XLINKS MOROCCO-UK POWER PROJECT

Preliminary Environmental Information Report

Volume 1, Chapter 4: Need and Alternatives

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Glossary

Term	Meaning
Alverdiscott Substation	The existing National Grid Electricity Transmission substation at Alverdiscott, Devon, which comprises 400 kV and 132 kV electrical substation equipment.
Alverdiscott Substation Connection Development	The development required at the existing Alverdiscott Substation site, which is envisaged to include development of a new 400 kV substation, and other extension modification works to be confirmed by National Grid Electricity Transmission.
Alverdiscott Substation site	The National Grid Electricity Transmission substation site within which the Alverdiscott Substation sits.
Applicant	Xlinks 1 Limited.
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 to Alternating Current, or vice versa.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.
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.
HVAC cables	The High Voltage Alternating Current (HVAC) cables which would bring electricity from the converter stations to the new Alverdiscott Substation Connection Development.
HVDC cables	The High Voltage Direct Current (HVDC) cables which would bring electricity to the converter stations from the Moroccan converter stations.
Intertidal area	The area between Mean High Water Springs and Mean Low Water Springs.
Landfall	The proposed area in which the offshore cables make landfall in the United Kingdom (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Cornborough Range, Devon, between Mean Low Water Springs and the Transition Joint Bay inclusive of all construction works, including the offshore and onshore cable routes, and landfall compound(s).
Maximum design scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Proposed Development.
Mean High Water Springs (MHWS)	The height of mean high water springs is the average of the heights of two successive high waters during those periods of 24 hrs (approximately once a fortnight) when the range of the tide is greatest. MHWS is therefore the average height of the high waters of spring tides above Chart Datum. MHWS is taken to be the geographic limit of the marine consenting regime.
Mean Low Water Springs (MLWS)	The height of mean low water springs is the average height obtained by the two successive low waters during the same period. MLWS is therefore the average height of all low waters of spring tides above Chart Datum. MLWS is taken to be the geographic limit of the onshore planning regime.
National Grid Electricity System	National Grid Electricity System Operator (NGESO) operates the national electricity transmission network across Great Britain. NGESO does not distribute electricity to individual premises, but its role in the wholesale market is vital to ensure a reliable, secure and quality supply to all.

Term	Meaning
Operator (NGESO)	
National Grid Electricity Transmission (NGET)	National Grid Electricity Transmission (NGET) owns and maintains the electricity transmission network in England and Wales.
National Policy Statements	The current national policy statements published by the Department for Energy Security and Net Zero in 2023, and adopted in 2024.
Offshore Cable Corridor	The proposed corridor within which the offshore High Voltage Direct Current cables will be located, which is situated within the United Kingdom Exclusive Economic Zone.
Onshore Infrastructure Area	The proposed area within the Proposed Development Draft Order Limits landward of the Transition Joint Bays, which contains the onshore HVDC Cables, Converter Site, highway works and onshore HVAC Cables.
Onshore HVAC Cable Corridor	The proposed corridor within which the onshore High Voltage Alternating Current cables would be located.
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 (PEIR)	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.
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).
Point of Connection	An offer in which a specific juncture that Xlinks 1 Limited and National Grid Electricity System Operator have agreed upon to where the electricity generation source connects to the national electricity grid infrastructure.
The national grid	The network of power transmission lines which connect substations and power stations across Great Britain to points of demand. The network ensures that electricity can be transmitted across the country to meet power demands.
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
AC	Alternating Current
AOD	Above Ordnance Datum
DC	Direct Current
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ES	Environmental Statement
GB	Great Britain
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
NGET	National Grid Electricity Transmission
NGESO	National Grid Electricity System Operator
OHL	Overhead Lines
OS	Ordnance Survey
UK	United Kingdom

Units

Acronym	Meaning
GW	Gigawatt
GWh	Gigawatt hour
GWp	Gigawatt peak
Ha	Hectares
kV	Kilovolt
m	Metre
m^2	Metre squared
m^3	Metre cubed
mm	Millimetre

4 NEED AND ALTERNATIVES

4.1 Introduction

4.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) supports the Environmental Impact Assessment (EIA) work undertaken to date to establish a proposed route for the United Kingdom (UK) elements of the Xlinks Morocco-UK Power Project (the Project). For ease of reference, the UK elements of the Project are referred to in this chapter as the 'Proposed Development'.

4.1.2 The chapter introduces the need for the Proposed Development and the main alternatives considered. This chapter also details how the assessment of sites and design alternatives has been undertaken, the factors that have been considered, and the main reasons for discounting alternative design options.

4.2 Need for the Proposed Development

4.2.1 The compelling need for global action to decarbonise continues to be reinforced. On 20th March 2023, the U.N. Intergovernmental Panel on Climate Change (IPCC) published its 2023 assessment of global climate change. The report concludes that the world is likely to pass a dangerous temperature threshold within the next ten years, pushing the planet past the point of catastrophic warming — unless nations drastically transform their economies and immediately transition away from fossil fuels.

4.2.2 In May 2023, the World Meteorological Organisation stated that the likelihood of one of 2023 – 2027, and the five-year period, being the hottest on record, was 98%.

4.2.3 There is a growing body of both UK and international energy and climate change commitments, laws, policies and guidance highlighting an urgent need for new energy generation infrastructure, particularly renewable sources. Alongside this drive for new energy generation, the UK Government has committed to achieving net zero greenhouse gas emissions by 2050 and decarbonising the energy sector by 2035.

4.2.4 Decarbonisation is a legal requirement in the UK and is of global significance. In June 2019, the Government passed The Climate Change Act 2008 (2050 Target Amendment) Order 2019 that will end the UK's contribution to global warming by 2050: Net Zero.

4.2.5 UK electricity demand is expected to double by 2050. Decarbonisation requires the electrification of energy which is currently sourced from fossil fuels (including gas, petrol and diesel). The UK's pathway to achieving Net Zero by 2050 must also involve wider transitions outside of the power sector, including decarbonising transport, industry, agriculture and homes.

4.2.6 In June 2023, the Committee on Climate Change (CCC) published their Progress Report to the Government. In relation to the UK's Nationally Determined Contribution (NDC) for 2030, the report stated, "*To achieve the NDC goal of at least a 68% fall in territorial emissions from 1990 levels, the rate of emissions reduction outside the power sector must almost quadruple.*"

4.2.7 Extensive electrification requires major renewable and other low-carbon power generation expansion to ensure the UK can securely meet future electricity demand with a significantly lower carbon intensity. Therefore, decarbonising UK electricity generation is vitally important to meet the UK's legal obligations on carbon emissions and ensure sustainable energy resilience.

4.2.8 The decommissioning of existing generation assets also increases the requirement to develop new low-carbon generation with urgency to "keep the lights on".

4.2.9 The NPS EN-1 (DESNZ, 2023a) Part 3 explains why the government needs significant new large-scale energy infrastructure to meet its energy objectives and considers the need for such infrastructure urgent.

4.2.10 The Government's direction is to develop an integrated energy system which relies on low-carbon electricity generation for a significant proportion of its supply. As a consequence, as presented in Paragraph 3.3.3, '*Demand for electricity is likely to increase significantly over the coming years and could more than double by 2050 as large parts of transport, heating, and industry decarbonise by switching from fossil fuels to low-carbon electricity. The Impact Assessment for CB6 shows an illustrative range of 465-515TWh in 2035 and 610-800TWh in 2050'.*

4.2.11 The NPS EN-1 (DESNZ, 2023a) presents a compelling case for the need for new electricity generating capacity to meet the UK's legally binding targets to cut greenhouse gas emissions and meet the net zero by 2050. Additionally, the NPS EN-5 states that the security and reliability of the UK's energy supply, both currently and in the future, is heavily dependent on an electricity network that will allow for generation, storage, and interconnection infrastructure to meet the required rapid increase in electricity demand for the transition to net zero (DESNZ, 2024c).

4.2.12 Noting the crucial national benefits of increased system robustness through new electricity network infrastructure projects, NPS EN-1 also recognises the particular strategic importance of generation and new electricity networks in the UK's generation mix in this decade. As stated in paragraph 3.3.70, *'As all new grid projects have a role in efficiently constructing, operating and connecting low carbon infrastructure to the National Electricity Grid, the scope of networks CNP infrastructure is not limited to those associated specifically with a particular project.'*

4.2.13 The NPS EN-3 (DESNZ, 2023b) reinforces the urgent need for new major electricity infrastructure and supports the urgent need for new low-carbon infrastructure that is considered to be Critical National Priority (CNP) infrastructure, which refers to Sections 3 and 4 of NPS EN-1.

4.2.14 The Draft Strategy and Policy Statement for Energy Policy in Great Britain (DESNZ, 2023) stated, "New technologies and innovative business models will be crucial for meeting net zero, and innovation requires the right market, policy, and regulatory environment to be successful. Alongside competitive markets, government is working to ensure effective policy support and stability to encourage innovation. ". While the individual technologies the Project proposes may not be considered innovative, combining large-scale renewable energy connected generation from another country to provide reliable generation output is novel.

4.2.15 In March 2023, the Government published Powering Up Britain, which explains "how the government will enhance our country's energy security, seize the

economic opportunities of the transition, and deliver on our net zero commitments."

4.2.16 Under the Renewables investment section, the policy paper makes a direct reference to the Project, as follows, 'As we set out in the 'British Energy Security Strategy', we are actively exploring the potential for international projects to provide clean, affordable and secure power. For example, the government is interested in the Xlinks Morocco – UK Power Project, a proposed large scale onshore wind, solar and battery electricity generation site in Morocco that would exclusively supply power to the GB grid via high voltage direct current subsea cables. The government is considering – without commitment – the viability and merits of the proposal to understand if it could contribute to the UK's energy security.'

4.2.17 The reference to the Project in the Renewables Investment section highlights the potential for the Project to make a critical contribution to the plan to decarbonise the UK electricity sector. In this regard, the Project's key objectives include making a critical and timely contribution to decarbonisation and supply security in the UK, helping shield consumer bills from volatile energy prices and international supply markets, and providing the potential to deliver biodiversity net gains through its development.

4.2.18 It is therefore important that the assessment of alternatives is considered in the context of the urgent national need.

Strategic Proposal

4.2.19 The Project design reflects a range of key criteria that ultimately impact the Proposed Development in the UK. Specifically, the below boundary conditions, among others, have influenced the overall project design:

- Selection of a generation site in Morocco that enables renewable generation technologies to deliver a generation profile to GB that cannot be economically achieved with similar technologies located in GB
- Selection of a generation site that is not a priority location to provide power for Morocco's decarbonisation strategy
- Limiting the maximum depth of the offshore cable route such that existing installation engineering techniques can be used
- Aligning the connection to NGET's transmission network to the existing Grid Code
- Locating the landing point in GB to allow proven engineering techniques to be utilised within an acceptable risk envelope and minimising the impact on local stakeholders.

4.2.20 Existing and future interconnectors between GB and other electricity markets are anticipated to benefit the UK's transition to net zero significantly. However, market forces determine the flow of energy across the interconnectors, and there is no certainty that GB will be able to import power during a prolonged period of low solar and wind generation if the same weather event impacts the interconnected countries. Conversely, the Project's generation site will only be connected to the GB transmission network, eliminating the possibility that energy will be sold directly to alternative markets irrespective of market conditions.

4.2.21 As part of the first stage of developing the Project, the Applicant undertook option appraisals on several potential generation sites in Morocco, offshore HVDC cable routes, and connection points into the National Grid Electricity Transmission's (NGET's) transmission system in GB. Furthermore, the precise location of the landing point, onshore cable route and location of the HVDC converter station complex have undergone several revisions following consultation with local stakeholders as outlined in section 4.4. There are often several different ways that a project needs case could be met, which could involve different locations, technologies or designs. Each alternative option requires judgements and decisions about the best way to achieve the required outcome. The options appraisal process provides information to help inform those judgements.

Role of Morocco

4.2.22 Morocco has become an international leader in renewable energy over the last 10 years. The country has been a frontrunner in developing large, innovative projects, such as the Noor Ouarzazate Complex, the largest concentrated solar power (CSP) plant globally. Furthermore, the country has established a solid legal framework to foster investments in the renewable energy field.

4.2.23 Morocco benefits from ideal solar and wind resources, which are required to develop renewable projects that could provide suitable power production throughout the year. It has the third highest Global Horizontal Irradiance (GHI) in North Africa, which is 20% greater than Spain's GHI and over twice that of GB. Furthermore, the shortest winter day still offers more than 10 hours of sunlight. The combination of the solar resources, reliable windspeeds, and Battery Energy Storage System (BESS) at the generation site will produce considerably higher output and consistency than equivalent generation in GB. This helps provide generation profiles that address the needs of the UK power market, including during periods of low UK offshore wind production.

4.2.24 The Project will benefit from the well-established Moroccan renewable energy expertise whilst supporting the continued development of its renewable energy supply chain and creating a new export industry. The Project is also consistent with Morocco's foreign and energy policies.

4.2.25 Morocco offers an attractive and stable investment climate. Multiple international power companies, including TAQA of the United Arab Emirates, ACWA Power of Saudi Arabia, Engie and EDF of France, and Siemens of Germany, have invested successfully in the Moroccan energy market.

4.2.26 Morocco is a world leader in renewable energy. Morocco's National Energy Strategy, which focuses on the deployment of renewable generation, was launched in 2008, and it has pledged to generate 52% of its electricity from renewables by 2030. It is well on track to exceed that target.

4.2.27 Morocco already has a comprehensive strategy for decarbonisation and an abundance of suitable wind and solar sites that are much closer to points of demand on the Moroccan transmission network. In the previous decade (2010-2020), it invested $5.8 billion in renewable energy projects.

4.2.28 Despite Morocco's electricity demand increasing by 5% per year since 2004, renewables accounted for 37% of the country's electricity mix by the end of 2020.

4.2.29 Currently, 827 MW of solar generation, 1,510 MW of wind (the second-highest capacity in Africa), and 1,770 MW of hydropower are installed in Morocco, out of a total installed capacity of approximately 11GW.

4.2.30 The Moroccan State recognises that the country can benefit by exporting its significant natural solar and wind resources that are surplus to domestic requirements in the form of green energy, including the export of power and green hydrogen / green ammonia. The government recognises this will create a new and attractive export industry whilst developing local supply chains and creating local employment.

4.2.31 Among multiple other economic and social benefits, the Project will drive the creation of thousands of employment opportunities including a significant proportion of qualified jobs, supported by training and certification programs, which will help to consolidate the pioneering role of Morocco's renewables expertise as a regional and continental energy hub. The Project will also foster the establishment of an integrated renewable energy industrial ecosystem, including industrial production of renewable energy equipment, transformation, transport, storage, and reconversion, which combined will serve as an engine for growth and economic development.

4.2.32 Morocco and the UK have a long and stable relationship, including a 2021 partnership to work together on renewables development and climate initiatives.

Morocco/UK relations

4.2.33 Regarding trading relationships between Morocco and the UK, the two countries have a long relationship, having signed their first commercial agreement over 300 years ago in 1721.

4.2.34 On 7 and 8 December 2021, the UK and Morocco met for the 3rd UK-Morocco Strategic Dialogue and the inaugural meeting of the UK-Morocco Association Council. As can be seen in the formal statement[1], a key intention is to work together on renewable energy and climate initiatives, with which the Project is uniquely aligned.

[1] Department for International Trade (2021). UK-Morocco Association Agreement: Inaugural Ministerial association Council – Joint communique – available at: https://www.gov.uk/government/publications/uk-morocco-inaugural-ministerial-association-council-joint-communique/uk-morocco-association-agreement-inaugural-ministerial-association-council-joint-communique

4.3 Implication for Future Supply

4.3.1 The Project will be a strategic and critical energy asset for the UK.

4.3.2 For the UK, the Project will help to address:

- the UK Government's drive to meet its NDC and Net Zero commitments
- providing energy security for the UK
- peak demand challenges and security of supply
- diversification of energy sources
- delivering affordable energy for UK consumers
- stimulating cable manufacturing in the UK which will create approximately 1,350 jobs
- supporting the UK growth agenda.

4.3.3 For Morocco, the Project will:

- drive the creation of thousands of employment opportunities, including a significant proportion of qualified jobs, supported by training and certification programs, which is expected to help consolidate the pioneering role of Morocco's renewables expertise as a regional and continental energy hub.
- support the development of an integrated renewable energy industrial ecosystem.
- develop several projects and initiatives that will support the social and economic development of the local population in sectors such as health, education, infrastructure, water and revenue-generating activities.
- provide broader economic and social benefits.

4.3.4 The Project is being developed in accordance with National Protective Security Authority (NPSA) and National Cyber Security Centre (NCSC) guidance and related legislation—including the National Security & Investment Act 2021—to ensure that it follows best practices for security requirements and that any risks to the Project have been appropriately mitigated.

4.3.5 Projects such as this are vital to the UK meeting its Net Zero commitments under the Paris Agreement and NDC. Under the Paris Agreement, the parties agree to limit global warming to below 2 degrees Celsius (2°C) and preferably to 1.5°C (compared to pre-industrial levels). The parties aim to reach global peaking of greenhouse gas (GHG) emissions as soon as possible and to achieve a climate neutral world (Net Zero) by 2050. The UK was the first G7 country to pass a Net Zero emissions law in 2019. In 2019, the International Energy Agency (IEA) declared that nuclear and renewables combined are required for countries to meet their Net Zero commitments.

4.3.6 The Project is a low carbon renewable energy project providing 3.6GW of generation to the GB market. The Project will have an installed generating capacity in Morocco of 11.5GWp). The generation profile of the Project is unlike any other currently available or being considered in the UK energy mix. It provides a viable addition to the UK energy portfolio to deliver consistent, reliable, and significant volumes of electricity for the UK. The Project would complement the proposed low-carbon energy mix of domestic renewables (including the abundant offshore wind development) and nuclear.

4.3.7 The Project will deliver 3.6GW of firm, flexible and reliable energy at full capacity for over 19 hours a day on average, which is enough to provide affordable, clean power to the equivalent of over 7 million British homes. Once complete, the Project will be capable of supplying approximately 8 percent of Great Britain's electricity needs and significantly increase the country's ability to meet its Net Zero commitments.

4.3.8 Also, by providing clean, renewable energy at scale, the Project can support the UK in becoming a net energy exporter. The Project's generation profile, combined with the flexibility of the BESS at the generation site in Morocco, will enable a higher capacity of variable renewable energy (VRE) to be delivered to Great Britain. Any excess generation can be exported and sold to neighbouring countries via the GB transmission system and interconnectors.

4.3.9 The Project is a path-finder project, and the knowledge, know-how and advances it creates (both directly and in its supply chain) will allow the Applicant and other companies to export this capability worldwide.

4.3.10 In addition, the power provided by the Project will help the UK meet its growing electricity demand and create further opportunities for UK manufacturing and industrial capabilities. This includes stimulating subsea HVDC cable manufacturing capacity in the UK that will lead to approximately 1,350 jobs.

4.4 Alternatives Considered

4.4.1 Alternatives have been considered for each element of the Proposed Development. The design and layout of the Proposed Development have formed part of an iterative process. This process has been informed by the ongoing environmental appraisal process, and site/route selection taking into consideration the Design Principles and controls, non-statutory consultation feedback and engagement with stakeholders and consultees.

4.4.2 Engagement started back in April 2020 with landowners, alongside technical meetings with statutory consultees and meetings with both Torridge District Council and Devon County Council. The feedback from the engagement held to date has informed the ongoing design development.

4.4.3 The Proposed Development will continue to be developed as part of the environmental assessment process. It will have regard to outputs from engagement with both stakeholders and consultees. In addition, it will take into consideration any feedback from statutory consultation.

4.4.4 A Consultation Report will be submitted in support of the DCO application. This report will provide a summary of consultation feedback and how the Applicant has considered the feedback in developing the design. A Design and Access Statement will also be prepared and submitted to support the DCO application, which will set out the evolution of the Proposed Development design.

4.4.5 The following sections summarise the main alternatives considered for each element of the Proposed Development to date after first summarising relevant guidance.

Relevant Guidance

4.4.6 Volume 1, Part 1 Chapter 2, Regulatory and Planning Context sets out the overarching policy relevant to the Proposed Project, comprising National Policy Statement (NPS) EN-1, NPS EN-3, and NPS EN-5 (2023). These have been considered during the options appraisal process for the Proposed Development. Regarding the consideration of alternatives, paragraph 4.3.15 of EN-1 states that:

4.4.7 “Applicants are obliged to include in their ES information about the reasonable alternatives they have studied. This should include 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.” Whilst there is no statutory requirement to include alternatives within a PEIR, the Planning Inspectorate’s Advice Note Seven recommends that an Environmental Statement (ES):

“explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment”.

4.4.8 Regulation 18(2)(d) of the EIA Regulations requires “a description of the reasonable alternatives studied by the developer, 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” to be presented in the ES. Therefore, a description of the alternatives considered to date is presented in this PEIR, and a complete description of the alternatives will be provided in the ES.

Options Identification and Selection Site

4.4.9 The approach to identifying and assessing alternative sites and routes has ensured integrated and iterative consideration of potential impacts on the environment and local communities alongside technical and engineering factors. The Proposed Development has also been considered against National and Local planning policies. The overall aim of this approach has been to identify sites or routes that best balance these factors to establish the preferred Strategic Option for the Substation Point of Connection and Landfall. The Applicant also undertook a Corridor and Preliminary Routing for both on-shore and off-shore cables and siting of the Convertor Stations.

Site Selection Methodology

4.4.10 The site selection process has considered numerous factors that have influenced the site selection and design of the Proposed Development. The specific factors considered by the Applicant include:

- Environmental – Considering the relative sensitivity of different options in terms of National Designations, landscape, ecology, historic environment, hydrology, noise, traffic, recreational value, land use and other environmental factors.
- Social and Economic—Utilising the available capacity within the existing network, the social-economic impacts and benefits by considering the generation of low-carbon electricity, security of supply, and cost of development to manage the affordability of electricity for consumers.
- Electrical – Consider the effect of the additional power input into the existing National Grid Electricity Transmission system to identify available capacity and existing assets.
- Engineering – Considering the technical constraints arising from constructing and maintaining different options, such as those associated with using cable drilling techniques.

4.4.11 The electrical considerations around the point of connection into Alverdiscott National Grid Substation are the amount of existing and planned capacity on the regional transmission circuits and the extent of the upgrades likely required.

4.4.12 The environment and engineering have been reviewed as part of the site selection process, which has informed the Proposed Development and the design evolution of all the individual elements.

4.4.13 The selection process is an iterative process that has occurred over a number of years.

Point of Connection

4.4.14 The Project's point of connection would require connecting to the UK electricity system by connecting to the national grid operated by National Grid Electricity Transmission (NGET).

4.4.15 In May 2020, National Grid ESO (NGESO) received an application from the Applicant to connect electricity generated by a large amount of wind, solar, and battery storage plant installed in Morocco to the national grid via 2 x 1800MW HVDC links in 2026. In order to make a connection offer, NGESO carried out an

initial options appraisal assessment to identify and evaluate potential connection options within an agreed geographical range of the UK, spanning both South Wales and the South-West of England. The approach involved the following steps:

- Identifying potential connection options – Potential substation locations were identified based on existing connection points regarding technical and environmental feasibility
- Evaluation of connection options – This involved evaluating the options, considering the complexity of construction, land issues, technology, costs, and environmental constraints
- Detailed appraisal – This involves a more detailed appraisal of the options taken forward during the previous step to identify the preferred option.

4.4.16 The two main areas assessed were South Wales and the South-West peninsula of England. North Wales is much further geographically and potentially clashes with Round 4 Wind projects in the area, and connections further east along the south coast would likely have contributed to the existing physical landform stability issues in the area.

4.4.17 The NGESO considered existing substation sites with the potential to be expanded rather than zones for potential new substations anywhere along the line where available capacity can be sourced. Although a new substation could be designed and constructed, connecting to existing sites would entail fewer constraints.

4.4.18 The potential connection options that were investigated comprised the following:

- Alverdiscott
- Pembroke
- Seabank
- Indian Queens
- Exeter.

4.4.19 These substation sites were each evaluated against a range of criteria including offshore cable route length, development risk, environmental constraints, and interactions with other infrastructure. Due to the cost of offshore cable, the length required was also a leading factor for site selection.

4.4.20 Seabank Substation was also briefly considered due to its strengthened position after the new Hinkley - Seabank circuit is complete. However, this was ruled out due to its additional offshore route length and a lack of benefit over other options. In addition, there was a complicated access to the potential substation site which would provide difficulty in constructing the Proposed Development.

4.4.21 Highly sensitive environmental areas were identified surrounding the Indian Queens site and an appropriate and acceptable landing point and onshore route for the Indian Queens' point of connection was not identified. For this reason, the Indian Queens site was not taken forward for further consideration.

4.4.22 Highly sensitive environmental areas were also identified surrounding the Exeter site. The Exeter point of connection also showed potentially challenging interactions with other HVDC and telecom cables in the vicinity of the Proposed Development route. It was also not clear what mitigation strategies existed to minimise the cost of these interactions, therefore resulting in a high development

risk. For this reason, the Exeter site was not taken forward for further consideration.

4.4.23 This left the Pembroke substation, South Wales, and the Alverdiscott substation, South-West England sites as the two preferred points of connection to take forward for consideration.

4.4.24 Pembroke was the only obvious existing site in South Wales that was both 400 kV and was sufficiently coastal to minimise the length of the onshore cable connection. The main reasons Pembroke was determined as not suitable to progress for further consideration were potentially significant impacts upon sensitive designated areas along the onshore cable route and potential difficulty in managing cumulative impacts associated with other projects already proposed to connect into the Pembroke site.

4.4.25 The Alverdiscott site was identified as the preferred option to proceed for the non-statutory and statutory consultation as it had sufficient space for the development of any required additional infrastructure within the Alverdiscott substation site (owned by National Grid) and the development of the proposed new converter stations on land close to the Alverdiscott substation site. Additionally, compared with the alternative options considered above, the Alverdiscott substation was highlighted as being at little risk of significant conflict with nearby infrastructure and had limited environmental constraints identified within the initial appraisal.

4.4.26 An economic cost-benefit analysis (CBA) of the Pembroke and Alverdiscott substations was also undertaken to establish the most economically efficient point of connection. This demonstrated the significant advantages of having two connections in the South West of England. Given the findings of the CBA and fewer environmental constraints compared with other options, two 1800 MW connections at Alverdiscott were offered to the Applicant by NGESO to take through consultation.

Alternative Landfall options

4.4.27 Following the identification of the Point of Connection into the Alverdiscott Substation, potential landfall options were considered to take through to consultation.

4.4.28 The North Devon and South Devon coastlines were initially considered; however the South Devon coastline was immediately disregarded due to the required length of onshore cable route required to connect into the Alverdiscott substation – onshore cable routes from South Devon could have been in excess of 80km.

4.4.29 A preliminary desk study was carried out along the North Devon coastline to identify the potential landfall locations. Factors considered in determining a potential landfall location included:

- Suitable geological conditions for Horizontal Directional Drilling (HDD) and ground conditions in general for construction
- Topography (height difference) between the seabed and the landfall HDD site
- Avoiding a large number of land holding crossings
- Avoiding key utility infrastructure
- Potential environmental constraints
- Onshore cable route distance (from landfall to the Alverdiscott substation)

- Availability of access to and from the coast for workers and vehicles
- Proximity to sensitive receptors.

4.4.30 As part of the initial consideration of potential landfall sites, a longlist of 14 locations was created. Reasons for rejecting potential landfall locations included insufficient access or space for the HDD operations, unsuitable geology or topography for drilling, environmental constraints, and excessive disruption to other marine users. The initial shortlist was reduced to five locations, as detailed below:

- Cornborough Range – Identified as one of the few low points in the cliffs between Hartland Point and Westwood Ho!. An existing sewerage outfall at the site was installed using HDD in 2001, indicating suitable geological conditions for HDD installation. The potential landfall site also facilitates a potential cable corridor substantially contained within agricultural land.
- Portledge (Peppercombe) – The potential landfall at Peppercombe was considered challenging due to variable geological conditions (changes between soft and hard rock) which would make steering of the HDD more difficult and different types of rock which could cause a risk of bore collapse. The steeper topography at Peppercombe also creates challenges for site access and reduces the area of suitable land for duct stringing (laying the cable out behind the HDD machine to feed into the drilling area).
- Instow Sands – Cable laying within the Taw-Torridge estuary was considered challenging due to its powerful tides, narrow width and presence of other marine users. The landfall location would require HDD operations in close proximity to residential dwellings, a military training area and local recreational facilities (the Instow Cricket Club). The length of connection to the existing Alverdiscott substation is substantially longer than a potential connection from Cornborough.
- Saunton Sands – A potential landfall site would be located in close proximity to the Braunton Burrows Special Area of Conservation (SAC), which is an internationally important nature conservation designation. A potential landfall site was identified within the Saunton Sands Golf Club car park to allow for drilling beneath the SAC. However, the landfall site would then require an additional HDD further south across the River Taw and the connection to the existing Alverdiscott substation is substantially longer than a potential connection from Cornborough.
- Woolacombe - A potential landfall would require termination in the beach car park within the town or at the car park south of the Woolacombe Bay Hotel. A landfall at Woolacombe requires a significant distance of onshore cabling to the Alverdiscott substation, via a HDD crossing beneath the River Taw, or construction of new substation somewhere near the coast at Woolacombe and a connection to the local high voltage network.

4.4.31 The Cornborough Range was identified as the preferred option to take to consultation because it has the least potential impact compared to the other three options.

4.4.32 Two potential landfall locations were identified in the Cornborough Range area. These are identified in Volume 1, Figure 4.1 as the initial and proposed. Both are located to the south of Cornborough and to the north of Abbotsham on the coast.

4.4.33 The same factors as listed above in **paragraph 4.4.29** were considered in determining the most appropriate landfall location between the initial and proposed landfall sites shown in Volume 1, Figure 4.1.

4.4.34 The main difference and key factor in determining the suitability of the two sites was the cliff height and therefore the overall depth of the HDD due to the height of the cliff. The deeper HVDC cable is installed the less able it is to dissipate heat and therefore the greater impact on the cable rating. The initial landfall site would require a much deeper HDD and therefore was considered less suitable to the proposed landfall site.

4.4.35 The cliff at the initial landfall site is approximately 40-60m high, while the cliff height at the proposed landfall site is only 15-25m high resulting in the proposed landfall site being the preferred option to take to consultation.

4.4.36 In addition to a review of the factors detailed above, the Applicant undertook a review of the HDD profile for the proposed landfall site to confirm the HDD profile met the following criteria:

- A minimum depth of at least 10m beneath the cliff to avoid damaging the cliff
- A minimum distance of one kilometre between the HDD drilling exit point and the coast to avoid potential impacts on either the intertidal zone or the coastline
- A minimum depth of cover of at least 5m before the HDD exits at the landfall.

4.4.37 The proposed landfall site meets these criteria with a minimum depth beneath the cliff of approximately 20m, a HDD length of approximately 1.4km and exit depth of at least 5m.

4.4.38 For this reason, the proposed landfall site, located approximately 2.5 km south of Westward Ho! and 4km west of Bideford, was selected as the preferred option to take to consultation.

Alternative Onshore Cable Route

4.4.39 The identification and assessment of the onshore HVDC cable route options included the assessment of the key environmental constraints that would provide obstacles and constraints between the point of landfall at Cornborough Range and the grid connection at Alverdiscott Substation. A constraints analysis was undertaken to understand potential challenges for onshore HVDC cable routing from landfall to the connection point. This focused on the environmental, planning, engineering and cost constraints.

4.4.40 Environmental and planning features that were considered during the design of the onshore cable route to reduce the associated impacts included the following:

- Locations of settlements, including residential dwellings and farms
- Existing infrastructure, including roads and pipelines (e.g. gas pipelines)
- Statutory designated sites, such as Areas of Outstanding Natural Beauty (AONB), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR)
- Historically designated sites, such as Scheduled Monuments & Listed Buildings
- High flood risk areas & watercourses

- Areas of Ancient Woodland.

4.4.41 Engineering and cost considerations during the design of the cable route included the following:

- The River Torridge
- Existing infrastructure, including roads and pipelines (e.g. A39 or gas pipelines)
- Cost associated with the length of cable required
- Areas of steep or variable terrain
- Avoidance of multiple small and sharp bends in the cable route.

4.4.42 As part of the initial route selection, the Applicant met with landowners and undertook a walkover of the route, following which the route was refined, taking into account local knowledge from the landowners. This included existing residential property access to natural water sources, farming activities including seasonal activities, land drainage and flooding, minimisation of farm business impact, and reduced impact on farm access.

4.4.43 The onshore HVDC route was also further refined following the Stage 1 Design and first non-statutory consultation in November 2022. As a result of concerns raised about the cable routes proximity to Abbotsham, the proposed HVDC cable route was amended to be located further from Abbotsham. This amended route was consulted in on at the second non-statutory consultation in April 2023.

4.4.44 Final refinements have been made to the proposed onshore HVDC cable route following a review of the proposed HDD drilling locations as part of the Stage 3 Design. These refinements have been incorporated into the proposed route for statutory consultation.

Alternative Offshore Cable Route

4.4.45 The Project offshore cable route runs from the west coast of Morocco to Cornborough in the UK and is approximately 4,000 km long. The preferred route passes through the waters of Morocco, Portugal, Spain, France and the UK at an average depth of 140m and up to 800m at the deepest point along the route. The offshore infrastructure within the Proposed Development is approximately 370km long and includes the offshore HVDC cables and fibre optic cables located within the UK EEZ.

4.4.46 The proposed route for the offshore HVDC cables has been developed in three stages. In the first stage, Global Marine was commissioned in 2019/2020 to conduct a desktop options analysis of the entire offshore cable route and to identify a preferred route based on existing data. The study identified three potential route options from Morocco to the UK, as shown in Volume 1, Figure 4.2.

- Cable route in water depths less than 700m, keeping on the continental shelf, and relatively close to coasts of Portugal and Spain (red route) ‘the Preferred Route’;
- Cable route in water depths less than 3,000m, taking a deeper route across the Straits of Gibraltar and the Bay of Biscay (blue route); and
- A more direct route from Morocco to the UK (green route).

4.4.47 The more direct route between Morocco and the UK is significantly shorter (c.25%) than the other options but has a maximum depth of over 5,000m in the

Bay of Biscay. The number of cable systems operating in water depths beyond 700m is extremely limited. There are some HVDC cables that have been installed and are in operation up to depths of 1,640m in the Mediterranean. In addition, the EuroAsia interconnector is currently under development with a maximum depth of 3,000m however this has no operational track record. As such the direct route has not been taken forward for consultation.

4.4.48 In stage 2, Intertek conducted a feasibility assessment in 2022 to select the optimum route that balanced natural hazards and conservation areas, technological feasibility, and ease of installation, protection, and operation. The 700m deep cable route (red) option followed a route close enough to the continental shelf to be deemed technically feasible and was selected as the preferred option for further optimisation.

4.4.49 In stage 3, the Preferred Route (red) for consultation was further refined by a Routing Workshop that considered water depth, seabed features and geohazards, metocean influences, external stakeholders (e.g. seabed leaseholders, general fishing activities, shipping, etc.) and environmental constraints such as marine protected areas, including Special Areas of Conservation (SAC), Special Protection Areas (SPA), and Marine Conservation Zones (MCZ).

4.4.50 Further refinement of Preferred Route for consultation

4.4.51 Following the initial route option analysis and the confirmation that Cornborough Range would be the preferred entry point for the proposed landfall HDD, a more precise corridor was defined through a series of further workshops with the marine survey contractors, 4C Offshore and GEOxyz.

4.4.52 The following process was used to define the survey corridor:

- The centreline of the preferred route from the landfall out to the limit of the UK EEZ was used as the base case Route Position List (RPL)
- A 500m wide survey corridor was determined to provide sufficient flexibility for detailed cable route engineering within the corridor
- Geographic Information System (GIS) was used to conduct a detailed review of the most up-to-date information about seabed conditions and possible challenges to cable installation within the base case survey corridor
- The RPL was then modified through an iterative process to optimise the survey corridor further using the following factors:
  - Sensitive habitats and designated sites:
    - Sensitive environmental sites were excluded from the survey corridor wherever possible. For example, the preferred RPL was modified to avoid the East of Haig Fras Marine Conservation Area.
  - Existing and proposed seabed infrastructure and other marine users:
    - Existing and planned offshore installations (oil, gas and renewables) were excluded from the survey corridor by at least 500m where possible
    - There are significant numbers of in-service and out-of-service submarine cable crossings in UK waters. For the in-service cable crossings, the Project cables have been routed to cross as close to 90 degrees as possible

- Navigation and Traffic Separation Schemes (TSS) present a continuous risk of planned and unplanned anchoring. Areas of significant shipping activity have been avoided
- Dredging and dumping operations have a direct impact on the seabed and, therefore, are a potential threat to the cable, installation and future security. Therefore, designated areas for dredging and dumping were avoided
- Coastal firing ranges crossed by the route pose a UXO risk to marine operations. Exercises can clash with schedules. Avoid any UXO preferable (if not possible – identify and remove).

– Seabed morphology and shallow geography:
  - In the UK, the seabed is of the hardest clay-based soil type, with several boulder fields and outcrops that go deep into the seabed. The chosen route avoids the worst of these
  - Seabed sediment distribution and transportation affect the burial capability of the cable (sands and gravels offshore of the UK) and potential exposure after burial
  - Sandwaves are highly mobile and avoided where possible; otherwise, deeper burial/ or increased armouring will be required
  - Pockmarks, rock outcrops and reefs were avoided (there are some near Whitecross) as they can damage equipment or cause abrasion, suspension and/or exposure.

– Wrecks
  - The RPL was modified to exclude all known wrecks from the survey corridor by at least 500m. If uncharted wrecks were found during the subsequent surveys, separation of 1x water depth within the surveyed corridor was achieved.

– Cable engineering design
  - Project decision to utilise best-in-class, proven cable technology and crossing methodologies, with cable burial as the preferred method for protection
  - Straight route for at least 1,000m from the UK landfall (for the HDD)
  - The minimum bending radius of the indicative cable system was considered to ensure the RPL corridor could be followed by the cables.

4.4.53 This process's output was the RPL and associated survey corridor, which provided the basis for all of the Project's marine survey operations to date.

4.4.54 Detailed geophysical, geotechnical and environmental surveys were carried out in UK waters during 2022 and 2023 to inform the cable routing further. The results were used to refine the corridor to form the current location of the offshore HVDC cable route for consultation.

Alternative Converter Station

4.4.55 A 2 km radius study area was utilised around the NGET Alverdiscott substation to identify potential converter site options (see Volume 1, Figure 4.3). The radius

was determined by the need to minimise transmission losses along the HVAC cable route between the proposed Converter Site and the existing Alverdiscott substation. Transmission losses increase with distance along a HVAC cable.

4.4.56 The following factors were used to determine potential converter site locations:

- Area of land available to house two converter buildings
- Topography of available land
- Landscaping and screening opportunities
- Environmental constraints including flood risk, ecological habitats and archaeology
- Proximity of sensitive receptors
- Existing road access to and from the site
- Avoidance of Public Rights of Way (PRoW)
- Distance and potential impact of the HVAC cable corridor.

4.4.57 Following a review of the factors above, two potential locations were identified within the study area at Huntshaw and the old Webbery showground.

4.4.58 The Huntshaw Converter Site was proposed during the first non-statutory consultation in November 2022. The proposed Huntshaw Converter Site was located near Great Huxhill, approximately 0.7km south of the Gammaton Crossroads.

4.4.59 Feedback from the non-statutory consultation and a special Town Hall meeting in December 2022 at the Alverdiscott Village Hall indicated strong opposition to the proposed Converter Site at Huntshaw. Concerns about the proposed Huntshaw location included:

- Proximity to and associated construction phase impacts on residential dwellings, including listed buildings within 300m of the proposed Converter Site
- Visual impacts created by the proximity of Converter Site to residential dwellings and scale of landscaping mitigation required within close proximity
- Steep topography with a steep drop in ground levels towards the south east of the proposed site
- The need for a widening of existing roads and construction of a new temporary road for construction access to the proposed site
- Potential impacts on ecology.

4.4.60 As a result of the community opposition to the proposed Huntshaw Converter Site, the Applicant brought forward a proposed site at the old Webbery showground for the second non-statutory consultation event. This proposed site at the old Webbery showground was supported during the second non-statutory consultation and is being presented as the preferred Converter Site location for statutory consultation.

4.4.61 Recognising the proposed Converter Site at the old Webbery showground is still subject to statutory consultation, the Applicant notes the benefits of the proposed Converter Site for consideration include:

- Flatter topography compared to the proposed Huntshaw site, noting that the proposed old Webbery showground is still located on a rolling hillside. The old

Webbery showground site falls away from the road with the proposed converter buildings sitting further down the slope, with a backdrop of existing electricity pylons and a substation (the Alverdiscott substation)

- No impacts on ecological designations, PRoW or potential flood risk
- Access to an existing road network, noting a proposed haul road will mitigate impacts of construction traffic between the proposed Converter Site and proposed construction compound on Gammaton Road
- Short HVAC cable route between the proposed Converter Site and the existing Alverdiscott substation.

4.2 Alternative Design Development

4.4.62 The design and layout of the Proposed Development have formed part of an iterative process in which the ongoing environmental assessment has informed the site selection assessment ready for consultation, which considered the design principles and controls, non-statutory consultation feedback, and engagement with stakeholders and consultees.

4.4.63 The Proposed Development layout will continue to evolve following consultation and as part of the environmental assessment process and further design development. Having regard to outputs from engagement with stakeholders and consultees and feedback from statutory consultation.

4.4.64 A Consultation Report will be submitted supporting the DCO application, which will provide a summary of consultation feedback and how the Applicant has regard to the feedback in developing the design. A Design and Access Statement will also be prepared and submitted to support the DCO application, which will set out the evolution of the Proposed Development design.

4.4.65 The layout and extent of the Proposed Development have been through three design iterations. The first stage of design (Stage 1) was held before the public launch of the Proposed Development in November 2022. The second stage of design (Stage 2) was held before the non-statutory consultation in April-May 2023. The Stage Three design (Stage 3) has been informed by non-statutory Consultation and the Scoping Opinion, which is the current Proposed Development on which the Applicant is consulting on for statutory consultation.

4.4.66 The stages of the design development are discussed further below.

Stage 1 Design – First public Non-Statutory Consultation

4.4.67 An appraisal of the proposed option to locate the conceptual converter station design and connect to the Alverdiscott substation was presented at public consultation events at Huntshaw Parish Hall and Bideford (Caddsdown Business Support Centre) in November 2022.

4.4.68 The location required AC cables travelling north to the Alverdiscott substation, and given the steeper gradient of the land, substantial cut-and-fill earthworks. The conceptual earthworks proposed to create a two-tier platform, with the two stations arranged north and south.

4.4.69 The location's advantage included being lower with respect to important views of the site from the West, for example, the National Landscape (formally AONB), beaches at Westward Ho! and locations to the North such as Horwood and the elevated viewpoint at Codden Hill.

4.4.70 The disadvantages of the location included:

- Longer AC cables and a wider cable corridor will connect across fields to the Alverdiscott substation, approximately 1.7km North.
- The available land was a smaller land parcel which would limit the ability to build bunds around the stations and makes the site highly visible to local views from neighbouring properties to the immediate South and West.

- Extreme east sloping topography which would cause issues in construction feasibility.
- Proximity to numerous residential properties (within 300m) which could not be screened.
- The need for excessive access improvements to and from the site due to narrow roads.

4.4.71 Consequently, the conceptual design included a series of architectural features, including a curved roof line on the main converter building to try to minimise some of the visual impacts.

4.4.72 Based on local community feedback from the November 2022 non-statutory consultation (which was a general dislike of the proposed location) and the disadvantages of the location as listed above, an alternative location was then considered in the next stage of the design.

Stage 2 Design – Second public Non-Statutory Consultation

4.4.73 The proposed onshore HVDC cable corridor was amended following consultation feedback from the first non-statutory consultation that the proposed route came too close to residential properties in Abbotsham and the local primary school. An amended route was consulted on at the second non-statutory consultation as shown in Volume 1, Figure 4.4.

4.4.74 As detailed in Design Stage 1, the Applicant developed an alternative Converter Site location at a site further north to the proposed Huntshaw site, locally known as the old Webbery Showground, immediately to the West of the Alverdiscott substation.

4.4.75 The proposed alternate location at the old Webbery showground was presented at non-statutory public consultation events at Huntshaw Parish Hall and Alverdiscott Community Hall in April 2023. Consultation events at Pollyfield Community Centre and Caddsdown Business Support Centre were held in May 2023.

4.4.76 The proposed converter stations were located immediately to the west of the Alverdiscott substation, with the West convertor station oriented roughly North-South and the East converter station oriented roughly East-West. The orientation of the stations proposed at the second non-statutory consultation accommodated the consented but not implemented solar farm (ref: 1/1057/2021/FULM—Land At Webbery Barton And Cleave Farm Bideford Devon), which makes use of the field adjacent to the Alverdiscott substation, as shown in Volume 1, Figures 4.3 and 4.4 landfall.

4.4.77 The proposed design required substantial cut and fill to minimise the landscape's visual impacts from the north and west viewpoints. A potential landscape feature was also considered within the northern field shown in Volume 1, Figure 4.3 as the temporary contractor laydown area to help mitigate potential visual impacts north of the proposed Converter Site. A curved roof for the main converter building was maintained as a further mitigation measure.

4.4.78 Locating the Converter Site immediately west of the Alverdiscott substation significantly reduced the length of the HVAC cables between the Converter Site and the existing Alverdiscott substation. This resulted in a reduction in potential impacts associated with the HVAC cable route.

4.4.79 Due to the proposed Converter Site at the old Webbery showground being located at a higher elevation (closer to the local ridge line) compared to the proposed Huntshaw location, there was a potential for increased visual impacts associated with the converter buildings being visible over the ridgeline. This was proposed to be mitigated by constructing appropriately sized landscaped bunds to the west of the western converter station and to the north of the eastern converter station to 'screen' the majority of the building structure from these viewpoints.

4.4.80 Potential impacts on views from the south and east of the proposed convertor site at old Webbery showground would be mitigated by landscaped planting, noting that this screening would not be as high as the bunding to the north and west.

4.4.81 The proposed Converter Site at the old Webbery showground would require a longer HVDC cable route than the proposed Huntshaw Converter Site, however the Applicant anticipated that the additional length in HVDC cable corridor did not introduce any additional environmental impacts beyond those associated with the proposed Huntshaw Converter Site.

Stage 3 – Design for Statutory Consultation and PEIR

4.4.82 Following Design Stage 2, the Applicant further developed the conceptual layouts of the proposed converter stations at the old Webbery Showground location and made minor amendments to the proposed HVDC HDD locations along the route. The output of this process is presented within the PEIR and is the subject of statutory consultation.

4.4.83 The location of proposed HDD compounds for the onshore HVDC cable corridor was reviewed during Stage 3, resulting in minor amendments to the locations proposed during Stage 2. The amendments largely affected the proposed HDD compounds at Buckland Road and West Ashridge where the proposed cable route was amended to mitigate potential impacts on an existing groundwater well at Buckland Road and to move the northern HDD compound at West Ashridge to a flatter peace of agricultural land, reducing the need for substantial cut into the existing ground levels for the compound.

4.4.84 The Stage 3 Converter Site design has incorporated further detail from early engagement with the potential supply chain for the high-voltage converter equipment, resulting in an increase in the dimensions of the main converter building and its surrounding equipment (the platform) and necessitating the removal of the curved roof to meet internal design requirements of the supply chain.

4.4.85 Initial consideration of the construction environmental impacts, in particular potential traffic impacts associated with cut and fill operations required re-orientation of the convertor stations so that both are roughly oriented north to south. The reorientation of the converter stations reduces the extent of cut required into the hillside to site the converter buildings, thereby reducing the volume of materials generated during excavation. A review of the size and volume of proposed landscaped bunds has also helped to balance the cut and fill operations, resulting in an overall reduction in the anticipated number of construction vehicle (HGV) movements required to and from the proposed Gammaton Road compound during the construction phase.

4.4.86 The PEIR now proposes reducing the stations' visual impact by increasing the visual mitigation using landscaping bunds on all sides of the converter station. This alteration to include additional bunds while accommodating supply chain feedback for a larger platform has necessitated the use of steeper, near-vertical internal bund construction to allow sufficient space for the converter stations inside the bunds. The Applicant anticipates that the proposed vertical internal facing of the bunds will be constructed using a combination a shotcrete with appropriate stabilisation fixings (e.g. rock bolts) and gabion baskets (rock filled basket).

4.4.87 The advantages of a proposed design with bunding surrounding the converter buildings are:

- A reduction in the potential for surplus materials from cut operations requiring export from site, thereby reducing the project's potential construction traffic impacts.
- A reduction in visual impacts from views from the south and east (in addition to views from the north and west) associated with a greater volume of landscape bunding.

4.4.88 The design requires the removal of a portion of a consented solar farm currently in the construction phase (planning reference: 1/1057/2021/FULM - Land At Webbery Barton And Cleave Farm Bideford Devon) in the field immediately west of the existing Alverdiscott substation. This equates to circa 10% (4.5MW) of the solar farm’s overall proposed installed capacity. The loss of 4MWp from the solar farm will be offset by 3.6GW of clean energy from the Proposed Development. The Applicant is currently engaging with the solar farm owner to confirm the impacts on their development and how the decommissioning of the constructed solar panels would be managed.

4.4.89 The roof shape of the Converter buildings will be more angular than that proposed in Stages 1 and 2 of the design. However, architectural treatments will be proposed through design principles included in the DCO application to mitigate potential visual impacts associated with the form of the buildings. The proposed increase in landscaping bunding and planting will largely mitigate visual impacts associated with the change in the proposed roof shape. The size of the building and platform is required to ensure that the construction and operation of the site are fully feasible.

4.4.90 Overall, the design for PEIR and statutory consultation represents a series of beneficial trade-offs between the technical, supply chain, landscaping, and land constraints and requirements and represents an approach to minimising the developer's impact on the environment.

4.3 Next Steps

4.4.91 The Applicant seeks feedback on the Proposed Development as part of statutory consultation. That feedback will help refine the proposals that will form the Proposed Development, for which an application for a DCO will be made.

4.3 References

Online source:

Department for Energy Security & Net Zero (2023a) Overarching National Policy Statement for Energy (NPS EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf (Accessed: November 2023).

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