# Dean Moor
## Solar Farm

# Environmental Statement: Chapter 4 – Alternatives and Design Evolution

on behalf of **FVS Dean Moor Limited**

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# DEAN MOOR SOLAR FARM
# ENVIRONMENTAL STATEMENT
# CHAPTER 4 – ALTERNATIVES AND DESIGN EVOLUTION
# PLANNING INSPECTORATE REFERENCE EN010155
# PREPARED ON BEHALF OF FVS DEAN MOOR LIMITED

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

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# Contents



# Figures

# 4 Environmental Statement (ES) Chapter 4: Alternatives and Design Evolution

## 4.1 Introduction

4.1.1 This chapter is supported by the following figures (full versions of standalone figures, are provided separately where applicable) **[REF: 6.2]**:

- Figure 4.1: Post-1988 ALC Survey of Area C;
- Figure 4.2: Combined Constraints Plan;
- Figure 4.3: Preliminary Zone of Theoretical Visibility Analysis: Preliminary Site;
- Figure 4.4: Alternative Parcels and Provisional Agricultural Landscape Classification (ALC); and
- Figure 4.5: Draft Order Limits Comparison.

4.1.2 This chapter provides a summary of the site selection process that was undertaken to identify the Site for the Proposed Development. A description of the Proposed Development's design evolution is also provided, together with the main alternatives considered. This process has allowed opportunities to be identified to reduce potential adverse effects and increase beneficial effects of the Proposed Development.

4.1.3 Regulation 14(2)(d) of the EIA Regulations requires an ES to include:

*'A description of the reasonable alternatives studied by the applicant which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment'.*

4.1.4 This chapter therefore considers these alternatives as set out in Regulation 14(2)(d) of the EIA Regulations.

## 4.2 Guidance

4.2.1 On alternatives, paragraph 4.3.9 of NPS EN-1 considers the relevance of alternatives to be a '*matter of law*'. Paragraph 4.3.15 further outlines the requirement for an ES to include information about the *'reasonable alternatives'* studied and take into account environmental, social and economic effects as well as technical and commercial feasibility.

4.2.2 Paragraph 4.3.22 of EN-1 goes on to state that, due to the '*urgency of need for new energy infrastructure,'* the Secretary of State should be guided by principles when deciding what weight should be given to alternatives, which include the consideration of alternatives being *'proportionate'*, and alternatives should only be considered if they meet the objectives of the Proposed Development.

4.2.3 Paragraphs 4.3.23 advises the Secretary of State to consider whether there is a *'realistic prospect'* of alternative sites delivering the same infrastructure capacity as the proposed development. Paragraph 4.3.24 highlights that applications should not be refused on the basis that an alternative site would have fewer adverse impacts, as *'all suitable sites for energy infrastructure of the type proposed may be needed for future proposals.'*

4.2.4 Chapter 2.10 of NPS EN-3 identifies a range of factors which may influence the site of a proposed solar farm which are discussed in Section 4.4, as well as various technical considerations.

4.2.5 Whilst the ES does not directly address policy compliance, the alternative site assessment process is documented within this chapter insofar as it enables the requirements of the EIA Regulations to be met.

## 4.3 The 'Do Nothing' Alternative

4.3.1 The 'do nothing' alternative considers the future conditions at the Site, should the Proposed Development not progress. The Site is not allocated for any specific land use within the adopted Local Plan, therefore under the 'do nothing' scenario, it is assumed the Site would remain in agricultural use and the beneficial and adverse effects outlined in this ES would not arise.

## 4.4 Site Selection and Consideration of Alternative Locations or Uses

4.4.1 As part of the Applicant's site selection exercise, a range of matters were considered against the criteria included in EN-3 Section 2.10 and

environmental and planning factors to identify a site that is technically feasible and that minimises potential environmental impacts.

4.4.2 The site selection process involved four stages:

- Identification of a Viable Point of Connection ('POC') to the Grid Network – Area C was initially identified for the siting of the Proposed Development due to the OHL which cross it;
- Review of Land Availability and Suitability – the landholding which comprises Area C was assessed as being suitable for the Proposed Development;
- Constraints Review of Land – potential environmental constraints in Area C made it necessary to identify additional areas of land to ensure a sufficient developable area; and
- Identification of Additional Land – additional land was identified based on the results of a preliminary Zone of Theoretical Visibility ('ZTV') and consideration of several constraints. Areas A and B were identified as suitable for the Proposed Development without compromising the availability of the grid connection identified in the first stage.

4.4.3 At each stage, the Applicant considered the following constraints:

a. Landscape and visual constraints, particularly with consideration to the potential effects on the Lake District National Park and World Heritage Site, but also effects on the local landscape and nearby dwellings;
b. Ecological, arboricultural or hydrological constraints such as woodland, watercourses and hedgerows within and surrounding the Site; and
c. Cultural heritage.

4.4.4 Further refinement of the Site (Order Limits) has also occurred since publication of the PEIR in March 2024. The Site reduced in size by approximately 3ha, with a parcel of land by Rigg House Farm (to the east of Area C) being the largest portion of land removed from the Site boundary. The amendments made and their environmental considerations are discussed further in section 4.6 of this chapter.

## Identification of a Viable POC to the Grid Network

4.4.5 The process of finding a suitable POC into the grid network is a key determinant of whether a site may be viable for solar because without a viable grid connection there can be no solar farm. Paragraph 2.10.22 of EN-3 states that *'The capacity of the local grid network to accept the likely*

*output from a proposed solar farm is critical to the technical and commercial feasibility of a development proposal.'*

4.4.6 A grid connection point was identified at the 132kV OHL which crosses Area C of the Site (as shown on Figure 3.4) which has sufficient capacity to serve the Proposed Development. No off-Site cable route would be required for the grid connection. This is considered beneficial, as an off-Site cable route would increase the potential for likely significant environmental effects, such as, disturbance to the Local Road Network ('LRN'), potential noise, air quality, and ground conditions effects associated with cable routing. The landholding was identified as having minimal environmental constraints in comparison to the wider area, as set out in the following section. The identified POC within Area C is crucial for the Proposed Development.

4.4.7 An overview of Site selection methodology, with respect to good design, is provided within the Design Approach Document ('DAD') **[REF: 5.8]**. A further overview is provided by the Planning Statement where relevant to national and local planning policy **[REF: 5.5]**.

## Review of Land Availability and Suitability

4.4.8 The initially selected area of land around the OHL, which now comprises Area C (as shown on Figure 3.1), was identified as suitable based on the following factors.

### Solar Irradiation

4.4.9 The amount of electricity generated on-Site and therefore carbon emission displacement potential and commercial viability of a solar PV generating station is directly affected by irradiance levels. Area C was initially identified as being of a suitable size for a solar farm exporting over 50MW based on the irradiance levels in the north of England.

### Topography

4.4.10 The undulating topography and the relatively enclosed nature of Area C, within a basin, surrounded by higher ground provides natural screening for low level development within Area C. The largely rural and undeveloped

nature of the Site and surroundings meant overshadowing from tall vegetation and large buildings would not be a material constraint.

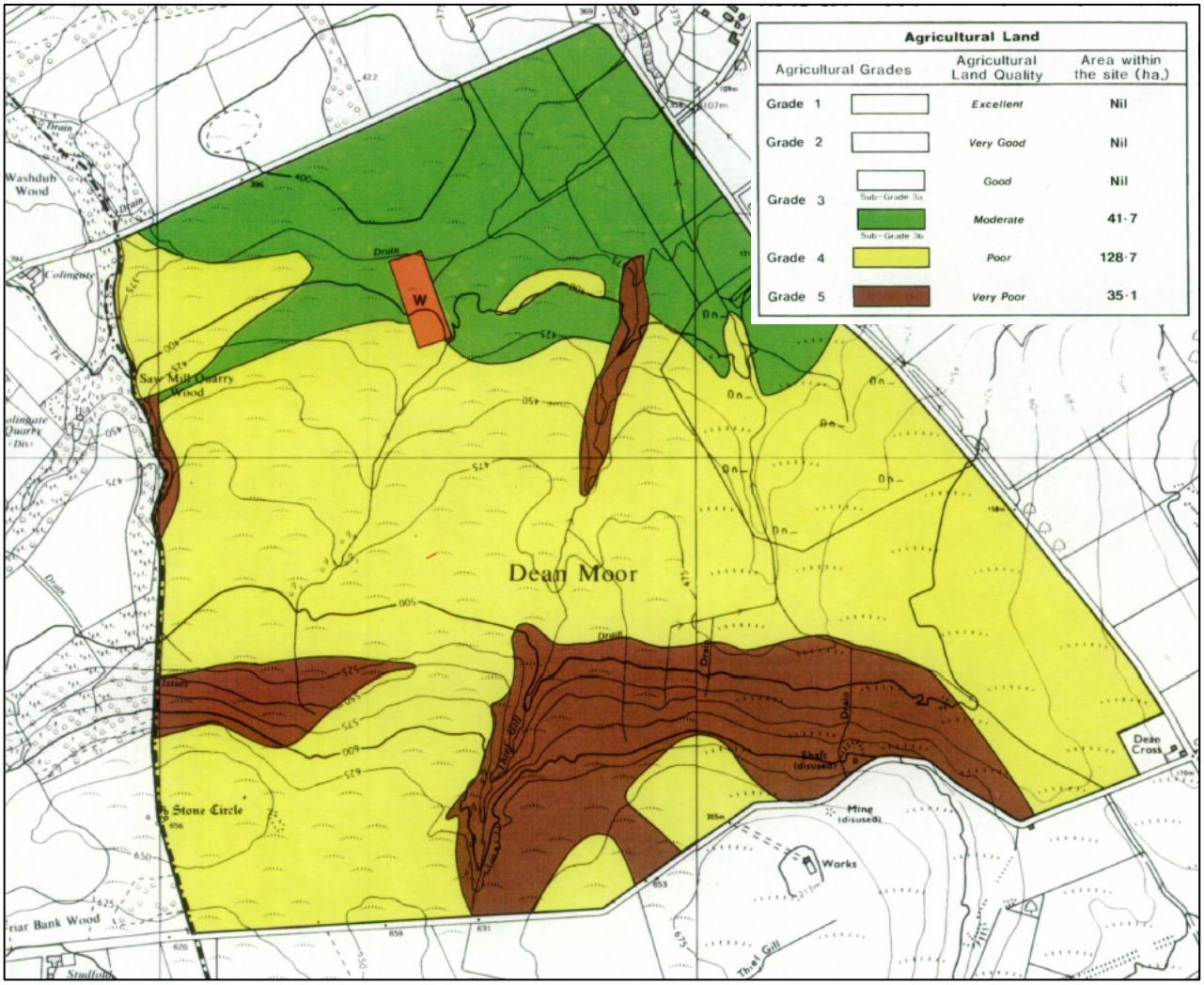
### Agricultural Land Classification

4.4.11 ALC considers grades 1, 2, and 3a agricultural land to be Best and Most Versatile ('BMV') land. EN-3 paragraph 2.10.29 notes the preference for poorer quality agricultural land for solar development over BMV land.

4.4.12 As outlined in the Planning Statement, the use of agricultural land is necessary for the Proposed Development which benefits from a POC within Area C. No non-agricultural land is available in any viable proximity to the POC to provide for a 150MW renewable energy generating station. There are no sites on Allerdale Borough Council or Copeland Borough Council Brownfield Registers which are larger than 3ha.

4.4.13 Area C of the Site was the subject of a detailed post-1988 ALC survey by Defra, shown in Figure 4.1 below, which identified a mix of land of Grades 3b (Moderate) (41.7ha), 4 (Poor) (128.7ha) and 5 (Very Poor) (35.1ha). It therefore does not comprise BMV land. Area C not comprising BMV agricultural land was highly influential for the Site selection process.

**Figure 4.1: Post-1988 ALC Survey of Area C**




## Visual impact on residential dwellings and recreational users of the Lake District National Park (LDNP)

4.4.14 An important consideration in the Site selection process was the potential zone of visual influence and the proximity to existing sensitive receptors, including residential dwellings and the LDNP.

4.4.15 The landscape is predominantly rural and is interspersed with isolated dwellings, farms and other agricultural businesses. There are few properties within 250m of the Site and only some would have a view into the Site.

4.4.16 Settlements within a 5km search radius from Area C include Workington, Distington, and Lillyhall. Proximity to settlements is considered beneficial

as it means the Proposed Development is closer to areas of local demand and therefore transmission losses are minimised.

4.4.17 Area C benefits from a degree of existing screening from local topography and landscape features such as woodland which limits its visibility from sensitive receptors such as the LDNP and residential settlements. The proximity to the more visually prominent Wind Farm within Area D (between Areas A and B) indicates that visual impacts were unlikely to be significant.

4.4.18 The land to the south of Area C is at a raised elevation and development in this area could have a wider ranging adverse visual impact. Other areas in closer proximity to residential settlements such as Gilgarran and Branthwaite would have an increased likelihood of visual impacts. Area C was therefore selected to avoid the most visually sensitive areas.

### Landscape Designations

4.4.19 The Site is not within a statutory landscape designation area. The LDNP lies approximately 3.2km to the east of the Site which is a landscape receptor of very high sensitivity.

### Ecological Designations

4.4.20 No national or international ecological designations are found on the Site. There are five internationally designated sites located within 10km of the Site, as well as a single nationally designated site, the River Derwent and Tributaries Site of Special Scientific Interest ('SSSI'), which is located 1.2km east of the Site. If the Proposed Development was located closer to these designated sites, there would be more potential for adverse ecological effects.

### Accessibility

4.4.21 In considering traffic and transport impacts, the Applicant identified that the Site can be accessed from the LRN which is comprised of rural single carriageway roads and is approximately 3km east of A595 which connects to the wider Strategic Road Network ('SRN') via the A66, thereby avoiding urban areas and rural settlements. Area C also benefits from several pre-

existing access points from the LRN that have been suitable for large farm vehicles and contains a network of established internal access tracks.

### Public Rights of Way

4.4.22 No PRoWs are located within Area C and the Proposed Development is likely to have minimal effects on users of the local PRoW network.

### Cultural Heritage Designations

4.4.23 There is one designated heritage receptor located in the southwest corner of Area C comprising the 'Large Irregular Stone Circle and a Round Cairn on Dean Moor' Scheduled Monument ('SM'). However, the SM is located on higher ground in the southwest corner of the Site that is not being developed on as part of the Proposed Development, as shown on Figure 3.4 **[REF: 6.2]**.

### Flood Risk

4.4.24 The Site is located within Flood Zone 1 'Low Probability' in the EA Flood Zone Map. EA surface water flood mapping identifies most of the Site as being of 'Very Low' risk of surface water flooding. The low flood risk in Area C meant that alternative sites were not considered on this basis.

### Security and Lighting

4.4.25 Security and lighting are a consideration for the location of solar farms. Factors which are considered include the availability of natural defences, such as hedgerows, and the need for perimeter security measures such as fencing, electronic security, CCTV, and lighting.

4.4.26 The Site does not lie within a designated 'dark sky area' and permanent lighting during operation would not be required. Therefore, this was not a significant consideration in Site selection.

### Summary of Site Selection Process

4.4.27 As described, the Applicant's initial selection of Area C took into consideration social, environmental, technical, and economic factors. The most important consideration in the siting of the Proposed Development was the grid connection, as Area C is crossed by OHL with existing

capacity where there was a grid connection offer. Area C was considered appropriate for the Proposed Development when assessed against the criteria included in NPS EN-3.

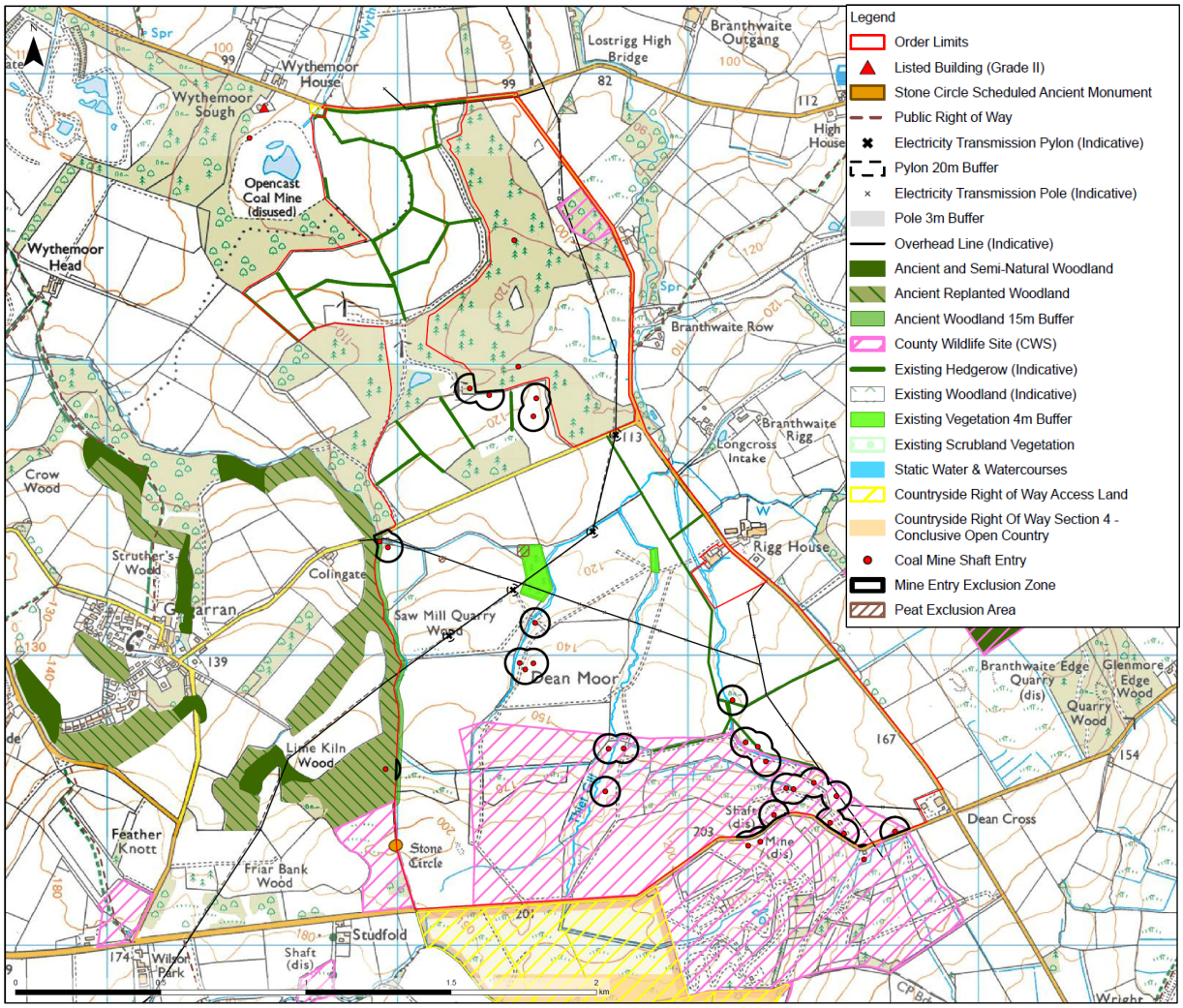
## Constraints Review of Land

4.4.28 As discussed above, Area C was initially selected due to the availability of a grid connection for 150MW export via the OHL within a landholding with minimal environmental constraints in comparison to the wider area. However, it became clear through a more detailed desk-based assessment and landscape surveys that the developable area was constrained by several factors which limited the placement of solar arrays. These include:

- Possible visual impacts – the southern area of Area C comprises a steep escarpment. The placement of solar arrays above this escarpment would make the Proposed Development more visible from the LDNP and other sensitive receptors. Therefore, this area was considered more sensitive from a landscape perspective;
- Features within the Site – the several watercourses in Area C posed constraints on the developable area as buffer zones would be required between the watercourses and generating station equipment for hydrological and ecological reasons. The generating station equipment would further need to be sufficiently set back from hedgerows and OHL using appropriate buffer distances informed by technical guidance which would limit their number and location;
- Cultural heritage designations – additional land was required to ensure that effects from the Proposed Development on the setting of the SM could be minimised;
- Biodiversity Net Gain ('BNG') – additional land was required to ensure sufficient flexibility to deliver BNG;
- Additional land was considered appropriate to ensure sufficient flexibility within the Site to respond to any unknown constraints which may arise; and
- Topography – Consideration of the need for exclusion areas outlined above, combined with the need to consider the topographic characteristics of the remaining land, which includes North-facing slopes, influenced the selection of additional land to achieve the required capacity.

4.4.29 Most of these constraints on the initial Site area are mapped in Figure 4.2 below. Upon review of these constraints, it became apparent that additional land would be necessary to reach the agreed export capacity.

**Figure 4.2: Combined Constraints Plan**



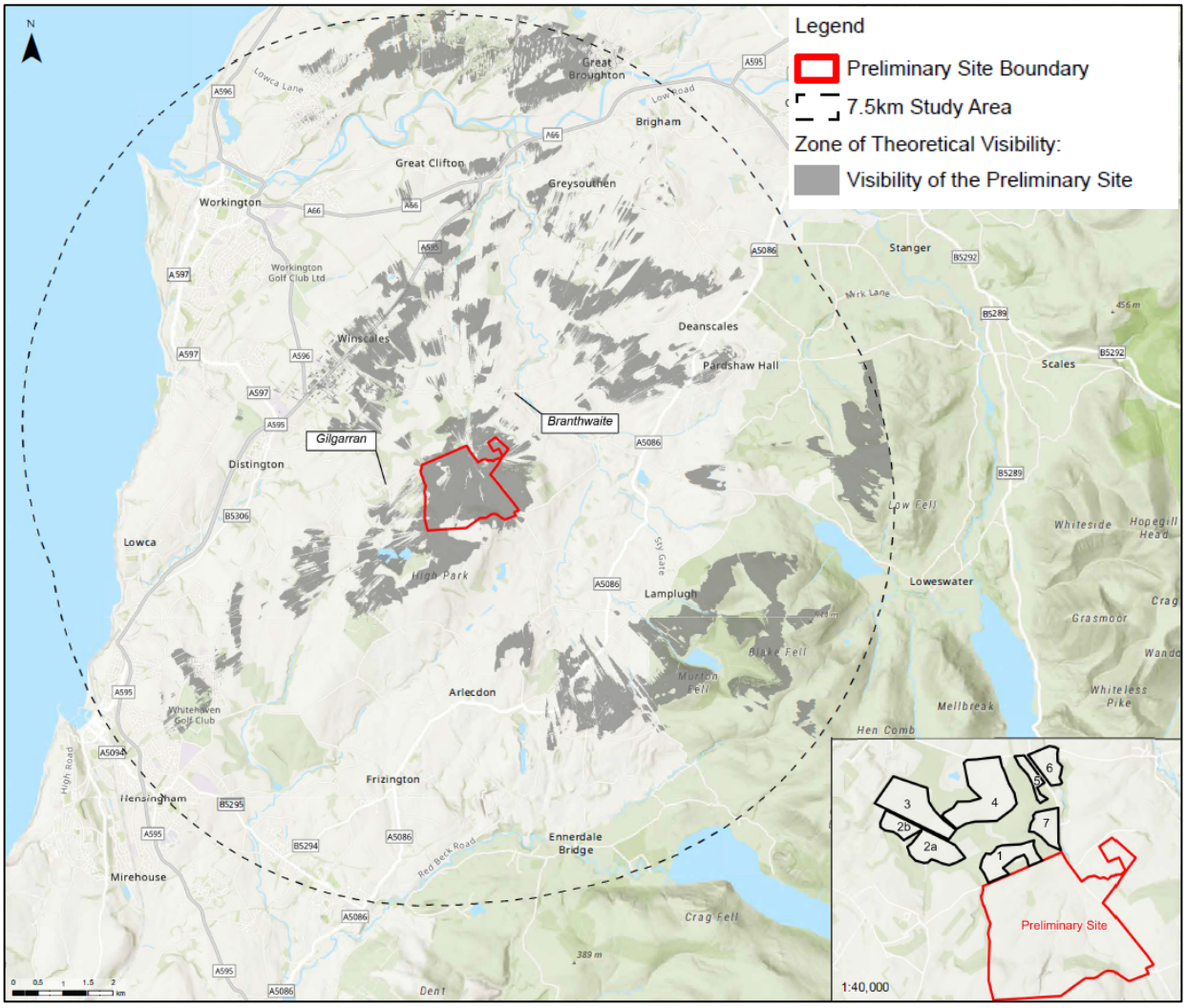

## Identification of Additional Land

4.4.30 The Proposed Development can only exist at the identified POC due to the grid connection agreement reached with the DNO. Therefore, through this Connection Agreement, the only additional land that could be considered was the land adjoining Area C.

4.4.31 The selection of additional land was led by a preliminary ZTV with a 7.5km study area from Area C (Figure 4.3) **[REF: 6.2]** created from six observer points within Area C to ensure that potential visual impacts on the LDNP as a sensitive receptor were accounted for. The ZTV identified seven potential parcels of land to the north and northwest for consideration, with the land to the south and east excluded on the basis of landscape and visual effects, including potential visibility from the LDNP. The additional

areas were also assessed through desktop review of environmental constraints and designations.

**Figure 4.3: Preliminary Zone of Theoretical Visibility Analysis: Preliminary Site**




4.4.32 A review of the Natural England provisional land classification[1] also identified areas surrounding the Site as being of Grades 4 and undifferentiated Grade 3 (i.e., Grade 3a (BMV) and Grade 3b). While this did not remove the potential of surrounding land being BMV, the elevation of this land and the recent history of being restored from mining use provided a high degree of certainty that land adjoining Area C would also not be BMV land. The Proposed Development's avoidance of BMV land

[1] Provisional Agricultural Land Classification (ALC) (England). Available at: https://naturalengland-defra.opendata.arcgis.com/datasets/5d2477d8d04b41d4bbc9a8742f858f4d/explore?location=55.200906%2C-3.062595%2C8.35 Accessed January 2024

has been verified through further assessment as set out in the ALC Report (Appendix 2.8) **[REF: 6.3]**.

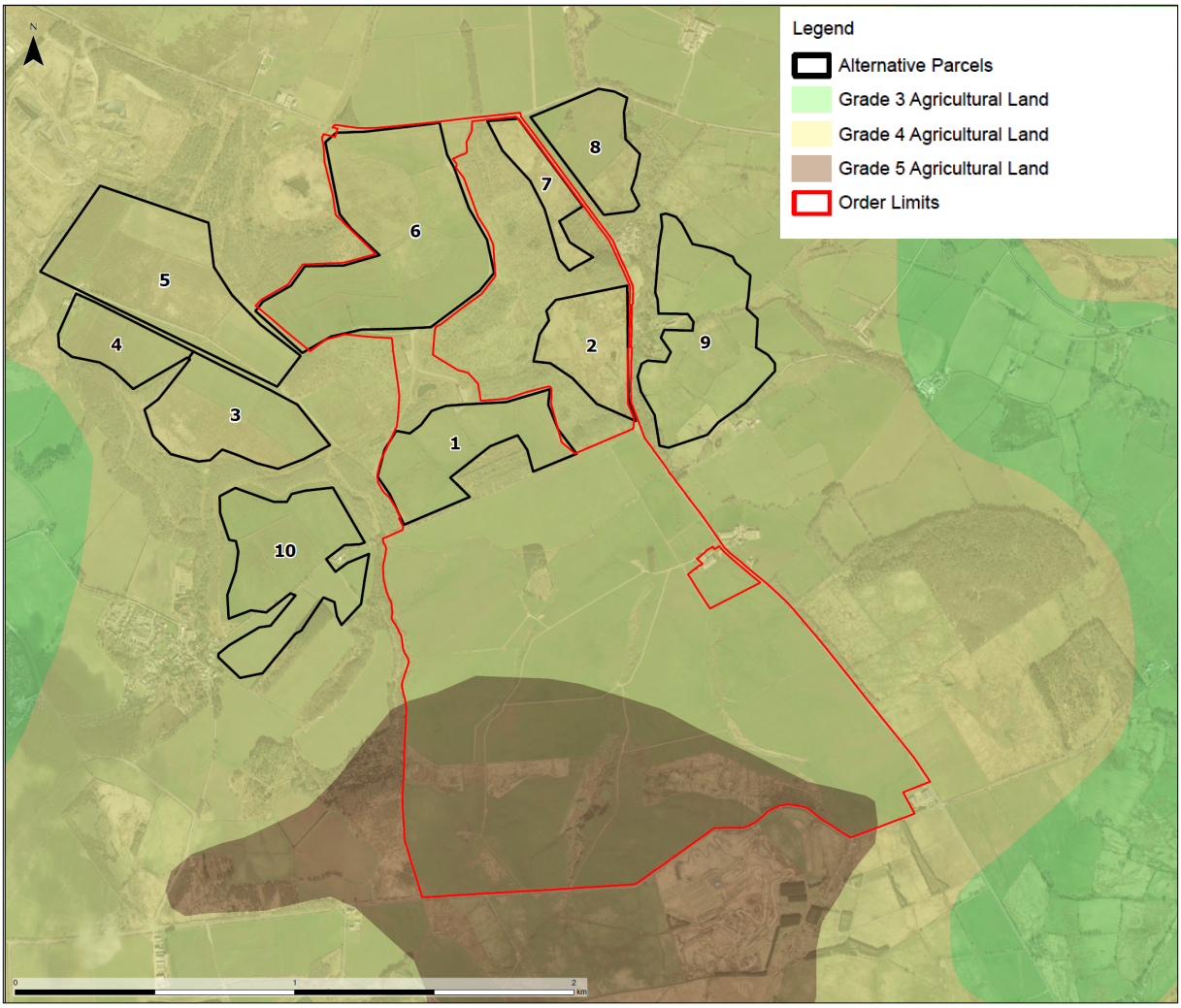
4.4.33 The most appropriate parcel of additional land was identified to be the area immediately to the north of Area C, south of the Wind Farm (Area B). The ZTV analysis indicated that this area would have very limited visibility in the surrounding landscape due to screening from woodland, while the ALC map indicated that this area would be unlikely to be BMV (Figure 4.4). The turbine locations north of Area B mean that overshadowing would not affect solar panel output. The proximity to Area C made connectivity with the rest of the generating station easily achievable. Area B benefits from an existing agricultural access point from Gilgarran Road which would make it easily accessible from Area C.

4.4.34 A further parcel of land to the north of Area B which now comprises Area A was considered e appropriate, shown on Figure 4.4 as parcel 6. This area was identified as unlikely to constitute BMV due to being restored colliery site, (Figure 4.4) and appeared to be in agricultural use as grazed farmland. Area A further benefits from a wide access point off Branthwaite Road used for the construction of the existing Wind Farm and existing internal tracks with connectivity into the north of Area B. Significantly, the preliminary ZTV analysis indicated that Area A would have limited visibility from the LDNP due to screening from woodland. On this basis, as well as the limited number of environmental constraints, Area A was added to the Order Limits for the Proposed Development.

4.4.35 As shown in Figure 4.2, both Areas A and B could be added without impacts on the local PRoW network, whereas other land in contention could not.

4.4.36 Within 3km of the Site there are two grade I Listed Buildings, one grade II* Listed Building and 25 grade II Listed Buildings. When considering alternative land in the immediate vicinity, consideration of the setting of these heritage assets influenced the selection of Areas A and B.

**Figure 4.4: Alternative Parcels and Provisional Agricultural Landscape Classification (ALC)**




4.4.37 Neither Area A nor B is located within nationally or internationally designated areas of ecological or landscape importance and they do not contain any designated historic assets. As indicated by Figure 4.2, Area A is located within the setting of the grade II listed Wythemoor Sough and adjoining barn and stable. However, it was perceived that the impact of the setting of this historic asset could be reduced through mitigation.

4.4.38 The other parcels of land to the north and northwest were considered to have a number of constraints which would make them unsuitable for the Proposed Development. The potential visibility from the LDNP and residential areas was the initial and primary site selection factor, although factors such as the poor drainage and waterlogged land, the presence of PRoW, and the lack of direct access were further constraints. Parcels 4

and 5 to the south of Lillyhall Industrial Estate were considered unsuitable due to possible visibility from the LDNP and their distance from Area C which would mean a longer underground cable connection.

4.4.39 To the north of the Site, parcels 7 and 8 were considered unsuitable due to limited (but some views) and extensive visibility from the LDNP respectively.

4.4.40 Land to the north and east of Branthwaite Edge was also considered (parcel 9) in addition to the land identified by the initial ZTV analysis. However, the potential visual effects on the dwellings located to the western edge of the that land, and the presence of FP 225002 which runs across the area would potentially create issues for the placement of solar arrays from a landscape perspective. Furthermore, the underground cable connection to the POC would be more difficult as the area lies on the other side of a road and wooded valley and stream.

4.4.41 An area to the east of Gilgarran village was also considered in the initial ZTV analysis (parcel 10). However, the connecting cables would have to pass between areas of replanted ancient woodland and stream to the west of the Site, and the proximity to Gilgarran village would make solar development in this area more challenging as it would have the potential to result in adverse effects on views from the village.

## 4.5 Iterative Site Evolution and Refinements to the Order Limits

4.5.1 The Draft Order Limits which were proposed in the PEIR have been refined following the statutory consultation to remove land which is not required for the DCO. Figure 4.5 overlays the Order Limits as shown in Figure 1.1, against the Site boundary proposed in the PEIR, with the areas which have been taken out following statutory consultation shown in blue.

- A small area has been removed from the northwest of Area A adjacent to Branthwaite Road as this parcel of land was unregistered and not required;
- An area has been removed from the Order Limits along the eastern boundary of Area C adjacent to Branthwaite Edge Road around the agricultural buildings as this land is not required for the DCO;

- The addition of 'Area D' which was previously part of Areas A and B at the PEIR stage. Area D is the land connecting Areas A and B, including the Wind Farm, Gilgarran Road between Areas B and C, and Branthwaite Edge Road (approximately 13.4ha); and
- Small adjustments have been made to the Order Limits along Area D (Gilgarran Road, Branthwaite Edge Road, and Branthwaite Road) to ensure the Order Limits are consistent with the Local Highways Authority estate.

## 4.6 Consideration of Alternative Designs

### Environmental Constraints and Design Mitigation

4.6.1 The design of the Proposed Development has evolved iteratively, with adjustments made to optimise the developable areas, taking account of constraints and opportunities, as well as considerations following the non-statutory consultation events that took place in Autumn/Winter 2023 and the statutory consultation period which took place following publication of the PEIR.

4.6.2 The main changes to the Proposed Development since the proposals presented in the PEIR are listed below. The Applicant has engaged on these matters further with statutory consultees as appropriate, and consultation events in mid-November 2023 were organised to inform the public about how the design of the Proposed Development has evolved to incorporate feedback and summarise the main changes following non-statutory and statutory consultation, including:

- The removal of the BESS from the Proposed Development for ground conditions reasons, which has also reduced the likelihood for adverse effects on agricultural land;
- An updated area for the Grid Connection Infrastructure, as shown in Work No. 2 **[REF: 2.3]** and the Parameter Plan (Figure 3.4) to incorporate the substation infrastructure either side of the watercourse;
- The inclusion of up to two POC masts (30m in height) within Work No. 2A – POC Masts **[REF: 2.3]**, and shown on the Parameter Plan (Figure 3.4) where the POC Masts may be sited;
- The improvement to two additional existing accesses (8 and 9) are incorporated into the Proposed Development for flexibility. These are both located on Gilgarran Road and are identified on the Parameter Plan (Figure 3.4). Access 2 has been moved further to the east to align with an existing Site access;
- More detailed definition to the parameters describing the dimensions of the Grid Connection Infrastructure, including the maximum size of

the compound, and the maximum height of buildings and equipment within the compound, further information of which is available from Chapter 3 – Site and Proposed Development Description and the DPD **[REF: 5.7]**;

- The potential areas where the primary and secondary construction compounds may be located have now been defined, as now shown on the Parameter Plan (Figure 3.4) and Work No. 4 – Temporary Construction Compounds; and
- Refined locations of proposed landscape and ecological mitigation measures and enhancements, as set out in the Landscape Strategy Plan (Figure 7.6.1-7.6.5).

4.6.3 Table 4.1 summarises the design evolution of the Proposed Development and the reasons for the choices made, having regard to possible environmental effects.

**Table 4.1: Issues raised in the design process which have been addressed in the evolution of the Proposed Development**

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| **Topographic Conditions for Solar PV Arrays** | The developable area of solar PV arrays has been influenced by the topography of the Site. Buffer zones are provided between the solar arrays and sensitive receptors within and adjoining the Site in accordance with technical guidance. | The minimum height above the ground of solar panel arrays has been lowered from the 800mm assessed at the PEIR stage to 700mm to accommodate the potential to place panels on north-facing slopes, which would affect minimal areas of the Site. The variance in array tilt is assessed as being 10-to-20-degree tilt from horizontal, although the typical range would be between 10 and 15. This is to account for variance and optimal output. |
| **Impacts on landscape and visually sensitive receptors** | Consideration of landscape and visual effects has been an important factor in informing the Proposed Development's design evolution. As described in section 4.4, the identification of possible visual effects on the LDNP and other sensitive receptors has informed the Site selection process. By selecting land, which is naturally well screened, the Proposed Development | The area within which solar PV arrays will be sited has been adjusted several times to reduce impacts on visually sensitive receptors. This includes providing additional 'set back' distance between solar PV arrays and properties, for example the property immediately adjacent on the southeast corner of the Site.<br>The Proposed Development will retain existing boundary |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | should have minimal impact on sensitive landscape and visual receptors. | vegetation where practicable, particularly established/mature woodland habitats.<br><br>Field boundaries will be reinforced where required and new planting of native hedgerows, trees and scrub will provide visual screening and biodiversity opportunities.<br><br>The Proposed Development contains areas for landscape and ecological enhancement which would not be developed with solar infrastructure, including the elevated open moorland in the southern part of Area C (shown on the Landscape Strategy Plan (Figure 7.6.1-7.6.5), where infrastructure is excluded to minimise visual intrusion.<br><br>Increases to maximum potential heights of infrastructure from the PEIR, as well as the addition of the up to two POC Masts and Communications Masts have been assessed within this ES in terms of their visual impact. |
| **Site Access Points** | The Site is within a rural area comprising small villages and hamlets including Gilgarran and Branthwaite. Construction traffic movement through these villages would likely result in significant effects by virtue of the rural nature of these roads.<br><br>The non-statutory consultation in Autumn/Winter 2023 raised concerns that the junction at Gilgarran Road and Branthwaite Edge Road is dangerous due to lack of visibility and high speeds. | The LRN would be utilised for construction plant and vehicles to access the Site. Access routing to the SRN has been selected to ensure that construction traffic avoids local settlements where possible and minimises any potential safety considerations by design.<br><br>Since the Concept Layout included within the PEIR, two additional existing access points (8 and 9) have been identified to increase the flexibility of the Proposed Development. These are shown on the Parameter Plan (Figure 3.4). The Applicant seeks the flexibility to utilise the identified existing field accesses for construction and operation to avoid tracking |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | | heavy vehicles across the Site. The Applicant has allowed for vegetation clearance to ensure appropriate visibility for construction traffic using the Gilgarran Road / Branthwaite Edge Road junction. |
| **PRoW and informal paths** | It emerged from the non-statutory consultation events that there are informal paths around and through the Site (between areas A and B in particular) which are anecdotally used by local residents even though they are not designated PRoW. It is understood that local residents may seek to add these routes to the Definitive Map. | The layout of the Proposed Development has accounted for the possibility of these informal routes being formalised, by avoiding introducing solar arrays in locations which would lead to severance of these existing routes.<br><br>The Proposed Development has been developed to minimise impacts on recreational routes, where possible.<br><br>Two permissive paths are proposed and are included on the Landscape Strategy Plan (Figure 7.6.1-7.6.5). Signage will also be provided.<br><br>The OCTMP (Appendix 5.2) **[REF: 6.3]** addresses the potential interaction between the PRoW network and construction phase effects. |
| **Impacts on Ecologically Sensitive Receptors** | A CWS is located in Area C of the Site, as shown on Figure 4.2. The CWS is a non-statutory designation that is designated for its acidic moorland habitats.<br><br>A range of watercourses also flow through the Site which are hydrologically connected to the River Derwent and Bassenthwaite Lake SAC, located 1.2km east. | The design and layout of the Proposed Development has responded to ecological constraints within the Site, including Dean Moor CWS which is partially located within Area C and the identification of locally-site important habitats such as areas of woodland, hedgerows, and corridors along the Thief Gill and other watercourses through the Site.<br><br>Buffer strips between the solar arrays and existing habitat will be sown with a species-rich grass mix to benefit several species, in particular |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | | invertebrates, insectivores, birds, and bats.<br><br>The Site layout will allow existing sensitive habitats to be retained including ponds, watercourses, woodland, hedgerows, and small areas of scrub and swamp. Where habitat loss cannot be avoided, it will be minimised as far as possible and mitigated through on-Site planting.<br><br>Areas within the Dean Moor CWS are primarily identified for ecological mitigation and landscape enhancement purposes. The potential for placing solar arrays in a part of the CWS is being considered, but these would be developed in conjunction with other ecological enhancements if possible. |
| **Biodiversity and Landscape Enhancements** | The CWS within the south of Area C and existing green infrastructure across the Site pose opportunities for biodiversity and landscape enhancements. | The Landscape Strategy Plan (Figure 7.6.1-7.6.5) proposes green infrastructure enhancement areas across the Site. Since the statutory consultation, further enhancement areas have been proposed as a result of considering layout of the works areas and incorporation of further exclusion areas, which are reflected on the Landscape Strategy Plan (Figure 7.6.1-7.6.5).<br><br>The layout and type of green infrastructure and mitigation and enhancement areas has been informed by the assessment of environmental impacts, maximising visual screening, and BNG. A BNG Report is provided in Appendix 8.8. |
| **Impacts on Cultural Heritage** | There is one designated heritage receptor located within the Site, namely the 'Large Irregular Stone Circle and a Round Cairn | The Site selection process has informed the Parameter Plan (Figure 3.4) that identifies developable areas which, with appropriate mitigation, would |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | on Dean Moor' scheduled monument. The western boundary of the Site bisects the receptor.<br><br>Wythemoor Sough has heritage value as an 18th century vernacular farmhouse that retains its traditional rural character. Wythemoor Sough is a Grade II listed building located 160m northwest form the Site. The heritage sensitivity/value of the receptor is medium due to its designation. | result in the lowest possible effects on nearby heritage assets, for example the Stone Circle, and nearby listed buildings such as Grade II Listed Wythemoor House.<br><br>Existing Site boundary vegetation will be retained where practical and will be combined with additional scrub and woodland planting to reduce the visual impacts from the Proposed Development.<br><br>Signage and landscape enhancements to better reveal the significance of the Stone Circle are proposed and discussed further in Chapter 6 – Cultural Heritage **[REF: 6.1]**.<br><br>Additional landscape screening to minimise visual impacts on the grade II Listed Building Wythemoor House is included within the Parameter Plan (Figure 3.4), however the topography of the Site means it will not be possible to completely avoid effects. |
| **Impacts on Flood Risk and Drainage** | The Site is located in Flood Zone 1 and is therefore not considered to be at risk of flooding. Several ordinary watercourses flow across Area C, including Thief Gill. These flow through the Site from the south and west, combining and flowing towards the northeast corner of Area C. Beyond the Order Limits, the combined channel becomes an EA designated main river. A pond is located centrally within Area D. | The layout of the Proposed Development has responded to policy and guidance around flood risk, incorporating the appropriate buffer zones between watercourses and the Proposed Development which are embedded into the Parameter Plan (Figure 3.4).<br><br>Solar farms are not vulnerable to flood risk and include embedded mitigation such as spacing between arrays to avoid erosion channels being created.<br><br>Stand-off buffers to watercourses and habitat improvements, along with the cessation of livestock farming will have beneficial effects to water quality and will slow runoff into watercourses. No |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | | solar PV infrastructure, Grid Connection Infrastructure, nor Highways Access Works will take place within 8m from the bank of an Ordinary Watercourse or Waterbody.<br><br>The Proposed Development will incorporate a landscape-led drainage strategy with targeted SuDS for hardstanding elements which would mimic existing greenfield runoff mechanisms and improve existing conditions (see FRA and ODS - Appendix 2.4) **[REF: 6.3]**. |
| **Ground Conditions** | As outlined in Appendix 10.3 - Peat Survey Report. British Geological Mapping indicated that there is an area of potential peat deposits located to the north and northwest of Area C, adjacent to an existing watercourse. | The layout of the Proposed Development has been informed by the Phase 1 Ground Conditions Assessment (Appendix 10.1) **[REF: 6.3]**, Coal Mining Hazard Assessment (CMHA) (Appendix 10.2) **[REF: 6.3]**, and a Peat Survey Report (Appendix 10.3) **[REF: 6.3]**.<br><br>Baseline data on peat has informed the developable areas within which the substation may be sited.<br><br>Buildings or structures will be located away from mine entries and peat. The location of mine entries will be determined through a Ground Investigation to be undertaken post consent and prior to commencement. Where possible, the ground stability risks will be addressed through remediation to be agreed with the Mining Remediation Authority.<br><br>The Peat Survey was completed after the consultation on the PEIR. There will be no solar infrastructure (carried out for Work Nos. 1, 2, 2A, 4, and 5, as shown on the Works Plans) [**REF: 2.3**] located on peat |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | | deposits. Impacts to identified peat deposits have been managed through design, to avoid siting infrastructure in these locations as shown on Figure 3.4 (Parameter Plan) and Figure 3.5 (Exclusion Areas).<br><br>This approach is discussed further in Chapter 10 – Ground Conditions and Appendix 10.3 - Peat Survey Report. |
| **Generating Capacity** | The generating capacity of the Proposed Development may be limited by environmental constraints where our understanding of these constraints has improved through surveys and assessment. | Areas A and B were included within the Site to ensure the Proposed Development could export 150MW of electricity.<br><br>The design is sufficiently flexible to allow for a decrease in the required developable area for solar arrays should further areas of exclusion be required as it is expected that higher wattage panels will be available in the procurement phase due to the speed at which solar technology is advancing. This means that the size of the current developable area can be reduced to respond to any potential constraints identified in the detailed pre-commencement work, or if no exclusions are required, existing buffers can be increased. This would ensure efficient use can be made of the existing grid connection available. |
| **Battery Energy Storage System (BESS)** | A BESS was included as part of the Proposed Development in the Scoping Report (Appendix 2.1) **[REF: 6.3]** and PEIR. The BESS would be associated with potential environmental impacts and would need to be considered in terms of ground conditions, major accidents and disasters, drainage, and landscape and visual impacts. This | The BESS has been removed from the Proposed Development following the statutory consultation period and is therefore not included on the Parameter Plan (Figure 3.4). The BESS was primarily removed to avoid ground disturbance, and potential construction issues associated with soft ground conditions. In addition, the removal of the BESS avoids long-term |

| Issue | Environmental Constraint or Opportunity Identified | Design Amendments Made in Consideration of Environmental Effects |
|---|---|---|
| | would include the need to complete a Battery Safety Management Plan (BSMP) within the DCO. | impacts from the sterilisation of agricultural land due to loss of soil through the construction of the BESS.<br>The location of where Grid Connection Infrastructure and Solar PV Infrastructure could be located has been adjusted accordingly. The removal of the BESS has allowed for the maximisation of the benefits from the solar PV arrays. This change also addresses points raised in relation to fire risk and drainage by Dean and Distington Parish Council, and the EA. |

4.6.4 The comments raised by statutory bodies throughout the statutory consultation period relevant to the design of the Proposed Development have been set out in Table 4.2 below, alongside how these comments are addressed within this ES.

**Table 4.2: Applicant's Response to Consultee Comments**

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| **Cumberland Council Local Highways Authority ('LHA')** | The LHA response encourages the Applicant to utilise the access off Branthwaite Road previously used for the Wind Farm (Access 1) over the others identified at PEIR to avoid excessive trips, delay, and damage to narrow roads, and to explore routing all access internally.<br>The LHA notes the Applicant's traffic management address potential issues with two-way flow of construction vehicles over the narrow bridge on Branthwaite Edge Road but the LHA does not consider this to be necessary, as it could encourage higher speeds, and simple signage and | A detailed response to the LHA's comments is provided in the TS (Appendix 2.5) **[REF: 6.3]**. It is not considered that the baseline conditions of the LRN present specific operational challenges. As such, it is not considered appropriate to create internal haul roads on-Site which may have greater environmental impacts. Considering the low number of anticipated construction vehicles over the construction programme, the impact of utilising more than one construction access is not likely to cause a significant issue.<br>Indicative permissive paths are proposed and are included on the Landscape Strategy |

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| | road markings are considered appropriate.<br><br>The LHA's statutory consultation response welcomes the proposed permissive paths to *'provide a recreational route in the north and new linkage between existing Gilgarran Road and Dean Cross Road and the Proposed Development will not preclude the use of any existing informal routes that mya continue to be used or which may be formally adopted as PRoW by the Council.'* | Plan (Figure 7.6.1-7.6.5). Signage will also be provided.<br><br>The OCTMP (Appendix 5.2) addresses the potential interaction between the PRoW network and construction phase effects. |
| **Cumberland Council Local Planning Authority ('LPA')** | The Council has indicated that improving water quality in the Marron and Derwent Rivers is an area which the Council is developing a strategy to address. | The Proposed Development will generally contribute to improved water quality through the reduction in intensity of grazing, which will reduce nutrients from sheep manure entering watercourses. The Proposed Development will also be introducing planting and green corridors along the existing watercourses on the Site. These will intercept nutrients before they enter watercourses, benefitting water quality. This will avoid significant adverse environmental effects on Statutory Designated sites, further information is available from Chapter 8 – Biodiversity. |
| **Electricity North West Limited ('ENW')** | Engagement with ENW has been ongoing to define the maximum parameters of the DNO substation and the appropriate setbacks to the OHL which cross the Site. | Up to two POC masts (30m height) and Communications mast (15m), have been added to the Proposed Development.<br><br>The area of where the Grid Connection Infrastructure may be located on the Parameter Plan (Figure 3.4) has been increased from the PEIR and now extends to either side of the watercourse.<br><br>Buffer distances between the OHL and the solar panels have been incorporated into the Parameter Plan (Figure |

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| | | 3.4) and are shown in Figure 3.5 (Exclusion Areas).<br><br>Solar PV Infrastructure will not be permitted within 3m of the OHL and 6m of the wooden poles and stays of the final alignment of the 11kV OHL. |
| **Lake District National Park Authority (LDNPA)** | The LDNPA response states:<br><br>'W*e appreciate and welcome the effort made in not proposing panels on higher land to the west of the site, having regard for the potential for viewers to perceive this as interfering with the transition from the coastal plain to the fells in the east.'*<br><br>The response confirmed that there are '*only limited views of the development from locations within the National Park boundary.*'<br><br>Further mitigation is recommended to break up the massing of panels:<br><br>*'Mitigation of the effect would depend on the success or otherwise of any planting to break up the massing of the panels. Planting within the site would be the best way to achieve this effect, but we appreciate that any planting that would be taller than panels would have the effect of reducing their effectiveness through shading. It is still considered that even low level planting might have an ameliorating effect.'* | Additional planting of blocks and corridors of screening to address the impact on long distance views, particularly to those viewpoints at the closest fells, has been proposed within Chapter 7 – Landscape and Visual and set out in the Landscape Strategy Plan (Figure 7.6.1-7.6.5).<br><br>Chapter 7 – Landscape and Visual addresses the LDNPA response. |
| **Dean and Distington Parish Council** | The response from Dean and Distington Parish Council outlines the expectation for biodiversity enhancement across the Site and states that: *'We expect corridors for nature to be created across the site linking to the significant* | The expectations for ecological enhancements are addressed in Chapter 7 – Landscape and Visual and Chapter 8 – Biodiversity. Including the proposed green infrastructure and indicative permissive paths outlined in |

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| | *surrounding areas of woodland, and that the access routes will allow the public, for the life of the development, to reach and enjoy the locations within Dean Moor where there will be an improved natural environment.''*<br><br>Dean and Distington Parish Council consultation response further welcomes the intention to *'provide footpaths to increase public access across the Site.'*<br><br>The response further raises a number of points in relation to BESS fire risk and drainage. | the Landscape Strategy Plan (Figure 7.6.1-7.6.5).<br><br>The BESS has since been removed from the Proposed Development, which has addressed the points raised around ground contamination, drainage, and decommissioning. |
| **Cumbria Wildlife Trust (CWT)** | The CWT is responsible for managing the CWS located within the south of the Site. The Applicant met with the CWT during the statutory consultation to discuss the Applicant's approach to Biodiversity Net Gain ('BNG) and plans for the CWS. The CWT welcomed the proposed improvements to biodiversity, although expressed concerns about the impact of solar development within the CWS. | The CWT's response is addressed in Chapter 8 – Biodiversity. The majority of the CWS within the Site is reserved for biodiversity enhancement measures, as shown on the Landscape Strategy Plan (Figure 7.6.1-7.6.5). In the limited areas where solar arrays may be located within the CWS, the Proposed Development is proposing to enhance the existing grassland, delivering an improvement to biodiversity in these areas.<br><br>The Applicant has agreed to work closely with CWT to agree the appropriate grazing management and BNG arrangements for those parts of the Site within the CWS, post-consent. |
| **Natural England** | Natural England's response addresses soil management measures and recommends commitments to minimise potential impacts of decommissioning on soils. | Natural England's response in relation to recommended soil protection measures are addressed within the OSMP (Appendix 5.3) **[REF: 6.3]**. |
| **The Environment Agency (EA)** | The Environment Agency's consultation response required confirmation of the fluvial flood risk at the confluence between | The Applicant has consulted with the LLFA and has confirmed that the flood risk modelling used is appropriate. This approach is described in |

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| | Lostrigg Beck and the ordinary watercourse. The EA also raise BESS drainage design, and requested more clarity about the outline biodiversity enhancements which were described during the statutory consultation. In particular the EA requested more detail on the enhancements to watercourses and wetlands on the Site, and in terms of improvements to the CWS. | the FRA (Appendix 2.4). The BESS has since been removed from the Proposed Development, addressing comments on BESS drainage design.<br>The details of the proposed biodiversity enhancements, including how the Proposed Development will deliver BNG, are described in Chapter 8 – Biodiversity and the BNG Report (Appendix 8.8). |
| **The Lead Local Flood Authority ('LLFA')** | The LLFA's consultation response sets out that the Proposed Development would not cause a material change in flood risk and recommend measures to be included in the detailed CEMP to be secured by DCO Requirement to address any impacts on potential water quality issues.<br>The LLFA acknowledge the planting and management proposals which '*will mean that the majority of the site will be a vegetated species-rich grassland which will act as a level-spreader / energy dissipater which will reduce erosive sheet flow.'*<br>Further details of the SUDS strategy are requested. | The LLFA's response is addressed in Appendix 2.4 FRA, and water quality is addressed in the Water Framework Directive (WFD) Assessment (Appendix 2.3) **[REF: 6.3]**.<br>Further information on water quality is available from the WFD Assessment (Appendix 2.3). Further detail on the mitigation measures which will be implemented during the construction phase are included within the OCEMP (Appendix 5.1) **[REF: 6.3]**. |
| **The Mining Remediation Authority** | The Mining Remediation Authority's statutory consultation response specified that the placement of solar arrays over coal mine entries should be avoided and advised on the appropriate buffer distances. | Buildings and structures will be located away from mine entries and peat. The location of mine entries will be determined through a Ground Investigation to be undertaken post consent and prior to commencement. Where possible, the ground stability risks will be addressed through remediation to be agreed with the Mining Remediation Authority. |

| Consultee | Consultation feedback | Design Amendments Made |
|---|---|---|
| | | This approach is discussed further in Chapter 10 – Ground Conditions. |
| **Local residents** | Responses were received throughout the statutory consultation from local residents concerned about visual impacts from their properties.<br>Local residents further highlighted the potential ecological value of a pond within the Site. This anecdotally included the regular presence of native species of bird.<br>Members of the public raised concerns about the potential impact from construction traffic during peak periods. | The Landscape Strategy Plan (Figure 7.6.1-7.6.5) outlines areas of green infrastructure with consideration of visual impacts and breaking up the massing of the Proposed Development. An area of solar panels has been set back from the property adjacent to the southeast corner following non-statutory consultation and further set back to the following statutory consultation.<br>The Proposed Development will deliver improvements to the existing pond and watercourses within the Site.<br>The Applicant is committed to scheduling deliveries to avoid peak periods, where possible, further information of which is set out in the OCTMP (Appendix 5.2). |
| **Cumbria Fire and Rescue Service (CFRS)** | The Applicant met with the Cumbria Fire and Rescue Service to discuss developing a BSMP. | While the issue of battery safety could have been addressed through agreement with CFRS, the removal of the BESS has avoided the need to agree the appropriate battery safety management arrangements with CFRS, as well as addressing concerns received from statutory consultation responses from the public. |

## Consideration of Alternative Technologies

4.6.5 Due to the rapid evolution of technology, the solar panels installed may have a higher panel rating than those currently available in the market. The Applicant proposes that an appropriate degree of flexibility is maintained to ensure that the best technology can be utilised at the point of construction to maximise the benefits of renewable energy generation and increase the efficiency of implementation of the Proposed Development.

4.6.6 Consideration of the Site's environmental constraints also influenced the choice of solar PV technology. Tracking PV arrays were discounted as they require a larger land take in an undulating landscape like the Site.