



XLINKS MOROCCO-UK POWER PROJECT

Preliminary Environmental Information Report

Volume 4, Chapter 5: Inter-related Effects



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Glossary

Term	Meaning
Access land	The Countryside and Rights of Way Act 2000 gives a public right of access to land mapped as 'open country' (mountain, moor, heath and down) or registered common land. These areas are known as 'access land'.
Alverdiscott Substation site	The National Grid Electricity Transmission substation site within which the Alverdiscott Substation sits.
Annoyance (dust)	Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance, as defined by the Institute of Air Quality Management.
Applicant	Xlinks 1 Limited.
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater.
Benthic	Associated with or occurring on the bottom of the seabed.
Best and Most Versatile	Agricultural land that is the best and most versatile for growing crops.
Biodiversity Net Gain	An approach to development that leaves biodiversity in a better state than before. Where a development has an impact on biodiversity, developers are encouraged to provide an increase in appropriate natural habitat and ecological features over and above that being affected to ensure that the current loss of biodiversity through development will be halted and ecological networks can be restored.
Bipole	A Bipole system is an electrical transmission system that comprises two Direct Current conductors of opposite polarity.
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Construction Environmental Management Plan	A document detailing the overarching management principles for construction, which includes construction-related environmental management measures, pollution prevention measures, the selection of appropriate construction techniques and monitoring processes.
Converter Site	The Converter Site is proposed to be located to the immediate west of the existing Alverdiscott Substation site in North Devon. The Converter Site would contain two converter stations (known as Bipole 1 and Bipole 2) and associated infrastructure, buildings and landscaping.
Converter station	Part of an electrical transmission and distribution system. Converter stations convert electricity from Direct Current (DC) to Alternating Current (AC), or vice versa.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
Dust	Solid particles suspended in air or settled out onto a surface after having been suspended in air, as defined by the Institute of Air Quality Management.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Electromagnetic Fields	EMFs are part of the natural world, and are produced wherever electricity is generated, transmitted, or used.

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Term	Meaning
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Fishery	A group of vessel voyages which target the same species or use the same gear.
Heritage asset	A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Inter-related effects	Multiple effects on the same receptor as a result of the Proposed Development. These occur when a series of the same effect acts on a receptor over time to produce a potential additive effect or where a number of separate effects, such as noise and habitat loss, affect a single receptor.
National Policy Statement(s)	The current national policy statements published by the Department for Energy Security and Net Zero in 2023.
Onshore HVDC Cable Corridor	The proposed corridor within which the onshore High Voltage Direct Current cables would be located.
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project, and which helps to inform consultation responses.
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if assessed in isolation in these three phases.
Proposed Development	The element of the Xlinks Morocco-UK Power Project within the UK, which includes the offshore cables (from the UK Exclusive Economic Zone to landfall), landfall site, onshore Direct Current and Alternating Current cables, converter stations, road upgrade works and, based on current assumptions, the Alverdiscott Substation Connection Development.
Proposed Development Draft Order Limits	The area within which all offshore and onshore components of the Proposed Development are proposed to be located, including areas required on a temporary basis during construction (such as construction compounds).
Protected species	A species of animal or plant which it is forbidden by law to harm or destroy.
Receptor	The element of the receiving environment that is affected.
Receptor-led effects	Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor or receptor group. As an example, multiple effects on a given receptor group such as local residents – construction dust and noise, increased traffic and visual change, etc may interact to produce a greater effect on this receptor than when the effects are considered in isolation.
Runoff	Runoff occurs when there is more water than land can absorb. The excess liquid flows across the surface of the land.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory

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Term	Meaning
	stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Scoping Report	The report setting out the proposed scope of the Environmental Impact Assessment process. The Scoping Report for the Proposed Development was submitted to the Planning Inspectorate (on behalf of the Secretary of State) in January 2024.
Study area	This is an area which is defined for each environmental topic which includes the Proposed Development Draft Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Xlinks Morocco-UK Power Project	The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the 'Project').

Acronyms

Acronym	Meaning
CEMP	Construction Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
ES	Environmental Statement
GHG	Greenhouse Gas
GVA	Gross Value Added
HDD	Horizontal Directional Drilling
MoD	Ministry of Defence
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NTM	Notice to Mariners
OMU	Other Marine Users
On-CEMP	Onshore Construction Environmental Management Plan
PEIR	Preliminary Environmental Information Report
PEXA	Military exercise areas and danger areas
PRoW	Public Right of Way
UK	United Kingdom
VMP	Vessel Management Plan

5 INTRODUCTION

5.1 Background

- 5.1.1 The Preliminary Environmental Information Report (PEIR) presents the preliminary findings of the Environmental Impact Assessment (EIA) work undertaken to date for the United Kingdom (UK) elements of the Xlinks Morocco-UK Power Project. For ease of reference, the UK elements of the Xlinks Morocco-UK Power Project are referred to as the ‘Proposed Development’.
- 5.1.2 This chapter considers the potential offshore and onshore inter-related effects associated with potential impacts of the Proposed Development during the construction, operation and maintenance, and decommissioning phases.
- 5.1.3 The assessment presented in this chapter has taken into account relevant impact assessments provided in the PEIR as set out in **Table 5.1**.

Table 5.1: Topic chapters of the PEIR used to inform the assessment

Topic Chapters
Volume 2 – Effects on the Onshore Environment
Chapter 1: Onshore Ecology and Nature Conservation
Chapter 2: Historic Environment
Chapter 3: Hydrology and Flood Risk
Chapter 4: Geology, Hydrogeology and Ground Conditions
Chapter 5: Traffic and Transport
Chapter 6: Noise and Vibration
Chapter 7: Air Quality
Chapter 8: Land Use and Recreation
Volume 3 – Effects on the Offshore Environment
Chapter 1: Benthic Ecology
Chapter 2: Fish and Shellfish Ecology
Chapter 3: Commercial Fisheries
Chapter 4: Marine Mammals and Sea Turtles
Chapter 5: Shipping and Navigation
Chapter 6: Other Marine Users
Chapter 7: Marine Archaeology and Cultural Heritage
Chapter 8: Physical Processes
Chapter 9: Offshore Ornithology
Volume 4 – Combined Effects on the Onshore and Offshore Environment
Chapter 1: Climate Change
Chapter 2: Landscape, Seascape and Visual Resources
Chapter 3: Socioeconomics and Tourism
Chapter 4: Human Health

- 5.1.4 The PEIR will inform statutory consultation. Following consultation, comments on the PEIR and any refinements in design will be reviewed and taken into account, where appropriate, in preparation for the Environmental Statement (ES) that will

accompany the application to the Planning Inspectorate for a development consent order.

5.2 Legislative and Policy Context

5.2.1 Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Regulation 5(2)(e)) require that the EIA process should identify, describe and assess the significant effects in relation to:

‘(e) the interaction between the factors referred to in sub-paragraphs (a) to (d) [population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape]’.

Planning Policy Context

5.2.2 The Proposed Development will be located within the UK Exclusive Economic Zone (EEZ) offshore waters (beyond 12 nautical miles (nm) from the English coast) and inshore waters, with the onshore infrastructure located wholly within Devon, England. As set out in Volume 1, Chapter 1: Introduction, of the PEIR, the Secretary of State for the Department for Energy Security and Net Zero (DESNZ) has directed that elements of the Proposed Development are to be treated as development for which development consent is required under the Planning Act 2008, as amended.

National Policy Statements

5.2.3 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to the Proposed Development, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government’s policy for the delivery of major energy infrastructure (Department for Energy Security & Net Zero 2023a);
- NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security & Net Zero 2023b); and
- NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security & Net Zero 2023c).

5.2.4 Of the three NPSs identified, one of these, NPS EN-1 addresses the consideration of inter-related effects, and this is summarised in **Table 5.2** below.

Table 5.2: Summary of relevant NPS policy

Summary of NPS requirement	How and where considered in the PEIR
NPS EN-1	
<i>‘The Secretary of State should consider how the accumulation of, and interrelationship between, effects might affect the environment, economy, or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.’ (paragraph 4.3.19).</i>	Project lifetime effects and receptor-led effects are assessed throughout this chapter of the PEIR.

National Planning Policy Framework

5.2.5 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2023) sets out the planning policies for England. In relation to various specific environmental topics, the NPPF reiterates the need to consider inter-related effects.

5.3 Consultation and Engagement

5.3.1 In January 2024, the Applicant submitted a Scoping Report to the Planning Inspectorate, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance, and decommissioning phases of the Proposed Development. It also described those topics or sub-topics which are proposed to be scoped out of the EIA process and provided justification as to why the Proposed Development would not have the potential to give rise to significant environmental effects in these areas.

5.3.2 Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 7 March 2024. Key issues raised during the scoping process specific to the inter-related effects chapter are listed in **Table 5.3**, together with details of how these issues have been addressed within the PEIR.

Table 5.3: Summary of Scoping Responses

Comment	How and where considered in the PEIR
Planning Inspectorate	
<p><i>'The Scoping Report states that inter-related effects will be considered in this chapter of the ES, including in relation to potential for a reduction in groundwater levels to impact on flow of surface watercourses. It is not apparent from the Scoping Report where this would be considered and presented. The ES must include an assessment of any likely significant effects on groundwater flow arising from the Proposed Development. Any proposed mitigation and monitoring with regards to groundwater flow effects must be clearly described in the ES, including likely efficacy. Mitigation and monitoring measures should be appropriately secured.'</i></p>	<p>Inter-related effects are presented within Volume 4, Chapter 5: Inter-related Effects of the PEIR. The impact of the Proposed Development on groundwater quantity in aquifers is provided within Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the PEIR, including the proposed mitigation measures and how they would be secured.</p>

5.4 Methodology

Study Area

5.4.1 Due to the differing spatial extent of potential effects experienced by different receptors, the study area and baseline environments for potential inter-related effects varies according to individual topics and receptor(s). The potential inter-related effects considered in this chapter are, therefore, also limited to the study areas defined in each of the topic chapters.

Impact Assessment Methodology

Overview

5.4.2 Specific to the inter-related effects impact assessment, the Planning Inspectorate Advice Note 9 (Planning Inspectorate, 2018) has been considered while writing this chapter, with specific regard to the following text (paragraph 4.13):

‘ensure that interactions (interactions between aspect assessments includes where a number of separate impacts, e.g. noise and air quality, affect a single receptor such as fauna) between aspect (the Planning Inspectorate refers to ‘aspects’ as meaning the relevant descriptions of the environment identified in accordance with the EIA Regulations) assessments are taken into account relevant to the worst case scenario(s) established and that careful consideration is given to how these are assessed.’

5.4.3 The approach to assessing inter-related effects has followed a four-stage process, as summarised in **Table 5.4** below and discussed in the following paragraphs.

Table 5.4: Summary of staged approach to the inter-related effects assessment

Stage	Description
1	Assessments undertaken for individual EIA topic areas within Volume 2, 3 and 4.
2	Review of the likely receptor(s)/resource(s) affected by more than one impact through analysis of the assessment of effect sections undertaken for individual EIA topic areas within PEIR chapters.
3	Identification of potential combination effects on these receptor groups through review of the topic assessments in the PEIR chapters.
4	Assessment undertaken on how individual effects may combine to create inter-related effects on each receptor group for: <ul style="list-style-type: none"> • ‘project lifetime effects’, i.e., during construction, operation and maintenance and decommissioning phases; and • ‘receptor-led effects’, i.e., multiple simultaneous effects on a single receptor/resource.

Stage 1: Topic-Specific Assessments

5.4.4 The first stage of the assessment was undertaken as part of the individual PEIR topic assessments i.e. comprising the individual assessment of effects on receptors across the construction, operation and maintenance and decommissioning phases of the Proposed Development. These topic specific assessments are reported as significance levels using methodologies set out in the respective chapters. Those assessments of significance are compiled for ease in this chapter i.e. within **Section 5.5**.

Stage 2: Identification of Receptor Groups

5.4.5 Stage 2 involved a review of the assessments undertaken in the topic chapters to identify ‘receptor groups’ requiring assessment within the inter-related effects assessment. The term ‘receptor group’ is used to highlight that the approach taken for the inter-related effects assessment will not consider each individual receptor, but rather potentially sensitive groups of receptors.

5.4.6 The potential receptor groups have been identified from the topic assessments (see **Table 5.1**) and these have been considered in further detail at Stage 3 and

4. The specific potential receptor groups can be found within the respective PEIR chapters within Volume 2, 3 and 4.

Stage 3: Identification of Potential Inter-Related Effect on Receptor Groups

5.4.7 Following the identification of receptor groups the potential inter-related effects on the receptor groups were identified. This was informed by the topic assessments together with expert judgement. Consideration was given to the potential for inter-related effects to arise for each of the identified receptor groups across each phase of the Proposed Development i.e. construction, operation and maintenance and decommissioning (project lifetime) as well as the interaction of multiple effects on a receptor (i.e. receptor-led effects).

Stage 4: Assessment of Inter-Related Effects on Each Receptor Group

5.4.8 A qualitative assessment has been undertaken to identify project lifetime effects and receptor led effects as defined in **Table 5.5** below.

Table 5.5: Definitions of project lifetime and receptor-led inter-related effects

Effect Type	Description
Project lifetime effects	Assessment of the scope for effects that occur throughout more than one phase of the Proposed Development (construction, operation and maintenance, and decommissioning) to interact to potentially create a more significant effect on a receptor than if assessed in isolation in these three phases.
Receptor-led effects	Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor or receptor group. As an example, multiple effects on a given receptor group such as local residents – construction dust and noise, increased traffic and visual change, etc may interact to produce a greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

5.4.9 The assessment has considered the potential for individual effects to interact to create a different or greater effect. Where potential project lifetime effects on receptor groups have already been considered within the topic chapters of the PEIR, these receptor groups have not been considered further in this assessment of inter-related effects.

5.4.10 Unlike the topic specific assessments, no attempt is made in this chapter to assign a level of significance to an identified inter-related effect. Rather, professional judgement has been used to identify any potential inter-related effects that could occur at receptor locations. A statement has been made as to whether, in the consultant’s opinion, the potential inter-related effects would be worse or better than the effects considered alone, and if so, whether this would be adverse or beneficial.

5.5 Assessment of Inter-Related Effects

- 5.5.1 Due to the preliminary nature of the assessment presented within this PEIR, a detailed assessment of the significance of the likely inter-related effects has not been undertaken. Instead, a discussion on the effects likely to arise within these receptor groups has been presented and consideration of whether the inter-related effects would be any greater than those considered in the PEIR. When an updated assessment is undertaken at the ES stage, a more descriptive assessment of inter-related effects will be undertaken.
- 5.5.2 The receptor groups for each topic are identified within the individual topic chapters (see Volumes 2, 3 and 4, of the PEIR).
- 5.5.3 The assessment of inter-related effects is presented within tables in this section, as follows:
- **Table 5.6** - Onshore Ecology and Nature Conservation;
 - **Table 5.7** - Historic Environment;
 - **Table 5.8** - Hydrology and Flood Risk;
 - **Table 5.9** - Geology, Hydrogeology and Ground Conditions;
 - **Table 5.10** - Traffic and Transport;
 - **Table 5.11** - Noise and Vibration;
 - **Table 5.12** - Air Quality;
 - **Table 5.13** - Land Use and Recreation;
 - **Table 5.14** - Benthic Ecology;
 - **Table 5.15** - Fish and Shellfish Ecology;
 - **Table 5.16** - Commercial Fisheries;
 - **Table 5.17** - Marine Mammals and Sea Turtles;
 - **Table 5.18** - Shipping and Navigation;
 - **Table 5.19** - Other Marine Users;
 - **Table 5.20** - Marine Archaeology and Cultural Heritage;
 - **Table 5.21** - Physical Processes;
 - **Table 5.22** - Offshore Ornithology;
 - **Table 5.23** - Climate Change;
 - **Table 5.24** - Landscape, Seascape and Visual Resources;
 - **Table 5.25** - Socioeconomics and Tourism; and
 - **Table 5.26** - Human Health.

Table 5.6: Onshore ecology and nature conservation – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Inter-related Significance
Project Lifetime Effects		
Potential impacts of habitat loss or damage	Following the implementation of mitigation strategies set out for the Proposed Development, the significance of project lifetime effects are unlikely to exceed those stated in the PEIR for any individual phase. The assessment on construction phase effects has been undertaken assuming that all elements could take place over the long-term (i.e. up to seven years), although it is recognised that many of the task level workings will not in fact take this long. Operation and maintenance phase impacts will be restricted to those associated with the Converter Site only and these will not increase above that identified during the construction phase. Decommissioning effects, given the time-frame intervening, will also be unlikely to have significant inter-related effects above those identified for construction phase, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment
Potential impacts of fragmentation, contamination	In considering the significance of project lifetime effects in relation to fragmentation and potential contamination, the inter-related effects are unlikely to exceed those assessed for individual phases, particularly construction, assuming that all proposed mitigation set out is implemented. Decommissioning effects, given the time-frame intervening, will also be unlikely to have significant inter-related effects above those identified for construction phase, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	
Potential impacts of disturbance to habitats utilised by protected or otherwise notable species or injuries to individuals	Considering the project lifetime effects on protected or otherwise notable species, assuming that all proposed mitigation set out is implemented, it is unlikely that these will exceed the significance of effects identified for individual phases of the scheme. Those identified for construction phase are likely to represent the most significant effects, with little additional effect to be expected during the operational phase. Decommissioning effects are also unlikely to exceed those identified for construction, although the ecological baseline at that time will require careful review to ensure that receptors currently identified are still relevant at that time.	
Receptor-led Effects		
The potential for receptor-led effects associated with elements from other disciplines on the onshore ecology and nature conservation would be a result of impacts such as habitat effects from issues such as spills/contamination during all phases, construction air contamination and or noise disturbance. Changes to habitats as a possible result of changes to water regime resulting from the Proposed Development are unlikely, although changes over time resulting from climate change may occur. Effects on onshore ecology and nature conservation are considered within this chapter.		

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Description of Impact	Likely significant inter-related effects	Inter-related Significance
<p>Effects on the hydrological regime are also assessed in Volume 2, Chapter 3, Hydrology and Flood Risk of this PEIR, and other potential effects on ground conditions are assessed in Volume 2, Chapter 4, Hydrogeology, Geology and Ground Conditions of this PEIR. Similarly, effects on air quality and potential disturbance are addressed in Volume 2, Chapter 7, Air Quality and Volume 2, Chapter 6, Noise and Vibration respectively of this PEIR.</p> <p>Positive effects such as those associated with habitat creation necessary for Biodiversity Net Gain are set out in this chapter and also detailed in Volume 4, Chapter 2 Landscape, Seascape and Visual Resources.</p> <p>Assuming that mitigation measures set out in the various chapters above are implemented, it is unlikely that the significance of inter-related receptor-led effects would increase over that which has already been reported in the individual chapters. Therefore there is no change from the inter-related assessment of receptor-led effects.</p>		

Table 5.7: Historic environment – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Loss of, or damage to, buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest.	Potential effects arising from impacts on buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest could occur during the construction phase. However, the assessment does not identify potential effects on these resources during the operations and maintenance phase. There is potential for impacts on buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest during the decommissioning phase but this is unlikely as decommissioning should be within the same footprint as construction and therefore all buried archaeological remains and deposits of geoarchaeological and palaeoenvironmental interest would have already been dealt with. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment
Change within the settings of designated heritage assets	Potential effects on designated heritage assets resulting from change within their settings could occur during construction, operation and maintenance and decommissioning. However, this only applies to heritage assets that have some level of intervisibility with one or both of the converter stations. This is a relatively small number of assets and therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group that are larger than the effects assessment within any individual phase.	
Change to the character of the historic landscape	Potential effects on the character of the historic landscape could occur during all three phases, with greatest change likely to be in the area of the converter stations. However, there are no historic landscape areas with a value greater than low value, and it is considered that there is no potential for project lifetime effects to occur on this receptor group that are larger than the effects assessment within any individual phase.	
Receptor-led Effects		
For the receptor-led effects, overall it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from inter-related assessment.		

Table 5.8: Hydrology and flood risk – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Impacts to groundwater, including aquifers.	Potential effects on aquifers, groundwater quality and flow during the construction, operation and maintenance and decommissioning phases. However, it is not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
Receptor-led Effects		
<p>There is potential for receptor led effects between possible groundwater contamination and surface water hydrology, especially in relation to the watercourse crossings via Horizontal Directional Drilling (HDD) or other trenchless techniques. Mitigation is proposed to ensure that contamination of groundwater does not occur. This is addressed in Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions, of the PEIR. There are also potential effects associated with ecology and potential pollution of watercourses during construction and this is addressed in Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the PEIR.</p> <p>There is also the potential receptor led effects associated with possible contamination or spillages and pollution of watercourses and therefore, water quality, including those potentially used as potable source, during construction. This is addressed in Volume 4, Chapter 4: Human Health of the PEIR.</p> <p>There is the potential for receptor led effects between dust emissions and surface water hydrology during construction. Tertiary mitigation is proposed to ensure suitable management of dust, such that the impacts to the quality of surface water receptors do not occur. This is addressed in Volume 2, Chapter 7: Air Quality of the PEIR.</p> <p>Overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

Table 5.9: Geology, hydrogeology and ground conditions – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Impacts to geological designated sites, land/soil contamination.	Geological designated sites and any existing land contamination would only be impacted during the construction phase and therefore there is no potential for project lifetime effects to occur on this receptor group.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
Impacts to groundwater, including aquifers.	Potential effects on aquifers, groundwater quality and flow during the construction, operation and maintenance and decommissioning phases. However, it is not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.	
Receptor-led Effects		
<p>There is potential for receptor led effects between possible groundwater contamination and surface water hydrology, especially in relation to the HDD (or other trenchless technology) proposed in proximity to the River Torridge and the adjacent potential contamination. There is also the potential for receptor led effects between groundwater dependent habitats or sites designated for conservation and possible groundwater contamination. Secondary mitigation is proposed to ensure that contamination of groundwater does not occur. This is addressed in Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions of the PEIR and Volume 2, Chapter 3: Hydrology and flood risk of the PEIR.</p> <p>There is potential for receptor led effects between historical contamination disturbance or spillages and land use and soil, especially in relation to human health receptors. However, mitigation proposed as part of the Onshore Construction Environmental Management Plan(s) (On-CEMP(s)), statutory health and safety requirements and measures to secure construction areas will ensure that contamination will not affect human health receptors. This is assessed in Volume 4, Chapter 4: Human health of the PEIR.</p> <p>For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

Table 5.10: Traffic and transport – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Effects on people associated with driver delay (including temporary delays to public transport services), pedestrian delay, pedestrian amenity and community severance.	These effects will be caused by construction works or construction traffic using the local road network and strategic road network and therefore are confined to this phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group. Whilst effects from decommissioning have been scoped out of the assessment for traffic and transport, the timescales of construction and decommissioning would be temporally separated.	No change resulting from inter-related assessment.
Receptor-led Effects		
Receptors include people that are living in and using facilities and using transport networks. There is potential for inter-related effects from transport with noise and vibration (Volume 2, Chapter 6: Noise and Vibration), air quality (Volume 2, Chapter 7: Air Quality), recreational resources (Volume 2, Chapter 8: Land Use and Recreation) and human health (Volume 4, Chapter 3: Socio-economics). The construction phase has the highest likelihood of receptor-led effects and a full assessment of these will be contained within the ES.		

Table 5.11: Noise and vibration – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Noise and vibration impacts due to the Onshore HVDC Cable Corridor landward of the transition joint bay.	Effects on human receptors from noise associated with the construction activities would be temporally separate to the decommissioning activities. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	No change resulting from inter-related assessment.
The impact of noise generated by additional vehicle movements on the local highway network during the construction and decommissioning phases for the Proposed Development on human receptors.	Effects on human receptors from noise generated by additional vehicle movements would be temporally separate to the decommissioning activities. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
The impact of noise generated during operation and maintenance of the converter stations on human receptors.	Effects on human receptors generated by noise during operation and maintenance of the converter stations would be confined to the operation and maintenance phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
Receptor-led Effects		
<p>There are potential inter-related effects on ecological habitats and species due to disturbance from noise and vibration associated with construction activities. The inter-related effects noise and vibration with ecology, particularly in relation to disturbance, are considered in Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the PEIR. There are also potential effects on human health in areas where HDD is required since loud equipment may be required to operate at night-time. Receptors exposed to high noise levels unmitigated may be subjected to sleep disturbance and increased stress. Further details of the effects on health are set out in Volume 4, Chapter 4: Human Health of the PEIR. Also inter-related effects on the setting of heritage features due to disturbance from noise and vibration associated with construction activities. The inter-related effects of noise and vibration with historic environment are considered in Volume 2, Chapter 2: Historic Environment of the PEIR.</p>		

Table 5.12: Air quality – summary of likely significant inter-related effects

Description of Impact	Assessment of project lifetime effects	Inter-related effect
Project Lifetime Effects		
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	The potential impacts of dust soiling during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment.
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	The potential impacts of suspended particulate matter on people during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	
The impact of an increase in suspended particulate matter on ecology arising from dust emissions generated by onsite construction and decommissioning activities.	The potential impacts of suspended particulate matter on ecology during the operations and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on ecology will be negligible, which is not significant in EIA terms	
Receptor-led effects		
Dust generated during the construction phase will also affect human receptors that are also likely to experience increased noise and traffic levels. However, tertiary mitigation is proposed to ensure suitable management of emissions to air during construction. This is assessed in Volume 4, Chapter 4: Human health of the PEIR. Ecological receptors will also be affected by dust and there is the potential for inter-related effects with ecology (Volume 2, Chapter 1: Onshore Ecology and Nature Conservation) and hydrology (Volume 2, Chapter 3: Hydrology and Flood Risk). Mitigation measures to reduce the dust impact to a level that it not significant will be implemented as documented in the On-CEMP. Noise and traffic will also be managed through the On-CEMP so the inter-related effects are considered to remain not significant. For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.		

Table 5.13: Land use and recreation – summary of likely significant inter-related effects

Description of Impact	Assessment of project lifetime effects	Inter-related effect
Project Lifetime Effects		
The temporary and permanent loss of agricultural land including Best and Most Versatile.	The agricultural land holdings considered in the assessment would be potentially affected at the construction stage only, with the exception of areas associated with the converter stations, joint bays and link boxes that would be affected during both construction and decommissioning. However, these would be temporally separate. Furthermore, these are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	No change resulting from inter-related assessment.
Temporary and permanent disruption to agricultural land holdings.		
Temporary and permanent disruption to the recreational use of recreational resources (coastal areas, Access Land, open greenspace, Coastal Path, other Public Rights of Way (PRoW), recreational resources).	The recreational receptors considered in the assessment would be potentially affected at the construction stage only with the exception of other PRoW that would be affected during both construction and decommissioning. However, these would be temporally separate. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
Receptor-led effects		
Potential receptor led effects are those affecting the amenity of recreational resources as a result of changes to the visual and acoustic environments arising from the construction, operation and maintenance and decommissioning of the Proposed Development. These are assessed, where relevant, in Volume 4: Chapter 2: Landscape, Seascape and Visual Resources and Volume 2: Chapter 6: Noise and Vibration of the PEIR. The potential effects arising from the Proposed Development on tourism are considered in Volume 4, Chapter 3: Socio-economics.		

Table 5.14: Benthic ecology - summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Temporary habitat loss /disturbance	The activities associated with adjacent project phases are distinct and the construction, operation and maintenance, and decommissioning phases are significantly separate temporally such that there will be no interaction of effects from them. As a result, the effects across the Proposed Development lifetime on benthic ecology receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase.	The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 1).
Temporary increase in suspended sediments and sediment deposition		
Changes to water quality (release of hazardous substances from sediments)		
Introduction and spread of Invasive Non-Native Species		
Underwater noise & vibration		
Sediment heating		
Electromagnetic Fields (EMF)		
Long-term habitat loss/change		
Accidental pollution	The Physical Processes assessment (Volume 3, Chapter 8), will, at ES stage include a full assessment of potential operational phase scour. This will be reviewed alongside final construction phase schedules to determine if similar construction phase impacts could occur (acknowledging that the separate bipoles / cable bundles may be installed in separate construction years)	Not significant (Any additional construction phase hydrodynamic regime changes are at this stage anticipated to be equivalent to operational phase characterisation (with no additional inter-related effects).
Receptor-led Effects		
Receptor-led effects are most likely to occur during the construction phase, whereby multiple impacts may occur simultaneously. Receptor-led effects could occur if a particular benthic receptor was influenced by multiple impacts (e.g. temporary habitat loss/disturbance and temporary increase in suspended sediments and sediment deposition). However, these impacts are of such low magnitude, that it is not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual impact. The assessment of potential effects on benthic ecology receptors (presented in Volume 3, Chapter 1 of this PEIR) already considers pathways for impact described e.g. in the Physical Processes chapter (Volume 3, Chapter 8) and the Underwater Noise and Vibration calculations (Volume 3, Appendix 4.1).		

Table 5.15: Fish and shellfish ecology – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Temporary habitat loss/disturbance	<p>The activities associated with adjacent project phases are distinct and the construction, operation and maintenance, and decommissioning phases are significantly separate temporally such that there will be no interaction of effects on fish and shellfish receptors between them.</p> <p>As a result, the effects across the Proposed Development lifetime are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase.</p>	<p>The effects are not likely to be greater when considered over the lifetime of the Proposed Development, therefore, no inter-related effects are considered likely. No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 2).</p>
Temporary increase in suspended sediments and deposition		
Injury and disturbance for underwater noise and vibration		
Collision risk to basking sharks from increased vessel activity		
Changes to water quality from resuspension of sediments		
Changes to water quality as a result of accidental pollution		
Introduction of invasive non-native species		
Habitat alteration and long term habitat loss		
EMF effects	<p>The Physical Processes assessment (Volume 3, Chapter 8), will, at ES stage include a full assessment of potential operational phase scour. This will be reviewed alongside final construction phase schedules to determine if similar construction phase impacts could occur (acknowledging that the separate bipoles / cable bundles may be installed in separate construction years)</p>	<p>Not significant (Any additional construction phase hydrodynamic regime changes are at this stage anticipated to be equivalent to operational phase characterisation (with no additional inter-related effects).</p>
Sediment heating		
Change in hydrodynamic regime	<p>Receptor led effects are most likely to occur during the construction phase, whereby multiple impacts may occur simultaneously (e.g. Temporary habitat loss/disturbance, Injury and disturbance for underwater noise and vibration and Temporary increase in suspended sediments and deposition will occur at the same time). However, these impacts will tend to affect IEFs differently (e.g. Nephrops are vulnerable to habitat loss but are not vulnerable to increased suspended sediments) and / or have minimal additive impact effect. Therefore, it is not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual phase.</p> <p>Some of these interactions are mutually exclusive (e.g. Injury and disturbance for underwater noise and vibration will mean reduced potential for collision risk with basking sharks).</p> <p>Additional assessment detail regarding operational phase scour is anticipated at ES stage, which will be considered specifically with regards potential for inter-related effects.</p>	
Receptor-led Effects		

Table 5.16: Commercial Fisheries – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Reduction in access to, or exclusion from established fishing grounds	Effects on commercial fisheries are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual Proposed Development phase.	No change to significance of effects resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 3).
Displacement leading to gear conflict and increased fishing pressure on adjacent grounds		
Displacement or disruption of commercially important fish and shellfish resources		
Increased vessel traffic associated with the Proposed Development within fishing grounds leading to interference with fishing activity		
Physical presence of infrastructure leading to gear snagging		
Receptor-led Effects		
<p>The commercial fisheries assessment inherently considers impacts on fish resource through assessment of displacement or disruption to commercially important fish and shellfish receptors, drawing on the assessment in Volume 3, Chapter 3: Fish and Shellfish Ecology (i.e. already incorporates inherent inter-related considerations).</p> <p>The commercial fisheries assessment inherently considered impacts of Proposed Development vessels interacting with fishing activity through assessment of increased vessel traffic leading to interference with fishing activity, drawing on the assessment in Volume 3, Chapter 5: Shipping and Navigation (i.e. already incorporates inherent inter-related considerations).</p> <p>No further receptor led effects on commercial fisheries receptors are identified.</p>		

Table 5.17: Marine mammals and sea turtles - summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Disturbance from underwater noise (e.g. ground condition surveys, dredging, rock-dumping)	Disturbance to marine mammals and sea turtles will be mainly caused by underwater noise from ground condition surveys, dredging and rock placement during the construction phase and removal of structures in the decommissioning phase (assuming the cable is not de-energised and left <i>in-situ</i>). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. As a result, the effects across the Proposed Development lifetime on marine mammal and sea turtle receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any Operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.	No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 4).
Increased vessel disturbance	The potential for disturbance effects to marine mammals and sea turtles will arise during the construction and decommissioning phase (assuming the cable is not de-energised and left <i>in-situ</i>). The construction and decommissioning phases are significantly separate temporally such that there will be no interaction between the two. With implementation of a Vessel Management Plan (VMP), impacts from vessel activity are assessed as minor and therefore, not significant across the relevant phases. As a result, the effects across the Proposed Development lifetime are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments for each individual phase. Any Operational-repair activities are, in this context, considered suitably unlikely, or intermittent, that no inter-related effects are predicted.	
Receptor-led Effects		
Inter-related effects from the combination of disturbance from underwater noise, the presence of vessels and loss of prey resources on marine mammals – The greatest potential for spatial and temporal interactions is likely to occur with underwater construction noise impacts (i.e. during the construction phase). It is noted that some of these interactions are mutually exclusive (i.e. disturbance/displacement resulting from underwater noise will mean reduced potential for vessel interactions). It is therefore not anticipated that any inter-related effects will be produced that are of greater significance than the assessments presented for each individual phase/impact. The assessment of potential effects on marine mammals (presented in Volume 3, Chapter 4 of this PEIR) already considers pathways for impact described e.g. in the Physical Processes chapter (Volume 3, Chapter 8) and the Underwater Noise and Vibration calculations (Volume 3, Appendix 4.1).		

Table 5.18: Shipping and navigation – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Collision of a passing third-party vessel with a vessel associated with cable installation / maintenance / decommissioning.	Across the project lifetime, the effects on Shipping and Navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase. This includes no additional inter-related effects from the concurrent operational and operational-repair phases.	No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 5).
Cable installation / decommissioning causing disruption to passing vessel routeing/timetables.		
Increase in the risk of a vessel-to-vessel collision due to construction vessel activity		
Cable installation / decommissioning causing disruption to fishing and recreational activities.		
Cable installation / decommissioning causing disruption to third party marine activities (e.g., military, dredging)		
Reduced access to local ports		
Anchor interaction with the cable		
A vessel engaged in fishing snags its gear on the cable		
Reduction in under keel clearance resulting from laid cable and associated protection		
Interference with marine navigational equipment		
Receptor-led Effects		
The displacement of commercial fishing vessels from fishing grounds may lead to an increase in collision risk between third party vessels. However, as these effects are already assessed within the Shipping and Navigation assessment, they are not anticipated to interact in such a way to result in combined effects of greater significance than the assessments presented in the individual receptor assessments (c.f. Volume 3, Chapter 5).		

Table 5.19: Other Marine Users – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Access to Military PEXAs	<p>During the construction, operation and maintenance (repair), and decommissioning-removal phases of the Proposed Development, safe passing zones will be used, and therefore the areas from which Ministry of Defence (MoD) activities can occur may potentially be constrained, but highly localised (there are no baseline restrictions on vessel movements associated with the MoD areas).</p> <p>MoD activity is able to continue operating during the Operational phase, effects on Other Marine Users (OMU) receptors across the phases are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase. Consultations with the MoD are planned to discuss any further consideration of PEXA constraints.</p>	No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 6).
Displacement or disruption of recreationally important fish and shellfish resources.	<p>Proposed Development lifetime inter-related effects are unlikely as the majority of disturbance (resulting in highest Suspended Sediment Concentration/deposition) will be during the construction and decommissioning (removal) phases with minimal disturbance likely during the operational phase, primarily occurring during repair activities.</p> <p>Across the Proposed Development lifetime, the effects on recreational fishing are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase. Impacts on fish and shellfish has been carried out in Volume 3, Chapter 2: Fish and Shellfish Ecology of the PEIR, impacts to commercial fisheries has been undertaken in Volume 3, Chapter 3: Commercial Fisheries of the PEIR and impacts on socio-economics has been undertaken in Volume 4, Chapter 3: Socio-Economics of the PEIR.</p>	
Increased vessel traffic within recreational areas as a result of changes to shipping routes and construction vessel traffic leading to interference with recreational activity.	<p>With the successful implementation of measures adopted for this development (i.e. issue NTMs and VMP), no likely significant effects are predicted for the construction, operational, and decommissioning phases of the Proposed Development.</p> <p>The majority of vessel traffic (resulting in interference with recreational activities) is predicted to peak during construction and decommissioning with reduced potential for interference during operational phase, with impacts limited to repair activities. Therefore, across the Proposed Development lifetime, the effects on recreational areas are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each phase. Impacts to shipping and navigation has been carried out in Volume 3, Chapter 5: Shipping and Navigation of the PEIR.</p>	
Receptor-led Effects		
<p>The maximum design scenario promotes a generally precautionary approach throughout. The linear nature of the Proposed Development will also tend to separate individually distinct and temporary (phased) activities (rather than layer impacts together). It is not anticipated that any inter-related effects on OMU receptors will be produced that are of greater significance than the assessments presented for each individual activity.</p>		

Table 5.20: Marine archaeology and cultural heritage – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Temporary increase in suspended sediments and sediment deposition	<p>The majority of potential effects on marine archaeology are associated with construction phase activities, given the scale of activities relative to other phases. However, given effects on archaeological features are generally considered irreversible there is potential for cumulative inter-related effects.</p> <p>The potential for project lifetime effects on marine archaeological features will be reviewed at ES stage, following detailed review of the geophysics data and identification of potential features of interest (see e.g. Volume 3, Appendix 7.2).</p>	<p>Significance may depend on site specific characteristics of the individual features, which are yet to be defined. At PEIR stage, assumed to be potentially significant (and assumed that combined effects are of greater significance than the assessments for each phase), requiring feature specific mitigation strategies. Further characterisation will be provided at the ES stage.</p>
Changes to water quality (release of hazardous substances from sediments)		
Underwater vibration		
Change in hydrodynamic regime (scour & accretion)		
Accidental pollution		
Receptor-led Effects		
<p>Receptor-led effects are most likely to occur during the construction phase, whereby multiple potential routes for impact may occur simultaneously. Potential effects on marine archaeological features will be reviewed at ES stage, following detailed review of the geophysics data and identification of potential features of interest (see e.g. Volume 3, Appendix 7.2).</p>		

Table 5.21: Physical processes - summary of likely significant inter-related effects

Description of Impact	Likely inter-related effects	Significance
Project Lifetime Effects		
Sediment Disturbance or Seabed Change	Whilst occurring during different phases of the development, activities will not occur simultaneously (i.e. assumed construction will have been completed before maintenance activities are required) and therefore, there is not expected to be a combined effect of greater significance than already presented within the assessments presented for each individual Proposed Development phase. Operational phase scour will be assessed at ES stage and consideration for inter-related effects will be made, including temporal considerations in terms of the installation of the two bipoles (separately within the same overall construction period).	At PEIR stage it is assumed there will be no change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 8). This assessment of inter-related effects will be revisited at ES stage, particularly around the assessment of scour, which is currently provisional.
Changes to Water Quality		
Receptor-led Effects		
<p>Sediment disturbance or seabed change is also considered within Volume 3, Chapter 1: Benthic Ecology, Volume 3, Chapter 2: Fish, and Volume 3, Chapter 7: Marine Archaeology and Cultural Heritage, with regards to likely effects on e.g. designated habitats and heritage assets. These chapters draw on the assessment work completed within the Physical Processes assessments (refer to Volume 3, Appendix 8.1 High Level Assessment of Sediment Disturbance) and already incorporate inherent inter-related considerations.</p> <p>Water quality is also considered within e.g. Volume 3, Chapter 1: Benthic Ecology and Volume 3, Chapter 2: Fish and Shellfish, with regards to likely effects on e.g. designated habitats. These chapters draw upon the assessment work completed within the Physical Processes assessments (including Volume 3, Appendix 8.1 High Level Assessment of Sediment Disturbance) and already incorporate inherent inter-related considerations.</p>		

Table 5.22: Offshore ornithology - summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Visual and noise disturbance	As none of the impacts on offshore ornithology receptors were assessed individually to have any greater than a negligible effect, it is considered highly unlikely that they will inter-relate to form an overall significant effect on offshore ornithology receptors. All impacts are short-term and of negligible magnitude.	No change resulting from inter-related assessment (compared to assessment of effects in isolation – see Volume 3, Chapter 9).
Indirect impacts via loss/disturbance to habitats		
Pollution incidents		
Receptor-led Effects		
As none of the impacts on offshore ornithology receptors were assessed individually to have any greater than a negligible effect, it is considered highly unlikely that they will inter-relate to form an overall significant effect on offshore ornithology receptors. The assessment of potential effects on ornithology receptors presented in Volume 3, Chapter 9 is already informed by the associated characterisations undertaken within e.g. the physical processes assessments (Volume 3, Chapter 8), the shipping and navigation assessments (Volume 3, Chapter 5) and the fisheries assessments (Volume 3, Chapter 2).		

Table 5.23: Climate change – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
The impact of GHG emissions arising from the manufacturing and installation of the Proposed Development	These effects will only occur during one phase therefore there would be no change over the three phases.	No change resulting from inter-related assessment.
The impact of GHG emissions arising from the consumption of materials and activities required to facilitate the operation and maintenance of the Proposed Development.	These effects will only occur during one phase therefore there would be no change over the three phases.	
The impact of GHG emissions arising from land use change during the construction, operation and maintenance and decommissioning phases.	Negligible effects are identified for each phase and with the phases together but would be temporally separate to the for each of the phases. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
The impact of GHG emissions arising from decommissioning works (e.g., plant, fuel and vessel use) and the recovery (or disposal) of materials.	These effects will only occur during one phase therefore there would be no change over the three phases.	
The impact of climate change on the Proposed Development	Negligible effects are identified for the construction, operation and maintenance and decommissioning phases, but these would be temporally separate for each of the phases. Therefore, it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
Receptor-led Effects		
<p>There are potential inter-related effects with receptors for hydrology and flood risk, geology, hydrogeology and ground conditions, onshore ecology and nature conservation, noise and vibration, landscape, seascape and visual resources, and marine archaeology and cultural heritage.</p> <ul style="list-style-type: none"> • The assessment of flood risk, including increases in rainfall rates due to climate change, has been addressed in Volume 2, Chapter 3: Hydrology and Flood Risk of the PEIR, ensuring the drainage design is able to accommodate increasing volumes of surface water runoff associated with the effects of climate change. As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts. • The assessment of Volume 2, Chapter 4: Geology, Hydrogeology and Ground Conditions considers the potential impact of climate change on the mobilisation of contaminants due to increased intensity of extreme precipitation events and increased rainfall during the wettest months. However, best practice measures will be detailed within an Onshore CEMP to manage any environmental risks during construction (e.g. appropriate handling and storage of materials). As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts. 		

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Description of Impact	Likely significant inter-related effects	Significance
<ul style="list-style-type: none"> • The assessments of onshore ecology and nature conservation (Volume 2, Chapter 1 of the PEIR and landscape, seascape and visual resources (Volume 4, Chapter 2 of the PEIR) consider future climate projections when determining appropriate mitigation measures to be implemented to manage the visual and ecological effects of the Proposed Development. When developing detailed mitigation, climate resilient plant species will be specified in order to ensure the success of the planned mitigation over the Proposed Development’s lifetime. Such species will be detailed within the Outline Ecology and Landscape Management Plan. As such, there will be no change in the reported significance of effect when assessed in-combination with climate impacts. • The assessment of Volume 3, Chapter 7: Marine Archaeology and Cultural Heritage of the PEIR considers the potential impact of climate change on the indirect disturbance of archaeological assets from scour due to more intense physical and chemical processes. Although the effect is considered to be moderate adverse, which is significant, there would be no change due to climate change over the original marine archaeology and cultural heritage assessment. The Proposed Development includes mitigation measures to minimise potential disturbance including micro-routeing to avoid known sites of archaeological significance and preservation by recording remains prior to, during, or after impact. For the ES, detailed archaeological review of geophysical survey data and borehole cores will allow specific mitigation to be developed and targeted. <p>Therefore, for the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.</p>		

Table 5.24: Landscape, seascape and visual resources – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Landscape impacts - potential change to landscape character.	<p>The potential effect is directly in relation to the scale and size of development proposed, the geographic extent of impact, and the distance and context factors in relation to the receptor. The scale of potential effects on landscape character is likely to be high in relation to the converter stations and substation themselves and diminishing with distance from the Converter Site and Alverdiscott Substation Site. The scale of effects will also increase through the construction phase due to the nature of the impact and the increased land required for temporary construction compounds, reduce during operation and maintenance (e.g. due to planting proposals), decreasing further through the decommissioning phase.</p> <p>Although this indicates that there is a potential lengthening of the temporal effect, across the project lifetime, the effects on landscape character resources are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.</p>	No change resulting from inter-related assessment.
Receptor-led Effects		
<p>There are inter-relationships with receptors for the historic environment, ecology and recreation. Whilst the assessment of effects on character includes land that contains heritage assets, effects on heritage assets and their context and settings are considered within Volume 2, Chapter 2: Historic Environment of the PEIR. The assessment of effects on character includes land that contains ecological assets effects on flora and fauna within habitats and is considered within Volume 2, Chapter 1: Onshore Ecology and Nature Conservation of the PEIR. The construction and operation of the Converter Site will change the existing farmland, resulting in some temporary and some long term loss of features such as hedgerows, ditches and trees which have ecological value. The impacts will result in some localised major adverse effects on landscape character, which is significant. Therefore, the significance of these combined effects on visual receptors will not be of any greater significance than the effects when assessed in isolation.</p> <p>Whilst the assessment of effects on visual receptors includes people using recreational assets, effects on public open space and public rights of way (which are primarily during construction and decommissioning) are considered within Volume 2, Chapter 8: Land Use and Recreation of the PEIR.</p>		

Table 5.25: Socio-economics and Tourism – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Impacts on GVA	Impacts on GVA from the supply chain expenditure have been assessed distinctly for each phase of the project. There will be minimal overlap between the construction and operational phase and therefore it is considered that there is no potential for project lifetime effects to occur on this receptor group.	No change resulting from inter-related assessment.
Impacts on employment	Impacts on employment from the supply chain expenditure have been assessed distinctly for each phase of the project. There will be minimal overlap between the construction and operational phase and therefore it is considered that there is no potential for project lifetime effects to occur on this receptor group.	
Impacts on tourism sector	Impacts on the tourism sector, particularly through the displacement of visitors, are only likely to be expected to occur during the construction phase. The other assessments which have the potential to effect tourism receptors have not identified any additional inter-related effects and therefore there is not potential for project lifetime effects to occur on this receptor group.	
Impacts on tourism and recreation assets	The other assessments which have the potential to effect tourism receptors have not identified any additional inter-related effects and therefore there is not potential for project lifetime effects to occur on this receptor group.	
Receptor-led Effects		
There is not expected to be any further effects as a result of the socio-economic effects identified in this assessment.		

Table 5.26: Human health – summary of likely significant inter-related effects

Description of Impact	Likely significant inter-related effects	Significance
Project Lifetime Effects		
Noise impacts	Noise effects occur in all three phases. Only close to the converter stations is there the potential for the same population to be affected in all three phases. The combined effect is not considered to be on a scale to significantly affect population health.	No change resulting from inter-related assessment.
Receptor-led Effects		
<p>Construction and decommissioning activities may create temporary changes in air quality, noise, recreation, water and land quality and transport access. These may be experienced in combination for the same site-specific and local geographic populations as transitory construction works occur within the Proposed Development Draft Order Limits. These populations may also experience pressures on housing and healthcare associated with the Proposed Development workforces. At a population level it is not expected that the combination of effects would interact in a way that would reinforce health outcomes or exacerbate health inequalities on a scale to affect public health. The same populations would also benefit from the improved energy security, whilst noted, the combined effect is not considered to change the assessment conclusions. No new or materially different population health effects are therefore likely.</p>		

5.6 Conclusion

- 5.6.1 The tables presented within this chapter of the PEIR provide the assessment of potential inter-related effects (both project lifetime and receptor-led effects) arising from the Proposed Development on a range of receptor groups.
- 5.6.2 Following the implementation of mitigation measures adopted as part of the project and further mitigation (if required), project lifetime effects arising during the construction, operation and maintenance, and decommissioning phases of the Proposed Development are generally unlikely to result in effects of greater significance than those reported individually in the PEIR.
- 5.6.3 For marine archaeology, there is potential for inter-related effects (between different project phases) given the precautionary assumption that any effects on marine heritage features are irreversible and therefore susceptible to cumulative impact. The potential for project lifetime effects on marine archaeological features will be reviewed at ES stage, following detailed review of the geophysics data, identification of potential features of interest and development of feature specific mitigation strategies.
- 5.6.4 The assessment of impacts deriving from scour (e.g. local scour of bed sediments as a result of the interaction of currents with rock protection) will be characterised at ES stage. Scour impacts have the potential to affect multiple receptors, hence the potential for inter-related effects (both project lifetime and receptor-led) will be further characterised and reported at ES stage.
- 5.6.5 Further to the specific examples above, all potential inter-related effects for both project lifetime and receptor led considerations will be reviewed again following further refinements in the project design. Where there remains scope for potential effects to occur they will be carried forward into the assessment of inter-related effects reported in the ES that will accompany the application for development consent.

5.7 References

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