of some construction compounds to assist in minimising noise levels.

24.3.1.2. Additional construction stage mitigation, such as consideration of programme changes to reduce residents' noise exposure, is also specified for some areas of construction where work is being undertaken during sensitive periods and/or very close to sensitive receptors.

24.3.1.3. Mitigation measures are embedded into the design of the Converter Station to reduce noise levels during its operation. There are two types of embedded mitigation; the Converter Station layout/orientation and mitigation to individual items of plant (for example enclosures or silencers). Additional mitigation has been recommended to reduce Converter Station noise levels at one receptor. This small reduction in noise levels may be achieved by installing a noise barrier.

24.4. RESIDUAL EFFECTS

24.4.1.1. Significant adverse effects are anticipated in some areas where weekend daytime and limited weekend night-time activities will be necessary during construction of the Proposed Development. The out-of-hours working is necessary to minimise traffic impacts resulting from road closures which are required to complete the works. It is not possible for the road closures to be implemented during the day due to predicted significant traffic impacts on the surrounding road network. No other significant effects are anticipated relating to noise and vibration of the Proposed Development.

25. SOCIO-ECONOMICS

25.1. BASELINE

25.1.1.1. There are a number of socio-economic receptors that could be affected by the Proposed Development. These comprise:

- Residences and businesses: the Onshore Cable Route passes through several residential urban areas. A number of commercial businesses are adjacent to the cable route and located in the wider area, including business park access.
- Community facilities: there are 22 schools, 16 early childhood facilities, two higher education providers, one library, 11 churches, six GP's/medical facilities, nine pharmacies', three dentists, four care homes and five opticians within 500 m of the Order Limits.
- Recreation, leisure, open space: a number of PRoW (for example Monarch's Way – see Plate 15) and off-road cycle routes, leisure facilities (including two golf courses, swimming pool, marina and sailing club) allotments, playing fields, parks and informal areas of open space are located within 500m of the Order Limits.
- Tourism receptors: there are a number of tourist attractions in the wider area that may be affected, for example, by traffic. These include SDNP and attractions in Portsmouth, in addition to annual events.

25.2. POTENTIAL IMPACTS

25.2.1.1. The potential socio-economic impacts assessed relate to:

- Generation of direct, indirect and induced employment opportunities during construction;
- Disruption, including change in access to local residences, commercial businesses (including shops and other services) during construction;
- Disruption, to users of community facilities, including potential impacts on community severance, during construction;
- Disruption, including change of access and amenity value for users of leisure facilities, recreational and open space, PRoW, and cycle routes during construction; and
- Disruption to tourism, including change of access to tourist attractions and events and disruption during construction (e.g. Southsea Leisure Park).

Plate 15 – Monarch's Way way marker

25.3. PROPOSED MITIGATION

25.3.1.1. Effects on recreational and open space will be minimised where practicable by measures such as drilling underneath the allotments and avoiding key features of parks and playing fields.

25.3.1.2. A number of mitigation measures are proposed to maintain access including diversion of affected PRoW and traffic management to minimise disruption to businesses, residences and community facilities.

25.4. RESIDUAL EFFECTS

25.4.1.1. Significant adverse effects are anticipated during both construction and operation of the Proposed Development. The significant adverse effects expected are:

- Temporary diversion during construction for users of seven PRoW and four long distance footpaths and an off-road cycle route;
- Temporary loss of open space, access and amenity during construction at Farlington Playing Fields and Bransbury Park (moderate adverse);
- Temporary disruption from changes to access, traffic, noise, air and visual amenity for tourist receptors - visitors to Southsea Leisure Park, Victorious Festival and South Central Festival (moderate adverse, significant); and
- Loss of amenity for users of PRoW at the Converter Station during operation.

25.4.1.2. All other residual socio-economic effects of the Proposed Development are considered to be not significant.

26. HUMAN HEALTH

26.1. BASELINE

26.1.1.1. The human health assessment has identified receptors likely to be impacted by the Proposed Development, comprising residences and businesses, and users of community facilities; greenspaces; and pedestrian and cycle routes. The information in the air quality; noise; employment and business activity; landscape; soil/land contamination; and water quality chapters were used in the assessment.

26.1.1.2. The populations of East Hampshire, Havant and Winchester are a similar size to each other, and generally have a higher proportion of older people, while Portsmouth has a much larger population than other authorities, with a greater proportion of younger people.

26.1.1.3. Government data shows that Winchester, East Hampshire and Havant are less deprived than the England average, while Portsmouth is more deprived. Public Health England data shows that the health of the populations of Winchester and East Hampshire is generally better than the England average, while the health of the populations of Portsmouth and Havant is more similar or worse than the England average.

26.2. POTENTIAL IMPACTS

26.2.1.1. The potential impacts on human health assessed during construction and operation relate to:

- emissions of pollutants to air and generation of noise emissions;
- changes to landscape and greenspace;
- changes in local business activity and employment;
- contact with contaminated soil/land and water; and
- disruption to local transport and access to community facilities.

26.2.1.2. During operation, the perceived fear of harm from EMF exposure was also assessed.

26.3. PROPOSED MITIGATION

26.3.1.1. The construction of the Onshore Cables will be phased, with temporary traffic management measures, including the diversion of affected footpaths, to minimise disruption and maintain access to local businesses, residents, and community facilities. Following construction, all existing footpaths and cycle routes and greenspaces will be reinstated.

26.3.1.2. There will be a programme of community liaison to ensure that the potentially effected receptors are provided with early warning of construction activities.

26.3.1.3. The mitigation measures recommended in other topic chapters (for example Noise and Vibration) will also address potential construction impacts on human health.

26.4. RESIDUAL EFFECTS

26.4.1.1. Significant adverse effects are anticipated during the construction of the Onshore Cable Route relating to noise emissions. Noise emissions may cause annoyance and anxiety, leading to temporary short term moderate adverse effects on psychological health and sleep disturbance. All other residual human health effects of the Proposed Development are considered to be not significant.

27. WASTE AND MATERIAL RESOURCES

27.1. BASELINE

27.1.1.1. Currently, minimal quantities of material resources are consumed and minimal quantities of wastes are generated on the land that is proposed for development.

27.1.1.2. The South-East region generally has a higher than average availability of construction materials in comparison to other UK regions. Sales and stocks of permitted crushed rock and concrete blocks are below the UK average, however national supplies are buoyant. It is considered that the availability of materials for construction of the Proposed Development is likely to be sufficient.

27.1.1.3. Landfill capacity is likely to reduce over the life of the Proposed Development to the first year of operation. However, there are waste re-use and recovery facilities available in the region to divert waste arisings generated by the Proposed Development from landfill sites.

27.2. POTENTIAL IMPACTS

27.2.1.1. The potential impacts on waste and material resources assessed during both construction and operation relate to:

- The consumption of materials resources; and
- The generation and disposal of waste.

27.3. PROPOSED MITIGATION

27.3.1.1. Mitigation measures have been identified to reduce the impacts of the Proposed Development on the consumption of materials and generation and disposal of waste. The measures identified include the identification of sustainable sources of materials, maximising the use of recycled materials and maximising reuse or recovery of waste to minimise waste going to landfill.

27.4. RESIDUAL EFFECTS

27.4.1.1. A potential significant adverse effect may arise in relation to material resource consumption. The requirement for specialist material for the construction and operation (including repair and maintenance) of the Marine Cables has the potential to result in a significant adverse environmental effect.

27.4.1.2. The assessment process identified that there would be no other significant environmental effects in relation to waste generation and disposal to landfill as a result of the construction and operation (including repair and maintenance) of the Proposed Development.

28. CARBON AND CLIMATE CHANGE

28.1. GREENHOUSE GAS EMISSIONS

28.1.1. BASELINE

28.1.1.1. Without the Proposed Development, there would not be any emissions from construction, maintenance, refurbishment, replacement, and on-site energy consumption. However, there would be emissions in both the UK and France to generate electricity, which would be impacted by the transfer of electricity between the UK and France by the Proposed Development.

28.1.2. POTENTIAL IMPACTS

The potential carbon impacts assessed relate to:

- Embodied emissions including raw material supply, transport and manufacture (A1-A3)[2];
- Transport of materials to site (A4);
- Construction and installation process (A5);
- Transport of waste arisings away from site (A5);
- Operational energy use and operational fuel consumption (B6);
- Transmission Losses (B6);
- Fugitive gas emissions (B8);
- Maintenance – energy used on visits (B2);
- Replacement of materials (including transport of those materials) (B4);
- Repair and Refurbishment (B3 and B5); and
- The change in emissions from generation plant due to energy transfers between UK and France (D).[3]

[2] These alphanumeric values are PAS2080 lifecycle references. They ensure clarity when referring to Lifecyle stages.
[3] An example of emissions changes from generation plant due to the operation of the interconnector would be if hydro and nuclear power from France, was transferred to the UK over the interconnector during a period of high demand, resulting in gas fired (peaking plant) not operating, thus resulting in a reduction in emissions compared to the do-nothing scenario.

28.1.3. PROPOSED MITIGATION

28.1.3.1. The Converter Station design will adopt a sustainable approach which will involve the following measures:

- Reducing where possible material use in construction and minimising the use of high carbon materials; and
- Buildings should be energy and resource efficient.

28.1.3.2. The Marine Cable Corridor of the Proposed Development requires rock for backfill, non-burial protection, pre- and post-lay bunds (during construction) and for remedial protection during operation. To help identify a sustainable source for this material, the appointed contractor will record decisions (made by consensus, and taking into account the associated economic and environmental factors, including carbon) which have been made to ascertain whether or not the source of rock required for the Marine Cable Corridor can originate from the UK, and whether the impact of using such rock originating from the UK is lower than using material imported from an international source.

28.1.4. RESIDUAL EFFECTS

28.1.4.1. Significant minor adverse effects are anticipated during construction (and decommissioning) of the Proposed Development due to carbon emissions.

28.1.4.2. Significant beneficial effects are predicted to arise, due to the change in emissions from the generation plant due to energy transfers between UK and France as a result of the operation of the Proposed Development. The net CO_2 emissions due to construction and operation of the Proposed Development, over its minimum 40 year lifespan, are expected to be approximately minus 1,272,000 tCO_2e, due to the change in emissions from the generation plant due to energy transfers between UK and France.

28.2. CLIMATE RESILIENCE

28.2.1. BASELINE

28.2.1.1. The climate resilience assessment presents the vulnerability of the Proposed Development to changes in climate variables (such as seasonal temperature and rainfall, extreme temperature and rainfall and storminess).

28.2.1.2. The current climate of the South-East England is warm and dry. Climate projections indicate that the region will become hotter and drier in summer and warmer and wetter in winter with more extreme rainfall and temperature events.

28.2.2. POTENTIAL IMPACTS

28.2.2.1. Change in the climate variables are considered to have the potential to give rise to likely significant effects during both construction and operation of the Proposed Development. These include sea level rise, storm surge and storm tide, drought, extreme precipitation and temperature events, gales and extreme wind, storms, soil moisture and stability.

28.2.3. PROPOSED MITIGATION

28.2.3.1. Mitigation measures to ensure the climate resilience of the Proposed Development are already included in the design. For example, measures to adapt to temperature increases include choosing materials which are able to function at the higher predicted temperatures.

28.2.4. RESIDUAL EFFECTS

28.2.4.1. The Proposed Development would not be vulnerable to any significant changes in climate during the development lifetime, so no significant effects have been identified.

29. CUMULATIVE EFFECTS

29.1.1.1. When considered in isolation, the environmental effects of a single activity on a single receptor may not be significant. However, when individual effects are considered in combination with other effects (significant or not significant) in the same area, occurring at the same time, the resulting cumulative effect may be significant.

29.1.1.2. There are two types of cumulative effects which are considered as part of the EIA process:

- Inter-project effects: Also referred to as ‘cumulative effects’ (PINS, 2019). The interaction and combination of environmental effects of the Proposed Development with other developments and activities affecting the same receptor; and
- Intra-project effects: Also referred to as ‘interrelationships between topics’ (PINS, 2019). The interaction and combination of environmental effects, and indirect effects of the Proposed Development affecting the same receptor, either within the site or in the local area.

29.1.1.3. Transboundary effects have also been considered. Transboundary effects are those effects that may impact countries other than the country, or countries, in which a project will be constructed and operated.

29.2. INTER-PROJECT EFFECTS

29.2.1.1. The inter-project effects have been assessed in accordance with PINS Advice Note Seventeen (PINS, 2019) as follows:

- Stage 1: Establishing the zone of influence for the environmental topics and producing a long list of other developments which are upcoming within those zones of influence;
- Stage 2: Reviewing whether there is the potential for cumulative effects based on the nature, scale and temporal overlap with the development (establishing a 'shortlist');
- Stage 3: Gathering information on the developments which are remaining following Stage 2; and
- Stage 4: Assessment of potential cumulative effects and mitigation required to reduce the significance of effect.

29.2.2. MARINE

29.2.2.1. For the marine components of the Proposed Development (Chapters 6 – 14), no significant residual cumulative effects are predicted to result from the cumulative contribution of impacts from the Proposed Development with other projects during construction (and decommissioning) and operational stages (including repair and maintenance).

29.2.3. ONSHORE

Construction (and decommissioning)

29.2.3.1. For the onshore components of the Proposed Development (Chapters 15 – 26) and those Chapters which consider both onshore and marine (Chapters 27 and 28), significant residual cumulative effects were predicted to result from the cumulative contribution of impacts from the Proposed Development with other projects during construction (and decommissioning) stages for Onshore Ecology, Landscape and Visual Amenity, Noise and Vibration, Socio-economics and Waste and Material Resources. The significant cumulative effects were identified in relation to the following developments:

- Onshore Ecology:
  - 68 Land to the south of Old Mill Lane and east/south-east of The Haven (19/01071/FUL); and
  - 62b North Portsea Island Coastal Flood Defence Scheme Phase 4B;
- Landscape and Visual Amenity:
  - 62b North Portsea Island Coastal Flood Defence Scheme Phase 4B;
  - 67 Land South of Lovedean Electricity Substation (57524/001); and
  - 68 Land to the south of Old Mill Lane and east/south-east of The Haven (19/01071/FUL).
- Waste and Materials:
  - 74 Southsea Seafront from Long Curtain Moat in the West to Eastney Marine Barracks in the East (19/01097/FUL) – Waste and materials.
- Noise and Vibration:
  - 62b North Portsea Island Coastal Flood Defence Scheme Phase 4B;
- Socio-economics:
  - 62b North Portsea Island Coastal Flood Defence Scheme Phase 4B.

29.2.3.2. These effects represent potential localised adverse (significant) cumulative inter-

project effects during the Construction Stage of the Proposed Development.

Operation (including repair and maintenance)

29.2.3.3. For the onshore components of the Proposed Development (Chapters 15 - 26), significant effects from operation have been identified for Landscape and Visual Amenity. Significant cumulative effects have been identified in relation to the following developments:

- 67 Land South of Lovedean Electricity Substation (57524/001); and
- 68 Land to the south of Old Mill Lane and east/south-east of The Haven (19/01071/FUL).

29.3. INTRA-PROJECT EFFECTS

29.3.1.1. The assessment of intra-project effects considers the potential impact on both marine and onshore receptors occurring as a result of interrelationships between different impacts arising from the construction, operation and maintenance and decommissioning stages on the marine and onshore elements of the Proposed Development.

29.3.1.2. Different interactions of impacts may result in an additive or synergistic effect. Additive effects are those where similar types of impact from the Proposed Development may affect a receptor at the same time in a similar way, whilst synergistic effects are those where different types of impact affect a receptor and interact to increase their combined significance.

29.3.1.3. A number of intra-project effects have been identified for both marine and onshore receptors.

29.3.1.4. One significant effect was identified in relation to the users and residents of Hambledon Road (located in Section 4) during the construction period. Negative effects were identified in the Landscape and Visual Amenity, Traffic and Transport and Human Health chapters.

29.4. TRANSBOUNDARY EFFECTS

29.4.1.1. Chapters 6 - 14 of the ES have assessed the potential likely significant transboundary effects arising from the Proposed Development within each topic chapter. Transboundary effects have not been identified for the onshore chapters (chapters 15-26) as sensitive receptors are likely to be limited to the UK terrestrial environment. Chapters 27 (Waste and Material Resources) and Chapter 28 (Carbon and Climate Change) were scoped out of the transboundary assessment.

29.4.1.2. Transboundary effects have also been assessed within each chapter through identification of particular impacts that could affect other countries (e.g. increases in suspended sediments). These impacts are also assessed through undertaking the Habitats Regulations Assessment which assesses the potential for adverse effects from the Proposed Development on designated sites and their features within France and the Channel Islands. Transboundary effects have also been considered through the inclusion of projects from other Member States (namely, France) in the cumulative assessment.

29.4.1.3. Potential transboundary impacts were assessed primarily with France, but also with Belgium and Netherlands associated with commercial fisheries.

29.4.1.4. These assessments concluded that no significant transboundary effects are predicted and no significant adverse effects are predicted either alone, or in combination with other projects/plans on any features of the French designated sites assessed.

30. SUMMARY OF EFFECTS

30.1.1.1. The significant adverse effects anticipated during construction of the Proposed Development comprise:

- Effects on landscape character, associated local landscape features, the setting of SDNP or visual amenity and visual receptors at the Converter Station Area, the Onshore Cable Corridor and the Landfall at Eastney.
- Effects due to the temporary loss of agricultural land, the temporary impacts on five farm holdings and the permanent impacts on three of those holdings (see APP-132).
- Effects associated with the potential requirement for dewatering of groundwater aquifers in Section 4, 5, 6 and 7 during construction of the Onshore Cable Route.
- Effects related to severance, changes to pedestrian and cycle amenity, traffic delay and fear and intimidation in Sections 1 and 2.
- Effects related to severance, changes to pedestrian and cycle amenity, traffic delay, fear and intimidation and accidents and safety in Sections 3-10.
- Effects from noise impacts during evening, night-time and/or weekend construction works in Section 4, 5 and 8.
- Effects are predicted due to the temporary loss of recreational areas and temporary disruption from changes to access, traffic, noise, air and visual amenity for tourist receptors.
- Effects on health due to the generation of noise emissions from construction of the Onshore Cable Route.
- Effects due to the requirement for specialist rock material for the marine components of the Proposed Development.
- Effects of greenhouse gas emissions during construction of the Proposed Development.
- Effects due to inter-project cumulative effects associated with Onshore Ecology, Landscape and Visual Amenity and Waste and Material Resources.

30.1.1.2. The significant adverse effects anticipated during decommissioning, as a potential worst-case, of the Proposed Development comprise:

- Effects on some landscape character areas, the setting of the SDNP and local landscape features as well as on some residents, recreational and transport users over the duration of the works at the Converter Station Area.
- Effects on tranquillity and on immediate residents and recreational and transport users at the Landfall.
- Effects associated with the potential requirement for dewatering of groundwater aquifers in Section 4, 5, 6 and 7 during decommissioning of the Onshore Cable Route.
- Effects related to severance, changes to pedestrian and cycle amenity, traffic delay and fear and intimidation in Sections 1 and 2.
- Effects related to severance, changes to pedestrian and cycle amenity, traffic delay, fear and intimidation and accidents and safety in Sections 3-10.
- Effects are predicted due to the temporary loss of recreational areas and temporary disruption from changes to access, traffic, noise, air and visual amenity for tourist receptors.

30.1.1.3. The significant adverse effects anticipated during operation of the Proposed Development comprise:

- Effects on landscape character, associated landscape features, the setting of SDNP and visual receptors for the Converter Station Area. As planting matures, the significance of many effects would reduce and would not be significant after 10 years. Effects would remain significant on landscape character of the area and some immediate residents within a 1.2 km radius of the Converter Station Area, and on some recreational and transport users over very localised sections of PRoW and roads within a 3 km radius of the Converter Station Area after 20 years.
- Effects on landscape features (openness), residents and recreational users immediately after construction and on commencement of operation at the Landfall at Eastney. After 10 years, as planting matures there would be no significant effects at the Landfall.
- Effects from loss of amenity for pedestrians on PRoW at the Converter Station.
- Effects from material resource consumption from the requirement to consume specialist rock material for the Marine Cable.
- Effects from inter-project cumulative effects associated with Landscape and Visual Amenity.

30.1.1.4. The Proposed Development will result in moderate, significant, beneficial effects relating to greenhouse gas emissions. The net CO_2 emissions of the Proposed Development, over its minimum 40 year lifespan (from construction and operation), are expected to be approximately minus 1,272,000 tCO_2e, due to the change in emissions from the generation plant due to energy transfers between UK and France.

REFERENCES

PINS. (2019). *Advice note seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. August 2019.*