AQUIND Limited

AQUIND INTERCONNECTOR

First Written Question Responses – Appendix 1 Converter Station Design Approach (MG1.1.3)

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1. THE CONVERTER STATION AND DESIGN POLICY IN NPS EN-1

1.1. INTRODUCTION

1.1.1.1. Written Question MG1.1.3 stated the following:

"*Explain the design approach and design credentials of the Converter Station buildings and structures. Reference should be made to the objectives in section 4.5 of NPS EN-1 and how the proposed development seeks to address or exceed the expectations of good design set out in the National Design Guide."*

1.1.1.2. The Applicant has prepared this document to address the queries raised in relation to the design approach and design credentials of the Converter Station buildings and structures.

1.1.1.3. The Secretary of State's s35 Direction (APP-039) directed that NPS EN-1 has effect in relation to the application for development consent. The text in bold is the Applicant's emphasis. NPS-EN 1 section 4.5 states:

"*4.5.1 The visual appearance of a building is sometimes considered to be the most important factor in good design. But high quality and inclusive design goes far beyond aesthetic considerations.* ***The functionality of an object — be it a building or other type of infrastructure — including fitness for purpose and sustainability, is equally important.*** *Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible.* ***It is acknowledged, however that the nature of much energy infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.***

4.5.2 Good design is also a means by which many policy objectives in the NPS can be met, for example the impact sections show how good design, in terms of siting and use of appropriate technologies can help mitigate adverse impacts such as noise.

4.5.3 In the light of the above, and given the importance which the Planning Act 2008 places on good design and sustainability, ***the [SoS] needs to be satisfied that energy infrastructure developments are sustainable and, having regard to regulatory and other constraints, are as attractive, durable and adaptable***

(including taking account of natural hazards such as flooding) as they can be. In so doing, the [SoS] should satisfy itself that the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible. Whilst the applicant may not have any or very limited choice in the physical appearance of some energy infrastructure, there may be opportunities for the applicant to demonstrate good design in terms of siting relative to existing landscape character, landform and vegetation. *Furthermore, the design and sensitive use of materials in any associated development such as electricity substations will assist in ensuring that such development contributes to the quality of the area.*

4.5.4 For the [SoS] to consider the proposal for a project, applicants should be able to demonstrate in their application documents how the design process was conducted and how the proposed design evolved. Where a number of different designs were considered, applicants should set out the reasons why the favoured choice has been selected. In considering applications ***the [SoS] should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy.***

4.5.5 Applicants and the [SoS] should consider taking independent professional advice on the design aspects of a proposal. In particular, Design Council CABE can be asked to provide design review for nationally significant infrastructure projects and applicants are encouraged to use this service.

4.5.6 Further advice on what the IPC should expect applicants to demonstrate by way of good design is provided in the technology-specific NPSs where relevant."

1.2. ASSESSMENT OF THE CONVERTER STATION BUILDINGS AND STRUCTURES AGAINST THE DESIGN POLICIES IN NPS EN-1

1.2.1.1. The updated Design and Access Statement ("DAS") (APP-114 rev002) outlines in section 2.1.3 how the objectives in section 4.5 of NPS EN-1 have been related to the design development of this project, in summary:

"The concept of good design has therefore not only informed the selection of the technologies, the location of the Converter Station and the ORS at Landfall but also those embedded mitigation measures which will minimise adverse effects both during the construction and operation of the Proposed Development."

1.2.1.2. The DAS, an updated version of which is submitted at Deadline 1 (APP-114 rev002), also describes in section 2.1. how the concept of good design relates to energy infrastructure projects such as the Converter Station, and outlines approaches taken including mitigation measures to minimise adverse effects both during the

construction and operation of the Proposed Development. Section 3.2.1 of the updated DAS discusses the site selection of the Converter Station.

1.2.1.3. The updated DAS section 3.2.1 describes the site selection for the Converter Station buildings and structures, with reference to impact on visual amenity and environment, and proximity to residential properties.

1.2.1.4. The updated DAS Section 4.3 (Converter Station Design Meetings) documents the collaborative process undertaken with LPA's and stakeholders to explore design options and arrive at the set of design parameters defined by the Design Principles, meeting the objectives defined in section 4.5.4 of NPS EN-1.

1.2.1.5. DAS Section 6.2 (Design Principles for the Converter Station) sets out the design approach to the buildings.

1.2.1.6. Section 8, table 8.1 of the DAS relates each Design Principle to the relevant objectives in section 4.5 of NPS EN-1.

1.2.1.7. The DAS also explains the need for the Converter Station buildings and structures within section 5.1.1.2:

"The converter station is required to change the electrical current from high voltage direct current (HVDC) to high voltage alternating current (HVAC) – used by the National Grid in the electrical transmission network"

1.2.1.8. The DAS also outlines within section 5.1.3 the proposed landscaping at Lovedean (Converter Station Area) presenting measures on reprofiling and planting and explains the landscape design principles in section 6.2.3.

1.2.2. LOCAL CONTEXT

1.2.2.1. DAS Section 3.2 provides an analysis of the consideration of five potential locations for the Converter Station, taking into account:

- Operational and site constraints
- Avoidance of areas of high environmental value or public amenity, such as ridge tops and rare species habitat
- Minimisation of proximity to dwellings, public buildings, and public spaces due to possible audible noise and electromagnetic interference from the Converter Station
- Avoidance of flood plains, rivers or streams
- Avoidance of marshland which would require piling for foundations
- Avoidance of footpaths and historic public rights of way ('PRoW'), where practicable

1.2.2.2. The site to the north of Lovedean Substation was discounted due to its impact on the South Downs National Park; the site to the south-west was discounted to enable

preservation of Ancient Woodland; and the southernmost site due to its proximity to and visual impact on residential areas.

1.2.2.3. The final location was selected taking into account the existing topography and vegetation, which provided natural screening of the Converter Station site from key receptors including nearby settlements and urban areas, the public highway and PRoWs, and provided the opportunity of being mitigated by the introduction of additional landscaping. It was therefore concluded that this site (Option B) had the potential to result in a lesser visual impact.

1.2.2.4. Further micro-siting of the Converter Station to preserve a section of established hedgerow is also provided as an option, and is subject to an agreement with National Grid regarding the acquisition of the land required for this.

1.2.3. FLOOD RISK / SURFACE WATER DRAINAGE

1.2.3.1. The Converter Station site selection process described in DAS Section 3.2 eliminated any sites where flood risk would be an issue.

1.2.3.2. The DAS section 3.1.2.8 confirms: "*The Environments Agency's Flood Risk Data indicates that the site is located in an area at low risk of flooding (Flood Zone 1).*"

1.2.3.3. Appendix 7 (Surface Water Drainage and Aquifer Contamination Mitigation Strategy) of the Onshore Outline Construction Environmental Management Plan (OOCEMP) provides further details of the flood and drainage measures.

1.2.4. CULTURAL HERITAGE

1.2.4.1. The Site Context and Analysis provided at section 3.1.2.9 to the DAS confirms that there are no heritage assets in the immediate proximity to the Converter Station:

"The Converter Station is not located within the immediate proximity of any statutory or non-statutory heritage assets. A number of Listed Buildings, predominately Grade II, lie within Lovedean, Denmead, Hambledon and along the narrow lanes mainly to the east of the Converter Station area, with the closest being at Denmead Farm (two Grade II Listed Buildings), off Edneys Lane to the south west and Ludmore Cottages to the north east (one Grade II Listed Building)."

1.2.4.2. The Converter Station site is not close enough to the listed buildings referred to above to have any negative impact.

1.2.5. LANDSCAPE AND VISUAL AMENITY

1.2.5.1. The Converter Station is sited close to the South Downs National Park and the Monarch's Way and a small number of residential properties. To mitigate against landscape and visual impacts the building is to be designed to integrate into the surrounding landscape through the sensitive use of colour, cladding and colour

grading as well as minimising the extent of visual clutter through the rationalisation of building functions into simple building forms as stated in section 6.2 of the DAS.

1.2.5.2. Landscaping (including cut and fill, reprofiling if / where appropriate) and associated planting is proposed around the Converter Station to tie the Converter Station into its surroundings, the details of which are provided at section 6.2 General Principles and Landscape Design Principles of the DAS.

1.2.5.3. Proposals seek to minimise the loss of existing vegetation which serves a visual screening function and introduce landscape management measures to maintain, enhance and replace planting where appropriate. New planting which will range from woodland (with areas understorey and ground flora), hedgerows and new calcareous and marsh grassland will serve a visual screening function and/or enhance biodiversity and connectivity across the site.

1.2.6. NOISE

1.2.6.1. Building design principle 9 for the Converter Station, stated at section 6.2.2 of the DAS, confirms: "*Operational noise from the Converter Station will meet the criteria provided for in the operational broadband and octave band noise criteria document (Application Document 7.7.11) .*". This is also secured by Requirement 20 to the dDCO (APP-019).

1.2.6.2. The building walls and roofs will be designed to ensure that the required sound proofing is provided, and additional measures will be incorporated as required for any external equipment to ensure that the stated noise criteria are not exceeded.

1.2.6.3. In this regard, the DAS confirms at paragraphs 5.2.5.11 and 5.2.5.12 as follows:

"The Proposed Development's valve cooling systems are expected to generate noise and have, therefore, been included in the noise modelling and assessment. As this equipment is located inside the Control Building, external noise break-out from this equipment will be minimised.

Additionally, the Control Building will be located between the two Converter Buildings to serve three functions:

- *Optimise the water pipes design from the cooling plant to control room;*
- *Optimise the fibre optic cable routes to the control room; and,*
- *As explained in Appendix 1, the positioning of the Control Building along the western edge of the Converter Station compound forms an uninterrupted noise screen between the outdoor valve cooling systems and Millfield Farm, thereby minimising operational noise effects at this receptor.*"

1.2.7. FINAL DESIGN APPROVAL

1.2.7.1. Requirement 6 of the draft DCO states:

"(1) The construction of any phase of Works No. 2 (excluding Works No. 2(a)) must not commence until written details of the –

(a) layout;

(b) scale;

(c) proposed finished floor level;

(d) external appearance and materials;

(e) hard surfacing materials;

(f) location of the attenuation ponds;

(g) vehicular access, parking and circulation areas;

(h) proposed services above and below, ground, including drainage, power andcommunications cables and pipelines, manholes and supports;

relating to that phase of those works and confirming how those details accord with the design principles for the converter station have been submitted to and approved in writing by the relevant planning authority in consultation with the South Downs National Park Authority."

1.2.7.2. The Converter Station design will be required to be in accordance with the Design Principles, as set out in section 6.2 of the Updated DAS, and secured by Requirement 6, as set out above.

1.2.8. CONCLUSION IN RESPECT OF EN-1

1.2.8.1. By their nature, the Converter Station buildings and structures are required to be functional, with limited opportunity to alter the aesthetic. However, consideration has been given to the following (with reference to sections above):

- (1.2.1.3 and 1.2.2) Site selection to minimise the impact on visual amenity and environment; and reduce proximity to residential properties.
- (1.2.1.4) Demonstrating the evolvement of the design process and consideration of design options defined in section 4.5.4 of NPS EN-1
- (1.2.1.5 referring to DAS Table 8.1) relates the DAS Design Principles to specific objectives in 4.5 of NPS EN-1
- (1.2.3) Flood risk and climate change.
- (1.2.5) Noise impact

2. NATIONAL DESIGN GUIDE (MHCLG 2019)

2.1. INTRODUCTION

2.1.1.1. The National Design Guide ('NDG') was published by MHCLG on 1 October 2019 and sets out the characteristics of well-designed places and demonstrates what good design means in practice, by outlining and illustrating the Government's priorities for well-designed places in the form of 10 characteristics.

2.1.1.2. Given the breadth of development which the NDG has been produced to relate to, and noting that the NDG is in many respects an overarching design guide which focuses on the delivery of well-designed places, rather than the design of individual buildings, and in particular buildings which form part of infrastructure projects such as those comprised in the Proposed Development, there is difficulty in applying the ten characteristics to the Converter Station buildings and structures in a meaningful way.

2.1.1.3. Nonetheless, the Applicant has considered all ten characteristics which are detailed within Part 2 of the NDG, their relevance to the Converter Station buildings and structures, and where they are relevant how the buildings and structures perform in relation to them.

2.2. OVERARCHING COMMENTS ON CONVERTER STATION BUILDINGS AND STRUCTURES DESIGN IN THE CONTEXT OF THE NDG

2.2.1.1. Paragraph 4 of the introduction to the NDG states the long-standing principles for good design as follows:

"The long-standing, fundamental principles for good design are that it is: fit for purpose; durable; and brings delight. It is relatively straightforward to define and assess these qualities for a building. We can identify its activities and users, the quality of detail, materials, construction and its potential flexibility. We can also make judgements about its beauty."

2.2.1.2. In Vitruvian terms (utility, durability and delight), the proposed Converter Station buildings and structures buildings have utility and durability, they are highly functional buildings and structures that must meet operational requirements in the delivery of nationally important infrastructure and have therefore been designed to be fit for purpose. They are resilient to flood risk events and climate change, built to

last for their expected lifetime and are secure, and as such they are durable. The ability of the Converter Station buildings and structures to delight is limited by the requirements in relation to their function, but, as described above, account has been taken of the local context and of the amenity of nearby residents and the public use of surrounding areas, and how the buildings and structures appear in this context. Design measures to address the massing and appearance of the buildings have been explored and presented to LPA's and stakeholders to establish the Design Principles in Section 6.2 of the updated DAS.

2.2.1.3. Whilst not mentioned in the NDG, another well-established general design principle is 'form follows function' (Bauhaus). In that regard the Converter Station buildings and structures are highly functional, minimalist and with a clear emphasis on technology and resilience.

2.2.1.4. The following sections relate the ten characteristics and sub-sections in the NDG to the Converter Station buildings and structure design development. The NDG characteristics which are deemed irrelevant are identified and explanations given.

2.2.1.5. The Design Principles established in DAS Section 6.2 are related to the relevant NDG Characteristics in Table 2.1 below.

2.2.2. CONTEXT – ENHANCES THE SURROUNDINGS

2.2.2.1. **C1 Understand and relate well to the site**: It is important to note that the location of the Converter Station is determined by the need for it to be in proximity to Lovedean Substation.

2.2.2.2. Section 3.2 of the DAS details the process undertaken to establish the optimum location for the Converter Station, taking account of functionality, impact on the local environment and residential areas and avoidance of flood risk.

2.2.2.3. The site has been selected to take advantage of existing topography and vegetation to provide screening. Landscape mitigation measures are included to increase screening and enhance the environment around the site.

2.2.2.4. **C2 Value heritage, local history and culture**: The DAS at section 3.1.2.9, (referred to in 1.2.1.3 above) identifies that there are no heritage assets in the immediate proximity to the Converter Station.

2.2.3. IDENTITY – ATTRACTIVE AND DISTINCTIVE

2.2.3.1. **I1 Respond to existing local character and identity:** The cladding system selected for the Converter Station buildings will be comprised of small elements of varied colours from a palette (refer to DAS section 6.2.2 Building Design Principle 3) selected to compliment the surrounding landscape, with reference to a study of contextual views (refer to DAS Plate 4.10). Colour grading across the building will be considered and relate to adjoining land uses with the roofing a dark non reflective colour to minimise visual impact.

2.2.3.2. The Converter Station buildings and structures are to be integrated into the surrounding topography as far as practicable within the identified constraints.

2.2.3.3. The access road will be designed and configured to minimise environmental impact, with the surfacing and landscaping to be designed to take account of the site context in accordance with the Landscape Design Principles (section .6.2.3 of the DAS)

2.2.3.4. The design will seek to minimise the loss of existing vegetation. Landscape, management measures will be introduced to maintain, enhance and replace existing vegetation where required, retaining a visual screening function.

2.2.3.5. New planting will be sympathetic to the existing landscape and reflective of native species and new woodland, scrub and hedgerow planting will be introduced to provide appropriate screening from sensitive receptors, enhance landscape character and improve biodiversity.

2.2.3.6. **I2 Well-designed, high quality and attractive**: The cladding system of layers of small elements ("baguettes") of varied colours selected for the Converter Station Buildings (refer to DAS plates 4.8 and 4.9) will break up the mass of the buildings and present a higher quality and attractive appearance than the standard profile sheet cladding systems usually installed on buildings of this type.

2.2.3.7. Curved corners will be included, where practicable, to soften the visual impact and attention will be applied to relationships between the component parts of the main structures to add interest and further reduce the perceived mass of the building.

2.2.3.8. **I3 Create character and identity**: The cladding system curved corners outlined in section 2.2.3.2 above will add character and identity to the Converter Station buildings, albeit the aim of the design is not to make the buildings stand out in the landscape.

2.2.4. BUILT FORM – A COHERENT PATTERN OF DEVELOPMENT

2.2.4.1. **B1 Compact form of development**: The Converter Station compound will be cut into the hill slope to reduce the overall height as much as practicable from the north, west and east, and its impact on the South Downs National Park.

2.2.4.2. The Converter Station buildings and structures will be contained within a secure compound, as much of the equipment as possible will be contained within the buildings which will be rationalised to simple built forms to avoid visual clutter.

2.2.4.3. Heating and ventilating plant will be located in the buildings or at ground level, there will be no plant on the roofs of the highest buildings.

2.2.4.4. **B2 Appropriate building types and forms**: The design of the Converter Station buildings and structures will meet the functional requirements of the facility, following the National Grid Technical Guidelines to meet functional and operational needs relating to structural stability; thermal and acoustic performance; fire safety; electrical safety; future maintenance; security and access for operation and maintenance.

B3 Destinations: This characteristic is deemed irrelevant as there is no public access to the Converter Station.

2.2.5. MOVEMENT – ACCESSIBLE AND EASY TO MOVE AROUND

Characteristics M1, M2 & M3 are deemed irrelevant as the Converter Station is an unmanned facility with no public access, however access to and around the facility for installation and maintenance to meet operational requirements has been appropriately considered.

2.2.6. NATURE – ENHANCED AND OPTIMISED

2.2.6.1. **N1 Provide high quality, green open spaces with a variety of landscapes and activities, including play:** This characteristic is deemed irrelevant as there is no public access to the Converter Station.

2.2.6.2. **N2 Improve and enhance water management:** The Landscape Mitigation proposals (Plates 5.38 – 5.41 in the DAS) include attenuation ponds to manage the site drainage with appropriate planting to compliment the existing landscape and promote biodiversity.

2.2.6.3. **N3 Support rich and varied biodiversity:** The landscape design will seek to minimise the loss of existing vegetation of ecological value as far as practicable and will include management repair measures where appropriate to maintain existing biodiversity.

2.2.6.4. New planting will be introduced which is sympathetic to the surrounding landscape character and reflective of native species to further existing biodiversity.

2.2.6.5. The biodiversity of the semi-improved neutral and species poor grassland at the Converter Station will be improved by the application of green hay sourced from Denmead Meadows to ensure native plants of local provenance are used to colonise and increase the value of the grassland with the aim of achieving calcareous grassland.

2.2.6.6. Glades and more open areas of woodland will be created in species rich woodland belts and copses taking into consideration soil types, species, mixes and heights, achieved through detailed management regimes. Existing biodiversity will be enhanced to encourage diversity including understorey planting and ground flora (including ferns). New woodland, scrub and hedgerow planting will be introduced to enhance landscape character and improve biodiversity.

2.2.6.7. Detailed landscaping proposals will include appropriate measures to maintain wildlife habitats and corridors wherever feasible.

2.2.7. PUBLIC SPACES – SAFE, SOCIAL AND INCLUSIVE

2.2.7.1. Characteristics P1, P2 & P3 are deemed irrelevant as there is no public access to the Converter Station.

2.2.8. USES - MIXED AND INTEGRATED

2.2.8.1. Characteristics U1, U2 & U3 are deemed irrelevant as the Converter Station is a single use facility with no public access, or residential components.

2.2.9. HOMES AND BUILDINGS – FUNCTIONAL, HEALTHY AND SUSTAINABLE.

2.2.9.1. Characteristics H1, H2 & H3 are deemed irrelevant as the Converter Station is an unmanned facility with no public access, however safe access for maintenance personnel to and within the buildings and structures has been duly considered

2.2.10. RESOURCES – EFFICIENT AND RESILIENT

2.2.10.1. **R1 Follow the energy hierarchy:** The Converter Station buildings will be designed to reduce energy consumption where practicable and the facility design and construction methods will adopt a sustainability approach to reduce the carbon footprint as far as possible.

2.2.10.2. **R2 Selection of materials and construction techniques**: External cladding and roofing to the buildings will be pre-coated metal, or equivalent durable low-maintenance material.

2.2.10.3. External building materials and finishes will have a design life of 20 years to first major maintenance.

2.2.10.4. The design of the Converter Station will balance cut and fill of excavated earthworks in order to minimise the quantity of imported earthwork material and maximise the reuse of arisings.

2.2.10.5. **R3 Maximise resilience:** This characteristic is not relevant as the functional requirements of the Converter Station do not present opportunities for passive energy saving design, and there are no public open spaces

2.2.11. LIFESPAN – MADE TO LAST

2.2.11.1. **L1 Well-managed and maintained**: External cladding and roofing to the buildings will be pre-coated metal, or equivalent durable low-maintenance material and all external building materials and finishes will have a design life of 20 years to first major maintenance.

2.2.11.2. **L2 Adaptable to changing needs and evolving technologies**: This characteristic is deemed irrelevant as the Converter Station is a single use facility

2.2.11.3. **L3 A sense of ownership**: This characteristic is deemed irrelevant as there is no public access to the Converter Station.

Table 2.1 – DAS Design principles related to the NDG Characteristics

General Design Principles	Ref
1. The site layout and design will meet the operational requirements of the Converter Station facility.	B2
2. The design will seek to integrate the proposed Converter Station and associated infrastructure into the surrounding topography, as far as practicable within operational requirements and environmental constraints.	C1 I1
3. Where practicable and subject to environmental constraints the Converter Station construction platform would be cut into the hill slope to reduce the ridge level of the building.	C1 B1
4. The Converter Station buildings and associated above ground equipment will be contained within a secure compound, as depicted upon the Parameter Plans.	B1
5. The Telecommunications Building(s) will be contained within a separate compound.	
6. All HVDC cables and the associated fibre optic cables from the Marine Cable Corridor to the Onshore Cable Corridor and Converter Station, as well as the HVAC cables, will be buried and the land above re-instated on completion to minimise impact. There is a requirement for Link Boxes or Link Pillars approximately every 6km for the Onshore Cable Route. Only the Link Pillars would be above ground and would measure approximately 1.0m x 1.0m x 0.6m	C1
7. The access road will be designed and configured to allow maintenance access and include the movement of abnormal indivisible loads, whilst minimising environmental impact. Permanent surfacing and landscaping will take account of the local context and be detailed in accordance with the 'Landscape Design Principles'	C1 I1
8. The design of the Convertor Station will comply with building control requirements and generally follow the National Grid Technical Guidelines, including the design life of materials and components to meet its functional and operational needs relating to: structural stability; thermal and acoustic performance; fire safety; electrical safety; future maintenance; security and access for operation and maintenance. The operational needs for the Converter Station will include: • Appropriate operational space, including electrical and magnetic clearances, and space for maintenance and anticipated repair operations within the Convertor Station.	B2

General Design Principles	Ref
• Allowances for replacement of equipment in a timely manner to ensure minimal disruption or interruption to operation. • Dual perimeter security fencing with sterile zone to allow appropriate entry and exit provisions for workers and deter access by others.	
Converter Station Building Design Principles	
1. External cladding and roofing to the buildings will be pre-coated metal, or equivalent durable low-maintenance material.	R2 R3 L1
2. The wall cladding be comprised of narrow vertical elements of varied colours to break up the mass of the building.	I2
3. Colours will be selected from a palette of autumnal colours within the ranges below chosen to complement the surrounding landscape. • RAL 1013 -1015; 8001- 8015; 8023 – 80281 • Colour grading across the building from dark to light will be considered to relate to adjoining land usage and visual impacts, including the Monarch's Way long distance footpath to the north of the site. The roofing will be in a dark recessive non-reflective colour to minimise visual impact.	C1 I1 I2 I3
4. Building massing will be designed to rationalise the different functions required and avoid visual clutter which could result from different sized buildings scattered across the site.	B1
5. The Converter Station will be orientated on an east-west axis with the HVDC cables entering the Valve Hall to the western side of the site, the Valve Hall and buildings of up to 26m in height being located to the western side of the site and the outdoor infrastructure, up to 15m in height, to the eastern side. The HVAC cables exit the Converter Station site on the eastern boundary travelling towards Lovedean Substation further to the east.	
6. Curved corners will be included, where practicable, to soften the visual impact and attention will be applied to relationships between the component parts of the main structures to add interest and further reduce the perceived mass of the building.	I2 I3

General Design Principles	Ref
7. Lightning masts of up to 30m in height, will be needed and could be attached to the Converter buildings and/or located within the compound defined on the Parameter Plans.	
8. Heating and ventilation air conditioning will be located within the buildings or at ground level within the defined building site plan. There will be no plant on the roofs of the highest buildings.	C1 B1
9. Operational noise from the Converter Station will meet the criteria detailed in Chapter 24 Noise and Vibration (Section 24.4.5 and Appendix 24.6).	
10. The Converter Station will not be illuminated other than in circumstances such as upon activation of an intruder alarm or maintenance or repair operations.	
Landscape Design Principles	
1. The proposals for landscaping will be developed and approved in accordance with the indicative landscape mitigation plans. A DCO Requirement will ensure that detailed designs, post consent, will be in accordance with those plans and the further design principles detailed below.	
2. The design will seek to minimise the loss of existing vegetation of ecological, landscape character and / or screening value as far as practicable and will include management repair measures where appropriate with reference to the indicative landscape mitigation plan.	C1 I1 N3
3. New planting will be introduced which is sympathetic to the surrounding landscape character and reflective of native species.	I1
4. The biodiversity of the semi-improved calcareous grassland at the Converter Station will be improved by the application of green hay sourced from Denmead Meadows to ensure native plants of local provenance are used to colonise and increase the value of the grassland.	N3
5. Species rich woodland glades would be created within areas of new planting, taking into consideration soil types, seeding mixes and management regimes.	N3
6. New woodland, scrub and hedgerow planting, within locations broadly indicated upon the indicative landscape mitigation plans, will be introduced within the Order Limits to provide appropriate screening from sensitive receptors, enhance landscape character and improve biodiversity.	I1 N3

General Design Principles	Ref
7. Detailed landscaping proposals will include appropriate measures to maintain wildlife habitats and corridors wherever feasible.	N3
8. Excess fill will be utilised in a sympathetic manner to create new naturalistic landforms and provide screening from sensitive receptors.	
9. New planting will take place early in the construction programme where practicable, and where planting will not be affected by construction works.	
Sustainability Principles	
1. In response to climate change concerns the development approach will aspire to reduce the carbon footprint of the Project wherever feasible.	R1
2. The Converter Station design will adopt sustainable approach to design which will involve the following measures: • Reducing where possible material use in construction and minimising the use of high carbon materials. • Buildings should be energy and resource efficient.	R1
3. External building materials and finishes will have a design life of 20 years to first major maintenance.	R2 R3 L1
4. The design of the Converter Station will seek to balance cut and fill of excavated earthworks in order to minimise the quantity of imported earthwork material and maximise the reuse of arisings.	R1 R2
5. The Converter Station will not be illuminated at night other than in circumstances such as upon activation of an intruder alarm or for maintenance or repair operations.	

2.2.12. CONCLUSION ON THE NDG

2.2.12.1. The Applicant considers that the Converter Station buildings and structures have taken account of the principles of good design as they relate to Nationally Significant Infrastructure Projects with the associated need for high technical specification, functional and secure buildings. Detailed above is an analysis of

measures taken to reduce the impact of the Converter Station buildings on visual amenity and the surrounding landscape and environment, including design enhancements.

2.2.12.2. The Converter Station buildings and structures proportionately respond to the characteristics set out in the NDG where relevant to it. In the context of its operational function, this facility achieves good design.