



# Volume 1: Design and Access Statement

Longhedge Solar Farm

30/11/2022



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# INTRODUCTION

## BACKGROUND

- 1.1. This Design and Access Statement (“DAS”) has been prepared by Neo Environmental Limited, on behalf of Renewable Energy Systems (RES) Ltd (“the Applicant”) in support of a planning application submitted to Rushcliffe Borough Council (“the Council”) for a proposed 49.9MW solar farm development (the “Proposed Development”) on lands between Hawksworth and Thoroton, circa 15.5km east of Nottingham, Nottinghamshire (the “Application Site”); the approximate centre point of which can be found at Grid Reference E476129, N343467.

### Development Description

- 1.2. The application seeks full, temporary (40 years), planning permission for Longhedge Solar Farm with the following description of development.
- 1.3. The Proposed Development will consist of the construction of a 49.9MW solar farm. It will involve the construction of bi-facial ground mounted solar photovoltaic (PV) panels, substation, inverter stations, security measures, site access, internal access tracks and other ancillary infrastructure, including landscaping and biodiversity enhancements.,
- 1.4. Following the 40-year operational phase, the equipment associated with the Proposed Development would be removed, and the Application Site reinstated to its former state. This, coupled with the measures that are proposed to enhance the landscape and increase biodiversity of the Application Site will ensure that upon decommissioning, the Application Site can not only be restored to its current agricultural use, but will also have resulted in net beneficial gains for ecology and the local landscape fabric.

## ROLE AND PURPOSE OF THE DESIGN AND ACCESS STATEMENT

- 1.5. This DAS has been prepared in accordance with Article 9 of the Town and Country Planning Act (Development Management Procedure) (England) Order 2015<sup>1</sup> (“the DMPO”) and National Planning Practice Guidance (“NPPG”) which set out the requirements for Design and Access Statements.
- 1.6. The NPPG states that a Design and Access statement must:

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<sup>1</sup> <https://www.legislation.gov.uk/uksi/2015/595/article/9/made>

- a) *Explain the design principles and concepts that have been applied to the proposed development; and*
- b) *Demonstrate the steps taken to appraise the context of the proposed development, and how the design of the development takes that context into account.*

1.7. The NPPG also sets out what should be included in a Design and Access Statement and makes the following points:

- *A development's context refers to the particular characteristics of the application site and its wider setting. These will be specific to the circumstances of an individual application and a Design and Access Statement should be tailored accordingly.*
- *Design and Access Statements must also explain the applicant's approach to access and how relevant Local Plan policies have been taken into account. They must detail any consultation undertaken in relation to access issues, and how the outcome of this consultation has informed the proposed development. Applicants must also explain how any specific issues which might affect access to the proposed development have been addressed.*

1.8. The purpose of this document is to demonstrate that the Applicant has fully considered the design and access issues as part of the comprehensive preparation of the scheme prior to submission of the planning application. This report therefore covers the following matters:

- Use – what buildings and spaces will be used for;
- Amount – how much will be built on site;
- Layout – how the buildings and public and private spaces will be arranged on site, and the relationship between them and the buildings and spaces around the site;
- Scale - how big the buildings and spaces would be (their height, width and length);
- Landscaping - how open spaces will be treated to enhance and protect the character of a place;
- Appearance - what the building and spaces will look like, for example, building materials and architectural details; and
- Access - why the access points and routes have been chosen, and how the site responds to road layout

- 1.9. This Design and Access Statement should be read in conjunction with the accompanying Planning Statement which assesses the planning policy context relating to the design and access issues of the Proposed Development.

## SITE CONTEXT

- 1.10. The Application Site is located in a semi-rural setting on lands between the settlements of Hawksworth (0.1km west) and Thoroton (0.2km southeast), circa 15.5km east of Nottingham, Nottinghamshire. (See **Figure 1** of **Volume 2: Planning Application Drawings** for further detail).
- 1.11. Centred at approximate Grid Reference E476129, N343467, the Proposed Development Site comprises nine fields covering a total area of c. 94.24hectares (ha), although only 37.7ha of this area is required to accommodate the solar arrays themselves, with the remaining area being used for ancillary infrastructure and mitigation and enhancement measures. The Proposed Development Site covers low lying lightly undulating agricultural land with an elevation range of c. 20m to 25m AOD. Internal field boundaries comprise, hedgerows, tree lines and several linear strips of woodland shelter belt. External boundaries largely consist of mature to lower hedgerows with individual trees and some evident gaps. In terms of existing infrastructure; electricity pylons extend north-south through fields 5, 6 & 8, whilst electricity lines pass northwest to southwest through fields 4, 5, 6 & 9.
- 1.12. The Application Site will be accessed via the creation of a new entrance off the linear public highway Thoroton Road. The vegetation is set back from the road verge by a few metres and therefore visibility will not be an issue. Appropriate visibility splays are included within the CTMP.
- 1.13. The haul route will be from the A46 to the southwest of the Application Site. The vehicles will exit the A46, signposted A6097 (Mansfield), take the 4th exit at the roundabout onto Bridgford Street followed by the 1st exit at the next roundabout onto Fosse Way. Vehicles will travel along this road for approximately 1.5km to the next roundabout, where they will take the 2nd exit onto Tenman Lane. This road will be travelled on in an eastern direction for approximately 3.2km before taking a left hand turn onto Hawksworth Road and vehicles will travel along here for approximately 2km before taking a right hand turn onto Thoroton Road. Vehicles will travel in a southeast direction for approximately 0.9km before turning left into the Application Site.
- 1.14. There is one recreational route located within the Proposed Development Site (Bridleway 1 & 6 that pass through the northern fields), and several located close by (**See Figure 3 of Vol 2: Planning Drawings**). National Cycle Network (NCN) route 64 shares the minor road on the east side of the Proposed Development Site.
- 1.15. The Proposed Development Site is mostly contained within Flood Zone 1 (at little or no risk of fluvial or tidal / coastal flooding), however there are some areas of Flood Zone 2 and 3a which follow the watercourse/drains within the site and have been carefully considered during the design phase.



## SITE SUMMARY

1.16. The Proposed Development has been sensitively sited within the local landscape, and is assessed as being a good location for a solar farm for the following reasons:

- The site is close to a viable grid connection;
- The fields across the site have good solar irradiation levels;
- It lies outside of any statutory environmental, archaeological and landscape designations;
- With the proposed Landscape and Ecological Management Plan (LEMP) and Biodiversity Management Plan (BMP), the site will be significantly enhanced for ecology;
- The Application Site is not assessed to be at significant risk of flooding from groundwater or surface water flooding with the design of the Application Site carefully considered to mitigate against any potential risks; and
- Sheep grazing can occur during the development's lifespan, using a low intensity grazing regime which will allow agricultural activities to continue and therefore the site will have a dual use.

1.17. Largely because of the above-mentioned attributes, as well as the benign nature of solar farm development, very little disturbance to the existing environment will be required to implement the Proposed Development.

# DESIGN

## DESIGN PRINCIPLES AND EVOLUTION

- 1.18. The design of a solar development is an iterative process, running in tandem with the identification of potential environmental effects. As environmental constraints and sensitivities have been identified, the layout of the Proposed Development has undergone a series of modifications to avoid and / or reduce potential environmental effects through careful design.
- 1.19. Following site surveys and identification of various environmental considerations, a constraints map was produced by Neo Environmental Ltd which was used to inform a series of design meetings. Environmental factors considered in the final design of the Proposed Development are discussed further within the Technical Appendices that accompany the planning application (**Volume 3: Technical Appendices**).
- 1.20. Another important factor in finalising the proposals has been consultation with the community and local stakeholders. This process and how feedback received has shaped the design is summarised in the accompanying **Statement of Community Involvement (Vol 1)**.
- 1.21. The final design and layout have been achieved through detailed assessments of the environmental effects and consideration of the identified spatial constraints, combined with consideration of the visual appearance of the Proposed Development from sensitive viewpoints and designated heritage assets. These are briefly discussed below and in more detail in the **Planning Statement (Volume 1)** and within the **Technical Assessments** included in **Volume 3**.
- 1.22. An Agricultural Land Classification (ALC) assessment was conducted at the Application Site (See **Technical Appendix 9: Volume 3**), which has demonstrated that the majority is grade 3b, with some larger areas of grade 3a and two very small areas of grade 2.
- 1.23. The Application Site is entirely located within the Landscape Character Assessment Unit (LCU) 25: South Nottinghamshire Farmlands: Aslockton Village Farmland. The host character type stretches from the Application Site and covers the detailed study area within 2km to the east and north, extending up to and beyond 3km to the west and 10km to the south. (See **Figure 1.1 of Technical Appendix 1: Volume 3**). The site does not lie within any statutory landscape designations and there are no designated heritage assets within the Proposed Development site.
- 1.24. The Proposed Development has undergone a series of modifications to avoid or reduce potential environmental effects through careful design. The measures incorporated into the Proposed Development design include the following:
- Main drainage ditch buffer of 8m;

- 5m buffer from hedgerows;
  - Various visual buffers from settlements;
  - 4.3m buffer for 33kV (8.6m corridor);
  - 6.6m buffer for 132kV (13.2m corridor + distance between 2x wires);
  - Various PROW buffers;
  - Tree buffers;
  - 10m woodland buffer; and
  - 10cm gaps at the bottom of security fencing for mammals.
- 1.25. A geophysical survey of the site was also undertaken to determine any anomalies likely to indicate archaeological features of significance. A plethora of anomalies interpreted as possible or probable archaeological potential have been identified across the PDA at two locations. To aid description these clusters of anomalies have been grouped into main areas of archaeological activity (AAA1 and AAA2).
- 1.26. A total of seven non-designated entries within the Nottinghamshire HER, representing five separate sites, lie inside this boundary. These sites include two distinct areas denoting cropmarks of archaeological potential (see **Figure 3.2: Appendix 3A**). As the development design includes these two defined areas, they are at risk of direct impacts from the construction of the proposed solar farm. The two HER sites lying outside these defined areas include findspots for Iron Age pottery sherds (NB16) and flint scatter (NB17) and are not considered to have any distinct surviving remains that could be impacted. For further detail, please see **Technical Appendix 3: Cultural Heritage Impact Assessment, Volume 3**.
- 1.27. Other factors that have informed the design and layout of the proposed development are considered below.

## USE

- 1.28. It is proposed that the use of the site will be for the development of a solar farm, involving solar photovoltaic panels and associated infrastructure. Underground cables will be used to connect the solar installation to the grid network.
- 1.29. The most notable benefit of the Proposed Development is the support it will provide towards the Central Government's commitments to reduce emissions of greenhouse gas emissions and achieve their legally binding target of net zero greenhouse gas emissions by 2050, following the declaration of a climate emergency in 2019 within the UK. Analysis from the Climate Change Committee and other independent bodies shows that the UK will need to

deploy at least 40GW of solar by 2030 if it is to achieve net zero by 2050. The Proposed Development will have an export capacity of up to 49.9MW; a solar farm of this size will generate a significant amount of electricity from renewable sources, therefore offsetting the need for power generation from the combustion of fossil fuels including coal and oil. Consequently, during its operational lifespan (40 years), the Proposed Development has the potential to displace electricity generated from fossil fuels and consequently represents carbon savings. See **Planning Statement (Volume 1)** for more detail.

- 1.30. The proposed solar farm will involve the temporary change of use of the land but, due to the time restricted nature of the development, the agricultural use will be retained in the long term. This means that the land will remain designated as greenfield following decommissioning of the Proposed Development, not brownfield. The application is for temporary consent for dual purpose – enabling agricultural use in the form of sheep farming and generating renewable electricity using solar as a green energy source. It should be noted that the project is fully reversible, and the site can therefore be reinstated back to its current state following the operational period. Furthermore, where a solar farm is installed on land which has been previously farmed, it enables the ground underneath to recover, while providing income for the farming business. This means solar farms help to regenerate soil quality, and so are helping to ensure the continued availability of high-quality agricultural acreage for future generations.
- 1.31. In addition, the minimal physical intrusion of the development itself will mean that the panels can be removed after their 40-year lifetime and the land will revert swiftly to full agricultural use.
- 1.32. Coupled with the measures that are proposed to enhance the landscape and increase biodiversity of the Application Site, this will ensure that upon decommissioning the Application Site can not only be restored to its current agricultural use but will also have resulted in net gains in terms of both biodiversity and the local landscape fabric.
- 1.33. Due to the land required for such projects, these will generally need to be located outside of urban areas and within the countryside, where the capacity to accommodate such developments exists.

## AMOUNT AND FABRICATION

- 1.34. The extent of the Proposed Development has been refined and finalised having consideration of potential environmental effects and consultation with the Local Planning Authority (LPA), statutory and non-statutory consultees and the local community.
- 1.35. As a result of the iterative process, the Proposed Development, although covering a large area of land, is confined to locations where effects have been limited as far as possible and are considered justifiable when considered in the context of the scheme benefits, including to support the UK's renewable energy increase and CO<sub>2</sub> reduction legally binding targets.

- Consideration of the planning balance which weighs up all material factors associated with the planning application is contained within the accompanying Planning Statement (**Volume 1**).
- 1.36. The Proposed Development will consist primarily of a steel framework to support the PV panels. In addition, a substation and inverter/transformer containers will be introduced as well as access tracks and underground cables. The scheme also includes boundary fencing and a CCTV system to restrict access and protect the scheme from theft and vandalism. This is the minimal level of development necessary to ensure that the site performs effectively with regards to its purpose of generating low carbon renewable energy.
- 1.37. Different levels of intrusion and disturbance are anticipated for different construction elements of the proposed solar farm. All construction elements involving topsoil stripping or deeper excavations are considered to be ground disturbance derived from infrastructure during the construction phase, while impacts resulting from the solar panels themselves, as well as the perimeter fencing, are considered to be ground disturbance derived from piling effects.
- 1.38. Overall, the proposed footprint of the Proposed Development is expected to be circa 3.98% (3.56Ha) of the Application Site area (94.24Ha). The majority of the Application Site area will be utilised for solar panels only, which comprises a 'pin-prick' effect, similar to the introduction of fence posts and is considered to cause minimal disturbance. The cumulative 'pin-prick' ground disturbance occurring from the piling for the panels themselves will be less than 0.05% (0.04Ha) of the Application Site area. The majority of the proposed footprint of the Proposed Development is associated with access tracks, temporary construction compounds and cable trenches. A lower area of ground disturbance will occur from excavations required for infrastructure such as the ancillary buildings.

## LAYOUT

- 1.39. The infrastructure layout of the Proposed Development can be found as **Figures 4 and 5** within **Volume 2: Planning Application Drawings**.
- 1.40. In proposing the general layout of the development of the main project site, great consideration was given to the retention of the established field boundaries on site along with planting and enhancement of native hedgerows and trees. This will help ensure that the development is well contained both physically and visually.
- 1.41. The Application Site is well located geographically for solar gain. The photovoltaic panels are oriented in a southwards direction and will be inclined at an angle between 10 and 30 degrees to maximise solar gain and will remain in a fixed position throughout the day and during the year (i.e. they will not rotate to track the movement of the sun). The photovoltaic panels will be laid out in rows across the site and will be spaced to avoid any shadowing effect from one panel to another.

- 1.42. A network of internal tracks around the solar panels will be laid to allow vehicle access to the supporting equipment to allow for maintenance. The layout and extent of the tracks is limited to that necessary to provide access and maximise efficiency.
- 1.43. Specific details and areas of the construction elements are detailed below:
- 5,746 module racks, 160,888 Modules, 45,968 pile driven poles = 367.74m<sup>2</sup>
  - 1 x Substation Compound – Abnormal shape – Total Area: 4,656.42m<sup>2</sup>
  - 2 x Spare Parts Containers (12.19m (L) x 2.44m (W)) = 59.48m<sup>2</sup>
  - 28 x Inverters Substation (16.0m (L) x 6.0m (W)) = 2,688m<sup>2</sup>
  - 14 x Inverter Substation Hardstandings (16.0m (L) x 16.0m (W)) = 3,584m<sup>2</sup>
  - 7.499km of deer fencing with 2,499 posts at 3m spacing, c. 0.03m<sup>2</sup> footprint each. Fence is 2.4m high with a 0.1m gap at the bottom. = 75.00m<sup>2</sup>
  - CCTV posts are 3.5m in height and we have 98 = 54.88m<sup>2</sup>
  - Road is average 4/5m wide and will involve an average of 300mm depth of soil removed. Local widening at turns for access reasons. Occasionally they will use a geosynthetic reinforcement or soil stability to reduce depth. Total length approximately 3.33km (14,985m<sup>2</sup>).
  - Cable trenches are circa 1m deep and up to 1m wide. They are approximately 4,995m in length and therefore an area of 4,995m<sup>2</sup>.
  - 2x Temporary Construction Compounds (50.00m (L) x 60.00m (W)) = 6,000m<sup>2</sup>
- Overall, the proposed footprint constitutes a relatively small percentage of the total area of the Application Site (94.24ha):
- 37,022.78m<sup>2</sup> for infrastructure (c. 3.93% of the Application Site area); and
  - 442.74m<sup>2</sup> for piling (c. 0.05% of the Application Site area).
- 1.44. The total ground disturbance area resulting from the Proposed Development is therefore **37,465.52m<sup>2</sup>** or c. **3.98%** of the Application Site area.
- 1.45. The layout of the equipment has been informed by a number of factors through the site selection and iterative design process. These include:
- The avoidance of environmentally sensitive areas to reduce potential effects relating to ecological assets including the implementation of:

- Main drainage ditch buffer of 8m;
  - 5m buffer from hedgerows;
  - Various visual buffers from settlements;
  - 4.3m buffer for 33kV (8.6m corridor);
  - 6.6m buffer for 132kV (13.2m corridor + distance between 2x wires);
  - Various PROW buffers;
  - Tree buffers;
  - 10m woodland buffer; and
  - 10cm gaps at the bottom of security fencing for mammals.
- Reducing potential impacts on the landscape character and fabric of the area and the visual amenity of local receptors by proposing a planting plan with mitigation screening and the implementation of buffers from residential receptors and Public Right of Ways (PROWs), see **Volume 3, Technical Appendix (TA) 1: LVA** for further details;
  - Buffering development from existing infrastructure including the overhead lines;
  - Achievement of optimum equipment efficiency and energy outputs through effective orientation and positioning; and
  - Consultation with the LPA, statutory and non-statutory consultees and the wider community.

## SCALE

- 1.46. The scale of development on site has been determined by the equipment necessary to generate the intended capacity of 49.9MW of renewable energy using solar PV technology at the Application Site.
- 1.47. Throughout the design iteration process, the Application Site has reduced in size from c.144ha in October 2021 to the current site area of 94.24ha (September 2022). These changes were following feedback from the community and stakeholders, as well as the results of site surveys and assessments. For example the local community came forward with a preference for the eastern field to be removed, this aligned with the results of a geophysical survey which showed high potential for archaeological remains, therefore this field was removed. Other reductions were the removal of the fields to the south of Thoroton Road, and the field

immediately north of the village of Thoroton itself to maintain a compact and well-screened site minimising potential residential receptors. A large set-back was also allowed around the village of Hawksworth to minimise potential visibility. PV solar panels were also removed in the north eastern section of field 5 to preserve southernly views towards the church spire of St Helena's in Thoroton and to give additional set-back distance from the Bridleway route running across the north of the site.

- 1.48. Where possible, The Proposed Development has been designed to enable agriculture usage to continue. For example, Traditional arable farming can continue in a large section of Field 5 and an area south of Field 1, allowing the day to day activities, and seasonal changes associated with it. The remainder of the Application Site has been designed for the dual use of energy production and sheep grazing. The provision of a sheep handling facility in the southwestern corner of field 6, has been included in the design in a location that will facilitate the management of the flock as detailed in **Figure 14 of Volume 2: Planning Application Drawings**. Following decommissioning, the Application Site will be restored to its former agricultural use.
- 1.49. The design also includes significant PRoW enhancements, by the inclusion of two Permissive Bridleways, that meet existing bridleways 1&6, that traverses on an east to west axis, across fields 5&4, dissecting fields 1&2. This significantly improves recreational benefits to a wide range of Public Rights of Way users whilst also improving road safety for all users as they can avoid using the road network. See **Figure 3 of Volume 2: Planning Application Drawings**.
- 1.50. All of the plant buildings on site will be at or below single storey level. Even when viewed from nearby public vantage points, the scale of development will not be overbearing due to its limited height and relatively benign appearance (i.e., lack of movement and external illumination etc).
- 1.51. Each array of panels within the field will be mounted on a simple metal framework. The main purpose of the mounting structure is to hold the modules in the required position without undue stress. It must be capable of withstanding appropriate environmental stresses for the location, such as wind or snow loading. The framework will be driven into the soil between 1 and 2 metres deep, avoiding the need for deep foundations. Such supporting systems are designed to avoid the use of concrete foundations and are reversible.
- 1.52. With regard to the proposed ancillary buildings and associated infrastructure, they are designed to be as small as possible while still being capable of undertaking their required function within the site. Such structures, with the exception of the tower on the substation located in Field 8, will not be prominent within the surroundings and will be smaller than many isolated stores and barns typically found in the countryside environment. The existing woodland and hedgerows located in the surrounding area, combined with the proposed landscape enhancements means that views of the Proposed Development will be very localised and unobtrusive in the wider landscape. Further information regarding this can be found in **Volume 3, Technical Appendix 1: LVA**.



- 1.53. The cables associated with the Proposed Development will be buried underground and will therefore be appropriate to the setting and location.

## APPEARANCE

- 1.54. The Proposed Development Site would lie within the undulating farmland surrounded by hedgerows and occasional tree belts and woodland, which provide varying levels of containment and screening in the surrounding landscape. Additionally, the closest settlement area lies 0.1km west, with another 0.2km away to the southeast. Visual effects of the Proposed Development have been assessed in more detail in the Landscape and Visual Assessment which can be found in **Volume 3, Technical Appendix 1**. In the longer term as a result of the mitigation planting, localised visual effects would be reduced. The planting plan provides for the introduction of hedgerow planting to maintain visual screening. Some existing hedgerows are also proposed to be infilled and enhanced.
- 1.55. The substation and containers which house the inverters/transformers will be recessively coloured to blend in with the landscape (RAL 6005 – Moss Green).
- 1.56. In terms of reflectance, photovoltaic solar panels are by no means a highly reflective surface. They are designed to absorb sunlight and not to reflect it. Several studies have shown that photovoltaic panels (as opposed to Concentrated Solar Power) have similar reflectance characteristics to water, which is much lower than the likes of glass, steel, snow, and white concrete by comparison. Similar levels of reflectance can be found in rural environments from the likes of shed roofs and the lines of plastic mulch used in cropping. Nonetheless, photovoltaic panels have a flat polished surface, which omits ‘specular’ reflectance rather than a ‘diffuse’ reflectance, which would occur from a rough surface.
- 1.57. The surface of the panels will be finished with an anti-reflective coating. This means that the panels will not produce large amounts of glint and glare that will affect visual receptors in the vicinity of the site. A Glint and Glare Assessment was undertaken as part of the planning assessment and, once mitigation was taken into consideration, all impacts were reduced to **None** for all properties. Further information on this can be found in **Technical Appendix 6: Glint and Glare of Volume 3**.

## LANDSCAPE

- 1.58. A Landscape and Visual Assessment is included as **Technical Appendix 1 in Volume 3** which considers the landscape and visual effects of the Proposed Development, it is anticipated that adverse effects arising from the Proposed Development would be limited to the Application Site itself and isolated points on site boundaries, and with the mitigation proposed in the Landscape and Ecology Management Plan will be reduced further. The overall design of the

Proposed Development has included several site reductions and setbacks to remove more visible land from points around Thoroton and Hawksworth.

- 1.59. It is considered that the landform and vegetation including mature trees and hedgerows of the site and surrounding area, make this location ideal for utilisation as a solar farm and the effects resulting from the installation of the development. The mature trees and hedgerows offer significant screening and allow for the proposals to be successfully accommodated.
- 1.60. In terms of visual effects, consideration was undertaken from eight viewpoints in the surrounding area. A number of these are taken from Public Rights of Way in the vicinity (VP's 5&6; see **TA 1: LVA of Volume 3 for further detail**) and these will be subject to major/moderate visual effects during construction phase and Year 1 of the Proposed Development, however the hedgerow and vegetation planting included within the scheme would mitigate such visual effects once it has matured sufficiently, reducing potential visual effects to moderate or below by year 10.
- 1.61. Landscape enhancement measures are proposed to provide screening and improve the sites capacity to host a greater range of biodiversity. These include woodland planting, native hedgerow and tree planting and the introduction of native grasses throughout the Application Site, providing additional habitat and food resources for the local wildlife as well as providing mitigation screening for the Proposed Development, reducing the potential for inward views from nearby receptors.

## ACCESS

- 1.62. The proposed haul route for the Proposed Development has been identified by considering the ability of the route to physically accommodate the required vehicles, in addition to the sensitivity of the routes to potential disruption by the movements of traffic to and from the Application Site.
- 1.63. The haul route will be from the A46 to the southwest of the Application Site. The vehicles will exit the A46, signposted A6097 (Mansfield), take the 4th exit at the roundabout onto Bridgford Street followed by the 1st exit at the next roundabout onto Fosse Way. Vehicles will travel along this road for approximately 1.5km to the next roundabout, where they will take the 2nd exit onto Tenman Lane. This road will be travelled on in an eastern direction for approximately 3.2km before taking a left hand turn onto Hawksworth Road and vehicles will travel along here for approximately 2km before taking a right hand turn onto Thoroton Road. Vehicles will travel in a southeast direction for approximately 0.9km before turning left into the Application Site.
- 1.64. The site will be accessed from a new site access point off Thoroton Road and will be designed in accordance with the Nottinghamshire Highway Design Guide to ensure that the largest construction vehicles can enter and exit the site access point. To facilitate this, 13.3m of hedgerow will need to be removed.

- 1.65. The local access route is predominantly consisting of roads wide enough for vehicles to pass, however Thoroton Road becomes a single lane road towards the site entrance. This road has good forward visibility and a number of passing places and it is thought that with the addition of some construction traffic management measures that there will be limited impacts on local road users along this stretch of road.
- 1.66. It was noted during the site visit that it was likely that vehicles would be travelling up to the roads speed limit and therefore the full 210m x 2.4m visibility splay for a 60mph road is required. The visibility splay of 210m x 2.4m will be achievable without the need for any remedial works
- 1.67. A detailed Construction Traffic Management Plan (CTMP) has been prepared to demonstrate how the site will be accessed during the construction period (see **Volume 3, Technical Appendix 5**). The CTMP provides details of the number of deliveries during the construction period and also provides details of vehicle routing to access and exit the site.
- 1.68. Impacts from the operational phase of the site, consisting of between 10-15 LGVs per year for security and maintenance, is not considered to be significant.
- 1.69. The safety and convenience of residents and users of the PRow network is a matter of paramount importance to the Applicant and therefore a number of health and safety measures have been proposed during the construction stage of the development. These have been outlined in more detail in the CTMP (**Technical Appendix 5, Vol 3**).
- 1.70. The local PRow network would be enhanced through the creation of two Permissive Bridleways providing bridleway users with traffic free routes, improving road safety for all users. . To the north of the village of Hawksworth, a new gate is proposed to enable access to the new Permissive Bridleway in this location. The gate is located on land over which The Applicant has land rights. Please see **Figure 3 of Volume 2: Planning Application Drawings**, for details of these new routes.
- 1.1. Please refer to **Volume 2: Figure 15** for details on treatment of locations where internal site access tracks cross bridleway.

## ENERGY STATEMENT

- 1.2. This section of the DAS addresses the benefits of renewable energy developments and the need for such facilities in respect of national policy and energy strategies.
- 1.3. As laid out in its Net Zero Strategy published in October 2021, the UK Government has made it clear that solar and wind will be the backbone to achieving a secure, affordable and low carbon energy supply. Analysis from the Climate Change Committee and other independent bodies shows that the UK will need to deploy at least 40GW of solar by 2030 if it is to achieve net zero by 2050. Solar Energy UK<sup>2</sup> has published an analysis, as shown in the table below, estimating that residential and commercial development is expected to account for nearly 37% (15GW) of the total 2030 solar PV deployment with the remaining 63% (25GW) coming from large scale ground mounted solar farms.
- 1.4. The UK Energy Security Strategy<sup>3</sup> published in April 2022 commits to look to increase the UK's current 14GW of solar capacity by up to 5 times by 2035. Our current power system still relies heavily on fossil fuels, such as gas. The volatile price of gas is the main reason that bills have increased so rapidly in recent months. The need to rapidly scale up home grown energy has become even more urgent. Large-scale solar, alongside onshore and offshore wind is now the cheapest form of electricity generation. This makes developments like the Proposed Development not just good for the environment but also for the consumer. If consented, the Proposed Development would be capable of producing clean, green electricity for approximately 15,200 homes every year.
- 1.5. The Proposed Development aligns with the NPPF by contributing to the decarbonisation of electricity generation and hence, sustainable development. The development of the Proposed Development will mean a substantial reduction of approximately 25,000t<sub>3</sub> of CO<sub>2</sub> emissions annually. This is based on multiplying the Proposed Development's average annual yield, by the number of tonnes of carbon which fossil fuels would have produced to generate the same amount of electricity. The figure for this is calculated using the BEIS "all fossil fuels" emissions statistic of 440 tonnes of carbon dioxide per gigawatt hour (GWh) of electricity. This represents a significant contribution to the legally binding national and international requirement and associated targets to increase renewable energy generation and reduce CO<sub>2</sub> emissions.
- 1.6. Based on BEIS average domestic household consumption per year at 3,748kWh, the Proposed Development can meet the energy needs of approximately 15,200 homes.
- 1.7. The most notable benefit of the Proposed Development is the support it will provide towards the Central Government's commitments to reduce emissions of greenhouse gas emissions to combat the effects of climate change. Since 1990, the UK has reduced emissions by 44% whilst

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<sup>2</sup><https://solarenergyuk.org/resource/lighting-the-way-making-net-zero-a-reality-with-solar-energy/?cn-reloaded=1>

<sup>3</sup><https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy>

increasing GDP by 78%, the fastest decarbonisation rate in the G7<sup>4</sup> and in June 2019, the UK became the first major economy to set a legally binding target to reach net zero greenhouse gas emissions by 2050, in recognition of the transformative change needed to tackle global climate change.

- 1.8. Although significant progress towards this goal has already been made, the UK have far to go. The CCC published the Sixth Carbon Budget: The UK's Path to Net Zero<sup>5</sup> on 9 December 2020 which sets out the actions needed to achieve net zero emissions. The CCC's recommended pathway, the *Balanced Net Zero Pathway* requires a 78% reduction in UK territorial emissions by 2035, a 63% reduction from 2019. Similarly, the International Energy Agency (IEA) recently released a roadmap to a global net-zero energy system by 2050<sup>6</sup> stating that advanced economies such as the UK should target net-zero electricity generation by 2035, with Canada and the USA having already implemented such targets. Former UK Prime Minister Boris Johnson has since stated that it would be possible to end gas-fired electricity generation in the UK by 2035<sup>7</sup>; this would mean the entirety of the nation's electricity generation mix would be produced by renewable energy and low carbon technology, primarily onshore and offshore wind and solar power.
- 1.9. The Proposed Development will have an export capacity of up to 49.9MW; a solar farm of this size will generate a significant amount of electricity from renewable sources, therefore offsetting the need for power generation from the combustion of fossil fuels including coal and oil. Consequently, during its operational lifespan (40 years), the Proposed Development has the potential to displace electricity generated from fossil fuels and consequently represents carbon savings.
- 1.10. The amount of CO<sub>2</sub> savings depends on which source of electricity generation the solar farm generating capacity is displacing at any given time. A renewable energy development would have a maximum potential to save carbon emissions when substituting coal fired generation. However, it is not appropriate to define the electricity source for which this renewable electricity project would substitute due to uncertainty in the future grid mix. As a result, the figure used for calculating the level of CO<sub>2</sub> offset as a result of the introduction of the Proposed Development, is the BEIS "all fossil fuels" emissions statistic of 440 tonnes of carbon dioxide per gigawatt hour (GWh) of electricity<sup>8</sup>.
- 1.11. Scaling this up to the CO<sub>2</sub> displaced over the lifetime of the Proposed Development (40 years), circa 1,000,000t<sup>3</sup> of CO<sub>2</sub> will be displaced. This represents a significant contribution to the legally binding national and international requirement and associated targets to increase renewable energy generation and reduce CO<sub>2</sub> emissions.

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<sup>4</sup> [BEIS Outcome Delivery Plan: 2021 to 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/946968/s-ub-national-electricity-and-gas-consumption-summary-report-2019.pdf)

<sup>5</sup> [The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/946968/s-ub-national-electricity-and-gas-consumption-summary-report-2019.pdf)

<sup>6</sup> [Net Zero by 2050: A Roadmap for the Global Energy Sector - Event - IEA](https://www.iea.org/press-releases/net-zero-by-2050-a-roadmap-for-the-global-energy-sector)

<sup>7</sup> [UK Government eyeing 100% clean energy grid by 2035, Boris Johnson confirms \(edie.net\)](https://www.edie.net/news/uk-government-eyeing-100-clean-energy-grid-by-2035-boris-johnson-confirms)

<sup>8</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/946968/s-ub-national-electricity-and-gas-consumption-summary-report-2019.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/946968/s-ub-national-electricity-and-gas-consumption-summary-report-2019.pdf)

Table 2: Estimated prevention of emissions in tonnes of CO<sub>2</sub>.

Estimated Prevention of Emissions in CO <sub>2</sub> (tonnes)	
Annual	Solar Farm Lifetime (40 years)
25,000t <sup>3</sup>	1,000,000t <sup>3</sup>

- 1.12. Using the “all fossil fuels” emission statistic is current industry standard and is considered an accurate depiction of calculating CO<sub>2</sub> savings when introducing renewable energy schemes as the emphasis of introducing renewable technology is to replace fossil fuels and combat CO<sub>2</sub> levels and not to replace other renewables. It is considered that using the “coal” emission statistic would give the worst-case scenario comparator for calculating carbon savings.
- 1.13. Based on BEIS average domestic household consumption per year, 3,748kWh<sup>9</sup>, the Proposed Development can meet the energy needs of approximately 15,200<sup>10</sup> homes. The generation of this level of renewable energy therefore represents a substantial benefit which would be experienced if planning permission were to be granted.
- 1.14. In addition, the operation of the Proposed Development could, based on the same assumptions, also displace other gases related to coal-fired electricity generation including those associated with acid rain such as sulphur dioxide (SO<sub>2</sub>) and oxides of nitrogen (NO<sub>x</sub>).
- 1.15. It should be noted that there are significant increases in output and efficiency yearly in solar panels; today's average commercial solar panel converts over 20% of the light energy hitting it to electricity, up from 12% just 10 years ago<sup>11</sup>. Furthermore, it is expected that panels will be even more efficient at the time of construction of the solar farm, if consented (earliest construction is early 2024).
- 1.16. A recent study published in Nature Energy by Dr Gunnar Luderer identified that *‘building solar creates an insignificant carbon footprint compared with savings from avoiding fossil fuels.’*<sup>12</sup> The study measures the full lifecycle greenhouse gas emissions of a range of sources of electricity out to 2050. The footprint of solar comes in at 6gCO<sub>2</sub>e/kWh. In contrast, coal CCS (109g), gas CCS (78g), hydro (97g) and bioenergy (98g) have relatively high emissions, compared to a global average target for a 2C world of 15gCO<sub>2</sub>e/kWh in 2050.
- 1.17. A review of policy within the **Planning Policy Context** and **Material Considerations** sections above indicates that there is a clear need to ensure security of supply through the development of a diverse energy generation system.

<sup>9</sup> [Sub national electricity and gas consumption summary report 2020 \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/86484/sub-national-electricity-and-gas-consumption-summary-report-2020.pdf)

<sup>10</sup> Based on average annual yield of 57GWh/3,748kWh per household.

<sup>11</sup> [A breakthrough approaches for solar power - BBC News](https://www.bbc.com/news/technology-55888888)

<sup>12</sup> <https://www.carbonbrief.org/solar-wind-nuclear-amazingly-low-carbon-footprints>

## CONCLUSION

- 1.18. This Design and Access Statement has been prepared in accordance with requirements of Article 9 of the DMPO and the NPPG. The DAS has established:
- The design principles and rationale that have been applied to the Proposed Development, including the various relevant environmental and technical criteria;
  - The steps taken to appraise the context of the Application Site, and how the design of the Proposed Development takes that context into account, in respect of design iteration, the various relevant environmental and technical criteria, and each design component;
  - The relevant planning policies in respect of access, and how these policies have been taken into account and are addressed; and
  - That all relevant issues which might affect access to the Proposed Development have been addressed.
- 1.19. The DAS has thus established that the Applicant can demonstrate an integrated approach that will deliver inclusive design and address the full range of access requirements throughout the design process.
- 1.20. The location of the Proposed Development has been carefully selected and the design and layout of the solar panels has been given great consideration. The site is naturally well screened, with additional planting proposed as part of the development. The height of the proposed panels has also been reduced from 3.5m to 2.8m, this low physical height of the solar panels and associated equipment results in the visual effects of the Proposed Development being considered to be limited.
- 1.21. Safe access can be taken into the site from the public highway and within the site. Mitigation measures will be employed to ensure construction traffic is managed appropriately as outlined within the accompanying CTMP (**TA 5 CTMP of Volume 3**).
- 1.22. Overall, the Proposed Development is appropriate in terms of design and access and the development clearly represents a necessary step towards meeting the UK's legally binding climate change and renewable energy obligations, following the declaration of a climate emergency in 2019 within the UK.