



AQUIND Limited

AQUIND INTERCONNECTOR

Environmental Statement Addendum 3

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EXECUTIVE SUMMARY

Project and planning context

AQUIND Limited are developing the AQUIND Interconnector Project. The Project is a new 2,000 MW subsea and underground High Voltage Direct Current bi-directional electric power transmission link between the South Coast of England and Normandy in France. AQUIND applied for a Development Consent Order (DCO) pursuant to the Planning Act 2008 to the Secretary of State in November 2019. This included an Environmental Statement. The Application was accepted by the Planning Inspectorate in December 2019.

The Examining Authority recommended the approval of the Application and the making of the Order to the Secretary of State in June 2021. The Secretary of State refused development consent in January 2022. The decision to refuse development consent was the subject of a claim for Judicial Review, which resulted in the quashing of the decision in January 2023 on grounds of unlawfulness.

Purpose of this document

The Application is now required to be redetermined by the Secretary of State. To assist with this redetermination the Secretary of State issued a request for further information from the Applicant in March 2023. This ES Addendum 3 provides information in respect of the SoS's request for further information in relation to two principal matters – 1) consideration of alternatives namely the use of Mannington substation instead of the proposed substation site at Lovedean and 2) consideration of new environmental information that may have come forward since the Secretary of State's decision, including details of any new plans or projects which should be included in updated cumulative assessments.

Structure of this document

Section 1 provides an introduction and contextual information on the project, planning background and purpose of this addendum.

Section 2 provides background information on the legislative and policy context in respect of consideration of alternatives, consideration of new environmental information and updated cumulative impact assessment.

Section 3 addresses the request for consideration of the Mannington substation as an alternative solution. An analysis of this option, and comparison with the Lovedean option, has been undertaken and is summarised in Section 3.

Section 4 addresses the request for consideration of any new environmental information which may have come forward since the Secretary of State's decision. This section summarises any new information and analyses the implications on the assessment conclusions provided in the original planning submission.

Section 5 addresses the request to consider any new plans or projects that should be included in an updated cumulative assessment. This section summarises any new plans or projects that have been identified and an assessment of the potential new or different cumulative or in-combination effects arising.

Consideration of Alternatives (Section 3)

The Secretary of State requested that the Applicant and National Grid provide any information relevant to the feasibility of Mannington substation as an alternative. This should include consideration of whether Mannington could offer a realistic prospect of an alternative in

delivering the same infrastructure capacity, including energy security and climate change benefits in the same timescale as the proposed development. The information provided should confirm what the impact of selecting Mannington as the substation would have on the proposed development as a whole. The response should also set out the impact of the previously proposed Navitus Bay offshore windfarm on the feasibility of Mannington.

The conclusion of our analysis of the Mannington alternative indicates that the Lovedean and Mannington options perform similarly in relation to their potential significant environmental effects related to the landfall and converter station locations. However, the Mannington based converter station is likely to give rise to wider-ranging visual effects, due to its presence in a much more flat and open landscape. The Mannington landfall would also require the introduction of new permanent hardstanding areas as well as the need for a new access road. With regard to the connection to Mannington Substation, an area of land would be required to accommodate two new interconnector connection bays, an extension to the double busbar substation to accommodate those, including the additional bus coupler and section breakers, which would be expected to be approximately 3,600sqm. Any such extension would most likely be into the bordering woodland so as to be contiguous with the existing substation, and would result in the loss of such trees (including possibly Ancient Woodland where not able to be located elsewhere) and also likely a requirement for new mitigation planting. No such extension is needed for the connection to Lovedean substation.

In relation to the marine and onshore cable routes, the analysis indicates that the Lovedean substation option is clearly preferable. The Mannington option would require a longer onshore cable connection with extensive significant potential effects on designated sites, protected species and cultural heritage. There would be much more wide-ranging effects on agricultural land with the need for a much more substantial mitigation and compensation package. The urban nature of the route for the Lovedean onshore cable option avoids these potential effects. The marine cable for the Mannington option would need to be much longer with commensurately greater potential impacts and risks to marine designated sites, the broader marine environment and shipping operations.

A connection to Mannington substation would take significantly longer with a longer marine and onshore cable routes adding two or three years to the construction timescales.

This additional time to deliver the Proposed Development is however separate from the need for additional works to reinforce the NETS so that the Proposed Development can operate and the time required for those works to be delivered. The additional reinforcements that it is understood would be required are extensive, and would mean it would be 2037 at the earliest before the Proposed Development could be operable. This compares to the Proposed Development being able to be operable by 2027 when connecting to Lovedean Substation.

There would be no realistic prospect of a connection to Mannington substation delivering the same infrastructure capacity in the same timescale as the Lovedean connection.

From a cost perspective, it is identified that where the Proposed Development connects to Mannington Substation this would be likely to cost an additional £334 million - £456.81 million. This is comprised of the estimated additional costs associated with the onshore cable and the additional trenchless crossings needed to reduce the overall level of environmental impacts, and the additional length of the marine cables. This additional cost (plus the significantly longer timescale for delivery) would mean that the project would no longer be commercially viable.

This is separate from the likely significant additional costs to deliver the required reinforcement works to the NETS, which would be in addition to this amount. Whilst the Applicant is not able to provide an accurate estimate of the costs of the additional reinforcements, noting how extensive those reinforcements are and taking into account the known information on the cost of reinforcements between Lovedean and Bramley, it is evident that such costs would be significant and at least in the order of multiple hundreds of millions of pounds.

In relation to the impact of the previously proposed Navitus Bay offshore windfarm on the feasibility of Mannington, our further analysis indicates that the Navitus Bay project is not a determinative factor in why a connection to Mannington Substation is not feasible.

In summary, the Mannington substation alternative would result in significantly greater environmental impacts and risks, would take much longer to construct and to be capable of operation, and is not viable. The refusal of the Navitus Bay project, and the perceived freeing of capacity at Mannington substation, does not influence this conclusion.

New Environmental Information (Section 4)

The Secretary of State requested that the Applicant provide any new environmental information, if such information has come forward since the Secretary of State's decision, that would require an update to the environmental assessments within the Environmental Statement or Habitats Regulations Assessment.

In relation to the terrestrial environment, the desk data sources reviewed have either not been superseded or a review has indicated that there would be no significant changes to the conclusions already made. Therefore, the existing assessments remain valid. A validation study has been undertaken and concluded that there are no notable changes to the baseline and the existing assessment remains valid.

In relation to the marine environment, the desk data sources reviewed have either not been superseded or a review has indicated that there would be no significant changes to the conclusions already made. Therefore, the existing assessments have been confirmed to remain valid.

In conclusion, our analysis has indicated that, although some new environmental information has come forward, the conclusions of all assessments previously undertaken remain valid.

Cumulative and In-combination Effects (Section 5)

The Secretary of State requested details of any new plans or projects which should be included in updated cumulative assessments.

A full review of cumulative schemes has been undertaken. This included a review of the status of schemes included in the previous assessment, removing schemes which have been completed and assessing them as part of an updated baseline; and identifying and considering the cumulative effects of new developments arising since the previous assessment. An updated onshore long list and short list of development has been produced.

For the onshore element of the Proposed Development, 25 developments included in the previous assessment have been constructed and now represent baseline receptors, with a further three development applications withdrawn from planning. A review of the original assessment has been undertaken and no new significant effects have been identified for these receptors and the findings of the 2019 ES and 2020 ES Addendum remain valid.

Ten new developments have been identified. There is the potential for significant residual cumulative effects to result from the cumulative contribution of impacts from the Proposed

Development with the proposed solar farm at Denmead Farm should that receive planning permission in the future, in relation to landscape and visual amenity, temporary and permanent loss of agricultural land and disruption and disturbance to socio-economics receptors. No other additional cumulative effects have been identified.

For the marine element of the Proposed Development, a review of all cumulative schemes has been undertaken and no additional significant cumulative effects have been identified. The conclusions of the marine cumulative effects assessments previously reported in the 2019 ES and 2020 ES Addendum therefore remain valid.

1. INTRODUCTION

- 1.1.1.1. AQUIND Limited ('the Applicant') submitted an application for the AQUIND Interconnector Order (the 'Order') pursuant to Section 37 of the Planning Act 2008 (as amended) (the 'PA2008') to the Secretary of State ('SoS') on 14 November 2019 (the 'Application'). The Application was accepted by the Planning Inspectorate ('PINS') on 12 December 2019.
- 1.1.1.2. The Application seeks development consent for those elements of AQUIND Interconnector (the 'Project') located in the UK and the UK Marine Area (the 'Proposed Development').
- 1.1.1.3. The Project is a new 2,000 MW subsea and underground High Voltage Direct Current ('HVDC') bi-directional electric power transmission link between the South Coast of England and Normandy in France. By linking the British and French electric power grids it will make energy markets more efficient, improve security of supply and enable greater flexibility as power grids evolve to adapt to different sources of renewable energy and changes in demand trends. The Project will have the capacity to transmit up to 16,000,000 MWh of electricity per annum, which equates to approximately 5 % and 3 % of the total consumption of the UK and France, respectively.
- 1.1.1.4. The Proposed Development comprises the following:
- 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 accompanied by a smaller diameter FOC, connecting Lovedean Substation to the proposed Converter Station;
 - A newly constructed Converter Station Area comprising:
 - the Converter Station and associated equipment;
 - 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 telecoms; and
 - the compound comprising the Telecommunications Building(s) and associated equipment;
 - Two pairs of underground Onshore HVDC Cables, each pair accompanied by a smaller diameter Fibre-Optic Cable ('FOC'), to run from the Converter Station to the Landfall site in Eastney (near Portsmouth), approximately 20 km in length;
 - 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; and

- Two pairs of Marine HVDC Cables, each pair accompanied by a smaller diameter FOC, to run from the Landfall site in Eastney to the boundary of the UK Exclusive Economic Zone ('EEZ').

1.1.1.5. Sections 3.5 – 3.6 of Chapter 3 (Description of the Proposed Development) of the 2019 ES (APP-118) describe the Proposed Development in further detail.

1.2. ENVIRONMENTAL INFORMATION SUBMITTED TO DATE

1.2.1.1. An Environmental Statement ('ES') (APP-116 – APP-487) was submitted to PINS on 14 November 2019 as part of the 'Application. The 2019 ES sets out the findings of the Environmental Impact Assessment ('EIA') undertaken for the Proposed Development. The submitted ES is hereafter referred to as the '2019 ES'.

1.2.1.2. Two ES Addenda were submitted during the Examination, at Deadline 1 (REP1-139) ('ES Addendum 1') and Deadline 7 (REP7-067) ('ES Addendum 2'). At Deadline 9 of the Examination the Applicant also submitted the most recent version of the Schedule of documents forming the Environmental Statement (REP9-012). An updated version of the Schedule is submitted alongside this ES Addendum

1.2.1.3. Together, the 2019 ES, ES Addendum 1, ES Addendum 2 and this ES Addendum 3 now comprise the Environmental Statement for the Application.

1.3. PURPOSE OF THIS DOCUMENT

1.3.1.1. The Examining Authority ('ExA') submitted their Report and Recommendation in respect of the Application to the SoS on 8 June 2021, recommending the approval of the Application and the making of the Order.

1.3.1.2. Following several requests for further information in relation to the Project, the SoS refused development consent on 20 January 2022. That decision to refuse development consent was the subject of a claim for Judicial Review, which resulted in the quashing of the decision on 24 January 2023 on grounds of unlawfulness.

1.3.1.3. The Application is now required to be redetermined by the SoS, and to assist with this redetermination the SoS issued a request for information dated 3 March 2023 which has requested further information from the Applicant on various matters.

1.3.1.4. This ES Addendum 3 provides information in respect of the SoS's request for further information in relation to the following matters raised in the letter to the Applicant:

- 5. Consideration of Alternatives:
 - *The Secretary of State requests that the Applicant and both National Grid Electricity Transmission Plc and National Grid Electricity System Operator Limited provide any information relevant to the feasibility of Mannington substation as an alternative, including any relevant correspondence or studies, and an explanation of whether or not Mannington is a feasible alternative location for the substation. This should include consideration of whether Mannington could offer a realistic prospect of an alternative in delivering the same infrastructure capacity, including energy security and climate change benefits in the same timescale as the proposed development. The information provided should confirm what the impact of selecting Mannington as the substation would have on the proposed development as a whole. The response should also set out the impact of*

the previously proposed Navitus Bay offshore windfarm on the feasibility of Mannington.

- 8. Environmental Information:
 - *The Secretary of State requests that the Applicant provide any new environmental information, if such information has come forward since the Secretary of State's decision, that would require an update to the environmental assessments within the Environmental Statement and / or Habitats Regulations Assessment. In particular, the Applicant should provide details of any new plans or projects which should be included in updated cumulative and / or in-combination assessments.*

2. LEGISLATIVE AND POLICY CONTEXT

2.1. CONSIDERATION OF ALTERNATIVES

- 2.1.1.1. The consideration of alternatives in relation to the Proposed Development has been previously detailed within the 2019 ES at Chapter 2 – Consideration of Alternatives (APP-117) and within the Supplementary Alternatives Chapter (REP1-152). Taken together, those documents provide a description of the reasonable alternatives studied by the Applicant, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment, as is required in accordance with Regulation 14(2) and Schedule 4 of the EIA Regulations.
- 2.1.1.2. It is important when considering the description of the reasonable alternatives provided in Chapter 2 of the ES, and the further information provided in the Supplementary Alternatives Chapter, for the legislative and policy context relating to it to be clearly understood. For that reason, this ES Addendum 3 sets out below a summary of the relevant legislative and policy context.
- 2.1.1.3. As noted above, the requirements in relation to the information to be provided in an environmental statement regarding the reasonable alternatives studied are provided by the EIA Regulations, specifically Regulation 14(2) and Schedule 4 to the EIA Regulations.
- 2.1.1.4. Paragraph 2 of Schedule 4 to the EIA Regulations requires an environmental statement to include “*A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*”¹.
- 2.1.1.5. It should be noted in this regard that, as is confirmed in the government’s planning practice guidance², the EIA Regulations do not require an applicant to consider alternatives. However, where alternatives have been considered a description of them is required to be included within the relevant environmental statement.

¹ Paragraph 2 of Schedule to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

² Paragraph: 041 Reference ID: 4-041-20170728 of the Planning Practice Guidance

2.1.1.6. In addition to the requirements provided by the EIA Regulations, the national policy applicable to the Proposed Development, the Overarching National Policy Statement for Energy (EN-1) (the 'NPS'), includes policy and requirements in relation to alternatives. Paragraph 4.4.1 of the NPS confirms that, as in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives is in the first instance a matter of law, and that from a policy perspective the NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option. It should be noted that the EIA Regulations also do not include any requirement to establish whether a proposed project represents the best option. Paragraph 4.4.2 qualifies paragraph 4.4.1, recognising applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied (including an indication of the main reasons for the applicant's choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility) and other circumstances in which there may be specific legislative or policy requirements to consider alternatives.

2.1.1.7. As is set out at paragraph 2.2.1.2 of Chapter 2 to the ES, paragraph 4.4.3 of the NPS requires the SoS when determining an application, subject to any legal requirement, to be guided by specific principles when deciding what weight should be given to alternatives. These are as follows:

- The consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner.
- The SoS should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development.
- Where (as in the case of renewables) legislation imposes a specific quantitative target for particular technologies or (as in the case of nuclear) there is reason to suppose that the number of sites suitable for deployment of a technology on the scale and within the period of time envisaged by the relevant NPSs is constrained, the SoS should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals.
- Alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the SoS thinks they are both important and relevant to its decision.
- As the SoS must decide an application in accordance with the relevant NPS (subject to the exceptions set out in the Planning Act 2008), if the SoS concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the SoS decision.

- Alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the SoS decision.
- Alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the IPC's decision; and
- It is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the SoS in respect of it (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives which are particularly relevant). Therefore where an alternative is first put forward by a third party after an application has been made, the SoS may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the SoS should not necessarily expect the applicant to have assessed it.

2.1.1.8. This ES Addendum 3 provides further information in response to the request of the Secretary of State relevant to the feasibility of Mannington substation as an alternative, including any relevant correspondence or studies, and an explanation of whether or not Mannington is a feasible alternative location for the converter station and the connection to the substation, in circumstances where the SoS alone identified the need to further consider Mannington substation as such an alternative connection point when considering the Application.

2.1.1.9. The information set out herein in respect of the feasibility of a connection to Mannington substation identifies, to the extent that the Applicant is able from information which is within its knowledge:

- whether Mannington could offer a realistic prospect of an alternative in delivering the same infrastructure capacity, including energy security and climate change benefits in the same timescale as the Proposed Development;
- what the impact of selecting Mannington as the substation for the connection point for the Proposed Development would have on the Proposed Development as a whole; and
- the impact of the previously proposed Navitus Bay offshore windfarm on the feasibility of Mannington as the substation for the connection point for the Proposed Development.

2.2. ENVIRONMENTAL INFORMATION

2.2.1.1. The environmental desk-based data sources and survey data used to inform the Environmental Statement and submitted in support of the Application, provided a robust basis on which to conclude the likelihood of significant environmental effects and the identification of appropriate mitigation and was in line with all environmental legislation, policy and guidance.

2.2.1.2. In relation to Regulation 14 and Schedule 4 of the EIA Regulations which identify the information which is required to be included within an environmental statement for the purpose of identifying the likely significant effects of the development on the environment, there may be some environmental survey data which is required to support those conclusions, particularly ecological survey data, with an expiry date. As part of this addendum, both environmental desk-based data sources and survey data have been subject to a review to confirm the underlying data remains valid for assessment purposes.

2.2.1.3. Reviews have been undertaken (Section 4.1 and 4.2) for the desk-based data sources and survey data that were used to inform the baselines and assessments for the Environmental Statement, to confirm their validity and to determine whether adopting any more recent data which has come forward since the close of the Examination would alter the conclusions of the assessments.

2.3. CUMULATIVE IMPACT ASSESSMENT

2.3.1.1. The consideration of cumulative effects in relation to the Proposed Development has been previously detailed within Chapter 29 (Cumulative Effects) of the 2019 ES (Document Reference: 6.1.29) and Chapter 20 (Cumulative Effects) of the 2020 ES Addendum (Document Reference 7.8.1). Taken together, those documents provide a description of the “intra-project effects” (the interaction and combination of environmental effects of the Proposed Development between topics) and “inter-project effects” (the interaction and combination of environmental effects of the Proposed Development with other developments) assessed by the Applicant.

2.3.1.2. The requirements for consideration of cumulative effects to be included within an Environmental Statement are provided by the EIA Regulations. Specifically, Schedule 4 (5) of the EIA Regulations outlines that an ES should include “*A description of the likely significant effects of the development on the environment resulting from inter alia -... (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*”

2.3.1.3. In line with the above, a description of the likely significant cumulative effects was provided in each onshore technical chapter of the 2019 ES (Document reference 6.1.15 to 6.1.28), with a summary of significant cumulative effects provided in Chapter 29 – Cumulative Effects Assessment (document reference 6.1.29). The original cumulative assessment was updated in 2020 to include new cumulative schemes which were submitted up until May 2020. This is presented in Chapter 20 of the 2020 ES Addendum (document reference 7.8.1).

2.3.1.4. The legislation, policy and guidance detailed in Chapter 29 (Cumulative Effects) of the 2019 ES (Document Reference: 6.1.29) remains applicable with no relevant updates since October 2019.

3. FEASIBILITY OF MANNINGTON SUBSTATION

3.1. APPROACH TO ALTERNATIVES

- 3.1.1.1. The overall philosophy applied to the consideration of the reasonable alternatives, or the options, for the Proposed Development, by the Applicant is explained at paragraph 2.3 of Chapter 2 of the ES. This explains that a process of staged filtering was applied, increasing knowledge of the individual options, so as to proportionately consider them from a technical, cost and environmental perspective. Key to this exercise was the identification of whether the potential options could proceed, and also whether they had a realistic prospect of delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale.
- 3.1.1.2. As further explained at paragraph 2.3 of Chapter 2 of the ES, a proportionate multi-disciplinary approach was taken to the assessment of the reasonable alternatives, taking into account considerations relevant to and specialist input from experts in the fields of electrical engineering, cable engineering, the environment, planning and civil engineering in respect of both the onshore and marine environments. This included considerations relevant to geotechnical matters and access.
- 3.1.1.3. In addition, the consideration of the options took into account the potential impacts of the various options on land and the exploration of all reasonable alternatives to the compulsory acquisition of land. Exploring the reasonable alternatives to compulsory acquisition from the outset is considered to have allowed the Proposed Development to come forward in a manner which limits the interests in and rights over land that will be affected by it.
- 3.1.1.4. With particular regard to environmental considerations, constraints were identified including both statutory and non-statutory designations, ranging from international to local importance. These related to a number of different environmental disciplines, such as ecology, landscape, and heritage. The constraints identified were used to identify the potential effects on the environment in connection with the options and the level of mitigation that may be required to address those effects. The constraints and the likely level of mitigation that may have been required was considered having regard to the mitigation hierarchy approach.
- 3.1.1.5. The Supplementary Alternatives Chapter explained at paragraph 3.1.1.5 that the mitigation hierarchy approach is a tool designed to help limit possible adverse impacts on the environment. It requires that impacts should first be avoided, then reduced/mitigated and, only as a last resort, compensated (offset). The Mitigation Hierarchy is as follows:
- **Avoidance** - measures taken to prevent or avoid adverse effects as far as possible by designing out or by using preventative measures.

- **Minimisation** - measures taken to reduce the duration, intensity, extent and/or likelihood of impacts that cannot be avoided. For example, where the Proposed Development is likely to directly impact scrub and hedgerows, vegetation clearance would be undertaken outside of the bird breeding season, considered to be between March to August, to avoid killing or injuring breeding birds and their young.
- **Offsetting** - measures taken to compensate for any residual, adverse impacts after implementation and consideration of the previous steps.

3.1.1.6. The same overall philosophy has been followed in relation to the consideration of the feasibility of connecting the Proposed Development to Mannington Substation.

3.1.1.7. It should also be noted for completeness that for development of the type of the Proposed Development, being a linear marine and onshore scheme which is required to connect into the NETS, the consideration of the options for the individual elements cannot be taken in isolation from one another. Changing one aspect will have a bearing on the other aspects of the development and fixing one aspect of the development will likewise mean certain aspects of the development will then need to flow from this. To provide as clear an explanation as possible, this section of this ES Addendum 3 considers the relevant elements of the Project with a connection into the NETS at Mannington Substation separately to provide a full explanation in relation to each. There is inevitably however some cross over between the relevant considerations in relation to the individual aspects, including as the staged filtering approach is applied.

3.1.1.8. Given the connection point of Mannington is known, it was considered key to identify the potential feasible landfall locations for a connection to Mannington Substation, and to then consider the cable routes within the marine and onshore environments and the locations which might provide an appropriate location to site the required Converter Station (which includes (but is not limited to) two converter halls which are each required to be up to 26m in height and 50m in length) and for a converter station compound with dimensions 200 m x 200 m.

3.2. PHYSICAL CONNECTION INFRASTRUCTURE AT MANNINGTON SUBSTATION

3.2.1.1. An aerial view of the Mannington sub-station (from Google Maps) is shown in Plate 3.1, illustrating its location within the landscape. As can be seen, the substation consists of outdoor electrical equipment and mid-rise buildings. The area of the existing hard surfacing is visibly very congested, with very little remaining space available for new electrical equipment.



Plate 3.1 - Aerial View of Mannington 400kV substation

- 3.2.1.2. The Applicant has enquired with NGET and NGESO to confirm what works would be needed to the substation to accommodate the connection of the Proposed Development to the NETS at Mannington Substation. It is understood from those enquiries that an initial assessment has indicated that to facilitate the connection of the 2000MW Project at Mannington Substation, two (2) off 400kV bays would be required, i.e. one (1) connection bay for each 1000MW circuit. These connections could be made using Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS), or a combination of both, as preferred by NGET. In addition to the two new interconnector connection bays, an extension to the double busbar substation to accommodate those would be needed, including additional bus coupler and section breakers.
- 3.2.1.3. Further details of the typical equipment used in an AC switchyard is available in the Design and Access Statement for the Proposed Development (REP8-012), at section 5.2.3.

- 3.2.1.4. A more detailed assessment would be needed to determine the full extent of the works required to realise this connection, and this would need to consider factors such as the operational footprint, suitability of substation design and power system studies. However, such an assessment is beyond the scope of this alternatives assessment exercise and, for the reasons clearly indicated below relating to wider feasibility issues in respect of alternative connection to Mannington substation, such an assessment is not necessary.

3.3. PHYSICAL CONSTRAINTS TO A CONNECTION AT MANNINGTON SUBSTATION

- 3.3.1.1. As indicated in the aerial view of the Mannington substation (see Plate 3.1), the site is enclosed by mature woodland, which serves the purpose of minimising the visual impact of the substation in the surrounding landscape.
- 3.3.1.2. In summary, as discussed in Section 3.2 the sub-station is very congested and there appears to be no opportunity for extension to the sub-station without an expansion of the site and removal of some of the surrounding mature woodland trees.
- 3.3.1.3. The area of land that would be required to accommodate two new interconnector connection bays, and the extension to the double busbar substation to accommodate those, including the additional bus coupler and section breakers, would be expected to be approximately 3,600m².
- 3.3.1.4. From a review of the existing Mannington substation it is apparent that there is no such space within the existing operational footprint, and as such it would be expected that the substation would need to be extended. Any such extension would most likely be into the bordering woodland so as to be contiguous with the existing substation, and would result in the loss of such trees (including potentially Ancient Woodland where not able to located elsewhere) and also likely a requirement for new mitigation planting.
- 3.3.1.5. Plate 3.2 shows a red square which is 3,600m² to illustrate the likely extent of the area of additional hardstanding required. It should be noted that this location has been picked solely to show the spatial area requirement and does not indicate any particular preference or otherwise for where such hardstanding may be located.



Imagery ©2023 CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, Map data ©2023 50 m

Plate 3.2 - Aerial View of Mannington 400kV substation

3.4. ELECTRICAL UPGRADES TO THE NETS

3.4.1.1.

In their Feasibility Study (AQUIND HVDC Interconnector Feasibility Study, dated November 2015) for a connection of AQUIND Interconnector, NGET (at that time) initially considered ten (10) 400kV substations as far west as Chickerell and as far east at Bolney, as shown in Plate 3.3, which is an extract (plate 2.2) from the 6.1.2 ES - Vol 1 – Chapter 2 Consideration of Alternatives (APP-117).

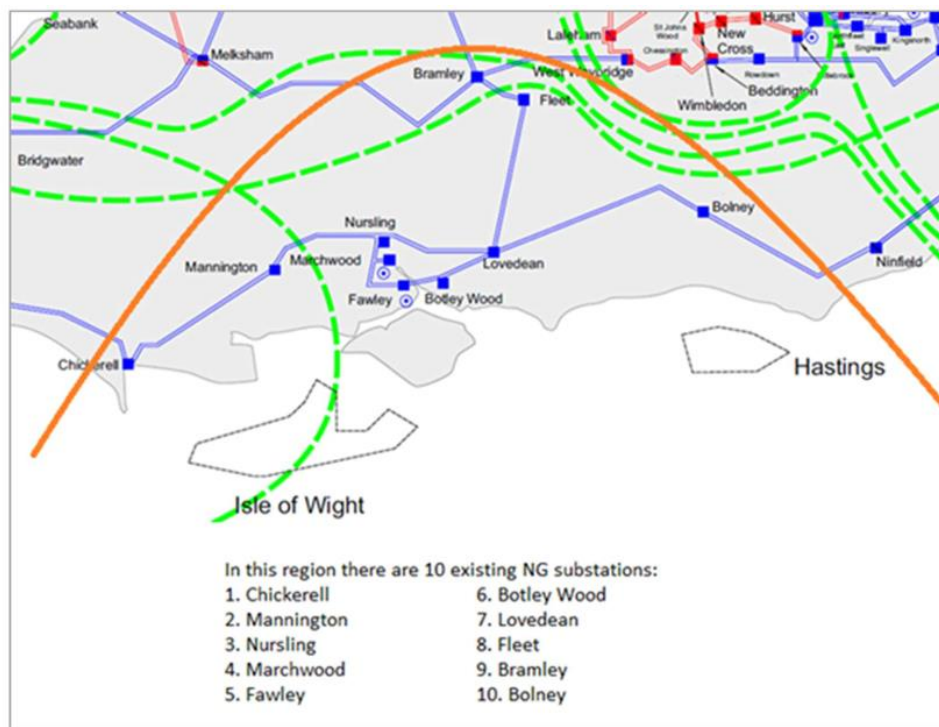


Plate 3.3 - Region of evaluation used in the Feasibility Study

- 3.4.1.2. The Feasibility Study indicated that the three (3) shortlisted substations (Bramley, Lovedean, and Chickerell) would require upgrades to the transmission network to accommodate the increased power flows. The other options to the west of Lovedean, including Mannington, were identified to require all or nearly all of the same network reinforcements as a connection at Lovedean, plus additional reinforcements either to get the power to Lovedean or reinforcements to the west to Exeter sub-station and as far north as Minety.
- 3.4.1.3. This point was confirmed in NGESO’s letter to the Planning Inspectorate, dated 25th January 2021 (REP7-109), in which they stated:
- *“Options to the west of Lovedean required all or nearly all of the same network reinforcements as a connection at Lovedean plus additional reinforcements either to get the power to Lovedean or reinforcements to the west to Exeter sub-station and as far north as Minety.”*
- 3.4.1.4. For completeness, it was also confirmed that options to the east of Lovedean required the same reinforcements as a connection to Lovedean, plus additional reinforcements to either get the power to Lovedean, or further on the east coast.
- 3.4.1.5. Such reinforcement works to the wider network would be expected to cause significant disruption during the installation of the upgrades and require a significant period of future planning by NGET for the required outage(s), in addition to the time needed to deliver them (discussed below at paragraph 3.5).

3.4.1.6.

It is understood by the Applicant that these reinforcement works would take two forms:

- Re-conductoring of the overhead transmission lines to accommodate the higher thermal duty on the conductors due to the power infeed from the new interconnector. This would require individual circuits to be taken out of service, the existing overhead wires removed and replaced with new higher rated wires, and the circuit then returned to commercial service. The costs and duration for the work would vary depending on the length of each cable circuit, though inevitably the longer the length of the network that requires upgrade, the more time and cost it would take to upgrade and the longer the circuit would need to be out of service. Such outages are typically planned many years in advance, given the impacts on the wider transmission network and the need to provide security of supply whilst they are undertaken. The re-conductoring work would be undertaken by NGET.
- Installation of reactive power compensation equipment at multiple sub-stations to support the voltage profile on the network. This would require the installation of shunt capacitor banks and/or Static Synchronous Compensators (STATCOM) at various sub-stations in the south coast region.

3.4.1.7.

The power flows in this part of the country are also predominantly from west to east, i.e., towards the major load centre of London, and accordingly the connection of the Proposed Development at Lovedean will require reinforcement works on the Lovedean – Fleet and Fleet – Bramley circuits. This was confirmed by NGENSO in their letter to the Applicant of 8th March 2022 (included as Appendix 3.1 – document reference 7.8.3.1), which stated:

- *“we can confirm that connections west of Lovedean (i.e. Mannington, Exeter, Chickerell, etc.) would have required the same network reinforcement as a connection at Lovedean however would also have required additional reinforcements to facilitate generation (or interconnector import) connections. This is largely because of the relatively little demand in the south-west and so power flows from those sites in the west will generally flow into Lovedean anyway, causing the same effect from Lovedean onwards, as well as any works required between that connection site and Lovedean. There may also have been slightly more voltage compensation required to the west, as far as Minety, as mentioned in the CION”.*

3.4.1.8.

From this the Applicant is able to confirm that for a connection at Mannington, reinforcements to the transmission network would be required on the Mannington – Nursling and Nursling – Lovedean circuits, in addition to the reinforcements to the transmission network required in connection with the Proposed Development on the Lovedean – Fleet and Fleet – Bramley circuits. As shown in Plate 3.5, the length of the transmission network from Mannington – Nursling – Lovedean is 76.23km, which would need upgrading to accommodate a 2000MW power infeed at Mannington. In addition, the 58.7km transmission network from Lovedean – Fleet – Bramley would need to be reinforced for a 2000MW connection at Mannington or Lovedean.

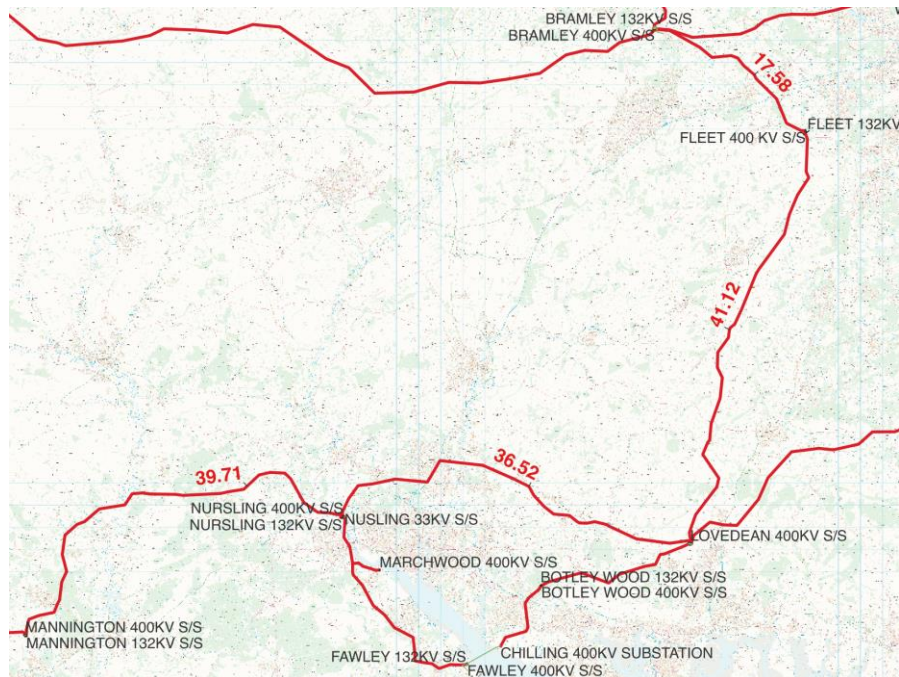


Plate 3.5 – Transmission network from Mannington to Bramley (distance in km)

3.4.1.9.

As set out in 3.4.1.5, in addition to the reinforcement works that would be required to the transmission network between Mannington to Lovedean and Lovedean to Bramley, it is understood that NGET and NGESO have identified that more recent assessments of the NETS in this area in relation to other possible connections indicate that the reinforcement works that would be required to support a connection of the Proposed Development to Mannington substation would include a new double 400kV circuit in the South West area and reinforcement of the existing Fawley - Chilling 400kV cables.

3.5. SCHEDULE FOR DELIVERY OF UPGRADES TO MANNINGTON SUBSTATION

- 3.5.1.1. When the Applicant originally sought and was given a connection agreement at Lovedean in 2016, NGET advised that the interconnector could be subject to constrained operation until the network reinforcements (Lovedean – Fleet and Fleet – Bramley) had been put in place. The date advised for this work to be completed was (and remains) 2027. This period of time is indicative of the timeframe required to plan and execute such major reinforcement works on the 400kV transmission network.
- 3.5.1.2. For a connection at Mannington substation the extensive additional reinforcement works identified at paragraph 3.3. would be required. It is understood that NGET and NGENSO have identified that the earliest possible date that the Proposed Development could connect into the NETS following the delivery of the required reinforcements is 2037. The Proposed Development is programmed to connect into the NETS at Lovedean by 2027, so 10 years before any possible connection to the NETS at Mannington Substation.

3.6. ADDITIONAL COST IMPACT OF NETWORK UPGRADES

- 3.6.1.1. The Feasibility Study did not quantify the CAPEX figures which would be incurred by NGET in delivering network reinforcements for a connection at Mannington. Whilst the Applicant is not able to speculate on the additional cost for the reinforcements which it is understood would be required, for context further information is provided below from the Feasibility Study.
- 3.6.1.2. The cost benefit analysis contained in the Feasibility Study presented the CAPEX for a 2000MW connection at Bramley and Lovedean, as follows:
- Bramley: for a connection in 2023/24 £403.42m
 - Lovedean: for a connection in 2020/21 £514.28m
- 3.6.1.3. The difference in timescale reflects the difficulties which the developer would face in achieving consent for and delivering an underground DC cable route of approximately 100km from the south coast through or around the South Downs National Park and around the town of Basingstoke, to reach Bramley 400kV sub-station.
- 3.6.1.4. The £110.86m difference in CAPEX was commented upon in the Feasibility Study as follows:
- *“Driving the difference in costs between a connection at BRAM and LOVE is an estimated requirement to provide up to £70m of additional shunt compensation on the network when connecting at LOVE and re-conductoring of additional circuits on the South-Coast for a LOVE connection, compared to a BRAM connection”*
- 3.6.1.5. The transmission circuit route length from Lovedean to Bramley is shorter (58.7km) than that from Mannington to Lovedean (76.2km), and it has been assumed that a similar level of re-conductoring and shunt compensation would be required for a 2000MW connection at Mannington to take power to the centres of consumption in the east via Lovedean. As such, it would be expected that the costs of the reinforcements between Mannington to Lovedean would be not less than £110.86m, and likely higher than this amount.

3.6.1.6. In addition to the reinforcements between Mannington to Lovedean, NGET and NGESO now understand that other reinforcements would be required to the NETS, which include a new double 400kV circuit in the South West area and reinforcement of the existing Fawley - Chilling 400kV cables. It is anticipated that the costs to deliver such an extensive set of works would be significantly more than the £110.86m that was identified in 2015 to be the cost of the upgrade of the NETS between Lovedean and Bramley. All additional costs of network reinforcements would be additional CAPEX for NGET.

3.6.1.7. As such, whilst the Applicant is not able to provide an accurate estimate of the costs of the additional reinforcements, noting how extensive those reinforcements are and taking into account the known information on the cost of reinforcements between Lovedean and Bramley, it is evident that such costs would be significant and at least in the order of multiple hundreds of millions of pounds.

3.7. SITING OF THE CONVERTER STATION NEAR TO MANNINGTON

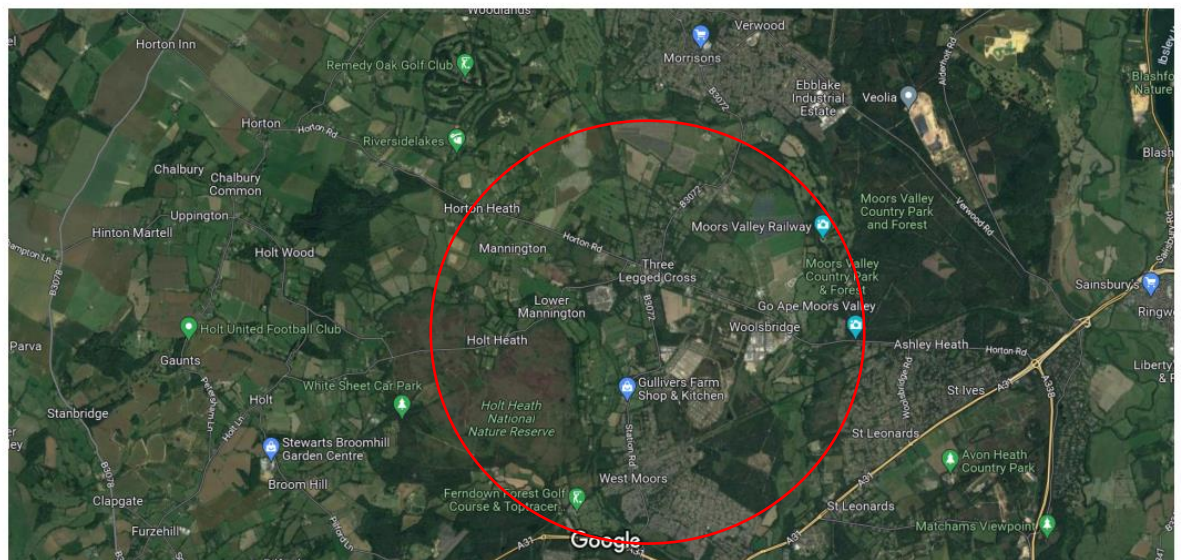
3.7.1.1. Paragraph 2.4.2 of Chapter 2 to the ES (APP-117) details the criteria used for the purpose of identifying a site for the location of the Converter Station, and which for ease of reference were as follows:

- The site should be within 2 km (radius) of the existing substation, with this criterion adopted for the following reasons:
 - A greater distance would result in greater electricity transmission losses along the HVAC Cables (and consequently reduce the efficiency of the Interconnector).
 - HVDC Cables have a resistance loss, where HVAC Cables have resistance, inductive and capacitive losses, resulting in greater transmission losses along them.
 - An HVAC cable circuit also requires a wider cable corridor than a HVDC cable circuit, creating a corridor where no tree or hedge growth is permitted, although the land can be returned to agriculture. As such, a shorter distance for the AC cable route, and thus closer proximity of the Converter Station to the substation reduces potential disruption and impact on the local environment in terms of ecology, traffic and visual impact. The construction corridor width for each of the HVAC circuits extends up to 23 m (depending on haul road requirements), and though temporary, maintaining a shorter distance of the HVAC cable provides an environmental benefit.
- Overall site dimensions of 200 m x 200 m with a permanent access way of at least 7 m wide (note this area increased from 160m x 200m following engagement with suppliers and the width of the access road has increased from 6m following detailed design processes, as explained at paragraph 2.4.5.2 Chapter 2 to the ES (APP-117));
- An additional area nearby with a minimum of 100 m x 100 m to use as a temporary Laydown Area during the construction period with further additional space close by for storage of excavated topsoil and other materials during construction;
- Beside or close to existing roads to minimise new road construction;

- Allowance for a turning radius of 30 m for the site entrance;
- Aim to avoid areas of high environmental value or public amenity, such as ridge tops and rare species habitats and areas of established and prominent hedgerows;
- Aim to minimise close proximity to dwellings, public buildings, and public spaces due to possible audible noise and electromagnetic interference from the Converter Station;
- Areas of high coastal salt or industrial contamination should be avoided;
- Flood plains, rivers or streams should be avoided;
- Marshland which would require piling for foundations should be avoided; and
- Footpaths and historic public rights of way should be avoided, where practicable.

3.7.1.2.

The image below (Plate 3.4) shows a wider view (image from Google Maps) of the area around Lower Mannington, where the substation is located. As noted above, the Converter Station should be located close to the NGET substation, and ideally within 2km, as shown by the red circle on the image centred on Mannington substation.



Imagery ©2023 CNRS / Airbus / Getmapping plc / Infoterra I srl & Rilusky / andsat / Copernicus / Maxar Technologies. Map data ©2023 1 km

Plate 3.4 - 2km radius of Mannington Substation (Google Maps, 2023)

3.7.1.3.

The Applicant has assessed the constraints in the area around the Mannington substation to identify which land is not suitable to accommodate and provide for the construction of the required Converter Station and can be excluded. Thereafter, it is possible to assess the merits of the remaining land and determine its suitability as a Converter Station location. The main constraints to finding a suitable site for the location and construction of the Converter Station within 2km of Mannington substation are as follows:

- **Existing Overhead Lines** – There are 2 no 400kV OHLs connected to north side of the Mannington Substation. One circuit runs immediately north for approximately 1.3 km before turning north east to Nursling Substation; the other heads west towards Chickerell Substation. There are 4 no. further high voltage 132kV OHLs which connect at the southern perimeter of Mannington Substation and run south towards Bournemouth and south east towards Ringwood. Given the height of the Converter Station buildings (up to 26m), and the likely need to use cranes for heights exceeding this, it would not be possible to construct the Converter Station site under, or in the immediate vicinity of, OHLs for safety reasons.
- **Designated Sites** – Holt Heath is located immediately south west of Mannington Substation with a smaller part of the heath also located north west of the substation. It includes dry and wet heathland, bog and ancient woodland. The area has several nature conservation designations: National Nature Reserve, Special Protection Area (SPA), Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). It is owned by the National Trust and managed in association with Natural England. The Heath is one of the few places where all six native British reptile species occur, and it also supports many other heathland animals, plants and birds. Rare heathland birds such as Eurasian Hobby, Nightjar, Dartford Warbler and Woodlark have been recorded as breeding on the reserve. As such, this area and impacts on it must be avoided.
- **Ancient Woodland** – Barewood Copse borders the south west and western sides of Mannington Substation. Mannington Copse is located 800m west of the substation. Paragraph 5.3.14 of the NPS EN-1 addresses ancient woodland and veteran trees: *‘Ancient woodland is a valuable biodiversity resource both for its diversity of species and for its longevity as woodland. Once lost it cannot be recreated. The IPC should not grant development consent for any development that would result in its loss or deterioration unless the benefits (including need) of the development, in that location outweigh the loss of the woodland habitat. Aged or ‘veteran’ trees found outside ancient woodland are also particularly valuable for biodiversity and their loss should be avoided. Where such trees would be affected by development proposals the applicant should set out proposals for their conservation or, where their loss is unavoidable, the reasons why’.* Any development in this location would therefore need to avoid impacts on the ancient woodland.
- **West Moors Ministry of Defence (MoD) Fuel Depot** – This is a large operational MoD site located approximately 1200m east and south east of the Mannington Substation. Parts of the depot are designated as part of the Holt and West Moors Heaths SSSI and Dorset Heaths SAC.
- **Scheduled Ancient Monuments** – There are two Scheduled Ancient Monuments located to the west side of the Mannington Substation. Any development at this location would therefore need to avoid any direct or indirect setting impacts on these sites.
- **Existing settlements and built infrastructure** - The area surrounding Mannington Substation site comprises a mixture of nucleated settlements as well as linear settlements along some of the main roads and scattered housing and isolated farmsteads along some of the secondary roads and lanes:

- The village of Three Legged Cross forms a nucleated settlement immediately north east of the substation.
- There is also a significant amount of linear settlement and a mixture of residential, commercial and industrial uses along Ringwood Road which runs east from Three Legged Cross.
- Settlement is less dense along Horton Road, east of Three Legged Cross, and is mainly residential and agricultural with a number of caravan and camping sites adjacent to the road.
- Settlement along Burts Lane and Holt Road (both west of the substation), the west side of Three Cross Road (east of the substation, running south from the village of Three Legged Cross) and Newman's Lane (south of the substation) consists primarily of farmsteads.

3.7.1.4. The environmental and ecological constraints in the vicinity of the Mannington substation are shown in the maps in Appendix 3.2 (document reference 7.8.3.2).

3.7.1.5. The above constraints around Mannington substation significantly restrict the area of land available to accommodate a Converter Station. The Applicant has identified two available sites with the potential to accommodate the Converter Station. These are:

- Land west of Gundry's Farm.
- Land north of Sturt's Farm.

3.7.1.6. An overview of these sites in relation to the location of Mannington Substation is provided in Plate 3.5, with the land west of Gundry's Farm located to the east of Mannington Substation and the land north of Sturt's Farm located south of Mannington Substation.



Plate 3.5 – Potential Converter Station Site at Land west of Gundry’s Farm and land north of Sturts Farm

3.7.1.7. A high-level assessment of the ability for each those sites to accommodate the Converter Station and its construction is provided in Table 3.1 below:

Table 3.1 - Suitability of shortlisted sites to accommodate a Converter Station

Relevant Consideration	Land west of Gundry’s Farm	Land north of Sturt’s Farm
200m x 200m Converter Station Site available	Yes	Yes, though this would require removal of approximately 600m of established hedgerow and the site is immediately adjacent to 2.no of the overhead lines (OHLs) which run south from Mannington, which would form a significant constraint during construction (e.g. crannage, clearances for deliveries of oversized loads

Relevant Consideration	Land west of Gundry's Farm	Land north of Sturt's Farm
		to the site) and which would be highly likely to make the build in this location unfeasible.
100m x 100m temporary laydown and construction site available adjacent to Converter Station Site	Yes, though this would have the potential to require temporary use of a proportion of Gundry's Farm Caravan and Camping, located immediately to the east, for a period of up to three years (including reinstatement).	Whilst there is a 100m x 100m site available, it would not be adjacent to the Converter Station site due to the presence of hedgerows and OHLs. A larger area than 10,000m ² is therefore likely to be required due to the need for a less efficient layout.
HVAC Cable Route distance to Mannington Substation and any notable impediments.	<p>Approximately 850m, assuming an east to west orientation of the Converter Station and the HVAC cables entering the Mannington Substation via its southern boundary.</p> <p>It is anticipated that the HVAC cables would enter the substation via a trenchless installation method to avoid impacts on the ancient woodland.</p>	<p>Approximately 450m, assuming a south to north orientation of the Converter Station and the HVAC cables entering the Mannington Substation at its southern boundary fence.</p> <p>This route would need to cross 3 no. hedgerows before reaching the substation's southern boundary.</p> <p>The route will also need to be installed between two pylons which will serve as additional constraint.</p> <p>It is anticipated that the HVAC cables would enter the substation via a trenchless installation method to avoid impacts on the ancient woodland.</p>
Access Road provision	New access road required from B3072, approx. 450m in length requiring hedgerow and tree removal along a 15m wide corridor for a distance of 185m, with an increased amount of removal required at the junction to accommodate a 30m turning circle and	New access road required from B3072, approx. 600m long requiring hedgerow and tree removal along a 15m wide corridor for a distance of 40m, with an increased amount of removal required at the junction to accommodate a 30m turning

Relevant Consideration	Land west of Gundry's Farm	Land north of Sturt's Farm
	provide adequate visibility splays	circle and provide adequate visibility splays
Proximity to existing dwellings	Approx. 200m to properties south of Ringwood Road	Approx. 100m to Sturt's Farm

- 3.7.1.8. Taking the above into account, it is identified that the land west of Gundry's Farm provides the only potential location for the Converter Station, on the basis that it would not be possible to construct the Converter Station at the land north of Sturt's Farm in light of the constraint provided by the existing OHLs in this location.
- 3.7.1.9. This position is supported by a review of National Grid Technical Guidance Note 287: Third-party guidance for working near National Grid Electricity Transmission Equipment dated 2016, which provides as follows at page 5 of the guidance³:
- *"Work which takes place near overhead power lines carries a significant risk of coming into proximity with the wires. If any person, object or material gets too close to the wires, electricity could 'flashover' and be conducted to earth, causing death or serious injury. You do not need to touch the wires for this to happen. The law requires that work is carried out in close proximity to live overhead power lines only when there is no alternative, and only when the risks are acceptable and can be properly controlled. Statutory clearances exist which must be maintained, as prescribed by the Electricity Safety, Quality and Continuity Regulations 2002."*
- 3.7.1.10. The Applicant is also aware of Bluestone Energy's plans to develop a Battery Energy Storage System on the land immediately south of Mannington Substation – this has the potential to introduce additional constraints for AC Cable routing from the south.
- 3.7.1.11. The land west of Gundry's Farm is less constrained, though the construction activities are likely to have a significant impact on Gundry's Farm Caravan and Camping, located immediately to the east, and may require temporary possession of part of their landholding for a period of up to three years (not including reinstatement).

³ <https://www.nationalgrid.com/electricity-transmission/document/86846/download>

3.7.2. PRELIMINARY ENVIRONMENTAL REVIEW OF ALTERNATIVE CONVERTER STATION SITE – LAND WEST OF GUNDRY’S FARM

- 3.7.2.1. Table 3.2 sets out the relevant environmental constraints and sensitivities associated with the land surrounding the existing substation, relevant to the consideration of the siting of the Converter Station at land west of Gundry's Farm and the potential resultant impacts. Appendix 3.2 (document reference 7.8.3.2) shows the environmental and ecological constraints in the vicinity of the Mannington substation.
- 3.7.2.2. Notably, the land west of Gundry's Farm identified with the potential to accommodate the Converter Station was the location of the substation proposed in connection with the Navitus Bay Offshore Wind Farm project, and where relevant information has been drawn from the assessments for that project to inform the preliminary view on the likely impacts of the Converter Station in this location set out in table 3.2 below.
- 3.7.2.3. In this regard it should be noted that the buildings and infrastructure required for the Proposed Development (with 26m building height and 30m lighting mast height) are of a much different and larger scale than those for Navitus Bay (with 14m in building height and 19m lighting mast height), and which is explained in more detail in paragraph 3.12 below.

Table 3.2 – Summary of constraints and sensitivities in relation to Mannington Substation and the alternative Converter Station site – land west of Gundry’s Farm

Environmental topic	Summary of constraints or sensitivities
Landscape and Visual Amenity	<p>The Converter Station site would be located within the Dorset Heaths National Landscape Character Area (NCA). The Dorset Heaths NCA is broadly described as an undulating lowland heath with tracts of heather, stunted pines and gorse scrub, consisting of mosaics of heathland, farmland, woodland and scrub. The site is also located within a Local Landscape Character Area (LCA): LCA 21: Horton Common-Three Legged Cross, characterised as a heath/farmland mosaic, with land rising towards the north and belt of trees and scrub.</p> <p>There is a public footpath (E54/15) approximately 250m east of the substation, running along Haddons Drive, travelling southwest across Meadows Farm, reaching Newman’s Lane 1km south of the substation. A bridleway (E45/69) approximately 450m west from the substation travels south from Holt Road towards Newman’s Lane. It is noted that there are also private residences at Three Legged Cross village approximately 400m to the northeast, all within 500m of the existing substation, and these properties would be situated closer to the Converter Station at Gundry’s farm.</p> <p>The sensitivity of Dorset Heaths NCA is high due to the presence of highly valued landscapes of national importance which include 34 ha of the New Forest National Park, 10,189 ha of the Dorset AONB, 1,197 ha of the Cranborne Chase and West Wiltshire Downs AONB</p>

Environmental topic	Summary of constraints or sensitivities
	<p>and 5,388 ha of the Purbeck Heritage Coast. The Navitus Bay ES⁴ concluded that the change to landscape character and loss of vegetation were not significant. The same outcome was reported in respect of impacts on the Horton Common – Three Legged Cross LCA.</p> <p>As noted in the Navitus Bay Wind Park ES (Chapter 12 – Landscape and Visual), there is potential for significant effects for private residents, approximately 340m from the site identified as one of the options for siting the Converter Station (200m from the eastern boundary of the site) (elevation 25m AOD). The assessment was based on a viewpoint located at Gundry’s Farm Estate, to the immediate west of the principal dwellings of the farm estate and approximately 200m from the eastern boundary of the site. This view is across open fields, with views of the coniferous forestry plantation, mature deciduous tree belt that runs parallel to Ringwood Road, and glimpsed views through tree belts towards some of the properties on Ringwood Road.</p> <p>The very open nature of the site would have resulted in the Navitus Bay Onshore Substation being wholly visible from a number of locations within the estate boundary, likely resulting in a substantial alteration to the landscape fabric due to removal of grazing pasture and establishment of construction compounds. During operation, even with perimeter planting and 15 years establishment, there would still be significant adverse effects.</p> <p>This would likely be the same outcome for the Converter Station in this location, though it would be expected that the impacts would be worse given the increased height and mass of the Converter Station buildings, given it would be a height of 26m (with 30m lightning masts), in comparison to the Navitus Bay onshore substation (14m in height, extending to 19m with lightning masts above finished ground level). The Converter Station would also likely require more mitigation planting which would take longer to mature to provide screening, however given the height of the buildings it is not likely that it would be possible to wholly screen the Converter Station. There is therefore potential for additional residential receptors to experience more significant and longer term effects, even after mitigation.</p>
<p>Ecology and Nature Conservation and Arboriculture</p>	<p>There are a number of statutory designated sites including Ramsar sites, Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Sites of Special Scientific Interest (SSSI) located within 2km of the existing Mannington substation. These include the following:</p>

⁴ Documents submitted in connection with the Navitus Bay Offshore Windfarm project are available in the public domain here - <https://webarchive.nationalarchives.gov.uk/ukgwa/20171215191632/https://infrastructure.planninginspectorate.gov.uk/projects/south-east/navitus-bay-wind-park/?ipcsection=docs>

Environmental topic	Summary of constraints or sensitivities
	<ul style="list-style-type: none"> • Dorset Heathlands Ramsar site, located 250m north of Mannington substation. The qualifying features include breeding and non-breeding bird species such as Woodlark and Merlin. • Dorset Heathlands SPA and Ramsar approximately 400m east of Mannington substation. • Dorset Heaths SAC approximately 400m west of Mannington substation. This site is designated for Annex I habitats Northern Atlantic wet heaths with Erica tetralix and European dry heaths. • Holt and West Moors Heath SSSI approximately 400m south of Mannington substation. • The Holt Heath National Nature Reserve (NNR), an area of Lowland Heathland, located approximately 500m southwest of Mannington substation. Holt Heath is a mature wood consisting mainly of oak trees with a few other species, and supports rare heathland birds such as Eurasian Hobby, nightjar, Dartford warbler and woodlark, as well as native British reptiles. • Local Nature Reserve of Pennington's Copse, Alder Bed and Broadmoor, located approximately 2.5km to the south of Mannington substation, which is also a Site of Importance for Nature Conservation (SINC). Pennington's Copse and Alder Bed are coppiced areas of woodland. The woodland supports dozens of bird species, wild flowers, deer and badger populations. This includes coppiced woodland with hazel, birch and ash under the mature oaks and dense stands of alder in the wetter areas. <p>A large area of Lowland Wet Grassland/Coastal and floodplain grazing marsh stretching from north to south lies at approximately 120m south of the existing Mannington substation. There are a few watercourses around and within the marsh that connects to Udder Waters in the south and eventually to Moors River.</p> <p>The Mannington substation is also bound by deciduous woodland as noted in the Priority Habitat inventory. This woodland also consists of Ancient and Semi-Natural Woodland, located in Barewood Copse to the west, south-west and south of the substation. Mannington Copse is located approximately 600m to the west of the site.</p> <p>According to the Navitus Bay Habitat Regulations Assessment (HRA) report, following a National Vegetation Classification survey, the construction works were designed to ensure all activities would be confined to three habitat types that are not designated features within Dorset Heaths SAC and Dorset Heathlands Ramsar site, including W16 birch woodland, U4 grassland and dense scrub.</p>

Environmental topic	Summary of constraints or sensitivities
	<p>The Navitus Bay HRA report also concluded no adverse effect on the integrity of the Dorset Heaths SAC or Dorset Heathlands Ramsar site is predicted. There are no direct impacts on the designated features of the Dorset Heaths SAC or Dorset Heathlands Ramsar site; and indirect effects will be controlled through the standard pollution prevention measures.</p> <p>In addition, following construction, the immature birch woodland and heathland areas lost within the working area would be replaced with heathland habitats. This would achieve a positive gain in heathland habitats within the Dorset Heaths SAC and Dorset Heathlands Ramsar site.</p> <p>In respect to hedgerows, the Converter Station site and connections to the existing substation would affect approximately six hedgerows with conservation status of Important and/or Priority status. Hedgerow would be temporarily lost to enable the installation of the cable.</p> <p>It is anticipated that a similar approach would be adopted for the Proposed Development. However, given a larger footprint of the Converter Station buildings and likely larger Laydown area that would be required for the construction of the Proposed Development, it would be expected that would be more areas of habitat loss and a larger area of mitigation planting required as a result through the HRA process.</p>
Historic Environment	<p>The Mannington substation is not located within a Conservation Area, the closest being Horton Conservation Area approximately 4km to the northwest of the site. There is one Scheduled Monument, Bowl Barrow on Summerlug Hill which is located approximately 500m southwest of the Mannington substation. There are no other Scheduled Monuments located within 2km of the Mannington substation. Two Listed Buildings - the Grade II listed 'Bridge ID 1323513' and 'Chapel Farm Cottage' (ID 1154835) are located 350m west and 1.1km to the east of the Mannington substation, respectively. These listed buildings may be affected by dust and vibration disturbance from construction works. During operation, there is the potential for minor adverse effects equivalent to 'less than substantial harm' on these listed buildings similar to the potential effects on Scotland Cottage for the Lovedean option.</p> <p>There are no registered parks and gardens within 2km of the Mannington substation.</p> <p>The Navitus Bay onshore cultural heritage and archaeology ES chapter identified a number of potential features located within the Gundry's Farm site, which were deemed to be of negligible, minor or uncertain significance. Their assessment concluded that there would be no significant effects at Gundry's Farm, though committed to a programme of archaeological field investigation, comprising a combination of targeted geophysical survey and evaluation trenching. This approach would likely be adopted for the Proposed Development's Converter Station works, though these works would need to cover a larger</p>

Environmental topic	Summary of constraints or sensitivities
	<p>footprint due to the increased size of the infrastructure. In line with the Navitus Bay ES conclusions, implementation of the measures set out in the WSI would be expected to reduce impact significance to an acceptable level.</p>
<p>Water Resources, Flood Risk and Ground Conditions</p>	<p>The Mannington substation is located within Flood Zone 1, however the land immediately to southwest of the site, that runs through Barewood Copse, is within Flood Zones 2 and 3 running from south to northwest along the marshes.</p> <p>According to the Navitus Bay onshore water environment ES chapter, there is one watercourse/ditch in the immediate vicinity of the site. The ditch lies adjacent to the northern boundary of the Gundry's Farm site and flows in a south easterly direction towards its confluence with a tributary of the River Crane, which eventually becomes the Moors River.</p> <p>In addition, the site is located within a Secondary A Aquifer zone, comprising permeable layers that can support local water supplies and may form an important source of base flow to local rivers. It is not, however, within a groundwater source protection zone.</p> <p>The main river Udders Waters flows 2km south of the Mannington substation. There are a small number of watercourses within the wider surrounding area, and connects to Udder Waters in the south, eventually to Moors River.</p> <p>In addition, there are notable surrounding land uses that may influence ground conditions at the Mannington substation such as the West Moors MoD Fuel Depot, the closest point being approximately 0.75m to the south-east of the site. There is also a historic landfill site located approximately 0.5km to the west of the site at Mannington Farm (licence surrendered in 1993).</p> <p>In line with the findings of the Navitus Bay project, and as reported in the Navitus Bay onshore water environment ES chapter, there would likely be no significant effects experienced at Gundry's Farm. Similar to the Navitus Bay project, and taking into account the larger footprint required by the Proposed Development's Converter Station, a Converter Station would give rise to an increase in the impermeable area of the site, with a corresponding increase in the rate and volume of surface water run-off.</p> <p>This would therefore require a surface water management strategy to control surface water run off arising from the impermeable areas associated with the Converter Station and access road. Sufficient space would be required for attenuation ponds, similar to the proposals for the Proposed Development at Lovedean substation, and which it is not certain would be available in this location. This could potentially also result in additional site clearance, encroaching on the woodland boundary of the site to the west and towards the B3072.</p>

Environmental topic	Summary of constraints or sensitivities
<p>Amenity (noise, vibration and air quality)</p>	<p>The site does not lie within an Air Quality Management Area.</p> <p>There are existing settlements around the Mannington substation. The closest potential sensitive receptor is a property located at approximately 110m west of the site, with Lower Mannington at 400m to the west and the Three Legged Cross village approximately 400m to the northeast, all within 500m of the existing substation. These areas would be likely experience adverse construction noise impacts.</p> <p>Waterloo Nursing Home, off Ringwood Road, to the north of Gundry's Farm would also need to be closely considered in terms of noise emissions in relation to construction and operational phases.</p> <p>The Navitus Bay Noise and Vibration ES chapter produced an operational noise prediction model showing the contour plots of the Navitus Bay onshore substation. This concluded that, with the adoption of best practicable means, public relations campaign and noise reduction of substation plant at source, there would be no significant effects.</p> <p>For the Proposed Development at Lovedean, two types of embedded mitigation have been employed: firstly, the layout and orientation of the Converter Station itself, and secondly, mitigation applied to the dominant plant items to reduce noise at the point of generation and contain noise. With respect to layout and orientation, the Converter Station options for the Proposed Development at Lovedean were orientated such that the dominant plant items are screened from the nearest sensitive receptors by the Converter Station buildings. The control buildings were positioned along the western edge of the Converter Station compound, providing an uninterrupted screen between the valve converter cooling fan banks and nearby affected sensitive receptors.</p> <p>This type of embedded mitigation approach for layout and orientation would be more challenging and complex for Land West of Gundry's Farm, given the spatial constraints presented by a smaller site. There is the potential need for further attenuation measures for a Converter Station at Mannington where the same levels of embedded mitigation provided by the layout and orientation are not available.</p>

3.7.2.4. In addition to the impacts identified in Table 3.2 above, it is identified that there would likely be significant impacts associated with construction traffic movements required to facilitate construction of the Converter Station.

3.7.2.5. As defined in Chapter 22 of the ES (APP-137) and Day Lane Technical Note (REP8-054) the construction movements shown in Table 3.3 would be generated by the construction of the Converter Station.

Table 3.3 Construction Traffic Movements

Construction Activity	Estimated HGVs		Estimated LGVs	
	Two-way	Total	Two-way	Total
Converter Station	43	86	0	0

3.7.2.6. For the purposes of the preliminary assessment of construction traffic impacts it is assumed that the construction traffic route would be for B3072 Horton Road – Ashley Heath Roundabout – A31 Ringwood Road, with no other local roads used by construction traffic other than those outlined above to access the location of the Converter Station. This indicative construction traffic routing is shown in Plate 3.6 below.

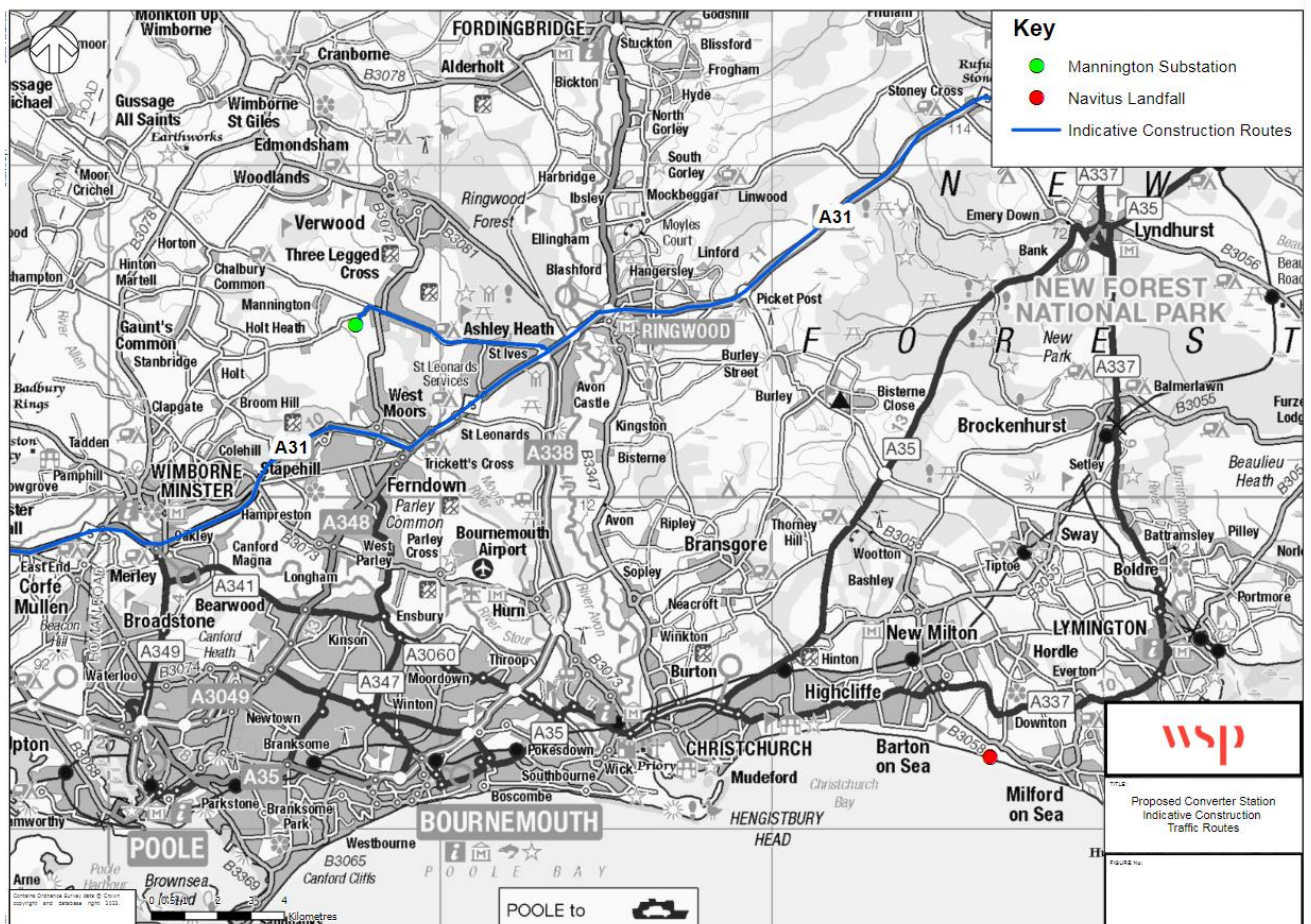


Plate 3.6 - Indicative construction traffic routing.

B3072 WEST MOORS ROAD

- 3.7.2.7. The B3072 West Moors Road is a single carriageway road with some residential properties located close to the junction with B3072 Horton Road before becoming more rural in nature. Footways are present in proximity of the residential properties. The route is generally straight with good visibility and carriageway widths of 6-7m. The route is suitable for construction traffic and already serves a range of industrial units on Collingwood Road and the Ministry of Defence West Moor site.
- 3.7.2.8. Sturts Community Trust is located south of the existing sub-station which is a high sensitivity receptor but this would only be impacted by construction traffic if the Converter Station access junction is south of its location.
- 3.7.2.9. Use of West Moor Road by construction traffic would have a detrimental impact on severance, pedestrian / cycle amenity, fear and intimidation and abnormal loads, some of which may lead to significant environmental effects given the presence of high sensitivity receptors at Sturts Community Trust.

HOLT ROAD

- 3.7.2.10. Holt Road is a rural single carriageway road subject to a national speed limit and approximately 6m in width. The rural nature of the route means that visibility is restricted at some bends as result of trees / hedgerows, whilst the carriageway also narrows to single lane width at the bridge over Mannington Brook. There are a number of residential properties located in Holt Heath but these are generally setback from the edge of the carriageway. Use of this route would be expected to require traffic management measures to be implemented to safely accommodate anticipated construction traffic movements.
- 3.7.2.11. The use of Holt Road by construction traffic would have a detrimental impact on pedestrian / cycle amenity, fear and intimidation, abnormal loads and traffic delay (as a result of the required traffic management control). These may lead to significant adverse environmental effects given the presence of sensitive receptors (residential properties).

BURT'S LANE

- 3.7.2.12. Burt's Lane is a rural single carriageway road subject to a national speed limit and approximately 5-6m in width. The route serves a number of residential properties and agricultural uses. It is considered that this route would be unsuitable for construction traffic without traffic management measures to control two-way movement of traffic between the Converter Station and B3072 Horton Road. This would result in adverse impacts in relation to pedestrian / cycle amenity, fear and intimidation, abnormal loads and traffic delay, some of which may lead to significant adverse environmental effects. There are no other sensitive receptors located on Burt's Lane.

B3072 HORTON ROAD

- 3.7.2.13. The B3072 Horton Road is a 6-7m wide single carriageway road providing access to / from the A31 and A338 for Three Legged Cross, Ashley Heath and other surrounding settlements. The route has footways on at least one side of the carriageway and is mainly subject to a 40mph speed limit. The route passes through a number of residential areas with other sensitive receptors such as care homes, pharmacies, residential units and educational facilities and also serves Woolsbridge Industrial Park and Moors Valley Country Park.

- 3.7.2.14. The A31 / A338 Ashley Heath Roundabout provides the main route between Southampton / London and Bournemouth. The junction is heavily trafficked and experiences significant traffic congestion during peak hours.
- 3.7.2.15. The use of Horton Road by construction traffic would be expected to result in temporary adverse impacts in relation to severance, pedestrian / cycle amenity, fear and intimidation, abnormal loads and traffic delay.
- 3.7.2.16. However, given the existing baseline traffic volumes on this route and provision of footways along B3072 Horton Road and pedestrian crossings, it is considered unlikely that the proportionate increase due to the addition of construction traffic would generate any significant environmental effects in relation to traffic and transport.

3.7.3. SUMMARY OF PRELIMINARY ENVIRONMENTAL REVIEW OF ALTERNATIVE CONVERTER STATION SITE - LAND WEST OF GUNDRY'S FARM

- 3.7.3.1. In terms of the settlements within 500m of Mannington substation, there are a low number of residential properties located at Mannington to the north-west and Three Legged Cross to the north-east. In addition, there are various small holdings and properties along lanes to the west and south-east of Mannington substation.
- 3.7.3.2. There is potential for significant landscape and visual effects for private residents, particularly those close to Gundry's Farm Estate, to the immediate west of the principal dwellings of the farm estate and approximately 200m from the eastern boundary of where the Converter Station would be sited. The very open nature of the site would likely result in the Converter Station being wholly visible from a number of locations within the estate boundary, likely resulting in a substantial alteration to the landscape fabric due to removal of grazing pasture and establishment of construction compounds.
- 3.7.3.3. Significant adverse effects in relation to views are likely, after mitigation, and would require more mitigation planting and time to establish in order to reach the maturity to provide appropriate screening, given the Converter Station would be a height of 26m (with 30m lightning masts). However, given the height of the buildings it is not likely that it would be possible to wholly screen the Converter Station. There is therefore high potential for additional residential receptors to experience longer term adverse significant effects, even after mitigation.
- 3.7.3.4. Given the proximity of Mannington substation and Gundry's Farm to statutory designated sites of international and national importance (i.e. Ramsar, SAC, SPA, SSSI), the siting of the Converter Station would need to consider how the construction works and permanent infrastructure, including AC and DC cable installations, could impact these sites. There could be potential for adverse impacts on these sites, for example through disturbance effects on the bird communities due to the degradation of roosting, foraging and breeding habitat. This would therefore have potential to harm the integrity of the designations and would have implications on the level of mitigation required. There is also the potential for a longer construction period with adverse effects on ecological receptors occurring over a longer period of time.
- 3.7.3.5. Due to the environmental constraints, the HVAC connection between the Converter Station and Mannington Substation would have to be carried out by Horizontal Directional Drilling. The HDD compounds would require clearance of hedgerow west of B3072 road, increasing the impacts of choosing Mannington as the grid connection point.

- 3.7.3.6. A programme of archaeological field investigation at Gundry's farm, comprising a combination of targeted geophysical survey and evaluation trenching is likely to be adopted for the Converter Station works. In line with the Navitus Bay ES conclusions, implementation of the measures set out in the WSI would reduce impact significance to what would be expected to be an acceptable level.
- 3.7.3.7. A Converter Station would give rise to an increase in the impermeable area of the site, with a corresponding increase in the rate and volume of surface water run-off. This would therefore require a surface water management strategy to control surface water run off arising from the impermeable areas associated with the Converter Station and access road. The ability to provide for attenuation ponds, similar to the Proposed Development at Lovedean, is considered uncertain in this location as it requires sufficient space which is not identifiable. A suitable drainage solution may not be able to be achieved in this location. This could potentially also result in additional site clearance, encroaching on the woodland boundary of the site to the west and towards the B3072.
- 3.7.3.8. Embedded mitigation relating to the layout and orientation of the Converter Station will be more challenging and complex for the site at Gundry's Farm. This is related to the spatial constraints presented by a smaller site, and subsequently the need for further attenuation measures where the same levels of embedded mitigation provided by the layout and orientation is not available.
- 3.7.3.9. The preliminary assessment of the construction traffic impacts associated with construction of the Converter Station shows that B3072 Horton Road and B3072 West Moors Lane provide suitable routes for construction traffic. Holt Road could also be used as an access route, though would require implementation of traffic management to control two-way traffic flow during the construction period, similar to that proposed in the Framework Construction Traffic Management Plan (AS-074) for Day Lane in Lovedean.
- 3.7.3.10. Overall, there is potential for significant landscape and visual effects for private residents, particularly those close to Gundry's Farm Estate during construction and operation. It is also anticipated that there may be more ecological mitigation required given the larger footprint of the Converter Station and subsequent longer construction effects at ecological receptors (i.e. within Dorset Heaths SAC and Dorset Heathlands Ramsar site). For the historic environment, implementation of the measures set out in the WSI would reduce impact significance at potential features located within the Gundry's Farm site, to what would be expected to be an acceptable level. In relation to site drainage, a suitable drainage solution may not be able to be achieved in this location, and this could potentially also result in additional site clearance encroaching on the woodland boundary of the site to the west and towards the B3072. Lastly, there is a potential need for further noise attenuation measures (i.e. at the Converter Station or nearby) where the same levels of embedded mitigation provided by the layout and orientation is not available due to spatial constraints.

3.8. LANDFALLS

3.8.1. LANDFALL FEASIBILITY ANALYSIS

3.8.1.1. As is detailed at paragraph 2.4.3 of Chapter 2 of the 2019 ES (APP-117), in April 2015, a preliminary desk study was undertaken by the Applicant to identify the potential landfall locations in connection with the three substations NGET had taken forward for further consideration at Bramley, Chickerell and Lovedean. 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.

3.8.1.2. Having covered such a wide area of the south coast, this search also identified the landfall locations of relevance to a potential connection to Mannington Substation, being landfalls 11 – 18 identified on plate 2.3 of Chapter 2 of the 2019 ES, and which is replicated below for each of reference.

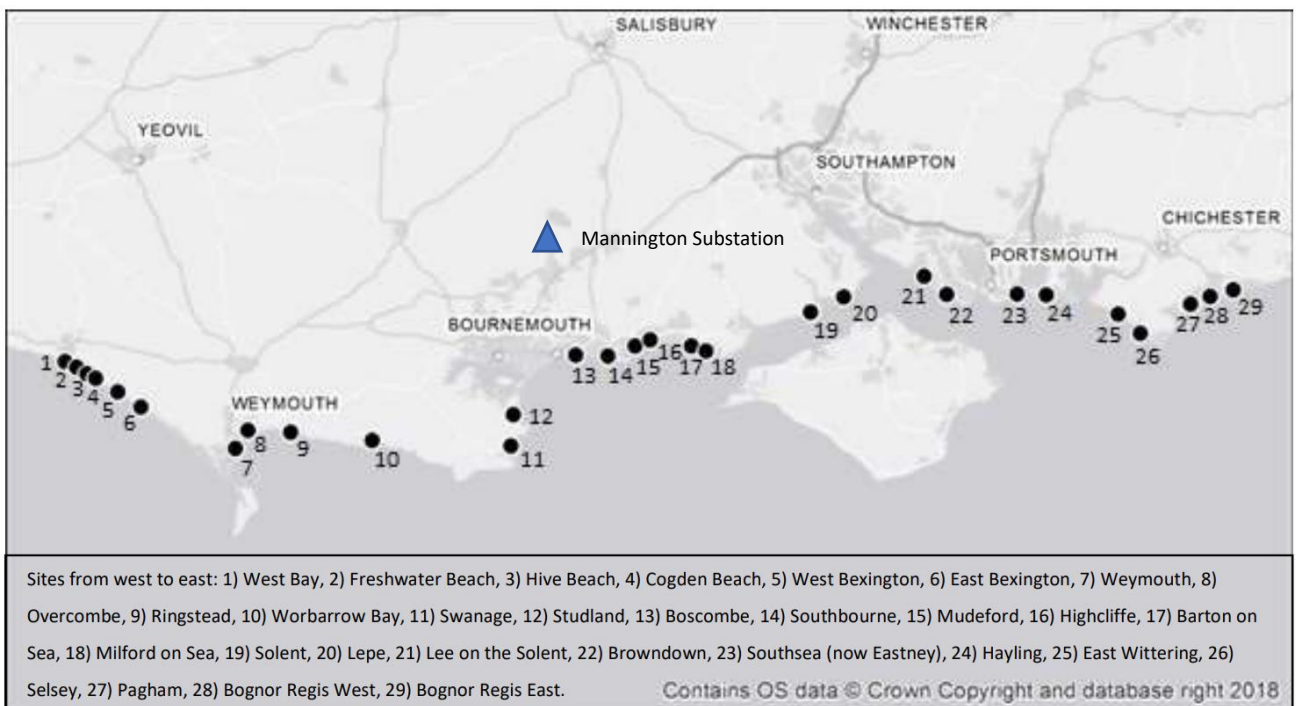


Plate 3.7 – A map of the potential landfall locations, evaluated in the 2015 desk study.

3.8.1.3. The landfalls 11 to 18 were selected on the basis of relative proximity to the Mannington substation (Plate 3.7). Landfalls 1 to 10 are located too far from Mannington, resulting in significantly longer marine and land cable routes. Landfalls 19 and 20 are located further from the Mannington substation than landfalls 11 – 18 and also are obviously not plausible landfall locations as confirmed by a high level risk assessment included in Appendix 3.3 (document reference 7.8.3.3). No other landfalls are relevant for the Mannington substation due to their distance from the substation.

- 3.8.1.4. To provide the further information requested by the SoS in respect of the feasibility of a connection to Mannington substation, the Applicant has considered each of landfalls 11 – 18 in further detail, which has included a review of the land and marine constraints relative to each. A site visit of the potential landfall locations was also undertaken on the 15th of March 2023 to further inform the understanding of their feasibility to accommodate the necessary hydraulic directional drill (HDD) required to facilitate the marine cables coming onshore and to be jointed to the onshore cables.
- 3.8.1.5. Included at Appendix 3.3 (document reference 7.8.3.3) is a high-level risk analysis provided by Natural Power of each of the Landfalls. This considers the constraints in the marine environment relative to each of the Landfalls and provides an assessment of the risks from a consenting and environmental impact perspective. The maps presented in Appendix B of the risk analysis report illustrate the various constraints.
- 3.8.1.6. Included at Appendix 3.4 (document reference 7.8.3.4) is a Technical Note produced by Stockton Drilling Limited relating to the feasibility of the HDD from each of the Landfalls.
- 3.8.1.7. Each Technical Note and the high-level risk analysis for each of the Landfalls are summarised below.

11- SWANAGE

HDD Feasibility

- 3.8.1.8. This site is located on the eastern edge of and within the Jurassic Coast World Heritage Site. Access to the land at Swanage is poor, particularly when considering articulated vehicle access will be required. The land up to any potential HDD site set-up is too steep to get the equipment to it, and pipe stringing and welding will also not be possible in the very limited space that will be left behind the HDD rig. These factors make this location unfeasible as a potential landfall site.

Marine Constraints

- 3.8.1.9. As shown in the maps presented in Appendix B of the risk analysis report, Swanage was identified to have significant and insurmountable constraints in relation to designated sites and protected habitats, both at the landfall itself and offshore (i.e. the offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, Studland to Portland SAC and Purbeck Coast MCZ designated for reef habitats, seagrass and maerl beds, and the coast has the South Dorset Coast SSSI designated for important geological interests), which would impact any approach to this landfall option. Seabed suitability is variable with some areas of rock that would impact installation options. There are also a number of other activities such as aggregate and disposal areas that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties. Given the extent of the constraints identified and the likelihood of unavoidable and unacceptable impacts on the numerous designated sites, Swanage has been identified to not be a feasible landfall location.

12 - STUDLAND

HDD Feasibility

- 3.8.1.10. This site is located on the eastern edge of and within the Jurassic Coast World Heritage Site. Access to the proposed site was not possible from the highway, therefore possible access with the HDD drilling kit in articulated vehicles is extremely unlikely, making this location unfeasible as a landfall location.

Marine Constraints

- 3.8.1.11. As shown in the maps presented in Appendix B of the risk analysis report, Studland, in close proximity to Swanage, was also identified to have significant and insurmountable constraints in relation to designated sites and protected habitats, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, Studland to Portland SAC, Studland Bay MCZ and Purbeck Coast MCZ designated for reef habitats, seagrass, seahorses and maerl beds and Studland Cliffs SSSI, Dorset Heaths and Studland Dunes SAC, Isle of Portland to Studland Cliffs SACs designated for sea cliffs, dune habitats and important geological interests), which would impact any approach to this landfall option. Poole Bay is also a Shellfish Water Protected Area under the Water Framework Directive. Seabed suitability is variable with some areas of rock that would impact installation options. There are also a number of other activities such as extant oil drilling activities, aggregate dredging, maintenance dredging and disposal areas and as well as seabed obstructions (including wrecks) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties. Given the extent of the constraints identified and the likelihood of unavoidable and unacceptable impacts on the numerous designated sites, Studland has been identified to not be a feasible landfall location.

13- BOSCOMBE

HDD Feasibility

Boscombe Pier

- 3.8.1.12. The area is clearly tidal given the amount of sand deposited on the road, therefore siting an HDD rig and ancillary equipment (2500m² area) would not be possible in this location because the area of the HDD compound would be likely to flood. The area above the cliff face is built up and has no possible location for set-up at all making this location unfeasible as a landfall site.

Boscombe car park (top of beach cliff)

- 3.8.1.13. Given the height of the cliff face and the fact that around 10m cover will be required at the cliff bottom (to avoid the risk of fluid break-out into the sea) there is not enough room on the car park to position the HDD rig back far enough to get the required depth, and pipe stringing which involves the laying out and welding of the duct pipe for insertion into the HDD hole would also be an issue in terms of space in this location. The above findings make this location unfeasible as a landfall site.

Marine Constraints

- 3.8.1.14. As shown in the maps presented in Appendix B of the risk analysis report, Boscombe was identified to be subject to a high level of constraint as a consequence of designated sites and protected habitats, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and two MCZs designated for sediment and rock habitats, as well as fish species and Poole Bay Cliffs SSSI designated for important geological interests) which would impact any approach to this landfall option. The risk score in this regard was lower than for Swanage and Studland, but still presented a very high consenting risk, which would be unacceptable for any project to proceed if an alternative without such risks was identified. Poole Bay is also a Shellfish Water Protected Area under the Water Framework Directive. Seabed suitability is variable with some areas of rock that would impact installation options. There are also a number of other activities such as extant oil drilling activities, coastal beach management and defence schemes, aggregate dredging

and disposal areas as well as seabed obstructions (e.g. potential wrecks) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

14 - SOUTHBOURNE

HDD Feasibility

- 3.8.1.15. Given the room potentially available on the car park area, the flatness of the land and the distance back from cliff face, this location in Southbourne is potentially feasible for HDD subject to further desktop and intrusive investigation.

Marine Constraints

- 3.8.1.16. As shown in the maps presented in Appendix B of the risk analysis report, Southbourne was also identified to be subject to a high level of constraint in relation to designated sites, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and two MCZs designated for sediments, and rock habitats, as well as fish species, and Poole Bay Cliffs SSSI in the vicinity designated for important geological interests), which would impact any approach to this landfall option. The risk score identified in this regard was the same as for Boscombe, representing a very high consenting risk. Seabed suitability is variable with some areas of rock that would impact installation options. Poole Bay is also a Shellfish Water Protected Area under the Water Framework Directive. There are also a number of other activities such as extant oil drilling activities, coastal beach management and defence schemes, aggregate dredging and disposal areas as well as seabed obstructions (e.g. potential wrecks and vessel activities) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

15 - MUDEFORD

HDD Feasibility

- 3.8.1.17. This site has a number of issues when considering the landfalls that would be required, including the depth required for the HDD (to avoid fluid break-out into the sea) and the lack of distance available to the sea wall from any likely HDD set-up at this location. The grassland area to the north presents a possible location but trees may need to be removed for access. It would also not be possible to string out and weld the duct pipe out for installation into the HDD hole, making this location unfeasible as a landfall site.
- 3.8.1.18. In addition to the initial landfall location identified, Avon Run Road was also considered for its suitability. The car park was identified to be a possible location for the HDD drill set-up in terms of distance from the sea, which would help to get the required depth under the sea (and avoid fluid break-out), however even though the car-park is a reasonable size the shape of the car park is such that there is not enough space to string out and weld the length of duct pipe onshore behind the rig setup which would be required for installation into the HDD hole. As a consequence, the stringing of the pipe effectively has to be done at sea with the pipe floated out, and whilst this is in theory able to be done, it is extremely difficult from an engineering perspective and adds significant risk and cost. It is therefore to be avoided unless there is no other alternative.
- 3.8.1.19. Moreover and of further risk, it would be necessary to forward ream the HDD holes in this location because of the set-up required at sea, which in a geology of sands and clays carries significant risk of the HDD holes collapsing and the installation ultimately proving

unsuccessful. Taking these constraints and significant risks into account, it has been determined that this location is not feasible as a landfall site.

Marine Constraints

- 3.8.1.20. As shown in the maps presented in Appendix B of the risk analysis report, Mudeford was also identified to be subject to a high level of constraint in relation to designated sites, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and is adjacent to Christchurch Harbour SSSI designated for important saltmarsh habitats and birds), which would impact any approach to this landfall option. Seabed suitability is variable with some areas of rock that would impact installation options. The risk score identified in this regard was the same as for Boscombe and Southbourne, representing a very high consenting risk. There are also a number of other activities such as coastal beach management and defence schemes, aggregate dredging and disposal areas as well as seabed obstructions (e.g. potential wrecks and vessel activities) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

16 - HIGHCLIFFE

HDD Feasibility

- 3.8.1.21. Given the height of the sea cliff and the space available there would not be enough space to set-up the HDD rig far enough back horizontally to achieve the vertical requirements of the drive (need to be 10m cover at the cliff face to avoid fluid break-out), there is also not enough space to string out and weld the duct pipe in this location given the depth requirements detailed above. Also, on the depth required to get far enough under the cliff bottom there could potentially be thermal issues with the electric cables for installation. The issues summarised above make this location unfeasible as a landfall site.

Marine Constraints

- 3.8.1.22. As shown in the maps presented in Appendix B of the risk analysis report, Highcliffe was identified to be subject to a high level of constraint in relation to designated sites, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and Highcliffe to Milford Cliffs SSSI designated for important geological and fossil interests as well as plant habitats), which would impact any approach to this landfall option. As with other sites, a very high consenting risk was identified as a result, Seabed suitability is variable with some areas of rock and areas of high energy sedimentary habitats that could impact installation options. There are also a number of other activities offshore such as aggregate dredging and disposal areas as well as seabed obstructions (e.g. potential wrecks and vessel activities) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

17 - BARTON ON SEA

HDD Feasibility

- 3.8.1.23. Given the height of the sea cliff and the space available there would not be enough available space to set-up the HDD rig far enough back horizontally to achieve the vertical requirements of the drive (need to be 10m cover at the cliff face to avoid fluid break-out), there is also not enough space to string out and weld the duct pipe in this location given the depth requirements detailed above, making this location unfeasible as a landfall site.

Marine Constraints

- 3.8.1.24. As shown in the maps presented in Appendix B of the risk analysis report, Barton on Sea was identified to also be subject to a high level of constraint in relation to designated sites, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and the Highcliffe to Milford Cliffs SSSI designated for important geological and fossil interests as well as plant habitats), which would impact any approach to this landfall option and present a very high consenting risk. Seabed suitability is variable with some areas of rock and areas of high energy sedimentary habitats that could impact installation options. There are also a number of other activities offshore such as aggregate dredging and disposal areas as well as seabed obstructions (e.g. potential wrecks and vessel activities) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

18 - MILFORD ON SEA

HDD Feasibility

Milford on Sea (south of Cliff Road and Whitby Road junction)

- 3.8.1.25. Given the height of the sea cliff and the space available there would not be enough available space to set-up the HDD rig far enough back horizontally to achieve the vertical requirements of the drive (need to be 10m cover at the cliff face to avoid fluid break-out). There is also not enough space to string out and weld the duct pipe in this location given the depth requirements detailed above. These factors make this location unfeasible as a landfall site.

Farmer's Field (Navitus Bay Landfall)

- 3.8.1.26. This location south of B3058 (Milford Road – Cliff Road) and south west of Downton Lane and Cliff Road junction to the west from Milford on Sea has enough space available to drill the landfalls and string out and weld the duct pipe for insertion into the HDD hole, however access to the site would have to be through the farm entrance and hard standing will need to be constructed across the site and retained for the life of the project to provide future access. This location is potentially feasible for the HDD landfalls subject to further desktop and intrusive investigation.

Marine Constraints

- 3.8.1.27. As shown in the maps presented in Appendix B of the risk analysis report, Milford on Sea was also identified to be subject to a high level of constraint in relation to designated sites, both at the landfall itself and offshore (i.e. offshore coastline is protected by Solent and Dorset Coast SPA designated for birds, and Highcliffe to Milford Cliffs SSSI designated for important geological and fossil interests as well as plant habitats and is adjacent to the Solent Maritime SAC designated for lagoons and marine habitats which is also a SSSI, Ramsar and Shellfish Water Protected Area), which would impact any approach to this landfall option. Seabed suitability is again variable with some areas of rock and areas of high energy sedimentary habitats that could impact installation options. There are also a number of other activities offshore such as the Needles navigation channel, aggregate dredging and disposal areas as well as seabed obstructions (e.g. potential wrecks and vessel activities) that would need to be managed or routed around to avoid interaction or the need for additional agreements with third parties.

3.8.2. SUMMARY OF LANDFALL FEASIBILITY ANALYSIS

- 3.8.2.1. From a technical feasibility perspective only two of the landfall locations that were considered along this stretch of the south-coast were identified to be feasible. These were Southbourne and the Farmer's Field west of Milford on Sea which were identified to be potentially feasible for HDD subject to further desktop and intrusive investigation. It is also known that the Farmer's Field west of Milford on Sea was proposed to be used as the landfall location for the Navitus bay project, which provides additional confidence in its suitability.
- 3.8.2.2. Taking this into account, and that constructing the landfall in this location would generally be expected to cause less impacts as located in a more rural location, the Farmer's Field west of Milford on Sea has been taken forward as the potential landfall location for the purposes of assessing the feasibility of a connection at Mannington Substation.
- 3.8.2.3. From a marine constraints perspective, the risk scores associated with landfalls 11-15 (which includes Southbourne) presented either an unacceptable risk that mitigation is unlikely to be viable, or of very high risk such that the locations would be unacceptable for any project to proceed where an alternative without such risks is able to be identified.
- 3.8.2.4. Landfalls 16 and 17, Highcliffe and Barton on Sea respectively, were considered to present very high risks in respect of impacts on designated sites due to the Special Protection Area located at the landfall which is designated for breeding tern colonies, and also the Site of Special Scientific Interest (SSSI) which spans the Christchurch Bay coastline in order to protect sensitive geological and fossil interests as well as plant habitats. Furthermore, from a technical perspective, these landfalls were also not considered to be feasible for HDD landfall methods.
- 3.8.2.5. Two locations were visited in the area of Landfall 18 near Milford on Sea. Of the two locations, only the Farmer's Field location west of Milford on Sea may provide potential feasibility for HDD from a technical perspective on the landward side. However, the seabed conditions off the coast indicate that the marine approach to the landfall is characterised by rock which could significantly constrain any cable burial activities offshore following the HDD. This location would also require building the landfall infrastructure, including the Transition Joint Bay, the ORS and a permanent access road, in agricultural land.
- 3.8.2.6. Overall, it is considered that the considerable challenges associated with these landfall locations identified within Poole and Christchurch Bay, from a marine consenting and environmental perspective, would present considerable risk to a project achieving a consent award, and alternative, lower risk, options would be recommended to be sought.

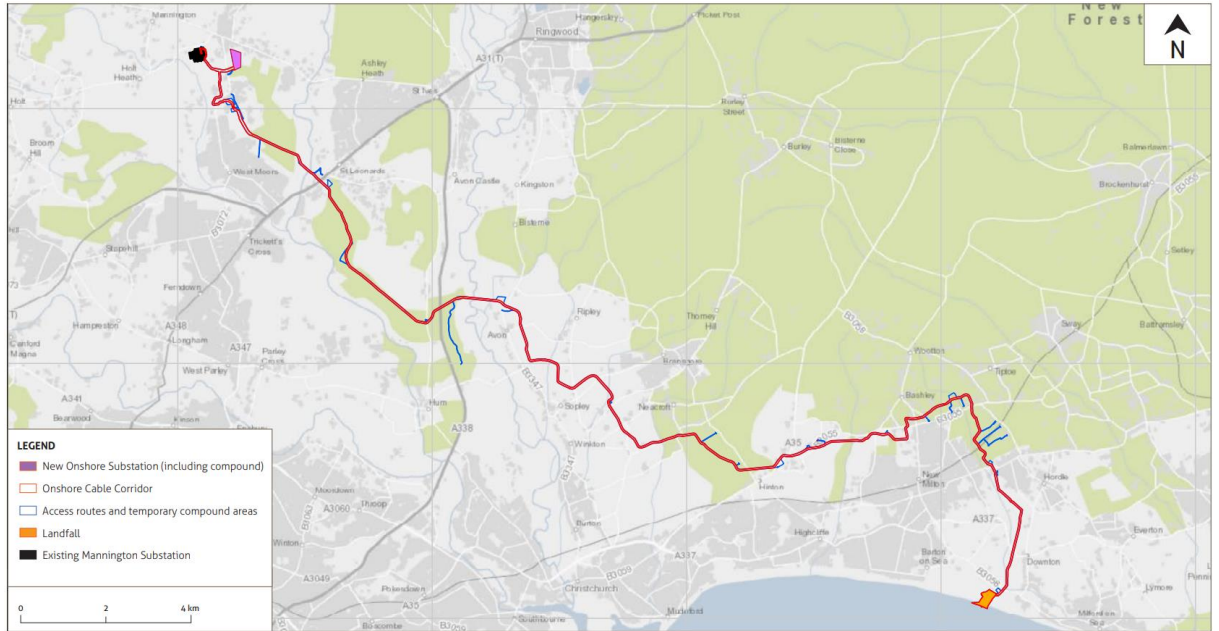
3.9. ONSHORE CABLE ROUTE

- 3.9.1.1. There would be two in principal options for an onshore cable route from the landfall site to Mannington substation:
- the Navitus Bay Wind Farm DCO Application Route, where large sections of the cable route would go through countryside; or
 - a 'by-road' route, which would primarily follow a highways-focused route, similar to the principles applied to the Onshore Cable Route forming part of the Proposed Development.
- 3.9.1.2. Each of those is considered in turn below.

3.9.2. NAVITUS BAY DCO APPLICATION ROUTE

Preliminary Environmental Review

3.9.2.1. This cable route would cross major junctions on main roads A35, A338 and A31; as well as some minor roads, though is primarily through agricultural land and fields.



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Plate 3.8 – Map of Onshore Development Area for Navitus Bay DCO Application Route (Navitus Bay Wind Park – Environmental Statement Non-technical Summary document 6.3 April 2014)

3.9.2.2. Table 3.4 outlines key environmental constraints and sensitivities along the Navitus Bay DCO Application Route, from Mannington substation to Navitus Bay landfall site, where there are key environmental constraints and sensitivities. These are illustrated in Appendix 3.5 (document reference 7.8.3.5).

Table 3.4 - Summary of constraints or sensitivities in relation to the Navitus Bay DCO Application route

Approximate location along the route	Summary of constraints or sensitivities
West Moors	The route passes through the Dorset Heathlands SPA and Ramsar, Dorset Heaths (SAC) and Holt and West Moors Heaths (SSSI), the designations of which all relate to the same area of land. These are classified for rare and vulnerable birds (as listed on Annex I of the Directive), and for regularly occurring migratory species. In terms of the wetland habitat, it is understood that they support a large assemblage of nationally rare and scarce wetland plant species and invertebrates.

Approximate location along the route	Summary of constraints or sensitivities
	<p>The route then crosses the Moors River system designated as a SSSI. The Moors River is a small lowland river which supports an exceptional diversity of aquatic and wetland plants. The vegetation varies, characteristic of mixed geology, low gradient rivers in the middle reaches to a type more typical of chalk streams towards the confluence with the River Stour.</p> <p>It should be noted that Lions Hill SSSI is also designated within a parcel of Dorset Heaths SAC land, to the south of Horton Road, and east of the Moors River.</p> <p>It was noted in relation to Terrestrial and Freshwater Ecology that the design of the cable corridor aims to minimise, where possible, impacts on heathland habitats. In addition, impacts on ancient woodland were able to be avoided through the use of trenchless crossing techniques (HDD). The use of trenchless techniques was required to avoid or minimise impacts on ancient woodland, heathland habitat on the West Moors MOD site (Dorset Heaths SAC) and the River Avon, in order to reduce or remove surface disturbance during cable installation.</p> <p>In addition, the potential heathland habitat loss and restoration for Dorset Heaths SAC at West Moors MoD would require mitigation in the form of scrub clearance within the West Moors MoD site in areas where no surface construction works are proposed.</p>
Avon	<p>As the cable route passes through land to the south of St Leonards and through Avon, a number of environmental designations are either passed through or within close proximity to the route.</p> <p>This includes designations such as:</p> <ul style="list-style-type: none"> • Dorset Heaths (Dorset Heathlands) Ramsar/SAC/SPA • River Avon SAC • Avon Valley Ramsar/SPA (and Avon Valley (Bickton to Christchurch) SSSI) • River Avon System SSSI • Hurn Common SSSI • Moors River System SSSI • St Leonards and St Ives Heaths SSSI <p>These designations have a variety of qualifying features associated with the diverse assemblage of wetland flora and fauna.</p> <p>It is an area containing an extensive complex of woodland, dry and wet heath and valley mires, associated seepages and peatlands situated on acidic and nutrient-poor soils. Pools in the heath-mire matrix support a species-rich assemblage of plants. Several species of plants, invertebrates and birds occurring at the site are rare, vulnerable, endangered or nationally scarce. The</p>

<p>Approximate location along the route</p>	<p>Summary of constraints or sensitivities</p>
	<p>site is important for breeding, feeding and roosting birds characteristic of the heathland environment and wintering raptors. Human activities include tourism, recreation, and increased development around the periphery.</p> <p>St Leonards and St Ives Heaths SSSI supports nationally scarce plants; the assemblage of breeding birds of lowland heath habitat and significant breeding populations of the rare Dartford warbler, nightjar and woodlark. It forms part of the Dorset heathlands, supporting significant wintering populations of hen harrier and merlin; important populations of smooth snake and sand lizard and nationally rare and scarce invertebrates.</p> <p>It is also noted that the River Avon is one of the most diverse chalk streams in the UK, with a wide range of variety of plants, fish faunas, and aquatic invertebrates. This SAC is designated for the Annex I habitat Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation and a number of protected species including Atlantic salmon, Brook lamprey, Sea lamprey and Bullhead.</p> <p>The Onshore Cable Corridor would cross two rivers, the River Avon (SAC) and Moors River (SSSI), as well as several smaller water courses and brooks, and a number of tributaries of Moors River, River Mude and Mannington Brook.</p> <p>The Navitus Bay ES identified potential for significant effects for wintering birds in the Avon Valley SPA attributed to displacement from foraging and roosting areas. The mitigation applied in order to achieve no significant effects, consisted of seasonal working restrictions between November and February inclusive with 250m of the River Avon. Within September, October and March, when over-wintering birds may be present, further measures to minimise potential sources of disturbance from construction activities within 250m of the Avon Valley SPA would be needed.</p> <p>With respect to Nightjar, Woodlark and Dartford Warbler, temporary loss of breeding and/or foraging areas and nesting areas was also identified, arriving at significant effects pre-mitigation. In order to achieve no significant effects, areas of conifer plantation would need to be felled and managed to establish heathland/grassland habitats prior to construction. Reinstatement would then be required, as well as pre-commencement surveys to establish nest site locations in order to establish exclusion zones to avoid any activities taking place that may result in nest abandonment.</p> <p>With respect to the SSSIs, and in particular those that are related to the river systems, there would be potential effects to these protected areas, including direct and indirect impacts from disturbance and displacement to species and habitats. Where there are significant river crossings, trenchless crossing methods (i.e. Horizontal Directional Drilling) were proposed. It was noted in the Onshore Ornithology ES Chapter that activity at the drilling compounds could result in the aural and visual disturbance of birds wintering within the Avon Valley SPA (notably Bewick's swan and gadwall).</p>

Approximate location along the route	Summary of constraints or sensitivities
	<p>The potential impacts with respect to the displacement of birds would also need to be mitigated through scrub clearance within the Dorset Heathlands SPA and within the St Leonards and St Ives Heathland SSSI in order to provide foraging and nesting habitat for displaced birds.</p> <p>In terms of heritage assets, the majority of the designated sites identified within the study were Listed Buildings. These are primarily clustered around the settlements of Hordle, Bashley, Hinton, North Bockhampton and Avon, and are predominantly Grade II listed cottages and farmhouses. As described in the Navitus Bay ES, none of the Listed Buildings that were assessed were located directly along the course of the proposed Onshore Cable Corridor. 'The Plough Inn', a grade II listed pub, fronts onto the B3055 to the south-east of Bashley (approximately 15m to the west of the Onshore Cable Corridor).</p>
Beckley and New Milton	<p>The section of the route comes into close proximity of Burton Common SSSI. The area supports populations of dwarf gorse, sand lizards and smooth snakes. Sand lizards and smooth snakes are essentially associated with the mature, dry heath, and is one of only three known sites for the former in the New Forest area.</p> <p>This section of the route runs along the boundary of the New Forest National Park along Bashley Cross Road. This would require water crossings at Walkford Brook and Danes Stream, both of which are also adjacent to areas of Ancient Woodland – Beckley Moor Copse and Ossemsley Copse, respectively. This route would also come into close proximity with Great Woar Copse.</p> <p>The Terrestrial and Freshwater Ecology ES Chapter for Navitus Bay identified potential impacts to sand lizards in terms of risk of death or injury of individuals and habitat loss. The required mitigation involved the creation of receptor sites for sand lizard within the Forestry Commission's estate in close proximity to the onshore development area.</p> <p>The Terrestrial and Freshwater Ecology ES Chapter for Navitus Bay also identified potential impacts with respect to woodland loss, long term damage to woodland structure, drainage and associated flora and fauna. This was attributable to construction impacts. The proposed mitigation involved broad-leaved woodland restoration, with a focus on increasing heterogeneity and the use of native trees within the planting schemes.</p> <p>Impacts on ancient woodland were able to be avoided through the use of HDD. The use of trenchless techniques was required to avoid or minimise impacts on ancient woodland, heathland habitat on the West Moors MOD site (Dorset Heaths SAC) and the River Avon, in order to reduce or remove surface disturbance during cable installation.</p>

Approximate location along the route	Summary of constraints or sensitivities
<p>Navitus landfall site</p>	<p>There is a further water crossing at Danes Stream, before reaching the coast near Hordle Manor Farm. Here, the landfall would be within close proximity to Highcliffe to Milford Cliffs SSSI.</p> <p>It is designated for its geological interest and provision of access to the standard succession of the fossil rich Barton Beds and Headon Beds, considered important both in a national and international context. The SSSI area stretches along the south coast of England from Christchurch in Dorset to Milford on Sea in Hampshire. It includes several Geological Conservation Review sites.</p> <p>The landfall site is in close proximity to Solent Waders and Brent Geese Strategy Sites NF135D, NF135E and NF135F located to the immediate east of the landfall option.</p> <p>The Ground Conditions and Contaminated Land ES Chapter for Navitus Bay identified potential impacts in relation to HDD activities potentially triggering ground instability and potential adverse effects of the Highcliffe to Milford Cliffs geological SSSI. The mitigation proposed was the use of trenchless techniques and appropriate drill alignment, maintaining a drill depth 10m below the future eroded cliff line. The proposed design measures and location would mitigate the principal effects and would be in accordance with the code of construction practice, similar to the approach the Applicant has taken at Eastney Landfall.</p>

3.9.3. IMPACTS ON PUBLIC HIGHWAY NETWORK

Traffic Management Requirements

- 3.9.3.1. The Navitus Bay DCO Application Route is primarily routed through agricultural land / fields, and thus has a less extensive level of traffic management required, as is detailed below. Traffic management requirements for the Navitus Bay Route were found to include:
- 32 perpendicular road crossings of single carriageway roads, equating to one day road closures each per circuit;
 - 680m of closures whilst the route travels on carriageway on the B3055 Bashley Cross Road, taking approximately 7 weeks per circuit; and
 - Overlap with existing off-road walking and/or cycling routes/Public Rights of Way, however as the majority of these would be involve very minor and short-term diversions only their impacts have been considered negligible.

Route Sensitivity

- 3.9.3.2. As this route is primarily located through agricultural land, its interaction with sensitive receptors in relation to traffic and transport is limited. It is not anticipated that in respect to this cable route, traffic management would be required in the immediate vicinity of any high sensitivity receptors. The only exception is the passing of St. Leonards Hospital adjacent to A31 Ringwood Road. However, due to the nature of the A31 Ringwood Road in this location it is assumed Horizontal Directional Drilling (HDD's) will be used for the route to pass under this road, without the requirement for any traffic management. As such, there will be no traffic or transport impact upon the receptor.

3.9.4. REVIEW OF NAVITUS BAY DCO APPLICATION ROUTE

- 3.9.4.1. As identified in the Navitus Bay ES, there are a number of internationally and nationally designated sites in close proximity to this cable route. It is likely that a similar level of mitigation as detailed in the Navitus Bay ES would be required for the Proposed Development in this setting, including the need for 15 trenchless techniques (HDD) at various sensitive locations at New Forest National Park and River Avon SPA/SAC. in relation to main watercourse crossings, areas of woodland and maintaining substation visual screening.
- 3.9.4.2. This option would also require works directly within ecologically sensitive and protected areas (and designated sites). For example, the potential impacts with respect to habitat loss supporting designated bird features of the Dorset Heathlands SPA would require compensation. This also applies to the nationally designated sites of the St Leonards and St Ives Heathland SSSI in order to provide foraging and nesting habitat for displaced birds.
- 3.9.4.3. For the Proposed Development at Lovedean, the majority of habitats affected by the cable installation works are urban habitats while potential bird features from Chichester and Langstone Harbours SPA can be avoided through construction timing. As a high-level assessment, it is considered that this option is more constrained in ecological terms than the Proposed Development connecting at Lovedean
- 3.9.4.4. There would be potential for heathland habitat loss. The Navitus Bay proposals mitigated this through the encouragement of a heathland/acid grassland mosaic over the onshore cable easement. Potentially one of the more onerous mitigation measures required was the delivery of 28.5ha of additional heathland habitat, suitable for heathland birds. It is assumed that the Proposed Development would be required to satisfy a similar requirement in terms of mitigating heathland habitat loss.
- 3.9.4.5. As this route takes place primarily off carriageway, it is not anticipated that there will be any significant traffic and transport related impacts associated with traffic delay. Given the short construction period of each, road crossings could also be programmed to occur on weekends and / or school holiday periods to mitigate potential impacts associated with construction works occurring during weekday peak periods. All traffic and transport related impacts are likely to be negligible and short term.

Information on Additional Costs and time to construct

- 3.9.4.6. This route is approximately 15km longer than the Lovedean route (35km by comparison to 20km), and without including the trenchless crossings that would be required it is estimated based on the known per km cost for the Onshore Cable Route forming part of the Proposed Development (excluding HDD costs) that the additional cost associated with this additional length of cables and their construction is £78 million.

- 3.9.4.7. 14 trenchless techniques (e.g. HDD) crossings, excluding the landfall HDD and the HDD to install HVAC cables between the Converter Station and Mannington substation, have been identified to be required in connection with this onshore cable route, which is based on the crossings required for the proposed Navitus Bay cables. Stockton Drilling have considered the characteristics of those crossings and have identified an estimated cost for those of £24.81 million. This compares to the costs associated with the 5 trenchless crossing required in connection with the Lovedean route, and which are costed at £12.37 million in total, so an additional £12.445 million.
- 3.9.4.8. Taking the above into account, the total additional cost for the construction of this onshore cable route, comparing to the Proposed Development, is estimated to be £91 million. This is circa 75% of the costs associated with the onshore cable for a connection to Lovedean, representing a close to doubling of the cost.
- 3.9.4.9. In addition, whilst the Applicant does not have sufficient information available to undertake a detailed assessment of the cost estimate for the Navitus Bay DCO Application, the Navitus Bay scheme and an alternative scheme for the Proposed Development connecting at Mannington are similar in terms of the onshore cable and electrical building elements, and it is considered reasonable to undertake a direct comparison to understand an approximate difference in the cost compared to the Proposed Development connecting at Lovedean.
- 3.9.4.10. Paragraph 2.1.10 of the Navitus Bay DCO Application Funding Statement states “*NBDL has been advised that the total property cost estimates for the acquisition of the required interests in land should not exceed £15 million*”.
- 3.9.4.11. The Applicant’s professional advisor on land and property matters has advised agricultural land prices have increased by approximately 10% on average since the Navitus Bay Funding Statement was submitted in January 2015 and that it would be reasonable to assume the land acquisition costs for an alternative cable route to Mannington and the associated land for the Converter Station would cost between £12m and £15m, with a midpoint of £13.5m to be used for comparison purposes.
- 3.9.4.12. The table presented at paragraph 5.5 of the Applicant’s Funding Statement – Rev-002 (REP6-021) identifies that the Applicant’s land acquisition costs for the Project were estimated to be £4.97m.
- 3.9.4.13. As such, it is estimated the land acquisition costs for the Mannington option would be approximately £8.5m more than for the Lovedean option.
- 3.9.4.14. It is also estimated that it would take approximately 4-5 years to construct this onshore cable route. By comparison, the period of time to construct the onshore cable route to the Lovedean substation is 3 years. This would add two years onto the timescale for the construction of the onshore cables for a connection to Mannington substation.

Table 3.5 Comparative costs of Lovedean and Mannington onshore cable routes

Features	Lovedean Eastney	- Manning. - West of Milford on Sea	Additional Costs (£m)	Additional Costs (%)
Cable route length (km)	20.3	35		
Number of HDDs (exc. landfalls)	5	14		
Indicative Costs of construction net of HDDs (£m)	108.56	187.18	78.62	72%
Indicative Cost of HDDs (£m)	12.37	24.815	12.445	101%
Total indicative cost	120.93	211.995	91.065	75%

3.9.5. BY- ROAD ROUTE

Preliminary environmental review

3.9.5.1. Installation of the Onshore Cable Route within the public highway follows strategic project decisions outlined within Chapter 2 of the Environmental Statement (APP-117). The main considerations for this strategic decision were as follows (as detailed in table 2.1 of the Chapter 2 of the Environmental Statement):

- Highway installation reduces impacts on ecology, archaeology and associated designations;
- Highway installation has a reduced impact on agricultural/open land associated with the weight of the large cable drums, agricultural disruption of laying cables and the potential sterilisation of land above the cables (for maintenance purposes), but will result in temporary traffic disruption during installation (and to a lesser level during maintenance);
- Highway installation avoids risk of accidental damage from farming operations;
- Reduced impact on future development sites (greenfield) in an area with significant housing need through installation within the existing highway network;
- Avoidance of the need to develop greenfield land; and
- Ability to use verges alongside major roads, where possible, to reduce potential for lane closures and limit highway impacts associated with construction.

3.9.5.2. Table 3.5 outlines key environmental constraints and sensitivities along the by-road route and shown in Appendix 3.5 (document reference 7.8.3.5) from Mannington substation to Navitus Bay landfall site, where there are key environmental constraints and sensitivities.

Table 3.6 – Summary of constraints or sensitivities in relation to the By-road route

<p>Approximate location along the route</p>	<p>Summary of constraints or sensitivities</p>
<p>Three Legged Cross and Woolsbridge</p>	<p>The route is located close to the Dorset Heathlands SPA and Ramsar, Dorset Heaths (SAC) and Holt and West Moors Heaths (SSSI), the designations of which all relate to the same area of land.</p> <p>The route then crosses the Moor River system designated as a SSSI, similar to the Navitus Bay DCO Application Route.</p> <p>The impacts to the designated sites are likely to be less than those identified in Table 3.4 with respect to the northern section of the cable corridor, as this route avoids going through the designations in relation to the West Moors Heaths. There remains potential for indirect effects due to proximity of the designated sites to the Three Legged Cross to Woolsbridge route that runs along the main carriageway, until arriving at the watercourse.</p>
<p>St Ives and Ringwood</p>	<p>Moving through into St Ives and Ringwood, there is dense woodland at Ringwood Forest, located to the immediate north of Horton Road.</p> <p>The route then moves from Horton Road, onto the A31 and onto Castleman Trailway to the south of Ringwood village. This route would involve crossing the River Avon near Ringwood Road (A31), a crossing at a major road junction at the A31/B3801 junction and Bickerley Common, within close proximity to the following environmental designations to the south of Ringwood:</p> <ul style="list-style-type: none"> • Dorset Heaths (Dorset Heathlands) Ramsar/SAC/SPA • Avon Valley and Avon Valley (Bickton to Christchurch) Ramsar Sites (Description is given below) • Avon Valley Ramsar/SAC/SPA • River Avon SAC • New Forest SAC • St Leonards and St Ives Heaths SSSI • Avon Valley (Bickton to Christchurch) SSSI/ River Avon System SSSI <p>There would be potential for heathland habitat loss. The Navitus Bay proposals mitigated this through the encouragement of a heathland/acid grassland mosaic over the onshore cable easement, rather than re-establishment of any conifer plantation. Potentially one of the more onerous mitigation measures required was the delivery of 28.5ha of additional heathland habitat, suitable for heathland birds, outside of the onshore development area. It is assumed that the Proposed Development would be required to satisfy a similar requirement in terms of mitigating heathland habitat loss, though if following predominantly highway land, this would likely be reduced.</p>

Approximate location along the route	Summary of constraints or sensitivities
	<p>In addition to this, and in order to address the potential displacement of birds, scrub clearance would be required within the Dorset Heathlands SPA and within St Leonards and St Ives SSSI to provide foraging and nesting habitat for displaced birds.</p> <p>With respect to the SSSIs and in particular those that are related to the river systems, there would be potential effects to these protected areas include direct and indirect impacts from disturbance and displacement to species and habitats. In terms of the main river crossings, it is likely that the Proposed Development would need to adopt similar methods such as HDD in order to avoid above-ground impacts to sensitive sites. It would be important to address the impact on surface water receptors and risk of pollution/ contamination, as well as impacts on the habitats and qualifying features of the designated sites.</p> <p>As well as ecological designations, it is noted that the cable route is within close proximity to Ringwood Conservation Area. This area includes historic town centres such as Lymington and Ringwood, and whole villages in the Avon Valley and Downland areas.</p> <p>The areas where the cable route would cross these Main Rivers fall within Flood Zones 2/3, where there is the potential for adverse impacts on fluvial influences. Temporary works and flood risk management would need to be considered in detail to ensure that no reduction in the flood protection offered by the existing flood defences is introduced through a reduction in crest height or creation of a preferential flood pathway as a consequence of the installation of the cables. The potential impacts due to increases in flood risk along the cable route as a result of open trenching were identified the Onshore Water Environment ES chapter for Navitus Bay. These were mitigated by the use of trenchless techniques to install cables in a number of locations. This applied to locations along the cable corridor and at watercourse crossings e.g. silt and settlement management techniques.</p>
North Ripley and Bransgore	<p>As the route progresses from Ringwood towards Sandford, it then enters the New Forest National Park. The National Park is designated for the purpose of conserving and enhancing the natural beauty, wildlife and cultural heritage.</p> <p>At North Ripley, the cable route runs along the boundaries of small fragmented parcels of land classified as the New Forest SSSI. One area is also classified under SAC status. In addition, there is dense woodland on either side of the route in this location, with two areas identified as Ancient Woodland i.e. Whistler’s Copse and Martins Copse.</p> <p>Moving south there are additional areas of Ancient Woodland along Ringwood Road, between Shirley and Bransgore. These primarily comprise Prinks Wood, where there would also be a water crossing required to cross the Clockhouse Stream.</p> <p>Similar mitigation measures to the Navitus Bay DCO Application Route would be expected to be required to avoid loss and prevent or minimise disturbance to woodland. The Terrestrial and Freshwater Ecology ES Chapter for Navitus</p>

Approximate location along the route	Summary of constraints or sensitivities
	<p>Bay identified potential impacts with respect to woodland loss, long term damage to woodland structure, drainage and associated flora and fauna due to construction impacts. The proposed mitigation involved broad-leaved woodland restoration and, where required, adopted trenchless techniques to avoid or minimise impacts on ancient woodland.</p>
<p>Beckley and New Milton</p>	<p>The route comes into close proximity of Burton Common SSSI. The area supports populations of dwarf gorse, sand lizards and smooth snakes. Sand lizards and smooth snakes are essentially associated with the mature, dry heath, and is one of only three known sites for the former in the New Forest area.</p> <p>This section of the route runs along the boundary of the New Forest National Park along Bashley Cross Road. This would require water crossings at Walkford Brook and Danes Stream, both of which are also adjacent to areas of Ancient Woodland – Beckley Moor Copse and Ossemsley Copse, respectively.</p> <p>The likely impacts are as per the Beckley and New Milton section in Table 3.4 with respect to mitigating impacts in relation to reptiles and loss of woodland.</p>
<p>Navitus landfall site</p>	<p>The route then runs along Vaggs Lane over a railway bridge, and along Everton Road, turning down Hordle Lane at Hordle. There is a further water crossing at Danes Stream, before reaching the coast near Hordle Manor Farm. Here, the landfall would be within close proximity to Highcliffe to Milford Cliffs SSSI.</p> <p>The impacts and mitigation required are as per Table 3.4 with respect to the HDD works at Highcliffe to Milford Cliffs SSSI.</p>

PRELIMINARY TRAFFIC REVIEW

3.9.5.3. The cable route option for the installation to be predominantly in the public highway follows the following route from the identified landfall:

- Downton Lane;
- Hordle Lane;
- Everton Road;
- Vaggs Lane;
- B3055 Sway Road / Bashley Cross Road;
- A35 Lyndhurst Road;
- Ringwood Road;
- Thatcher’s Lane;

- Rod Lane;
- B3347 Christchurch Road;
- B3081 Ringwood Road;
- Horton Road; and
- B3072 Horton Road.

Traffic Management Requirements

3.9.5.4. Following a review of highway widths and existing conditions, the traffic management requirements for the public highway route were found to include:

- 19.1km of road closures, which would take a total of 191 weeks per circuit to complete;
- 8.0km of shuttle working traffic signal operation, which would take 80 weeks per circuit to complete;
- 2.0km of shuttle working at “pinch points” which would take 20 weeks per circuit to complete;
- 810m of single lane closures on the Strategic Road Network, which would take approximately eight weeks to complete per circuit;
- 1.2km of pedestrian / cycle route closures which would be in place for 12 weeks per circuit.

3.9.5.5. The longest sections of full road closures which would be required are as follows:

- 7.4km per circuit of road closures on Rod Lane / Thatchers Lane / Ringwood Road which passes through the Bransgore, North Ripley and Sandford areas. These links require road closure due their constrained rural nature coupled with narrow single carriageway roads and the lack of available space off carriageway (for example unusable / no verge space and/or footways adjacent to the running lanes). This would require diversions to be in place in this location for approximately 74 weeks per circuit; and
- 2.9km per circuit of full road closures on Ringwood Road between Bransgore in the north and Hinton Admiral in the south. This would require diversion via a 6.4km route on A35 / Lyndhurst Road to be in place over a period of 29 weeks. This road closure is required due to similar characteristics as noted above, namely the rural nature of the highways and limited adjacent verge/footway space.

3.9.5.6. The Lovedean route comparatively is shorter than this route, and requires a total of 13.8km of traffic management (16.0km less than the route to Mannington). As was set out in the Framework Traffic Management Strategy (FTMS) (AS-072), the Lovedean route comprises of the following:

- 862m full road closures per circuit (18.2km less than this route, equating to 182 weeks per circuit less of full road closures per circuit);
- 8.0km of the route having single lane closures per circuit (7.2km more per circuit than this route, equating to 72 weeks more of single lane closures per circuit);
- 5.0km per circuit of the route having shuttle working traffic signal operation (5.1km less per circuit than this route, equating to 51 fewer weeks of shuttle working per circuit); and
- The Lovedean route does not require any traffic management to be undertaken on the Strategic Road Network or in close proximity to it.

3.9.5.7. In respect to duration of works, the Lovedean route would require traffic management to be in place for approximately 849 days per circuit (170 working weeks per circuit) whereas this route would require 1,495 days of traffic management per circuit (299 working weeks per circuit). The route to Mannington would therefore require traffic management to be in place for 646 days (129 working weeks per circuit) longer than the Lovedean route per circuit (so 258 working weeks longer overall), and with a significantly longer period of full road closures that is largely avoided for the Lovedean route. The extent of the increase in working weeks does not reflect the overall increase in duration, because multiple sets of works would be undertaken in parallel. Based on six cables gangs working in parallel, the Mannington route would take approximately 43 weeks longer to construct overall. This, however, does not take into account potential seasonal restrictions associated with particular sections of the cable route which could make the overall construction timeframe substantially longer.

3.9.5.8. It should also be noted also that the timescales presented for the Mannington Route have been calculated using a high-level assessment only. A further detailed review of the existing highway conditions and constraints on the cable corridor would likely result in an extension of the anticipated duration of traffic management requirements on the Mannington Route, given the rural nature of much of the highway that used for the onshore cable route.

Route Sensitivity

3.9.5.9. The following locations have been highlighted as sensitive receptors within the vicinity of the proposed public highway route between Navitus Bay and Mannington Substation and are shown in Plate 3.9.

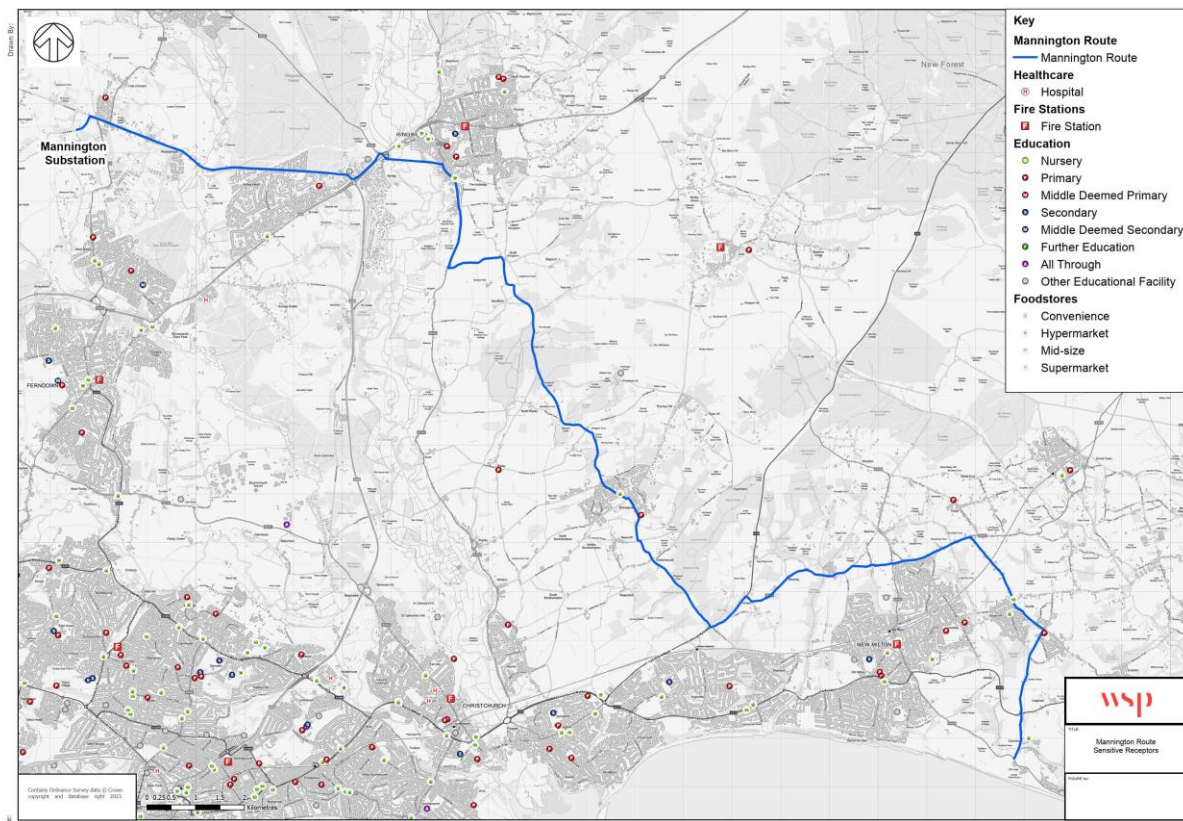


Plate 3.9 Location of sensitive receptors between Navitus Bay and Mannington substation

3.9.5.10. The sensitivity of the public highway route was found to be:

- High for approximately 4.7km of the route (comparative to 7.1km for the Lovedean route);
- Medium for approximately 3.5km of the route (comparative to 9.4km for the Lovedean Route);
- Low for approximately 4.5km of the route (comparative to 1.2km for the Lovedean route); and
- Negligible for approximately 19.9km of the route (no part of the Lovedean cable corridor in the public highway was identified to have a negligible baseline sensitivity).

3.9.5.11. Examples of high sensitivity receptors on the route includes:

- The junctions of A31 Ringwood Road/Verwood Road as well as A31 / A338 Ashley Heath Roundabout, these are both located on the A31 Ringwood Road. The A31 Ringwood Road/Verwood Road forms part of the Strategic Road Network (SRN), forming a key regional route into Bournemouth;
- Railway crossings in the vicinity of Vaggs Lane and the agricultural land to the immediate west of Vaggs Lane; and

- Hordle CE (VE) Primary School and Nursery, Bransgore Church of England Primary School, Ringwood Waldorf School, The Sheiling School, Ringwood and Oakdene Care Home.

3.9.5.12. Where high sensitivity receptors like schools are located in the immediate vicinity of the Onshore Cable Route, construction would be required to be undertaken outside of term time. It is anticipated that this would also be the case for construction works in the vicinity of the A31 / A338. This has the potential to considerably restrict, and potentially elongate, the programme of works.

3.9.5.13. Examples of medium sensitivity receptors on the route includes:

- Shorefields Holiday Park;
- Retail area in Ringwood;
- David Lloyd Gym;
- Fire Station on B3347 Christchurch Road; and
- Residential properties within close proximity to highway.

3.9.5.14. Examples of low sensitivity receptors on the route includes:

- Ashley Heath Caravan Park;
- Moors Valley Country Park;
- Kingdom Hall of Jehovah's Witnesses;
- Three Legged Cross United Reformed Church;
- St Mary the Virgin Church;
- All Saints Church;
- St Andrews Church;
- Hoburne Bashley Holiday Park;
- Sammy Miller Motorcycle Museum;
- St Michaels & All Angels Church; and
- Residential properties set back from highway.

Traffic Delay Impact

- 3.9.5.15. As suitable Department for Transport traffic flow information is not available for the Onshore Cable Route option, an estimate of traffic delay has been made based on professional judgement, taking account of the highway classification and location.
- 3.9.5.16. The locations where significant effects are likely to occur are summarised below:
- A35 Lyndhurst Road, where shuttle working traffic signals will be required for approximately 10 weeks per circuit between Hinton Admiral and Hinton;
 - B3347 Christchurch Road where shuttle working traffic signals will be required for 23 weeks per circuit on approach to and within Ringwood;
 - A31 Ringwood Road/Verwood Road and B3081 Ringwood Road where lane closures / shuttle working traffic signals will be required for approximately 8 weeks per circuit between Ringwood and Ashley Heath;
 - B3072 Ringwood Road / Horton Road where shuttle working traffic signals will be required for approximately 56 weeks per circuit in Ashley Heath and Three Legged Cross.
- 3.9.5.17. This equates to total of 97 weeks of significant traffic delay impacts per circuit. In all other locations it is anticipated that the level of traffic delay or diversionary impacts associated construction of the Onshore Cable Route would not lead to significant environmental effects.
- 3.9.5.18. The Lovedean route by comparison would create significant traffic delay for a total of 66 weeks per circuit whilst construction takes place on Hambledon Road, A3 London Road, A2030 Eastern Road and Havant Road. This is 31 weeks less per circuit than the Mannington route.

REVIEW OF THE BY ROAD ROUTE

- 3.9.5.19. There are a number of internationally and nationally designated sites in close proximity to the northern sections of the cable route. Although a larger proportion of the route is on carriageway, in comparison to the Navitus Bay DCO Application Route, there is potential for significant effects on ecologically designated sites. Trenchless techniques (e.g. HDD) would likely be required at sensitive locations in relation to main watercourse crossings and areas of woodland., as well as railway and major highway crossings.
- 3.9.5.20. This option would likely have fewer occurrences of directly impacting or having to work within ecologically sensitive and protected areas (and designated sites) given the nature of the works being predominantly in the highway, though there would still be potential to impact sites at where there are HDD works and compound locations.
- 3.9.5.21. Similar mitigation measures to the Navitus Bay DCO Application Route will be in place to avoid loss and prevent or minimise disturbance to woodland, though it is noted that the middle section of the route around Beckley and New Milton contains several parcels of woodland that abut the route from either side of the carriageway. The Terrestrial and Freshwater Ecology ES Chapter for Navitus Bay identified potential impacts with respect to woodland loss and long-term damage to woodland structure, requiring mitigation such as broad-leaved woodland restoration and, where required, adopted trenchless techniques to avoid or minimise impacts on ancient woodland. The Proposed Development would likely require a similar level of mitigation with respect to avoidance of impacts to ancient woodland.

- 3.9.5.22. This public highway route option would also likely result in significant levels of disruption to the traveling public, with long-term diversion routes totalling 103 weeks per circuit required to facilitate construction of the Onshore Cable Route on Rod Lane / Thatchers Lane / Ringwood Road and Ringwood Road (as noted in paragraph 3.9.5.5). This is comparative to the 8-9 days of diversionary routes which would be required to accommodate road closures for the Lovedean route. In addition, the option of locating the Onshore Cables in the public highways network is predicted to generate significant traffic delay impacts of 87 weeks per circuit around Ashley Heath, Three Legged Cross and Ringwood on the A31 / B3381, B3347 and B3072 (as noted in paragraph 3.9.5.16). This is 31 weeks longer per circuit than significant traffic delay impacts would occur as a result of the Lovedean route.
- 3.9.5.23. The route to Mannington would require traffic management to be in place for 646 days (129 working weeks) longer per circuit than the Lovedean route (albeit multiple gangs would be expected to be working in multiple locations in parallel, so the overall increase in the number of weeks that there would be traffic management on the highway would be less than 129 working weeks). Taking this into account, it is identified that the public highway route does not provide a feasible strategy for construction of the Onshore Cable Route to Mannington from the landfall location and the Navitus Bay DCO Application Route would be preferred.

3.10. MARINE CABLE ROUTE

3.10.1. MARINE CABLE ANALYSIS

General Considerations

- 3.10.1.1. The analysis of alternative indicative cable corridors between the landfall in France to any of Christchurch Bay landfalls (landfalls 11 to 18) is based on the same parameters of the Marine Cables forming part of the Proposed Development, including considerations relevant to their installation, protection, operation, maintenance and decommissioning, as outlined in sections 3.5.3, 3.5.5, 3.5.6, 3.5.7, 3.5.9 and 3.5.10 of Chapter 3 of the ES submitted (APP-118).
- 3.10.1.2. The analysis also takes into account the same considerations as when developing the Marine Cable Corridor of the Proposed Development (the “Proposed Marine Cable Corridor” or “PMCC”), as explained in sections 2.4.15.1 – 2.4.15.2 of Chapter 2 Consideration of Alternatives of the Environmental Statement. Those same considerations were also used when evaluating the Chickerell connection option, as discussed in section 5.2.5.2 of the Supplementary Alternatives Chapter (REP1-152), and which are of continuing relevance to the assessment of the feasibility of the marine cable route end approach to a landfall connecting to Mannington substation.
- 3.10.1.3. Before factoring in various constraints and the need for the marine cable to seek to route around those, the straight line between the landing point in France and the landfall at the Farmer’s Field west of Milford on Sea crosses the Isle of White and stretches for approximately 210 km. This is already 28 km longer than the PMCC. When all relevant constraints are factored in and a route is identified which seeks to avoid those, including the Isle of Wight itself and all designated areas along its coastline, the indicative alternative marine cable corridors (the “Alternative Marine Cable Corridors” or “AMCC”) become significantly longer.

Alternative Marine Cable Corridors

- 3.10.1.4. The figure entitled ‘Offshore Approach’ at Appendix 3.6 (document reference 7.8.3.6) illustrates the AMCCs (W1 and W2) for the Farmer’s Field landfall.
- 3.10.1.5. To reach that landfall from the established landfall location in France, an AMCC would need to turn west from the PMCC approximately 7km south of the UK/France European Economic Zone (EEZ) line, just before an aggregates extraction area immediately south of the UK/France EEZ line and before reaching the major shipping lanes of the English Channel which comprise the Channel Traffic Separation Scheme (TSS). Turning west closer to the French landing point would result in the AMCC crossing the SPA ZPS Littoral seineo-marin⁵ over an extended distance, fishing areas and areas designated for the development of large-scale offshore windfarms, located west of the PMCC as demonstrated in Plates 3.10 and 3.11, all of which should be avoided in the interest of identifying a route which does not give rise to unacceptable impacts.

⁵ Special Protection Area “Zone of Special Protection Seine-Marine Coastline”.

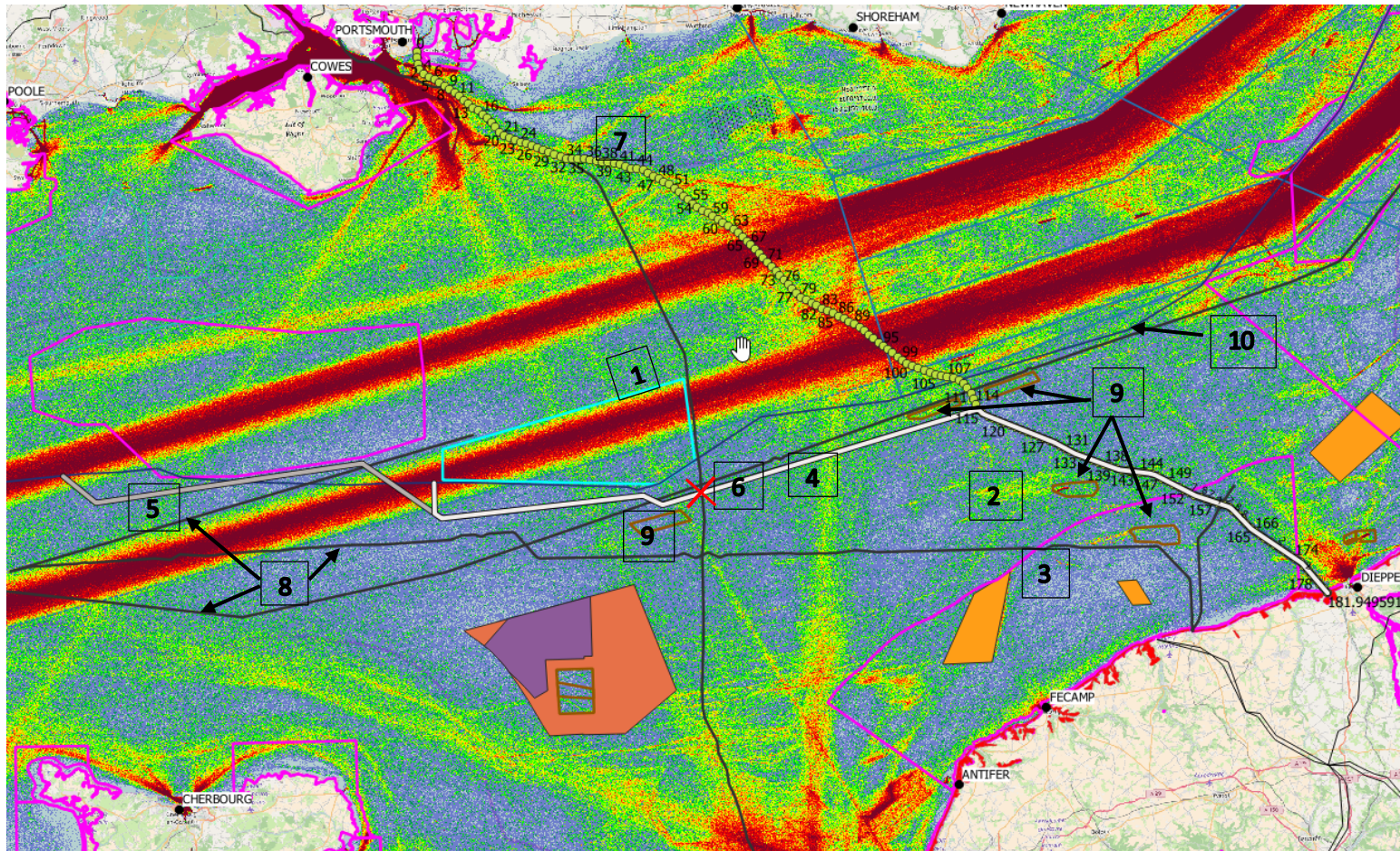


Plate 3.10 - The AMCC in the French EEZ (sources: marinetraffic.com, AIS Data, Natural Powe SARL, AQUIND). Marine traffic intensity is demonstrated by green (low) to yellow (moderate) to dark red (very high). Legend: 1. – The Channel TSS; 2. – A trawl and scallop fishing area centred at 16°E; 55°N; 3. – SPA Littoral seineo-marin; 4. - AMCC W1; 5. - AMCC W2; 6. - IFA2 crossing; 7. - Eastney – Pourville cable route corridor of the Proposed Development; 8. - Data cables; 9. - Aggregate extraction areas within FR EEZ; 10. - UK – FR EEZ boundary

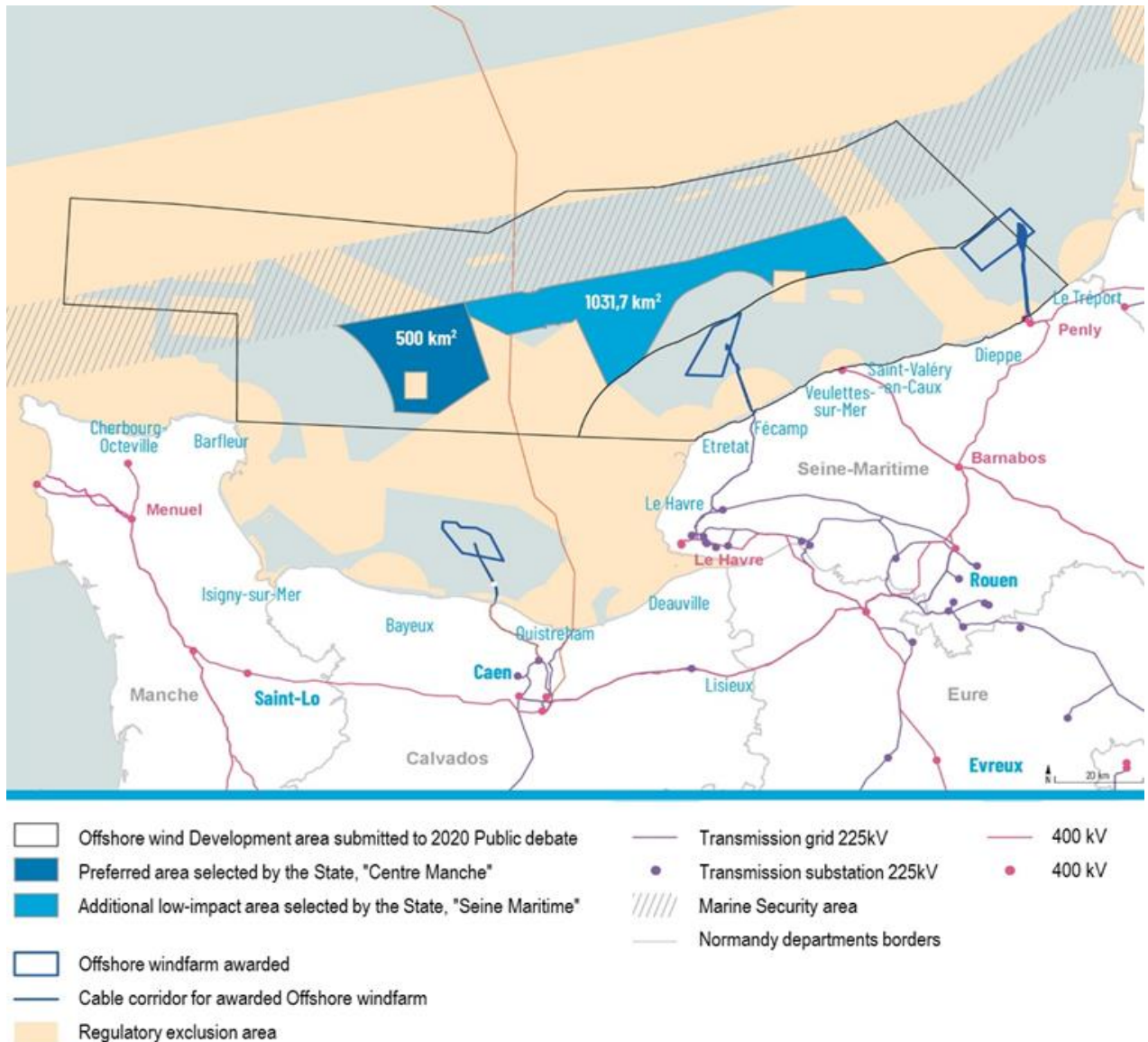


Plate 3.11- Awarded and planned offshore wind areas within the French EEZ and the French territorial waters (source: RTE⁶)

⁶ Perspective of Development of the French offshore transmission grid-RTE January 2022, available at https://www.eoliennesenmer.fr/sites/eoliennesenmer/files/fichiers/2022/01/Perspectivesdedeveloppement_res_eauelectriqueenmer_facadenormande_janvier2022_0.pdf

- 3.10.1.6. Any cable corridor option from Pourville to the Farmer’s Field landfall west of Milford on Sea would significantly increase the length of the cable corridor, due to the need to avoid various marine constraints in the UK EEZ and territorial waters.
- 3.10.1.7. As shown in the ‘Offshore Approach’ figure in Appendix 3.6 (document reference 7.8.3.6) turning west south of the UK/France EEZ line allows the AMCC to avoid the environmentally protected areas of Marine Conservation Zones (“MCZ”) of Offshore Brighton and Offshore Overfalls and the pilot Dolphin Head Highly Protected Marine Area (“HPMA”) due to be designated later this year⁷. The figure illustrates two candidate AMCCs namely, W1 and W2 routes. Also shown on the figure, both AMCCs would need to cross the IFA2 interconnector, in the French EEZ south of the Dolphin Head HPMA. The details of such crossings, including the complexities, risks and additional environmental impacts that would arise because of this, were explained by the Applicant in connection with the Chickerell connection option and are discussed in ES Addendum 1 - Supplementary Alternatives Chapter (REP1-152, paragraphs 5.2.5.10 – 5.2.5.15). Those paragraphs are of general application in terms of the issues that would arise with such a crossing, and therefore equally apply to either AMCC for a connection to Mannington Substation.
- 3.10.1.8. Following the westerly edge of the Dolphin Head HPMA, the AMCCs could take one of two routes – W1, which would turn north, and W2 – which would continue west as illustrated in the figure.

AMCC W1

- 3.10.1.9. W1 would head north into the UK Marine Area avoiding the western edge of the Dolphin Head pilot HPMA, crossing the main shipping channel leading into the Channel TSS in this location at an angle close to 90 degrees, which is the most direct route across. This route would follow the eastern boundary of the Wight-Barfleur Reef Special Area of Conservation (“SAC”) and then turn west in between the northern edge of this SAC and an aggregates extraction area immediately to the north. The route would then continue west in order to avoid a large area of hard rock seabed to the north, which stretches to the southern shores of the Isle of Wight and which may present challenges for burying the cables to target depth and result in additional requirements for cable protection.
- 3.10.1.10. Within the UK 12 nautical mile (nmi) limit, the AMCC W1 travels north-west to pass between a number of aggregates extraction areas located to the west and south-west of the Isle of Wight and then directly north to avoid an extensive area of Sabellaria Reef habitat (UK BAP Priority Habitat⁸) immediately to the west. This route passes within a military exercise area immediately to the west of the Isle of Wight and crosses the Needles navigation channel into the Solent, prior to approaching an HDD exit of the Farmer’s Field landfall approximately 1.2 – 1.4 km from the shore west of Milford on Sea. As a consequence of the need to avoid a considerable number of constraints by routing around them, the AMCC W1 is inevitably longer.

AMCC W2

- 3.10.1.11. The AMCC W2 would separate from W1 in the French EEZ southwest of the Dolphin Head pilot HPMA. It would then travel north-west in order to cross the major shipping lanes at as close to a 90 degrees angle as is possible and then follow the southern border of the Wight-Barfleur Reef SAC to avoid any direct impacts to the SAC's sensitive habitats. This would result in the route crossing back into the French EEZ, before turning north between Wight-Barfleur Reef SAC in the east and the West of Wight-Barfleur MCZ to the west. The route then continues to travel northwards between the South Dorset MCZ in the west and the Albert Field MCZ in the east, prior to turning north-east between the Albert Field MCZ and Portland Purbeck Coast MCZ/Studland to Portland SAC to the north to reach an entry to the deeper water within Christchurch Bay and the Farmer's Field HDD exit point. Again, as a consequence of the need to avoid numerous constraints and resultant impacts, AMCC W2 is significantly longer.
- 3.10.1.12. By comparison and with regard to constraints, the PMCC to Eastney manages to avoid environmentally designated areas in the English Channel, aggregate extraction sites, shipping channels and the crossing of IFA2 Interconnector without the need for any significant adjustments and extension. The PMCC follows almost a straight line between the French and English landfalls, which makes it the optimal marine cable route for the Project.

Environmental Impacts of the AMCCs

- 3.10.1.13. Even though both AMCC W1 and W2 are able to avoid most marine constraints identified, the routes required to avoid these constraints are both much longer and considerably more convoluted.
- 3.10.1.14. Within the UK Marine Area, whilst not directly impacting designated sites by travelling through those sites, both W1 and W2 must follow, in fairly close proximity, the boundaries to MCZs and SACs for fairly long distances. These sites are designated primarily for their sensitive habitats. This would be likely to result in indirect impacts such as sediment deposition and increased suspended sediments to sensitive species and/or habitats within these areas from cable installation activities, including potential seabed clearance, dredging and disposal of dredged material. Given the east-west direction of tidal excursion within the Channel and the lengths of the AMCCs in close proximity to these sites, any suspended sediments would likely be transported into these designated sites.
- 3.10.1.15. The PMCC avoids direct impacts to designated sites, and in contrast to the AMCCs, the eastward travel of the PMCC avoids designated sites at a further distance. As such, indirect impacts to features of any adjacent designated sites to the PMCC are kept to the minimum and are considered to be acceptable by the Marine Management Organisation (MMO). This acceptance position is supported by the designation of the two disposal sites (WI048 and WI049) for the Proposed Development by the MMO to undertake disposal of dredged materials in these sites. These disposal sites are located along the offshore aspects of the PMCC (as described in Appendix 6.5 of the Environmental Statement and secured through the Deemed Marine Licence) and it is unclear where any similar disposal sites for either of

⁷ [Defra announces Highly Protected Marine Areas to be designated in English waters - Defra in the media \(blog.gov.uk\)](#)

⁸ [Sabellaria spinulosa reefs \(UK BAP Priority Habitat description\) \(jncc.gov.uk\)](#)

the AMCCs could be located given their closer proximity to designated sites and other constraints.

- 3.10.1.16. Furthermore, both AMCCs have to navigate around large areas of rock and hard seabed substrate. Given that both routes have to travel in close proximity to these rocky areas, it is highly likely that both routes would encounter a greater percentage of rock seabed along their lengths within the UK Marine Area than the PMCC. This would result in a greater requirement for cable protection for both AMCCs, as target cable burial depths are much harder to meet in hard substrate. Cable protection methods such as concrete mattresses and rock protection result in the introduction of new substrate into the marine environment which can impact habitats and species (designated or not) and cable protection measures should be kept to a minimum where possible, in order to avoid changes in structure and function of marine habitats.
- 3.10.1.17. Finally, it is clear from the figure 'Offshore Approach' that both AMCCs have to make multiple deviations to mitigate impacts with other marine users and existing developments. Where both AMCCs have to make turns close to the EEZ line mid-Channel in order to cross the main shipping channels, even then, the W2 route in particular, remains within the mid Channel area for longer than 60 km before heading north up towards the UK Marine Area, out of the main shipping channels. This is considered to be a much less favourable route than the PMCC, which has a more direct crossing through both the southern and northern shipping lanes and into France. This is because the length of time the large construction vessels with limited manoeuvrability (and during any operation and maintenance works if required) will be within the shipping lanes will be kept to a minimum, and therefore avoid greater incidences of conflict with existing shipping operations.
- 3.10.1.18. Altogether, it is clear that in order to adhere to first principles of sustainable development, the PMCC route is far more favourable than either of the AMCC routes, and that, any route from France crossing into Christchurch Bay for a connection to Mannington substation is highly constrained, forcing circuitous routes that are unlikely to be viable in terms of environmental or economic impacts.

Incremental impacts during operations and decommissioning

- 3.10.1.19. During operation a longer marine cable route in the waters adjacent to major shipping channels would result in a much higher risk of damage from dropped objects and other accidents associated with marine traffic. The PMCC route was planned to minimise such risks of outages, taking into account all other constraints. Similarly, the decommissioning of so much longer cable routes is most likely to have a greater impact than the decommissioning of the route built within the PMCC, irrespective of what techniques and approaches might be available at the time.

Incremental impacts on the development and construction timeframe and costs

- 3.10.1.20. The comparative length of the PMCC and both AMCC options are shown below in Table 3.7.

Table 3.7 - Comparative lengths of Marine Cable Corridor Options

Options	PMCC (Eastney-Pourville)	AMCC W1 (Downton – Pourville)	AMCC W2 (Downton – Pourville)
Length of cable corridor (km)	182	265	309
Additional length of cable corridor (km)	n/a	83	127
% increase of the cable corridor length	n/a	45.6%	69.8%
Length of cables (both cable circuits) (km)	728	1060	1236
Additional length of cables (both cable circuits) (km)	n/a	332	508

- 3.10.1.21. The AMCC W1 would stretch for an additional 83 km, being 45% longer than the PMCC. AMCC W2 would be 127 km and close to 70% longer than the PMCC.
- 3.10.1.22. The increased distances and the volume of cables to be procured and manufactured would increase the duration of the construction of the Project and its cost. This would also result in an increased requirement for environmental data collection and baseline surveys. Moreover, because of the need to route around and in close proximity to various marine constraints, the impacts of the Project and the required mitigations to seek to limit those impacts would also increase consenting risk considerably.

Table 3.8 – Incremental time and cost impacts of the AMCC

Option	AMCC W1	AMCC W2
Additional Marine Survey duration (geophysical and geotechnical campaigns)	+3 - 6 months	+6 months
Additional Marine Survey costs (geophysical and geotechnical campaigns)	+ £1.9 million	+£2.9 million

Option	AMCC W1	AMCC W2
Additional DRASSM (Underwater Archaeology Research Department of France) assessment costs	c. +€140,000	c.+€390,000
Additional cable manufacturing duration	+ 5 – 9 months	+ 9 - 12 months
Additional cable route installation (based on marine campaigns)	+ 1 – 2 years	+1 – 2 years
Additional costs of marine cable route (manufacturing and installation)	+£231.4m	+ £353m
Total additional duration	+ 1 year and 8 months – 3 years and 3 months	+2 years and 3 months – 3 years and 6 months
Total additional cost	Circa £233.5 million	Circa £356.3 million

- 3.10.1.23. The crossing of IFA2 Interconnector would also require additional installation and monitoring costs during the lifetime of the Project.
- 3.10.1.24. In total, the AMCC W1 would result in extending the development stage of the Project by up to six months, manufacturing of cables by 5 – 9 months and construction of the marine cable route of the Proposed Development by approximately one to two years.
- 3.10.1.25. The AMCC W2 would result in extending the development stage of the Project by six months, manufacturing of cables by 9 – 12 months and construction of the marine cable route of the Proposed Development by approximately one to two years.
- 3.10.1.26. The AMCC W1 would result in additional costs for the construction of the marine cable route of circa £233.5 million, and the AMCC W2 of circa £356.3 million.
- 3.10.1.27. Such additional time and cost for either of the alternative routes would mean that a proposed connection to Mannington Substation would be deemed not feasible.

3.11. COMPARISON WITH THE PROPOSED DEVELOPMENT

3.11.1.1. An analysis has been undertaken of the feasibility of utilising Mannington substation as an alternative to the Proposed Development at Lovedean. This section summarises, compares and contrasts the two options and demonstrates the key reasons why Lovedean substation is the preferred solution and why a connection to Mannington Substation is identified to not be feasible.

Substation connection and converter station locations

Lovedean

- 3.11.1.2. During construction the Lovedean proposal will have likely significant but temporary effects on landscape character, associated local landscape features, the setting of the SDNP or visual amenity and visual receptors at the Substation connection and Converter Station site.
- 3.11.1.3. During construction there are likely to be significant but temporary noise impacts during evening, night-time and/or weekend construction works at the converter station location.
- 3.11.1.4. During operation the Lovedean proposal is likely to have significant effects on landscape character, associated landscape features, the setting of SDNP and visual receptors for the Converter Station Area immediately on completion of the construction works. However, as planting matures, the significance of many effects would reduce and would not be significant after 10 years. Effects would remain locally 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.
- 3.11.1.5. The only heritage asset in the vicinity of the converter station site found to be subject to an effect greater than negligible was the Grade II listed cottage to the north known as 'Scotland'. The assessment found a minor adverse effect equating to 'less than substantial harm' on this asset.
- 3.11.1.6. During operation there are likely to be significant effects from loss of amenity for pedestrians on PRoW immediately adjacent to the Converter Station.

Mannington

- 3.11.1.7. During construction the Mannington option would have likely significant but temporary effects on the character of views and visual amenity at Gundry's Farm.
- 3.11.1.8. In relation to construction noise, it is likely that the Mannington option would require similar working hours and therefore result in significant but temporary noise effects.
- 3.11.1.9. During operation, the Mannington option would have likely significant effects on character of view and visual amenity at receptors in proximity to Gundry's Farm. Even with perimeter planting and 20 years establishment, there would still be likely to be significant adverse effects noting the more open and relatively flat nature of the site there are likely to be more wide-ranging visual effects on the surrounding area compared to the Lovedean option.
- 3.11.1.10. Due to the creation of impermeable areas, an attenuation pond(s) would be required, but a suitable location for this has not been able to be identified.

- 3.11.1.11. A potential impact on groundwater may remain unmitigated where there is a lack of space for an attenuation pond(s) within the relevant area or lead to the need to clear space for the pond (and resulting in greater environmental impacts).
- 3.11.1.12. With regard to the connection to Mannington Substation, an area of land would be required to accommodate two new interconnector connection bays, an extension to the double busbar substation to accommodate those, including the additional bus coupler and section breakers, and would be expected to be approximately 3,600sqm. From a review of the existing Mannington substation it is apparent that there is no such space within the existing operational footprint, and as such it would be expected that the substation would need to be extended. Any such extension would most likely be into the bordering woodland so as to be contiguous with the existing substation, and would result in the loss of such trees (including possibly Ancient Woodland where not able to located elsewhere) and also likely a requirement for new mitigation planting.
- 3.11.1.13. During operation, the two options would also both result in residual visual impacts for localised areas near the station locations, although clearly affecting different sets of receptors. Both options would therefore be similar in terms of the types of potential impacts which are 'significant' at the substation connection and converter location sites. However, given the open and flat nature of the surrounding landscape at the Mannington site it is likely there would be likely to be a greater number of receptors affected and wider-ranging visual effects compared to the Lovedean option.
- 3.11.1.14. For a connection at Mannington substation, extensive additional reinforcement works to the transmission network would be required, and this would be expected to further significantly extend the period for the delivery of the Proposed Development, and for this to be capable of operation, to not before 2037 (based on information from NGET and NGESO). This would be ten years later than the delivery of the Proposed Development and before it could operate at the same capacity by comparison to a connection to Lovedean substation.
- 3.11.1.15. In addition, the total CAPEX for NGET to provide a connection at Mannington substation would also be expected to be significantly greater than for a connection to Lovedean substation, noting the reinforcement works which it is understood would be required. These include reinforcements of the NETS between Mannington substation and Lovedean substation, a new double 400kV circuit in the South West area and reinforcement of the existing Fawley - Chilling 400kV cables. Whilst the Applicant is not able to provide an accurate estimate of the costs of the additional reinforcements, noting how extensive those reinforcements are and taking into account the known information on the cost of reinforcements between Lovedean and Bramley, it is evident that such costs would be significant and at least in the order of multiple hundreds of millions of pounds.

Onshore cable route

Lovedean

- 3.11.1.16. During construction the Lovedean proposal will have likely significant but temporary effects on landscape character, associated local landscape features, the setting of the SDNP, and or visual amenity and visual receptors along the Onshore Cable Corridor.
- 3.11.1.17. During construction, there are likely to be significant but temporary effects on agricultural activities due to the temporary loss of agricultural land, the temporary impacts on five farm holdings and the permanent impacts on three of those holdings.

- 3.11.1.18. During construction, there are likely to be significant but temporary effects related to severance, changes to pedestrian and cycle amenity, traffic delay and fear and intimidation. Significant 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. There are also likely to be significant temporary effects related to severance, changes to pedestrian and cycle amenity, traffic delay, fear and intimidation and accidents and safety.
- 3.11.1.19. During construction, there are likely to be significant but temporary effects from noise impacts during evening, night-time and/or weekend construction works.

Mannington (Navitus Bay Route)

- 3.11.1.20. During construction, the Mannington option would have likely significant but temporary effects on character of view and visual amenity for Private residents at Hare Lane and users of PRow at Breakhill Copse.
- 3.11.1.21. During construction, there would be likely significant and temporary effects on landscape due to localised disruption to the landscape of the New Forest National Park and the temporary loss of agricultural land.
- 3.11.1.22. In relation to construction noise, it is likely that the Mannington option would require some out of hours working time and therefore result in significant but temporary noise effects.
- 3.11.1.23. During construction there are likely to be significant temporary effects related to pedestrian severance and pedestrian amenity. There would also be likely significant effects in relation to cycling and horse riding during the construction phase.
- 3.11.1.24. During construction, there would be likely significant effects on terrestrial ecology and onshore birdlife due to potential damages and disturbances to designated habitats and protected species. Additional mitigation measures would be required, including the restoration of habitats damaged during construction phase, the creation of additional wooded heath and heathland habitats off-site, scheduling of construction activities to avoid disturbance, as well as specific measures to be adopted to ensure compliance with relevant wildlife legislation.
- 3.11.1.25. During construction, there would be likely significant effects on one cultural heritage site - Golden Hill marl pit – located within an area of deciduous woodland at Ashley Lane in Hordle, as well as a number of other sites along the cable where more localised and detailed assessment and Written Scheme of Investigation measures would be required to avoid or minimise impacts to these sites.

Comparison

- 3.11.1.26. For the onshore cable element, the two options would have similar significant effects during construction in relation to landscape and visual effects, construction noise and pedestrian and cycle amenity. However, the Mannington option, running through a rural area would result in much more significant and extensive adverse effects in relation to terrestrial ecology due to direct and indirect impacts on designated habitats and protected species. This would require additional significant mitigations including extensive habitat restoration and specific protected species measures. The Mannington option would also have significant adverse effects on a cultural heritage site. In contrast, the Lovedean onshore cable route would run primarily in urban areas and have no significant effects on ecology with appropriate mitigation in place. The Mannington option onshore cable route would affect considerably more

agricultural land holdings due to the predominantly rural land uses; although these temporary effects could be mitigated there would therefore be more wide-ranging effects and a larger package of mitigation required compared to the Lovedean option which is mainly routed through urban areas.

- 3.11.1.27. This route is approximately 15km longer than the Lovedean route (35km by comparison to 20km), and without including the trenchless crossings that would be required it is estimated that the additional cost associated with this additional length of cables and their construction is £78.62 million.
- 3.11.1.28. 14 trenchless techniques (e.g. HDD) crossings, excluding the landfall HDD and the HDD to install HVAC cables between the Converter Station and Mannington substation, have been identified to be required in connection with this onshore cable route which is based on the crossings required for the proposed Navitus Bay cables. Stockton Drilling have considered the characteristics of those crossings and have identified an estimated cost for those of £24.815 million. This compares to the costs associated with the 5 trenchless crossing required in connection with the Lovedean route, and which are costed at £12.37 million in total. The Mannington connection route is therefore estimated to result in additional costs £12.445 million for trenchless crossings.
- 3.11.1.29. Taking the above into account, the total additional cost for the construction of this onshore cable route comparing to the Proposed Development is estimated to be £91 million. This is circa 75% of the costs associated with the onshore cable for a connection to Lovedean, representing a close to doubling of the cost.
- 3.11.1.30. It is also estimated that it would take approximately 4-5 years to construct this onshore cable route. By comparison, the period of time to construct the onshore cable route to the Lovedean substation is 3 years. This would add two years onto the timescale for the construction of the onshore cables for a connection to Mannington substation. As such, it is identified that there is not a realistic prospect of a connection to Mannington substation delivering the same infrastructure capacity in the same timescale, and the additional time and cost would be a reason why a connection at Mannington would not proceed.

Landfall

Lovedean

- 3.11.1.31. During construction the Lovedean proposal will have likely significant but temporary effects on landscape character, associated local landscape features, and on visual amenity and visual receptors at the Landfall at Eastney.
- 3.11.1.32. During operation the Lovedean proposal is likely to have significant 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.

Mannington

- 3.11.1.33. During construction, the Mannington option would have likely significant effects on character of views and visual amenity for users of PRoW at the landfall, while rendering the area of the Transition Joint Bay unsuitable for agricultural activities. During operation, the Mannington option would have likely significant effects on landscape features (openness), residents and recreational users immediately after construction and on commencement of operation at the Landfall at the Farmer's Field west of Milford on Sea. After planting matures, there would be no significant effects at the Landfall at Navitus.
- 3.11.1.34. The location of ORS in the Farmer's Field would also have greater visibility, but that could be mitigated by planting. The area of the ORS compound and the Transition Joint Bay would be excluded from farming activities. A permanent access road to the Transition Joint Bay and the ORS compound would need to be constructed in the field.

Comparison

- 3.11.1.35. At the landfall locations the two options would have similar significant effects during construction, including in relation to temporary landscape and amenity impacts. During operation, the two options would also both result in similar landscape and visual impacts during construction, reducing to no significant impacts once planting matures. However, the Eastney landfall would be located at an existing car park. In contrast, the Farmer's Field landfall west of Milford on Sea would require the introduction of new permanent hard standing areas over the Transition Joint Bay and in connection with the ORS compound, as well as the need for an access road to be put in place. It would exclude continued agricultural activities within those areas.
- 3.11.1.36. From a marine constraints perspective, the risks associated with landfalls 11-15 present either such unacceptable risk where mitigation is unlikely to be viable, or very high risk such that the locations would be unacceptable for any project to proceed where an alternative which is without such risks is able to be identified.

- 3.11.1.37. Landfalls 16, 17, and 18 were considered to present fewer risks in terms of marine consenting and environmental impacts. However, risks in regard to impacts on designated sites were considered to be very high due to the SPA designated for breeding tern colonies and the Site of Special Scientific Interest (SSSI) which spans the Christchurch Bay coastline in order to protect sensitive geological and fossil interests as well as plant habitats. Furthermore, from a technical perspective, Landfalls 16 and 17 were also not considered to be feasible for HDD landfall methods. HDD trenchless techniques are typically considered to be the least impactful method for cable landfalls and therefore, if this method is not a viable option, then the risks to consenting and the marine environment increase further. For the Farmer's Field west of Milford on Sea (Landfall 18), where HDD methods may be feasible from land, the seabed conditions off the coast indicate that it is characterised by rock and although HDD methods can drill through rock, cable burial activities beyond the HDD and offshore can be constrained and result in additional requirements of cable protection.
- 3.11.1.38. By comparison, the landfall at Eastney is lower risk than any of the alternative landfalls assessed from a marine/coastal perspective. Although the Eastney landfall also lies within the boundary of the Solent and Dorset Coast SPA, and in fairly close proximity to the Solent Maritime SAC, it avoids the SAC boundary, and the SPA is the only designated site that the landfall is located in, thereby avoiding other designations sites such as MCZs, SACs, SSSIs or Local Nature Reserves which constrain many of the alternative landfalls (as well as landscape designations such as Heritage Coast and AONBs).
- 3.11.1.39. Furthermore, the seabed conditions at Eastney are more conducive for marine cable installation with far less rocky seabed within the area compared to the landfalls and seabed to the west of the Isle of Wight.
- 3.11.1.40. Altogether, it is considered that the considerable challenges associated with the landfall locations identified within Christchurch Bay, from a marine consenting and environmental perspective, would weigh heavily against a project achieving a consent award due to the resultant potential for significant effects.

Marine cable route

- 3.11.1.41. Both the Proposed Marine Cable Corridor (PMCC), associated with the Lovedean substation site, and the AMCCs (Alternative Marine Cable Corridors), associated with the Mannington substation site, would be routed to avoid most marine constraints. However, the AMCCs would be much longer and considerably more convoluted due to many protected areas and other obstruction located to the west of the PMCC.
- 3.11.1.42. From a marine constraints perspective, in comparison to the existing Eastney marine cable route (i.e. PMCC), the two AMCCs identified as possible alternative routes to reach landfalls for the Mannington substation would both be significantly longer, more circuitous, and would take longer to survey, construct (and decommission) and would therefore be significantly more expensive than the PMCC.
- 3.11.1.43. The AMCCs would also require an additional cable crossing and cable crossing agreement to cross the IFA2 Interconnector and both AMCCs can only be routed for longer lengths within the main shipping channels mid-Channel, which is much less favourable to shipping and navigation interests than the more direct route taken across the Channel by the PMCC.

- 3.11.1.44. Compared to the PMCC, the AMCCs would also likely result in greater impacts to the marine environment from an EIA and HRA perspective due to the closer proximity of the AMCCs to the large number of marine designated sites (protecting sensitive habitats) in this area. Furthermore, the less favourable rocky seabed conditions in the area of the AMCCs will result in greater challenges for reaching important target burial depths for the cables and therefore, more cable protection will very likely be required, resulting in the introduction of greater amounts of new substrate required to protect the cables which can also have adverse impacts to the marine environment.
- 3.11.1.45. Overall, the PMCC route is shorter, more direct and is a far more favourable route than either of the AMCC routes or indeed any different permutation of these AMCC routes through the area. Based on the constraints considered, any route from France crossing into Christchurch Bay for a connection to Mannington substation will be highly constrained, forcing circuitous routes around obstacles and is unlikely to be viable in terms of environmental or economic impacts.
- 3.11.1.46. During operation a longer marine cable route in the waters adjacent to major shipping channels (i.e. the AMCC routes) would result in a much higher risk of damage from dropped objects (for example, anchors) and other accidents associated with marine traffic.
- 3.11.1.47. In total, the AMCC W1 would result in extending the development stage of the Project by up to six months, manufacturing of cables by 5 – 9 months and construction of the marine cable route of the Proposed Development by approximately one to two years.
- 3.11.1.48. The AMCC W2 would result in extending the development stage of the Project by six months, manufacturing of cables by 9 – 12 months and construction of the marine cable route of the Proposed Development by approximately one to two years.
- 3.11.1.49. The AMCC W1 would result in additional costs for the construction of the marine cable route of circa £233.5 million, and the AMCC W2 of circa £356.3 million.
- 3.11.1.50. Such additional time and cost for either of the alternative routes would mean that a proposed connection to Mannington Substation would be deemed not feasible. This is discussed further in the Planning Statement Addendum (document reference: 7.7.22).

Summary

- 3.11.1.51. In summary, the Lovedean and Mannington options perform similarly in relation to their potential significant environmental effects related to the landfall and converter station locations. However, the Mannington based converter station is identified to be likely to give rise to wider-ranging visual effects, due to its presence in a much more flat and open landscape and being surrounded by a higher density of residential receptors. The Mannington landfall would also require the introduction of new permanent hard standing areas over the Transition Joint Bay and in connection with the ORS compound, as well as the need for an access road to be put in place.

- 3.11.1.52. With regard to the connection to Mannington Substation, an area of land would be required to accommodate two new interconnector connection bays, an extension to the double busbar substation to accommodate those, including the additional bus coupler and section breakers, would be expected to be approximately 3,600sqm. From a review of the existing Mannington substation it is apparent that there is no such space within the existing operational footprint, and as such it would be expected that the substation would need to be extended. Any such extension would most likely be into the bordering woodland so as to be contiguous with the existing substation, and would result in the loss of such trees (including possibly Ancient Woodland where not able to located elsewhere) and also likely a requirement for new mitigation planting. No such extension is needed for the connection to Lovedean, with the substation connection works capable of being accommodated within the existing operational boundary of the substation.
- 3.11.1.53. In relation to the marine and onshore cable routes the Lovedean substation option is clearly preferable. The Mannington option would require a longer onshore cable connection with extensive significant potential effects on designated sites, protected species and cultural heritage. Although effects could be mitigated, there would be much more wide-ranging effects on agricultural land with the need for a much more substantial mitigation and compensation package. The urban nature of the route for the Lovedean onshore cable option avoids these potential effects with appropriate mitigation in place. The marine cable for the Mannington option would need to be much longer and would have much greater potential impacts and risks to marine designated sites, the broader marine environment and shipping operations; the Lovedean connection minimises these risks.
- 3.11.1.54. A connection to Mannington substation would take significantly longer, as a consequence of the longer length of the marine cables adding two/three years to the construction timescales for the Proposed Development. This additional time to deliver the Proposed Development is however separate from the need for additional works to upgrade the NETS so that the Interconnector can operate, and it is understood it would be 2037 at the earliest before the Proposed Development could be operable. This compares to the Proposed Development being able to be operable by 2027 when connecting to Lovedean Substation. There would clearly not be a realistic prospect of a connection to Mannington substation delivering the same infrastructure capacity in the same timescale as the Lovedean substation connection in light of this.
- 3.11.1.55. From a cost perspective, it is identified that a connection to Mannington Substation would be likely to cost an additional £334 million - £456.81 million (dependent on the chosen AMCC).
- 3.11.1.56. This amount is comprised of the estimated additional costs associated with the onshore cable and the additional trenchless crossings needed to reduce the overall level of environmental impacts, and the costs associated with the additional length of the marine cables (plus the additional costs generally associated with a longer construction period). This level of additional cost (plus the significantly longer timescale for delivery) would mean that the Project would no longer be commercially viable.
- 3.11.1.57. This additional cost is separate from the costs to deliver the required reinforcement works to the NETS, which would be in addition to this amount. Whilst the Applicant is not able to provide an accurate estimate of the costs of the additional reinforcements, noting how extensive those reinforcements are and taking into account the known information on the cost of reinforcements between Lovedean and Bramley, it is evident that such costs would be significant and at least in the order of multiple hundreds of millions of pounds.

3.12. IMPACT OF NAVITUS BAY CONNECTION ON FEASIBILITY OF MANNINGTON CONNECTION

3.12.1.1.

The Navitus Bay offshore wind farm was rated as 970MW and was planned to come ashore at a landing to the east of Bournemouth, with an onshore underground cable route to a new substation in an enclosed pasture field in the village of Three Legged Cross, East Dorset. The site of the substation, shown below in Plate 3.12, is largely contained by mature coniferous and broadleaf vegetation along its northern and western boundaries, whilst to the south the boundary is formed by a series Ministry of Defence buildings located behind a secure perimeter fence.

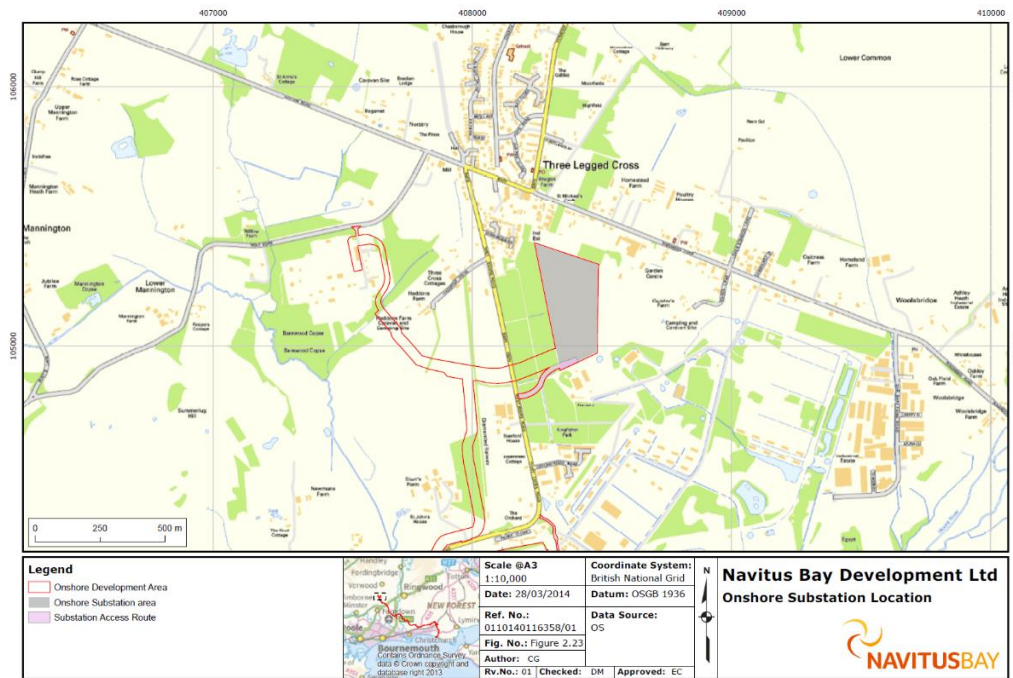


Plate 3.12– Navitus Bay substation location

3.12.1.2. The substation associated with Navitus Bay had an electrical footprint of approximately 3 ha, maximum height of electrical equipment of 11m, and a maximum building height of 14m. Lightning masts were also required, which were a height of 19m. By comparison, the converter station footprint required for AQUIND Interconnector is 4ha, with an additional 1ha required for a construction compound. Whilst the outdoor electrical equipment required is of a similar height, the converter halls required for AQUIND Interconnector have a maximum height of 26m, and so 12m taller than the Navitus Bay substation. In short, AQUIND Interconnector is a much larger project than the Navitus Bay offshore windfarm project.

3.12.1.3. Development consent for the Navitus Bay project was refused on 11 September 2015, with the reasons for refusal in the main relating to the landscape and visual impacts of the offshore wind turbines and impacts relating to those. The developer had a connection agreement in place with NGEN for a 970MW connection at Mannington, which would have involved the following impacts to NGET:

- Provision of one (1) 400kV bay in Mannington sub-station
- A route within the Mannington sub-station for the incoming 400kV underground cable from the adjacent Navitus Bay sub-station
- A clear route through the surrounding woodland, typically 20m wide, for the installation of the 400kV underground cable
- A protected corridor, typically 8m wide, through the surrounding woodland, in perpetuity to avoid damage to the cables from root growth
- Reconductoring of the overhead transmission lines between Mannington and Bramley to handle the increased thermal duty imposed by the 970MW power infeed
- Additional reactive power compensation on the south coast 400kV circuits to maintain the voltage profile on the network

3.12.1.4. The requirements of the Proposed Development are in some cases similar, and in some cases much greater, than those which would have been needed for Navitus Bay and are summarised in Table 3.9:

Table 3.9 – Comparison of Navitus Bay offshore Windfarm Proposals and the Proposed Development

Relevant Element	Navitus Bay	Proposed Development
Spare 400kV bays	1	2
Sub-station extension (if required)	1 new connection	2 new connections
AC cable route within Mannington	1 underground cable route	2 underground cable routes
400kV AC cable route through surrounding woodland	40m wide for installation 20m wide permanent easement	23m wide for installation 11m wide permanent easement

Relevant Element	Navitus Bay	Proposed Development
Overhead transmission line re-conductoring	From Mannington to Bramley to accommodate an additional 970MW power flow	From Mannington to Bramley to accommodate an additional 2000MW flow
Reactive power compensation on south coast circuits	Potentially east and west of Mannington	Potentially east and west of Mannington
Additional developer station in the vicinity of Mannington	AC sub-station including 220/400kV transformers, STATCOMs, and harmonic filters	HVDC converter station including 390/400kV transformers, AC/DC power electronic converters, and harmonic filters
Visual impact	Similar to Mannington sub-station, with outdoor equipment at 12m height, GIS Building at 14m height and lightning masts at 19m height	Indoor equipment in 2 large buildings, at 26m height, and outdoor equipment at 12m height, and lightning masts at 30m height
Landscaping	Tree planting around the station to minimise visual impact	Tree planting around the station to minimise visual impact
Audible noise	From transformers and cooling plant, with suitable mitigation measures	From transformers and cooling plant, with suitable mitigation measures

- 3.12.1.5. Taking into account the information presented regarding the feasibility of Mannington substation to accommodate AQUIND Interconnector today where Navitus Bay is not consented, it has been identified that that the effects that this would give rise to would potentially be too great for it to be reasonably considered that development consent could be obtained.
- 3.12.1.6. Had the Navitus Bay project been consented the surrounding landscape would include additional built development, the Mannington Substation would be further congested, and there would be an increased concentration of in-feed to the grid at Mannington, likely requiring further network upgrades of the type in any event identified for a connection of the Proposed Development at Mannington Substation.
- 3.12.1.7. It has in any event been shown that the Navitus Bay project is not a determinative factor in why a connection to Mannington Substation is not feasible and thus not a reasonable alternative to the Proposed Development.

4. ENVIRONMENTAL INFORMATION

4.1. VALIDITY OF ENVIRONMENTAL DATASETS

- 4.1.1.1. A review has been undertaken of the desk-based data sources used to inform the baseline and assessments for the Environmental Statement to confirm the validity of the data employed already, and investigate whether employing any more recent data that is now available would change the conclusions of the assessments.
- 4.1.1.2. Appendix 4.1 (document reference 7.8.3.7) provides the detailed results of the review of the data employed for the assessments and reports, and the impact on the ES using more recent data.
- 4.1.1.3. The survey data which was used to inform the Environmental Statement, submitted in support of the Application provided a thorough and robust basis on which to conclude the likelihood of significant environmental effects and the identification of appropriate mitigation.
- 4.1.1.4. A detailed table in Appendix 4.2 (document reference 7.8.3.8) demonstrates that the time elapsed since the examination of the application has not affected the validity of those conclusions.
- 4.1.1.5. Where necessary, to refine or confirm the need for prescribed mitigation to be implemented, the draft Order and associated documents referred to therein would secure additional surveys to be undertaken, prior to the commencement of the relevant aspect of the Proposed Development (as detailed in Appendix 4.2, document reference 7.8.3.8).

4.2. VALIDITY OF MARINE DATASETS AND ENVIRONMENTAL IMPACT ASSESSMENTS

- 4.2.1.1. A review has been undertaken of the survey and desk-based data sources that were used to inform the baselines and assessments for Chapters 6-14 of the Environmental Statement to determine the validity of the data employed already, and investigate whether employing any more recent data that is now available would change the conclusions of the assessments.
- 4.2.1.2. Consideration has also been given to any guidance documentation that may have changed methodologies or assessment conclusions. Commentary is provided in the bullets below and further in Appendix 4.3 (document reference 7.8.3.9) which provides the results of the review of the desk data sources undertaken for each marine technical chapter and reports upon the validity of these datasets employed for the existing assessments.
- **South Marine Plans (2018).** No updates to policies. Minor updates in 2022 regarding interpretation of terminology relating to EU Exit.
 - **Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (Chartered Institute for Ecology and Environmental Management ('CIEEM'), 2019)** employed by many of our marine ecology chapters. No update to these guidelines available.

- **JNCC guidelines for minimising the risk of injury to marine mammals from geophysical surveys (JNCC, 2017)** employed in Chapter 10 Marine Mammals. No update to guidelines available.
- **The protection of marine European Protected Species from injury and disturbance: Guidance for the marine area in England and Wales and the UK offshore marine area (Joint Nature Conservation Committee (‘JNCC’) et al., 2010)** employed in Chapter 10 Marine Mammals. No update to guidelines available.
- **Wessex Archaeology and The Crown Estate 2010 Model Clauses for Archaeological Written Schemes of Investigation: Offshore Renewables Projects. This guidance has been superseded by The Crown Estate (2021).** Archaeological Written Schemes of Investigation for Offshore Wind Farm Projects. Published by Wessex Archaeology on behalf of The Crown Estate however, this will not result in any change to the Chapter 14 Marine Archaeology assessment or Appendix 14.3 Outline Written Scheme of Investigation.

4.2.1.3. Table 4.1 below provides the results of the review of the survey data employed for the assessments and reports upon the validity of these datasets.

4.2.1.4. It is considered that the survey datasets employed within the 2019 ES remain valid and therefore there is no requirement to repeat or undertake any further marine survey work.

Table 4.10 – Validity of Marine Surveys

DISCIPLINE	SURVEY TYPE	SURVEY DATE(S)	DATE OF EXPIRY	NOTES ON VALIDITY (2023)
Intertidal and Benthic Habitats	Dropdown Video (still and video) Benthic Grab Sampling	Between July 2017 and March 2018	c.5 years	<p>Though not set out in guidance, the baseline data validity should be informed by the potential changes that may have occurred in the natural environment, i.e. due to natural processes. The validity of the data therefore depends on how stable or dynamic the environment is considered to be. Furthermore, the pre-construction surveys that are secured through Condition 3 of the Deemed Marine Licence (DML) will serve to mitigate any risk in respect of data validity in informing design with regard to sensitive habitats and the requirement to micro-site. These surveys will also provide an update to baseline conditions. Construction methodologies and final design presented in any pre-construction plans and documentation submitted to and approved by the MMO (as secured in Condition 4 of the DML) will therefore be based upon this updated data.</p> <p>In regard to the intertidal data, there is no change to the design of the project and there is no reason for this data to be called into question. There are no environmental sensitivities identified in this area and no mitigation was necessary as the design avoids impacts to intertidal habitats.</p>
	Intertidal Walkover Survey	July 2017		

DISCIPLINE	SURVEY TYPE	SURVEY DATE(S)	DATE OF EXPIRY	NOTES ON VALIDITY (2023)
Geophysical Survey	Multibeam Echosounder Side Scan Sonar Sub Bottom Profiler Magnetometer / Gradiometer	December 2017 to March 2018	Data will not expire given nature of features	Primary purpose of this dataset is for design and will provide an update to baseline conditions for construction methodologies and final design presented in any pre-construction plans and documentation submitted to and approved by the MMO (as secured in Condition 4 of the DML). The design of the project has not changed.
Geotechnical Survey	Core Penetration Test Vibrocores	June 2018 to August 2018	Data will not expire given nature of features	
Marine Water and Sediment Quality	Grab samples from benthic grab survey for contaminant analysis.	Between July 2017 and March 2018.	3-5 years	During examination, extensive consultation was undertaken with the MMO on the validity of the contaminated sediments samples collected and their shelf life. MMO concerns were mainly in regard to the dredging to be undertaken at the HDD exit pit. The final positions of AQUIND and the MMO are recorded in the 7.5.16 Statement of Common Ground (SoCG Rev 006) submitted at Deadline 8. Table 4.1 within the SoCG provides the details of matters where agreement is not reached between the MMO and AQUIND. The principle of a licence condition in the DML is agreed to address the potential for survey samples to be considered out of date and it is anticipated that AQUIND will need to submit a sediment sampling plan to the MMO and where they

DISCIPLINE	SURVEY TYPE	SURVEY DATE(S)	DATE OF EXPIRY	NOTES ON VALIDITY (2023)
				confirm that sediment sampling and analysis is required, sampling and analysis must be undertaken 6 months prior to commencement of dredging activities.
Physical Processes	This discipline relied upon the site data acquired during the geophysical, geotechnical, benthic ecology surveys, publicly available data, and the scientific literature. It is concluded that these data remain valid and thus the assessment of baseline conditions and potential environmental impacts remain valid. To confirm this, pre-construction surveys that are secured through Condition 3 of the DML will identify any changes to the seabed morphology and address any risk to the environment. These surveys will also provide an update to baseline conditions for construction methodologies and final design presented in any pre-construction plans and documentation submitted to and approved by the MMO (as secured in Condition 4 of the DML).			
Fish and Shellfish	No surveys conducted.			
Marine Mammals and Basking Sharks	No surveys conducted.			
Marine Ornithology	No surveys conducted.			
Shipping, Navigation and Other Marine Users	No surveys conducted.			
Commercial Fisheries	No surveys conducted.			
Marine Archaeology	Intertidal Walkover Survey	August 2018		No surveys were conducted whose primary objectives were archaeological. However, site data

DISCIPLINE	SURVEY TYPE	SURVEY DATE(S)	DATE OF EXPIRY	NOTES ON VALIDITY (2023)
	Geophysical/ Geotechnical Survey	December 2017 to March 2018 June 2018 to August 2018	Expiry of data is not based on time (see notes).	<p>acquired during geophysical and geotechnical surveys was assessed by an appropriately qualified marine archaeologist to enhance the baseline characteristics.</p> <p>As above, these data remain valid and thus the assessment of baseline conditions and potential impacts remain valid. To confirm this, pre-construction surveys that are secured through Condition 3 of the DML will address any risk to the environment as they will require archaeological input and will identify any future changes to the baseline characteristic. These surveys will also provide an update to baseline conditions for construction methodologies and final design presented in any pre-construction plans (which will include a Written Scheme of Investigation) and documentation submitted to and approved by the MMO (as secured in Condition 4 of the DML).</p>

- 4.2.1.5. Appendix 4.3 (document reference 7.8.3.9) provides the results of the review of the desk data sources undertaken for each marine technical chapter and reports upon the validity of these datasets employed for the existing assessments.
- 4.2.1.6. For all chapters, except for Chapter 13 Shipping and Navigation, the desk data sources reviewed have either not been superseded by anything more recent and therefore, the original datasets and the assessment conclusions remain valid, or, where more recent data has become available, then a review of these recent data has not indicated any significant changes that would impact the existing baseline or conclusions already made. Therefore, the existing assessments remain valid.
- 4.2.1.7. For Chapter 13 Shipping and Navigation, it was identified that more recent AIS data was available and as the updated guidance (MGN 654, which now supersedes MGN 543) advocates that datasets should not be less than 24 months old, it could not be initially concluded with a high level of confidence that the more recent data would not result in a material change to the baseline and therefore the assessment. Accordingly, a validation study has been undertaken which has reviewed two months of the most recent AIS dataset available and the results of this study are presented in Appendix 4.4 (document reference 7.8.3.10). The study concludes that there are no notable changes to the baseline from what was previously assessed and therefore, the conclusions of the existing assessment presented in Chapter 13 and Appendix 13.1 of the current ES remain valid.

5. CUMULATIVE EFFECTS ASSESSMENT

5.1. INTRODUCTION

5.1.1.1. Following the request from the SoS for further information of any new plans or projects which should be included in an updated cumulative and/or in-combination assessment, a full review of the position in respect of cumulative schemes has been undertaken. This has been conducted as a multi-stage process, as follows:

- reviewing and updating the status of schemes included in the previous assessment;
- removing schemes which have been completed since the submission of the original application and assessing them as part of an updated baseline; and
- identifying new developments that have been submitted and require consideration within the Cumulative Effects Assessment.

5.1.1.2. A supplementary cumulative assessment has therefore been prepared to capture and assess schemes submitted between submission of the Application and March 2023. Further detail can be found in Section 5.4 below.

5.2. LIMITATIONS AND ASSUMPTIONS

5.2.1.1. The supplementary cumulative assessment is based on publicly available information.

5.2.1.2. The additional list of developments was finalised on 17th March 2023. Any planning applications, status updates or additional information published since this date have not been included in the assessment.

5.2.1.3. The status of developments considered in the 2019 ES and the 2020 ES Addendum has been updated based on an analysis of desktop sources. This involved a combination of searches on local authorities planning registers and reviews of aerial images and Google StreetView.

5.2.1.4. Developments considered in the 2019 ES or the 2020 ES Addendum and subsequently fully constructed have been removed from the Stage 1 and 2 cumulative effect assessment tables (Appendices 5.3 to 5.15 of this ES Addendum (document references 7.8.3.13 to 7.8.3.25)). These have been coloured red and the text struck-through. Where these developments are now considered to be potential sensitive receptors, a review has been undertaken to identify representative receptors from the previous assessment and any potential additional or different significant effects upon these new receptors.

5.3. UPDATE TO EXISTING ONSHORE CUMULATIVE SCHEMES

- 5.3.1.1. As required by the Secretary of State, a full review of all cumulative developments considered in the 2019 ES and the 2020 ES Addendum has been undertaken. This was undertaken in March 2023 and involved reviewing desk-based sources in order to establish the current development status. The full breakdown is provided in the Appendix 5.1 (document reference 7.8.3.11) to this ES Addendum - Collated Onshore Long and Short List of Development (ES, ES Addendum and SoS Request Combined) (document ref:7.8.3.11). Where the status of projects have been updated or new cumulative developments have been identified these have been coloured in green in Appendix 5.1 (document reference 7.8.3.11). Where a development previously considered has been completed, it has been removed from the assessment. These have been coloured red and the text struck-through. Similarly, any applications which have been withdrawn from the planning process have been removed from the assessment. These have been coloured orange and the text struck-through.
- 5.3.1.2. The location of all cumulative developments identified in the 2019 ES and 2020 ES Addendum can be seen in Figure 5.1 (Document Reference: 7.8.3.27). These have been categorised based on their development status.
- 5.3.1.3. As part of the review three cumulative developments considered in the previous assessments have been withdrawn from the planning process. Therefore, these have been removed from the cumulative effects assessment, as there is no longer reasonable certainty about these developments.
- 5.3.1.4. The following developments have been withdrawn and therefore removed from the cumulative effects assessment:
- 24: Kendalls Wharf, Eastern Road, Portsmouth, PO3 5LY (17/01676/FUL);
 - 58: Portsmouth City Centre Highway Network incorporating parts of Mile End Road, Church Street, Commercial Road Marketway, Charlotte Street, Cascades Approach, Hope Street, Flathouse Road (17/02066/CS3); and
 - 3b: Development Land East of Horndean, Rowlands Castle Road, Horndean, Waterlooville (55562/006).
- 5.3.1.5. In addition, a total of 25 developments have been identified as being constructed since the submission of the Proposed Development. Therefore, it is no longer considered that there would be potential for cumulative effects to occur between these schemes and the Proposed Development. These schemes have therefore been removed from the cumulative effects assessment.
- 5.3.1.6. The following cumulative development have been completed and therefore removed from the assessment:
- 1: Land rear of 185-189A Lovedean Lane, Horndean, Waterlooville (54596/001);
 - 2: Land rear of, 179-189A Lovedean Lane, Horndean, Waterlooville (54596/002);
 - 7: 108 London Road, Widley, Waterlooville, PO7 5AA (APP/17/01009)
 - 8: Land at 38-44 London Road, Purbrook (APP/17/01141);
 - 12: Coastline between Ports Creek Railway Bridge and Kendall's Wharf, Portsmouth, PO3 5LY (14/01387/FUL);

- 17: Voyager Park, Portfield Road, Portsmouth, PO3 5FJ (11/00822/VOC as varied by 12/00159/VOC);
- 19: Land adjacent to 291 Locksway Road, Southsea (15/01330/FUL);
- 20: Land adj 1A Evelegh Road, Portsmouth, P06 1DH (16/01588/FUL);
- 25: Langstone Harbour Sports Ground, Eastern Road, Portsmouth (17/00182/FUL);
- 26: 170 Milton Road, Portsmouth, PO4 8PN (17/01097/FUL);
- 29: Admiral Lord Nelson School, Dundas Lane, Portsmouth, PO3 5XT (18/01891/FUL);
- 30: Unit 5, Interchange Park, Robinson Way, Portsmouth, PO3 5QD (18/01027/FUL);
- 31: Self-Drive Depot, Airport Service Road, Portsmouth, PO3 5PW (18/01050/FUL);
- 33: Cliff House, Dayton Lane, Portsmouth, PO6 1BS (18/01620/FUL);
- 34: 81 Solent Road, Portsmouth, PO6 1HJ (18/01618/FUL);
- 36: Land Bounded by Tanners Lane, Kidmore Lane and Anmore Road, Denmead (17/00335/FUL);
- 37: Land to rear of 32-36 Mill Road, Denmead, PO7 6PA (16/01861/FUL);
- 47: Land at Old Park Farm, Wimpey Site, Hambledon Road, Denmead (13/02843/FUL);
- 48: Berewood Phase 2 Development Site, London Road, Purbrook (APP/14/00032);
- 52: Berewood Phase 13A, Development Land to the West of Newlands Avenue, Waterlooville, Hampshire (17/01772/REM);
- 53: Berewood Phase 9b, West of Marrelsmoor Avenue, Waterlooville, Hampshire (17/02957/REM);
- 54: Berewood Phase 10a, South of Marrelsmoor Avenue, Waterlooville, Hampshire (17/02956/REM);
- 69: 36 Mill Road Denmead PO7 6PA (16/01861/FUL);
- 71: Land South of, Chalton Lane, Clanfield, Waterlooville (28463/002); and
- 76: 3 London Road, Purbrook, Waterlooville (APP/20/00212).

5.3.1.7.

None of the cumulative developments that have been removed from the cumulative assessment listed in paragraphs 5.3.1.4 and 5.3.1.6 were assessed as having significant cumulative effects.

5.3.1.8. These 25 newly constructed schemes are now considered to be baseline receptors to the Proposed Development. To establish whether the Proposed Development presents opportunities for potential significant effects on these receptors, a scoping exercise was undertaken to identify any topics which would likely be affected. As part of this scoping exercise, the following topics were identified as requiring further assessment to confirm any new potential significant effects:

- Visual amenity – construction and operational impacts;
- Traffic and transport – construction impacts only;
- Air quality – construction impacts only; and
- Noise and vibration – construction impacts only.

5.3.1.9. A review has been undertaken for these topics, reviewing the original assessment to establish representative receptors and identify potential significant effects. Professional judgement has been used to identify the effects at these new sites, based on the existing assessments undertaken to date.

5.3.1.10. As part of this review no new significant environmental effects have been identified to have the potential to occur above those assessed in the 2019 ES. The full review is presented in Appendix 5.2 of this Addendum (document reference 7.8.3.12).

5.4. ADDITIONAL ONSHORE DEVELOPMENTS

5.4.1.1. Since the submission of the Application in November 2019, and the ES Addendum in October 2020 an additional ten applications have been submitted which are relevant and require consideration within the Cumulative Effects Assessment.

5.4.1.2. The following applications for relevant onshore developments have come forward between May 2020 and March 2023:

- 3e: Development Land East of Horndean, Rowlands Castle Road, Horndean, Waterlooville (55562/013);
- 81: Land Bound By Hope Street & Church Street Roundabout to the north, Commercial Road (A3) and Lake Road to the east, Charlotte Street to the south And Hope Street to the West, Portsmouth (22/01243/CS3);
- 82: Tipner Interchange, Tipner Lane, Portsmouth (22/00024/OUT);
- 83: Post Office, Slindon Street, Portsmouth (20/00407/OUT);
- 84: 12-28 Arundel Street, Portsmouth (20/01464/FUL);
- 85: Queen Alexandra Hospital, Cosham, Portsmouth (21/00232/FUL);
- 86: Land west of Hulbert Road, Havant (APP/20/00441);
- 87: Havant Thicket, adjacent to Sir George Staunton Country Park, Reservoir and Pipe Line, Middle Park Way (APP/20/00990 & 51680/001);
- 88: Denmead Farm, Edneys Lane, Denmead, Waterlooville, Hampshire PO7 6JN (22/00447/FUL & 58038/003); and

- 89: Land at Forty Acres Farm, Havant Road, Havant (APP/18/00450 & APP/21/00605).

5.4.1.3. This ES Addendum assesses the potential for likely significant cumulative (inter-project) effects to arise in connection with the Proposed Development and these additional developments. This section of this ES Addendum should therefore be read in conjunction with Chapter 29 (Cumulative Effects) of the 2019 ES (Document Reference: 6.1.29) and Chapter 20 (Cumulative Effects) of the 2020 ES Addendum (Document Reference: 7.8.1) to understand the cumulative effects of the Proposed Development. The location of these additional developments, along with the developments identified in the 2019 ES and 2020 ES Addendum can be seen in Figure 5.1 (Document Reference: 7.8.3.27).

5.4.1.4. The legislation, policy and guidance detailed in Chapter 29 (Cumulative Effects) of the 2019 ES (Document Reference: 6.1.29) remains applicable with no relevant updates since October 2019 and the production of this addendum.

5.4.1.5. This addendum uses the same methodology as Chapter 29 (Cumulative Effects) of the 2019 ES (Document Reference: 6.1.29), in accordance with PINS Advice Note Seventeen (PINS, 2019) to assess inter-project effects. Each topic assessed the additional developments at Stage 1 & 2 (Appendices 5.3 to 5.15 of this Addendum (document references 7.8.3.13 to 7.8.3.25)) and then 3 & 4 (Appendix 5.16 of this Addendum (document reference 7.8.3.26)) if required.

5.4.1.6. There have been no changes to intra-project effects reported in Chapter 29 (Cumulative Effects) of the ES (Document Reference: 6.1.29) which relate solely to the effects related to the Proposed Development, rather than new development, and as such there is no need for any further information to be submitted in relation to intra-project effects.

5.4.1.7. In the 2019 ES, inter-project effects were summarised in the individual chapters, with the Cumulative Effects Assessment Matrix appended to each chapter and summarised in the Cumulative Effects Chapter. Whilst this addendum largely follows the same format at the 2019 ES, in this ES Addendum, the additional developments are assessed within the following sections.

5.5. ASSESSMENT OF ONSHORE LIKELY SIGNIFICANT INTER-PROJECT CUMULATIVE EFFECTS

5.5.1. ONSHORE INTER-PROJECT EFFECTS

5.5.1.1. Table 5.11 provides a summary of the additional developments which fall within each onshore environmental topic's ZOI for which significant cumulative effects were identified without mitigation.

5.5.1.2. Potential significant cumulative effects have been identified for landscape and visual amenity, soils and agricultural land use, traffic and transport and socio-economics.

5.5.1.3. In addition, a number of other effects in relation to the additional developments were identified in Appendix 5.16 of this Addendum (document reference 7.8.3.26), but which were identified as not being significant. Those are:

- Onshore Ecology – development 88;
- Heritage and Archaeology – development 88;
- Traffic and Transport – developments 81, 83, 87 and 89;

- Air Quality – development 88;
- Noise and Vibration – development 88;
- Socio-economics – developments 81, 82, 87 and 89; and
- Human Health – developments 81 and 87.

Table 5.11 – Summary of significant cumulative effects assessment matrix – Onshore

ID	Tier	Project Name and Reference	Topic	Assessment of cumulative effect with NSIP	Proposed mitigation	Residual cumulative effect
88	Tier 1	<p>Denmead Farm Edneys Lane Denmead Waterlooville Hampshire PO7 6JN</p> <p>Winchester City Council Ref: 22/00447/FUL</p> <p>East Hants Ref: 58038/003</p>	Landscape and visual impact	<p>A supplementary assessment of potential cumulative landscape and visual effects arising from the construction and operation of Denmead Solar Farm and Battery Storage Scheme (The Solar Farm Scheme) was undertaken in February 2023. This was prepared in response to the Solar Farm Application.</p> <p>The Assessment considered the Solar Farm Scheme alongside the Proposed Development and the Arcus/Statkraft Lovedean Greener Grid Battery Storage Scheme (The Battery Storage Scheme).</p> <p>In line with the assessment parameters set out in the Solar Farm application, receptors were considered during construction, at Year 1 and Year 15. The spatial scope of the assessment was defined as 2km, as the nature of the Solar Farm was deemed to be such that cumulative effects arising from beyond this distance were not likely to be significant.</p> <p>Whilst the assessment parameters between the Solar Farm Scheme and the Aquind Scheme differ, we find that cumulative effects arising from receptors identified in the Aquind Scheme that lie beyond the 2km Study Area are mitigated to the extent that no additional significant effects beyond those identified in the Aquind Scheme are likely to occur.</p> <p>A summary of this assessment is presented below.</p>	<p>Embedded mitigation:</p> <p>Existing and proposed native hedgerows are to be managed to a height of 3m or over around the perimeter to provide visual mitigation and to enhance visual enclosure.</p> <p>Proposed mitigation:</p> <p>If sites are constructed concurrently then site liaison and management would be required where practicable, to reduce effects, in relation to impacts on landscape, visual amenity, construction traffic management and noisy activities. This will be secured by Requirement 15 of the Order and implemented by the contractors through the Onshore Outline CEMP (REP9-005).</p>	<p>Full details of the impact on landscape character, landscape features and visual amenity for common receptors between the Proposed Development and the Solar Farm can be seen in the Appendix 5.16 Stage 3 & 4 Assessment Matrix, Table 1 (Document reference 7.8.3.26). A summary of this assessment, identifying the range of impacts is set out below.</p> <p>Landscape character:</p> <p>Localised Major adverse (significant) to Moderate-Minor adverse (not significant) cumulative effects during construction.</p> <p>Localised Major-Moderate adverse (significant) to Minor adverse (not significant) cumulative effects during operation Year 1.</p> <p>Localised Moderate adverse (not significant) to Minor-Negligible adverse (not significant) cumulative effects during operation Year 15.</p> <p>Landscape features:</p> <p>Localised Major-Moderate adverse (significant) to Moderate adverse (not significant) cumulative effects during construction.</p> <p>Localised Major-Moderate adverse (significant) to Moderate-Minor adverse (not significant) cumulative effects during operation Year 1.</p>

ID	Tier	Project Name and Reference	Topic	Assessment of cumulative effect with NSIP	Proposed mitigation	Residual cumulative effect
				<p>Section 1 Converter Station:</p> <p>The proposals comprise a ground mounted solar farm (with provision for a battery storage facility) with associated plant and equipment. It would be located on a number of land parcels extending to approximately 92ha in the vicinity of the Lovedean Substation in Hampshire.</p> <p>Sensitive receptors include:</p> <p>Landscape character areas LCA D: Downland Mosaics (2a Hambledon to Clanfield Downland (Mosaics) (SDNP), LCA 17: Hambledon Downs (which includes the Converter Station) (WCC), LCA 18: Forest of Bere Lowlands (WCC), LCA 3fi: Downland Mosaic: Horndean, Clanfield Edge (EHDC), and LCA 10a: Wooded Claylands: Havant Thicket and Southleigh Forest (EHDC). Landscape features including the sites, topography and landform, land use, buildings and infrastructure, watercourses and drainage, and vegetation.</p> <p>Visual receptors such as local residents, recreational users of PRow in the immediate vicinity, and users of local highway.</p>		<p>Localised Moderate adverse (not significant) to Moderate beneficial (not significant) cumulative effects during operation Year 15.</p> <p>Visual Amenity:</p> <p><u>Residential receptors</u></p> <p>Major-Moderate adverse (significant) cumulative effects on residential receptors during construction.</p> <p>Moderate adverse (not significant) cumulative effects on residential receptors during operation Year 1.</p> <p>Moderate-Minor adverse (not significant) cumulative effects on residential receptors during operation Year 15.</p> <p><u>Recreational receptors</u></p> <p>Major adverse (significant) to Minor adverse (not significant) cumulative effects on recreational receptors during construction.</p> <p>Major adverse (significant) to Neutral (not significant) cumulative effects on recreational receptors during operation Year 1.</p> <p>Moderate adverse (not significant) to Neutral (not significant) cumulative effects on recreational receptors during operation Year 15.</p> <p><u>Highways receptors</u></p> <p>Major-Moderate adverse (significant) to Moderate adverse (not significant) cumulative effects on highways receptors during construction.</p>

ID	Tier	Project Name and Reference	Topic	Assessment of cumulative effect with NSIP	Proposed mitigation	Residual cumulative effect
						<p>Moderate adverse (not significant) to Moderate-Minor adverse (not significant) cumulative effects on highways receptors during operation Year 1.</p> <p>Moderate-Minor adverse (not significant) to Minor adverse (not significant) cumulative effects on highways receptors during operation Year 15.</p> <p>Effective site supervision and management of works would reduce construction phase effects to a level that is not significant.</p>
88	Tier 1	<p>Denmead Farm Edneys Lane Denmead Waterlooville Hampshire PO7 6JN</p> <p>Winchester City Council Ref: 22/00447/FUL</p> <p>East Hants Ref: 58038/003</p>	Soils and Agricultural Land Use	<p>Agricultural land impacts were scoped out of the Environmental Statement for the Solar Farm, with a separate Agricultural Land Classification report prepared showing proposal would involve 12.5ha of Subgrade 3a (Best and Most Versatile (BMV)) and 75.9ha Subgrade 3b (non-BMV). No significant effects identified.</p> <p>The Environmental Statement for the Proposed Development identified minor to moderate temporary and permanent adverse effects on agricultural land, and also specifically on BMV agricultural land in Section 1 of the scheme (total of 35ha of agricultural land of mostly Subgrade 3b, with 4.4ha BMV Subgrade 3a).</p> <p>Cumulative effects on all agricultural land would increase to moderate adverse effect but remain at minor to moderate adverse for BMV land.</p>	No applicable mitigation.	<p>Due to the combined area of agricultural land required in Section 1, there would be a temporary and permanent moderate adverse (significant) effect on agricultural land.</p> <p>In Section 1 there would be a temporary and permanent minor to moderate adverse (not significant) effect on BMV agricultural land,</p>

ID	Tier	Project Name and Reference	Topic	Assessment of cumulative effect with NSIP	Proposed mitigation	Residual cumulative effect
88	Tier 1	Denmead Farm Edneys Lane Denmead Waterlooville Hampshire PO7 6JN Winchester City Council Ref: 22/00447/FUL East Hants Ref: 58038/003	Traffic and Transport	Construction traffic to use the same routing for the construction of the Solar Farm and the Proposed Development. Should the construction periods coincide, there is the potential for the magnitude of impact and duration of effect on the construction traffic route to increase.	Requirement 17 of the of the dDCO pertaining to construction traffic management would be updated to ensure that should construction periods coincide the previously stated maximum daily number of 71 two-way HGV movements at the access junction would not be exceeded by the combined construction of both the solar farm and the Proposed Development. A suitable reciprocal condition will also be imposed on any planning permission which may be granted for the solar farm, as per the request of Hampshire County Council dated 6 th February in relation to that application.	There would be a negligible (not significant) cumulative effect on the construction traffic route during construction. The restriction on the maximum number of two-way daily HGV movements remains the same as was previously agreed under Requirement 17 and as such the impact and duration of effect remains unchanged.
88	Tier 1	Denmead Farm Edneys Lane Denmead Waterlooville Hampshire PO7 6JN Winchester City Council Ref: 22/00447/FUL East Hants Ref: 58038/003	Socio-economics	The construction and operation of the solar farm would lead to employment generation. This would result in a cumulative effect on socio-economic receptors when considered alongside the job generation from the Proposed Development. There are a number of socio-economic receptors that could be affected by the construction of both the schemes. These include recreational routes, residences as well as recreational and business receptors, including Touch and Go Agility, Lovedean Granary B&B, Bird in Hand, Bezels Countryside Boarding Kennels and Cattery, Lower Chapters Bed and Breakfast as well as Shrover Hall. There could be increased disruption from reduced access, noise, dust and visual annoyance, traffic	If sites are constructed concurrently then site liaison and management would be required where practicable, to reduce effects, in relation to impacts on landscape, visual amenity, construction traffic management and noisy activities. This will be secured by Requirement 15 of the Order and implemented by the contractors through the Onshore Outline CEMP (REP9-005).	There would be a minor beneficial (not significant) cumulative effect in relation to employment generation during construction and negligible effect during operation within the context of the labour market. There would be a moderate adverse (significant) cumulative effect in relation to disruption and disturbance of socio-economic receptors during the construction of the scheme. During operation, there would be a minor adverse (not significant) cumulative effect as a result of reduced amenity of socio-economic receptors.

ID	Tier	Project Name and Reference	Topic	Assessment of cumulative effect with NSIP	Proposed mitigation	Residual cumulative effect
				<p>congestion and reduced amenity from multiple sources, in particular for Touch and Go Agility if the business uses the fields near the schemes for dog training. During operation, there would be reduced amenity as a result of the operation of both of the schemes, in particular on the Monarchs Way Long Distance Route.</p>		

5.6. ONSHORE MITIGATION AND ENHANCEMENT MEASURES

5.6.1. ONSHORE INTER-PROJECT MITIGATION

- 5.6.1.1. With respect to potential significant effects on tranquillity; site liaison, management and phased timing of works would reduce effects in combination with development 88. These will be detailed in the Onshore Outline CEMP (REP9-005), secured by Requirement 15 of the Order and implemented by the contractors.
- 5.6.1.2. For socio-economic effects in combination with development 88; site supervision and management would be required to reduce construction effects relating to traffic and noise, if construction takes place concurrently. These will be detailed in the Onshore Outline CEMP (REP9-005), secured by Requirement 15 of the Order and implemented by the contractors.
- 5.6.1.3. With respect to the potential significant in combination traffic and transport effects with development 88; it is proposed that the maximum daily number of 71 two-way HGV movements at the access junction would not be exceeded by the concurrent construction of both the solar farm and the Proposed Development. This would be secured by an update to Requirement 17 of the Order, in addition to a planning condition to be imposed on any planning permissions granted for this development and the entering into of a co-operation agreement between the Applicant and the application for this development.

5.7. CONTINUING VALIDITY OF MARINE CUMULATIVE EFFECTS ASSESSMENTS

- 5.7.1.1. A review has also been undertaken of the existing cumulative assessments for Chapters 6-14 of the Environmental Statement.
- 5.7.1.2. The cumulative long list for each topic chapter has been updated on 14 March 2023 and the Stage 1 and 2 assessments were re-assessed and are presented as an Updated Cumulative Matrix for each topic, presented in Appendices 5.18 to 5.26 (document references 7.8.3.28 to 7.8.3.36).
- 5.7.1.3. In each cumulative matrix, projects that are no longer in the datasets or where applications have been refused have strikethroughs in the matrix and are coloured red. These projects no longer have valid marine licences/permissions and are considered to be removed from the cumulative scenario as a result. In addition, projects where the permission/licence end dates are before September 2024 also have strikethroughs and are coloured red, as the revised indicative construction programme for the Proposed Development is Q4 2024-2026 (which is identified to be the earliest point at which construction could commence) and therefore, those projects will be completed prior to construction works for the Proposed Development having begun. None of these projects have been identified as new receptors.
- 5.7.1.4. New projects that have come forward have been included within the matrix and are illustrated in Figures 29.1A –29.5A presented in Appendix 5.27 (document reference 7.8.3.37). New projects were included where licence end dates fell beyond September 2024 and where the marine works fell within the Zones of Influence and were of a nature and scale to be considered for cumulative assessment. In addition, where project updates are available these have been taken into account and included below. These projects and any changes made in respect of projects previously identified and which remain relevant are coloured in green.

- 5.7.1.5. For all of the marine related chapters, the update to the cumulative matrices has not resulted in any additional significant cumulative effects being identified. Where the update has identified changes to existing cumulative projects or additional projects to be included within the assessment, it has been concluded that the changes to the project or the new project/s identified are in a location, or are of such a small scale and limited nature of works as to not result in cumulative effects. As such, it can be concluded that the conclusions of the existing marine cumulative effects assessments remain valid as no additional cumulative effects have been identified.

5.8. CONCLUSION

- 5.8.1.1. A full review of all cumulative development considered in the 2019 ES and 2020 ES Addendum has been undertaken. An updated onshore long list of development (see Appendix 5.1 - document reference 7.8.3.11) has been produced.

- 5.8.1.2. As part of this review, a total of 28 onshore developments included in the previous cumulative effects assessment are no longer considered to present potential cumulative effects. None of these cumulative developments were assessed as having significant cumulative effects. Of these 25 developments have been constructed and now represent baseline receptors to the Proposed Development, with a further three development applications withdrawn from planning. For those new constructed sites, a review of the original assessment has been undertaken and no new significant effects have been identified for these receptors. The findings of the 2019 ES and 2020 ES Addendum remain valid.

- 5.8.1.3. A review of the local authorities' Planning Register has identified an additional ten additional developments which are relevant to the Proposed Development. Significant residual cumulative effects were predicted to result from the cumulative contribution of impacts from the Proposed Development with one development for landscape and visual amenity, temporary and permanent loss of agricultural land and disruption and disturbance socio-economics receptors. The significant cumulative effects were identified in relation to development 88, the solar farm at Denmead Farm, Edneys Lane, Denmead, Waterlooville (Winchester City Council Ref: 22/00447/FUL & East Hants District Council Ref: 58038/003).

- 5.8.1.4. For all of the marine related chapters, the update to the cumulative matrices has not resulted in any additional significant cumulative effects being identified. As such, the conclusions of the marine cumulative effects assessments remain valid.

