

# FAIR OAKS RENEWABLE ENERGY PARK

## Environmental Statement Volume 2A - Written Statement

PREPARED ON BEHALF OF

Fair Oaks Renewable Energy Park Limited

JANUARY 2023



engena

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## PREFACE

This Written Statement forms the second part of a four volume, five part Environmental Statement which describes the findings of the Environmental Impact Assessment (EIA) of the proposed Fair Oaks Renewable Energy Park. The volumes of the complete document are:

Document	Title	Contents
Volume 1	Non-Technical Summary	Summarises the proposal and the key conclusions of the EIA for the non-technical reader
Volume 2A	Written Statement	Presents the full assessments of the EIA
Volume 2B	Appendices	Presents the appendices referred to in the Written Statement
Volume 3	Figures	Presents the figures referred to in the Written Statement
Volume 4	Visualisations	Presents the visualisations referred to in the Landscape and Visual Impact Assessment (LVIA) within the Written Statement

In addition to the Environmental Statement, the Applicant has submitted a Planning Statement which summarises the planning policy context of the proposal. A Design and Access Statement as well as a supporting Socio Economics Statement, Transport Statement and environmental assessments undertaken outside of the EIA regulations also accompany the planning application.

A complete set of application documents can be viewed in person at Rushcliffe Borough Council (Planning Team), Rushcliffe Arena, Rugby Road, Bridgeford, NG2 7YG or downloaded from the project website, as detailed in the box below.

Printed copies can be purchased at a cost of £500+VAT or digital versions, either as a download or on CD-ROM free of charge.

To order copies, please contact Engena Limited at:

The Old Stables, Bosmere Hall,  
Creeping St Mary, IP6 8LL.

[info@engena.co.uk](mailto:info@engena.co.uk)

The Applicant may also be contacted at:

<https://ridgecleanenergy.com/fairoaks/>

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## FAIR OAKS RENEWABLE ENERGY PARK

### Introduction

- 1.1 Helping to meet the National Need to reduce dependency on fossil fuels, the Fair Oaks Renewable Energy Park proposal (the Proposal) consists of:
- an array of ground-mounted solar panels and ancillary infrastructure including inverters (mounted

behind the panels), transformer units, access tracks, security fencing and infrared cameras, electrical and communications infrastructure;

- a Battery Energy Storage System (BESS) including battery units mounted in containers, power conversion and transformer units, switchgear containers, access tracks, security fencing and infrared cameras;
- Site electrical infrastructure comprising of DNO switchyard compound comprising terminations, protection and monitoring equipment, switchgear, disconnectors, busbars and main transformer. A DNO control building is sited adjacent to the compound for the sole use of the DNO. Underground power cabling connects the compound to the Solar PV and BESS Substation which is in turn connected to the energy park 33kv distribution system. Additional infrastructure includes access tracks, security fencing and security cameras; and
- A temporary construction compound will be located to the

- north east of the development area for the duration of construction and a grid connection cable will connect the site to the local electrical distribution network (subject to a separate consenting process).

- 1.2 The Proposal would have an installed AC capacity of up to 49.9MW.
- 1.3 The project could host up to 100MWh of BESS (Battery Energy Storage System), that is discharging at 50MW over two hours.
- 1.4 It is anticipated that the Proposal would be generating electricity for a period of forty (40) years.
- 1.5 For the purposes of the Environmental Impact Assessment and this Environmental Statement, assessments for impacts of the solar farm have been primarily based upon panel rows with a maximum height of up to 3.0m angled at around 20-25 degrees facing south.
- 1.6 The location of the proposed site is shown at **Figure 1.1**, the layout is shown at **Figure 1.2** and is overlaid on aerial imagery at **Figure 1.3 of ES Volume 3**.

## Energy Production

- 1.7 It is currently estimated prior to layout optimisation that the Proposal will be sufficient to offset the equivalent annual electricity needs of approximately 11 200 Nottinghamshire homes (based on average domestic consumption per household of 3 900kWh (DBEIS, 2020)).

## Carbon Offset

- 1.8 From the displacement of electricity generated from fossil fuel powered generation, the Proposal would offset the emission of a significant quantity of pollutants, particularly carbon dioxide, into the atmosphere. This reduction in emissions would contribute to the national legislation of net zero carbon emissions by 2050, the commitment of the UK Government to decarbonise energy supply by 2035 and international reductions required under the legally binding obligations of the Kyoto Protocol and Paris Agreement. It also contributes to the reduction of emissions in Rushcliffe Borough Council, thereby addressing the Council's declared Climate Emergency.

- 1.9 As discussed further in **Chapter 7 - Construction, Operation and Decommissioning**, on a conservative basis (DBEIS, 2021) the electricity produced by the Fair Oaks Renewable Energy Park will offset the equivalent of approximately 9 270 tonnes of CO<sub>2</sub> per annum.
- 1.10 Fair Oaks Renewable Energy Park would make a material contribution to net zero, helping to meet the National need reducing dependency on fossil fuels.

## The Applicant

- 1.11 The Applicant is Fair Oaks Renewable Energy Park Ltd, a project company owned by Ridge Clean Energy Ltd, a well-funded, UK-based clean energy company whose team have developed, constructed and operated clean energy projects in the UK since 2003.
- 1.12 Engena Limited is an independent planning consultancy with over 1GW of development experience in the renewable energy industry, specialising in project planning, development management and Environmental Impact Assessment

(EIA). Engena is supporting Ridge Clean Energy Limited with the provision of planning services.

### REFERENCES

Department for Business, Enterprise and Industrial Strategy (DBEIS), 2021, Sub-National Electricity Consumption Statistics, retrieved from: <https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics>.

United Nations, 1998, Kyoto Protocol to the United Nations Framework Convention on Climate Change.



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## INTRODUCTION

2.1 This chapter sets out the wider international, national, regional and local context within which the Fair Oaks Renewable Energy Park is proposed. The merits of the various forms of renewable energy are also considered, along with the current and future energy generation mix of the UK.

2.2 The imperative need to reduce the carbon dependence of the economy is also discussed against the various alternative energy solutions.

## GLOBAL CLIMATE CHANGE

2.3 It is internationally accepted that global warming and its association with climate change effects are a reality. Scientific opinion has converged on the appreciation that human activity, including the burning of fossil fuels, is rapidly changing the Earth's climate.

2.4 The Intergovernmental Panel on Climate Change (IPCC) was set up in 1988 by the World Meteorological Organisation and the United Nations Environment Programme to: *'assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human induced climate change, its potential impacts and options for adaptation and mitigation'* (IPCC, 1998).

2.5 The IPCC is split into three working groups:

- Working Group 1: The Physical Basis of Climate Change;

- Working Group 2: Climate Change Impacts, Adaptation and Vulnerability; and
- Working Group 3: Mitigation.

2.6 Each Working Group is responsible for the publication of its own findings, and the IPCC are organised such that the Working Groups report their findings in order. Upon completion of each report an overarching *'synthesis'* report is produced, which integrates the findings of the three groups.

2.7 The Working Groups publish in approximately 5-7 year cycles. The latest synthesis report provides the contribution of Working Group I (WGI) to the IPCC's Sixth Assessment Report, AR6, *'Climate Change 2021 The Physical Science Basis'*, and was published on 7<sup>th</sup> August 2021 (IPCC, 2021).

2.8 The findings of the Working Groups are clear and unequivocal, and as the IPCC assessments have progressed up to the present Assessment, the uncertainty levels have decreased.

## Working Group 1: The Physical Basis of Climate Change

*'It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.'* (Paragraph A.1; IPCC, 2021).

2.9 It was reported by the IPCC in AR6 that each of the last four decades have been successively warmer than any decade that preceded it since 1850. Between 1850 and 2019 it is likely that humans have caused global surface temperature to increase by 1.07°C; a rate that is unprecedented in at least the last 2000 years.

2.10 Not only is the rate of change unprecedented but also the scale of recent changes is unlike anything previously seen:

- globally averaged precipitation over land has likely increased since 1950, with a faster rate of increase since the 1980s and human influence extremely likely to have contributed to the changes in near-surface ocean salinity;

- mid-latitude storm tracks have likely shifted poleward in both hemispheres since the 1980s;
- glaciers have retreated across the globe and this is very likely the result of human influence. It is also very likely that human activity has contributed to less snow cover since 1950 in the Northern Hemisphere and surface melting of the Greenland Ice Sheet over the last 20 years;
- it is virtually certain that the global upper ocean has warmed since the 1970s;
- the rate of change of global sea level rise has almost tripled between 1901-1971 and 2006-2018;
- climate zones have shifted poleward in both hemispheres, and the growing season has increased by up to two days per decade since the 1950s;
- it is virtually certain that hot extremes have become more frequent and more intense across most land regions since the 1950s, while cold extremes have become less frequent and less severe;

- marine heatwaves have approximately doubled in frequency since the 1980s;
- tropical cyclone occurrence has likely increased over the last four decades and the location of peak intensity has shifted northwards - patterns that are not explainable by internal variability; and
- human influence has likely increased the chance of compound extreme events since the 1950s. This includes increases in the frequency of concurrent heatwaves and droughts on the global scale (high confidence); fire weather in some regions of all inhabited continents (medium confidence); and compound flooding in some locations (medium confidence).

2.11 It is likely to very likely that human influence is a key driver for all of these effects.

2.12 AR6 reaffirms the conclusions of AR5 that at least net zero CO<sub>2</sub> and strong reductions in other greenhouse gas emissions are required in order to stabilise human-induced global warming. Five new possible

climate future scenarios have been considered across AR6 to explore the broader range of greenhouse gas, land use and air pollutant futures than addressed in AR5. These scenarios are illustrated in **Plate 2.1**.

- 2.13 SSP1-1.9 and SSP1-2.6 are scenarios that start in 2015 and have very low and low GHG emissions and CO<sub>2</sub> emissions declining to net zero around or after 2050, followed by varying levels of net negative CO<sub>2</sub> emissions.
- 2.14 SSP2-4.5 is the intermediate emissions scenario, and SSP3-7.0 and SSP5-8.5 are the high to very high greenhouse gas emissions scenarios.
- 2.15 As shown at **Plate 2.1**, compared to 1850-1900, global surface temperature averaged over 2081-2100 is very likely to be: 1.0-1.8°C higher under the very low greenhouse gas emissions scenario (SSP1-1.9); 2.1-3.5°C higher under the intermediate greenhouse gas emissions scenario (SSP2-4.5); and 3.3-5.7°C higher under the very high greenhouse gas emissions scenario (SSP5-8.5).

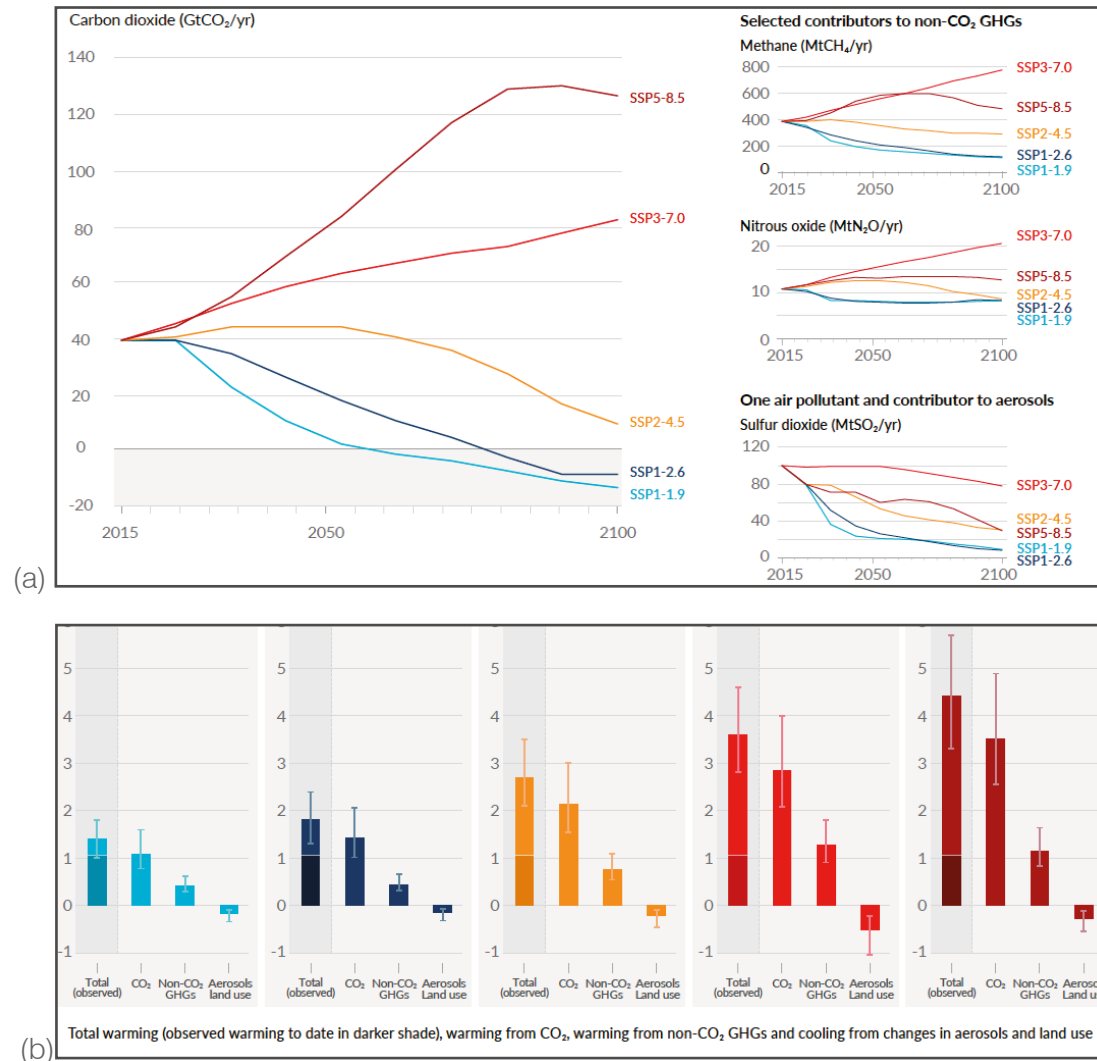


Plate 2.1 - (a) Future Annual Emissions of CO<sub>2</sub> (left) and of a Subset of Key Non-CO<sub>2</sub> Drivers (right) across Five Illustrative Scenarios; (b) Contribution to Global Surface Temperature Increase from Different Emissions, with a Dominant Role of CO<sub>2</sub> Emissions (IPCC, 2021)

2.16 As shown by **Plate 2.1 on page 17**, the scale of the challenge over the next two decades cannot be underestimated. However, this challenge must be achieved. Global warming must be limited to 1.5°C as soon as possible or the effects will become irreversible.

### *Working Group 2: Impacts, Adaptation and Vulnerability*

2.17 The impacts of the greenhouse effect on global temperatures and global climates are now apparent. The consequences of increased temperatures on rising sea levels and decreases in the ice mass, snow precipitation and ice cover are regularly reported. Working Group 2 have found that evidence of climate change impacts is strongest and most comprehensive for natural systems. However, impacts on human systems have also been attributed to climate change (IPCC, 2014).

2.18 Changing precipitation, and melting snow and ice are affecting water resources (quality and quantity). Many terrestrial, freshwater and marine species have shifted their ranges, migration patterns and interactions

in response to climate change. It has also been found that negative impacts of climate change on crop yields have been more common than positive impacts. There has been increased heat related mortality and decreased cold related mortality in some regions as a result of warming, and local changes in temperature and rainfall have altered the distribution of some water borne illnesses and disease vectors.

2.19 Within the Fifth Assessment Report, Working Group 2 also considered evidence relating to the socio-economic impacts associated with climate change. They found that people who are socially, economically, culturally, politically, institutionally or otherwise marginalised are especially vulnerable to climate change and are also vulnerable to some adaptation and mitigation responses.

2.20 With a *very high confidence* level, Working Group 2 have found that impacts from climate related extremes (e.g. heat waves, droughts, floods, cyclones, wildfires) reveal *significant* vulnerability and exposure of some ecosystems and many human systems to current climate variability.

2.21 Impacts of such climate-related extremes include alteration of ecosystems, disruption of food production and water supply, damage to infrastructure and settlements, morbidity and mortality, and consequences for mental health and human well-being. For countries at all levels of development, these impacts are consistent with a significant lack of preparedness for current climate variability in some sectors.

2.22 For Europe, the key risks associated with climate change have been identified as:

- increased economic losses and people affected by flooding in river basins and coasts, driven by increasing urbanisation, increasing sea levels, coastal erosion and peak river discharges;
- increased water restrictions. Significant reduction in water availability from river abstraction and from groundwater resources, combined with increased water demand (e.g. for irrigation, energy and industry, domestic use) and with reduced water drainage and runoff as a result of increased



evaporative demand, particularly in southern Europe; and

- increased economic losses and people affected by extreme heat events: impacts on health and well-being, labour productivity, crop production, air quality, and increasing risk of wildfires in southern Europe and in the Russian boreal region.

2.23 It is reported that adaptation can prevent most of the projected damages associated with flooding. However, it is recognised that this will come at a high economic cost and will raise environmental and landscape concerns/objections.

2.24 By way of recent example, there have been a number of devastating floods across the UK in recent years. In December 2013, when floods hit large parts of southern England, it emerged afterwards that one of the villages flooded in the south-east had previously refused the offer of a flood defence due to aesthetic impacts on the village (Guardian, 2013).

2.25 More recently during the floods across Shropshire, Worcestershire and Yorkshire in February 2020,

flood barriers holding back the River Severn at Ironbridge buckled as river levels nearby peaked at 6.0m. It was reported that *'permanent flood defences are not a feasible option in a place like Ironbridge - its special historic and scientific significance means that temporary barriers are a better alternative'* (BBC News, 2020). The temporary defences were pushed back 2.0m by flood water. Again, this highlights an adaptation issue which will likely be encountered more regularly in coming years - the balance between the protection of important assets and communities against the need for permanent flood defences and their associated impacts.

2.26 Conversely, adaptation methods to address water restrictions and losses associated with extreme heat events largely require the adoption of a different approach to current practices. This includes the use of more water efficient technologies, adaptation of dwellings, and (pertinent to this project) reductions in emissions to improve air quality.

### *Working Group 3: Mitigation of Climate Change*

2.27 Despite attempts to mitigate climate change, so far greenhouse gas emissions have continued to increase at an accelerated pace. Working Group 3 considered energy supply, transport, buildings, industrial processes, agriculture, forestry and spatial planning. Their report concluded that all sectors need to substantially reduce greenhouse gas emissions if we are to limit global warming to 2 degrees Celsius.

2.28 The reason for the accelerated increase in emissions is largely put down to increased use of fossil fuels in the energy and industry sectors. This is of particular concern for emerging economies who produce consumer goods for established economies.

2.29 The *'do nothing'* scenario would result in 4 degrees of global warming by the end of this century.

2.30 To prevent this, emissions need to be halved by 2050, and further after that. If emissions are not falling by 2030 it is twice as likely that we will not achieve this goal (IPCC, 2014). As

a result, the IPCC are recommending a substantial increase in low carbon energy prior to 2030, amongst other measures in different sectors. To achieve this, an increase in renewable energy supply is required, along with increases in nuclear energy and technological advances in large scale carbon capture and storage.

- 2.31 Whilst these measures are absolutely essential to limit global warming, they remain ambitious. The current baseline scenarios are expecting the emissions associated with energy supply to double or even treble by 2050. To achieve the reductions necessary, the low carbon electricity sector needs to increase from 30% of demand worldwide to 80% by 2050 (IPCC, 2014).

## IPCC Special Report - Global Warming of 1.5 degrees, 2018

- 2.32 In between the usual 5-7 year cycle of IPCC Synthesis studies, the IPCC were invited by the United Nations Convention on Climate Change to produce a special report on the impacts of global warming of 1.5 degrees above pre-industrial levels, contained in the Decision of the 21st

Conference of Parties of the United Nations Framework Convention on Climate Change to adopt the Paris Agreement.

- 2.33 The IPCC reported that:

*'Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (high confidence)' (IPCC, 2018).*

- 2.34 Of most alarm, it was reported that since Kyoto, global carbon dioxide emissions have continued to rise. If this trend continues, then a 1.5°C rise will occur before 2040.

- 2.35 In the short space of three years between the Special Report and publishing of the IPCC's Working Group I (WGI) contribution to the Sixth Assessment Report (AR6) (Climate Change 2021), the situation is more certain:

- 'climate change is already affecting every inhabited region of the world, be this through hot extremes, heavy rain or drought';*

- 'global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO<sub>2</sub> and other greenhouse gas emissions occur in the coming decades';*
- 'with every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture';*
- 'projected changes in extremes are larger in frequency and intensity with every additional increment of global warming'; and*
- 'continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events'.*

- 2.36 However, the IPCC also report that reaching and sustaining net zero global anthropogenic CO<sub>2</sub> emissions as well as reducing non-CO<sub>2</sub> emissions would halt anthropogenic global warming on multi-decadal timescales in the short term. In the longer term, there is a need to go further and not only sustain net zero emissions

but establish net negative CO<sub>2</sub> emissions. This is to prevent further warming from feedback loops caused by the initial warming event (such as the release of methane caused by the melting of Arctic permafrost), and to reverse ocean acidification and minimise sea level rise.

2.37 Internationally, the Special Report has attracted a great deal of attention, particularly by the younger generation inspired by youth campaigner Greta Thunberg. This in turn has led to declarations of Climate Emergencies by nations, including the UK, and local authorities.

2.38 A Climate Emergency was declared by the UK Parliament on 1<sup>st</sup> May 2019, this was followed by a significant number of local government bodies. To date 337 local authorities have now declared a climate emergency (climateemergency.uk, 2022). Rushcliffe Borough Council signed the climate emergency on 7<sup>th</sup> March 2019. The regional and local context is discussed further from **Paragraph 2.42 on page 22**.

## Climate Change in the UK

2.39 An annual UK weather and climate report entitled 'State of the UK Climate' is produced every July by the Met Office and published by the Royal Meteorological Society. The latest, published in July 2021 (Kendon, et al., 2021), found that:

*'Year 2020 was third warmest, fifth wettest and eight sunniest on record for the UK. No other year has fallen in the top-10 for all three variables for the UK.'*

2.40 The State of the UK Climate report also found:

- *2020 was the third warmest year for the UK in a series from 1884;*
- *all the top 10 warmest years for the UK in the series from 1884 have occurred since 2002;*
- *2020 was the seventh consecutive year where the number of air and ground frosts was below the 1981–2010 average;*
- *heating degree days in 2020 were fifth lowest, and cooling and growing degree days equal-ninth/eighth highest, respectively for the UK in series from 1960;*

- *2020 was the UK's fifth wettest year in a series from 1862. 2020 also included the fifth wettest winter [and] the fifth driest spring;*
- *widespread and substantial snow events have occurred in 2018, 2013, 2010 and 2009, but their number and severity have generally declined since the 1960s; and*
- *2020 was the eighth sunniest year for the UK in a series from 1919, with 109% of the 1981–2010 average and 113% of 1961–1990 average sunshine hours.*

2.41 **Plate 2.2 on page 22**, produced by the University of Reading (Hawkins, 2020) and using UK Met Office Data illustrates the average annual UK temperature since 1884. Blues represent cool average temperatures, and reds represent warm average temperatures. The increase in average annual temperature is abundantly clear.

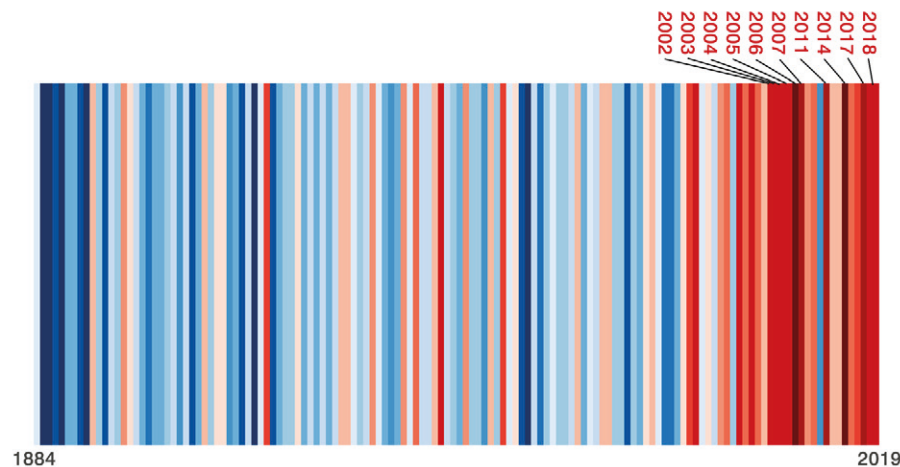


Plate 2.2 - UK Annual Temperature (Hawkins, 2020)

## Regional Context

- 2.42 The Fair Oaks Renewable Energy Park is located within the County of Nottinghamshire of England.
- 2.43 There have been a number of regionally focused studies on the effects of climate change. In 2011, Climate East Midlands published 'A Summary of the Local Climate Impacts Profile for Nottinghamshire'. The report states that the county covers some 850 square miles with a varying topography. This makes the county susceptible to all the main climate

change risks, excluding sea level rise. Key messages identified include:

- *Climate change is expected to increase the frequency and intensity of some of the extreme weather events which we already experience, such as heat waves, flooding and drought, though it may reduce the occurrence of severe winter cold spells.*
- *By helping us to understand our current vulnerability to severe weather, the [report] acts as a starting point for understanding our vulnerability to climate change.*

2.44 The County's approach at the time of publication is identified as being chiefly in response to emergencies - rather than preventative or adaptive actions.

2.45 The 'Ten Point Plan For Green Growth In The Midlands Engine' was published in July 2021 (Midlands Engine, 2021). The Midlands Engine is a multi sector partnership spanning 65 Local Authorities, one Combined Authority, 20 universities, nine Local Enterprise Partnerships and over 800,000 businesses.

2.46 It states:

*Our Ten Point Plan for Green Growth in the Midlands Engine sets out, with a unified voice, the Midlands Engine Partnership's collective plan: actions to be taken in partnership which will accelerate both the Midlands and the UK's path to net zero.*

2.47 The Plan seeks to address ten key sectors, setting out a roadmap for each:

- GREEN BUILDINGS  
Improve energy efficiency and decarbonise heat
- NET ZERO TRANSPORT

Lead the transition to reduce emissions	2.48	Through implementation of the plan, the partnership targets, by 2041, generation of 196 000 new jobs, 36% reduction in CO <sub>2</sub> emissions and more than £24billion in regional Gross Value Added (GVA) (the value generated by any 'unit' engaged in the production of goods and services).
• NATURE'S RECOVERY		
Protected and productive natural assets		
• BLUE-GREEN PLACES		
Where people and nature flourish	2.49	The plan clearly identifies the adaptive actions required regionally and the actions required across the ten points.
• LOW CARBON HYDROGEN		
Pioneer, commercialise and deliver hydrogen solutions	2.50	As stated at <b>Paragraph 2.38 on page 21</b> , Rushcliffe Borough Council declared a Climate Emergency in March 2019. In March 2020, the Council carried a motion to become net-zero carbon by 2030. Published in November 2021, Rushcliffe's <i>Climate Change Strategy 2021 - 2030</i> (Rushcliffe Borough Council, 2021) sets out how net zero will be achieved reporting a 18.2% reduction in its own emissions between 2008/9 and 2019.
• CLEAN ENERGY		
Sustainable energy generation and storage		
• SMART ENERGY		
Develop digital infrastructure to decarbonise		
• GREEN INNOVATION		
Green design and making for economic growth	2.51	The Rushcliffe Borough Council planning policy relative to climate change is discussed from <b>Paragraph 2.98 on page 29</b> .
• ENERGY WORKFORCE		
Highly skilled, inclusive and diverse		
• GREEN FINANCE		
Invest and enable to unlock opportunity		

## CLIMATE CHANGE POLICY

### International

- 2.52 Against the backdrop of evidence of global warming induced climate change, in 1992 the United Nations (UN) concluded that the impact of climate change was so serious that it was necessary for member nations to agree to a reduction in greenhouse gases. The United Nations Convention on Climate Change took place at the Rio Earth Summit. Following detailed cross-nation dialogue a treaty was agreed. The treaty came into effect in 1994.
- 2.53 The Kyoto Protocol was drawn up in 1997 to implement the UN Convention on Climate Change. Industrialised nations made the commitment to reduce their emissions of greenhouse gases by an average of 5.2% of 1990 levels during the period 2008-2012.
- 2.54 To reach a legally binding status, the Kyoto Protocol required the commitment of enough nations to account for at least 55% of the 1990 levels of greenhouse gas emissions. With the Russian government's



assent to the Agreement in 2004, the Kyoto Protocol was ratified in 2005 and became legally binding on those signatory nations. Countries accounting for over 63% of global CO<sub>2</sub> emissions have now signed to the agreement, binding 192 Countries plus the European Community as a regional member to the protocol.

2.55 If any of the Countries failed to meet their 2012 target, then the Protocol legally required them to make up the difference during the second commitment period after 2012 plus an additional 30% reduction penalty. All countries that participated in the first commitment period met their obligations.

2.56 Since Kyoto, the member states have regularly met to discuss progress at the Conference of the Parties (COP).

2.57 The second commitment period was negotiated in December 2012 at COP18 in Doha. Not all of the industrialised parties of the first commitment period committed to the second. However, the actions of the EU, Australia and Norway in committing to the second period ensured that the Kyoto Agreement remains in force. Of significance, COP18 also agreed to

provide developing countries with the assurance of funds to repair the 'loss and damage from climate change' (UNFCCC, 2012).

2.58 As of October 2020, 147 states have accepted the Doha Amendment. For the amendment to come into force, it needs to be accepted by 144 states. As such, the Amendment entered into force on 31<sup>st</sup> December 2020.

2.59 Negotiations for the post-2020 period resulted in the adoption of the Paris Agreement, which is a separate UN instrument rather than an amendment of Kyoto.

## *The Paris Agreement*

2.60 The Paris Agreement is arguably the most significant UN Framework Convention on Climate Change agreement since Kyoto.

2.61 It was negotiated by 196 states at COP21 near Paris and adopted on 12<sup>th</sup> December 2015. All UNFCCC members have signed the agreement and 189 have become party to it.

2.62 In line with the IPCC Special Report discussed from **Paragraph 2.32 on page 20**, the long-term temperature goal of the Paris Agreement is to limit

the global average temperature rise to 'well below 2 degrees Celsius above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 degrees Celsius'.

2.63 The operational details of the Paris Agreement were agreed at COP24, Poland in 2018.

## *COP26 Summit*

2.64 The 26th UN Climate Change Conference of the Parties (COP) summit took place in Glasgow from 31<sup>st</sup> October to 12<sup>th</sup> November 2021.

2.65 The UK Government in summarising the event (UK.GOV, 2021) state:

*The outcome includes a series of actions that all Parties are expected to take to accelerate their efforts. This includes:*

- *A stronger commitment to limit global temperature rises to 1.5 degrees, and greater acknowledgement of the latest science which reflects the urgent need to take action during this critical decade.*
- *The text includes 'phase-down of unabated coal power' and*

*'inefficient fossil fuel subsidies', as well as 'mid-century net zero'. This language has never been included in UN text before.*

- Parties are expected to revisit their 2030 emission reduction targets in 2022 and, where necessary, strengthen them to bring them in line with the Paris Agreement temperature goal.

## The UK Response

2.66 The United Kingdom have been at the forefront of climate change policy with the production of the first IPCC report and the formation of the UN Convention on Climate Change. From 1997, the 12% emissions reduction target required by the EU was extended by the Government to a national 20% emissions reduction by 2012. This was later reinforced through the announcement of the aspiration to reduce CO<sub>2</sub> levels by 60% of their 1990 levels by 2050.

### *Climate Change Act 2008*

2.67 The Climate Change Act 2008 sets a legal duty on the Secretary of State to reduce greenhouse gas emissions by 2050.

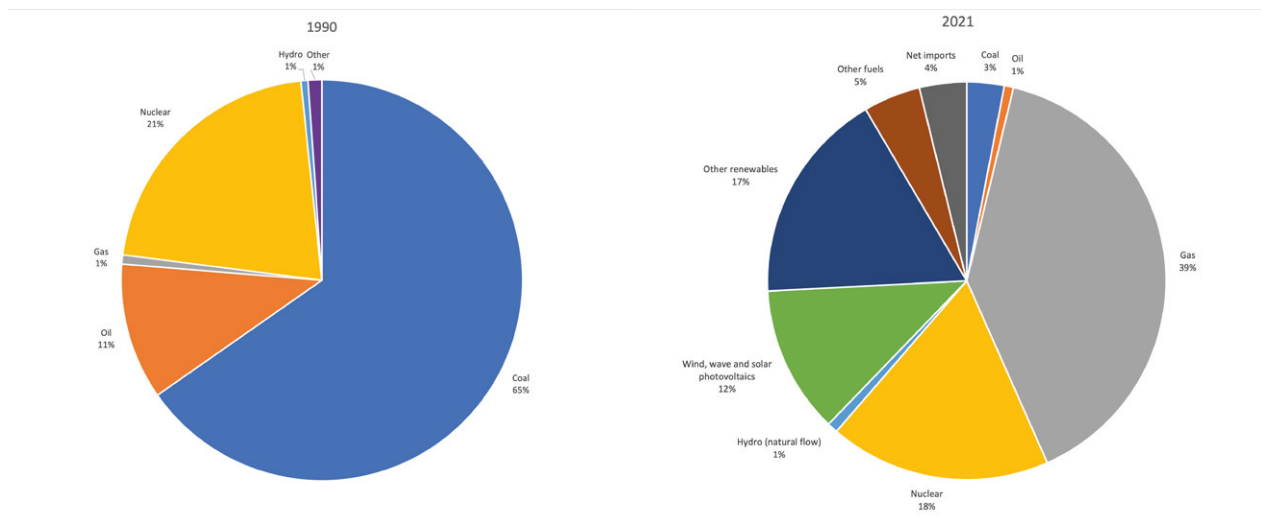


Plate 2.3 - 1990 Electricity Fuel Mix compared to 2020 Electricity Fuel Mix

(Source: Digest of UK Energy Statistics (DTI, 2000)(BEIS, 2022a)

2.68 At the time of Royal Assent, the Act set the target for greenhouse gas emissions to be 80% lower than 1990 levels by 2050. The Act also set an interim target of a 34% reduction by 2020.

2.69 Through the Climate Change Act, the UK has made significant progress in the electricity sector. This is illustrated in **Plate 2.3** which compares the most recent fuel mix data (2020) to that of 1990.

2.70 This illustrates the significant decline of coal fired generation and the increase of renewable generation from near zero to 31% (14% wind, wave and PV; 14% other including thermal from waste). It also demonstrates an increased reliance on natural gas generation from 1% to 36%.

2.71 The success of the power sector is largely due to binding targets set through a mechanism called the Renewables Obligation (requiring 10% of generation to be from renewables

by 2010, 15% by 2015 and then 30% by 2020) and later Feed-in Tariffs and Contracts for Difference.

2.72 The Climate Change Act is managed through a series of rolling five year carbon budgets and associated interim targets. The Fifth Carbon Budget was passed in 2016. This recommended that annual emissions be limited to an average of 57% below 1990 levels by 2032.

2.73 The carbon budget is established by the Climate Change Committee, an independent body formed under the Climate Change Act to advise the UK and devolved Governments and Parliaments on tackling and preparing for Climate Change. The advice is considered by Parliament and, if accepted, the resultant targets are adopted.

2.74 The carbon budget is formed through careful consideration of cross-sector emissions including power, buildings, industry, transport, agriculture, land use, forestry, waste and fluorinated gases.

2.75 For the 2015 budget the Committee produced a specific power sector report entitled 'Sectoral Scenarios for

the Fifth Carbon Budget' (October 2015). This report found:

- up to 200TWh of new generation will be needed in the 2020s to replace generation from retiring coal and nuclear capacity and to meet increases in energy demand during this time. The 2020s are a crucial decade for the power sector;
- low carbon generation is likely to be cost-competitive and can be delivered without subsidy. This is true even when these projects face the full cost of intermittency; and
- low carbon options '*represent good value investments for a society committed to climate targets and are included in our scenarios: onshore wind and ground mounted solar from the first half of the decade and nuclear, offshore wind and potentially carbon capture and storage in the second half of the decade*'.

## Net Zero

2.76 On 27<sup>th</sup> June 2019, the Government formally amended the target within the Climate Change Act as follows:

*'It is the duty of the Secretary of State to ensure that the net UK carbon account for the year 2050 is at least 100% lower than the 1990 baseline.'*

2.77 The United Kingdom is the first member of the G7 group of industrialised nations to legislate for net zero emissions.

2.78 To put into context the challenge of meeting Net Zero, the Climate Change Committee report that the UK emissions were 44% below 1990 levels in 2018. The first (2008-2012) and the second (2013-2017) carbon budgets were met and the UK is on track to meet the third (2018-2022) carbon budget. However, the Country is not on track to meet the fourth, which covers the period 2023 to 2027.

2.79 The Committee report that:

*'Meeting future carbon budgets and the UK's 2050 target to reduce emissions by at least 100% of 1990 levels will require reducing domestic emissions by at least 3% of 2018 emissions, that*

- is 50% higher than under the UK's previous 2050 target and 30% higher than achieved on average since 1990. This is an indication of how substantial the step up in action must be to cut emissions in every sector' (CCC, 2019a).*
- 2.80 In their advice to Government on implementing a 100% net zero target, in May 2019 the Committee published '*Net Zero - The UK's contribution to stopping global warming*' (CCC, 2019b).
- 2.81 This report recognises the foundations that are in place to deliver the previous 80% reduction target and describes the '*technically feasible but highly challenging*' '*further ambitions*' that must be achieved to reach 100% or Net Zero.
- 2.82 All sectors must play a role and it is recognised that societal changes addressing our habits and the way that we do things need to collectively happen to achieve Net Zero. These measures include:
- resource and energy efficiency;
  - societal choices to less carbon intensive activities, such as
- reduction in the consumption of meat;
  - extensive electrification, particularly of transport and heating, supported by a major expansion of renewable and low carbon power generation;
  - development of a hydrogen economy;
  - Carbon Capture and Storage; and
  - better land use with more emphasis on carbon sequestration and biomass production.
- 2.83 The measures above require a doubling of electricity demand, with all power produced from low-carbon sources.
- 2.84 To set the path to Net Zero, the Climate Change Committee published '*Policies for the Sixth Carbon Budget and Net Zero*' in December 2020 (CCC, 2020). The Committee state that this Sixth Budget is '*the most comprehensive advice we have ever produced*'. The Sixth Budget became law under the Carbon Budget Order 2021 on 24<sup>th</sup> June 2021, in advance of the UK hosting the 26<sup>th</sup> Climate Conference, COP26.
- 2.85 As well as the most comprehensive, it is also their most ambitious. The recommended pathway requires a 78% reduction in UK territorial emissions between 1990 and 2035 – bringing forward the UK's previous 80% target by almost 15 years. Indeed, this meets the 'highest possible ambition' scenario of the Paris Agreement.
- 2.86 To set the economic context for the Sixth Carbon Budget, the Committee highlight how the economic and social context for climate action has changed in important ways since the UK set the 2050 Net Zero target. The COVID-19 pandemic has significantly changed the economic backdrop in the UK and globally. Employment, GDP and business investment have all fallen, despite record low interest rates. The Committee state that increasing investment in green jobs could support the UK's recovery.
- 2.87 This is in line with the Prime Minister's 10 Point Green Plan (HM Government, 2020), which amongst other things seeks to increase sustainable generation, and accelerate the shift to electric vehicles, green public transport and green buildings.

2.88 The Sixth Carbon Budget requires action across four key areas:

- Reducing demand for carbon-intensive activities (shifting diets away from meat and dairy; reducing waste; slower growth in flights and travel demand; improved efficiency of buildings, vehicles and industry);
- Take up of low-carbon solutions (by the early 2030s all new cars and vans and all boiler replacements in homes and other buildings must be low carbon – largely electric; by 2040s all HGVs are to be electric or hydrogen powered);
- Expand low carbon energy supplies (low carbon electricity is now cheaper than high-carbon; electricity demand rises 50% to 2035, doubling or even trebling by 2050; low carbon hydrogen scales up); and
- Land (and removals) (planting of 440 000ha of mixed woodland; 260 000ha of agricultural land shifts to bioenergy production, including short rotation forestry; peatland restored and low carbon farming adopted. By 2035

bioenergy, using UK biomass, with Carbon Capture Storage will deliver removals of CO<sub>2</sub> at scale).

2.89 The Sixth Carbon Budget ties in with the Energy White Paper (December 2020), the Government Response to the Future Homes Standard (January 2021) (MHCLG, 2021a) and the 10 Point Green Plan. With all new cars and vans to be fully electric from 2030 and heating in new homes to be non-fossil from 2025, electricity demand is set to increase from c. 300TWh today, to 360TWh in 2030, 460TWh in 2035 and 610TWh in 2050. In addition to this, to produce hydrogen for transport, an additional 120TWh is required in 2050.

2.90 Renewable energy and battery storage (to manage variability) are key components of this drive. The Climate Change Committee's Net Zero scenario expects 80% of electricity to be supplied by renewable energy, of which wind will contribute 125GW and solar 85GW. Whilst the offshore resource will provide a significant portion of this, the Energy White Paper states that:

*'Onshore wind and solar will be key building blocks of the future generation*

*mix, along with offshore wind. We will need sustained growth in the capacity of these sectors in the next decade to ensure that we are on a pathway that allows us to meet net zero emissions in all demand scenarios'.*

2.91 The Government published their 'Net Zero Strategy: Build Back Greener' (DBEIS, 2021b), which is aimed at following a path over the next three decades to avoid catastrophic climate change. The Government see the present challenge to meet Net Zero by 2050 as offering opportunity for a green industrial revolution. For power this means a fully decarbonised power system, including more solar energy.

2.92 The Net Zero Strategy also provides policies in relation to decarbonising industry, heat and buildings, transport, natural resources, waste and fluorinated gases, and greenhouse gas removals.

2.93 The top two commitments for power in the strategy are:

- *take action so that by 2035, all our electricity will come from low carbon sources, subject to security of supply, bringing forward the government's commitment to*



*a fully decarbonised power system by 15 years; and*

- *accelerate deployment of low-cost renewable generation, such as wind and solar through the Contracts for Difference scheme by undertaking a review of the frequency of the CfD auctions.*

2.94 The Net Zero Strategy highlights that *'solar and wind power are now cheaper than new coal and gas power plants in two-thirds of the world'*. It is also acknowledged that following the path to Net Zero will provide a significant number of jobs and economic benefit for consumers and the country.

2.95 Most recent advice on the achieving net gain comes from the All-Party Parliamentary Group (APPG), Net Zero Roadmap (2021). The Net Zero APPG has brought together key opinion formers and decision makers including the Climate Change Committee, parliamentarians from across the political spectrum and high-level support from industry leaders and academic experts to contribute to the Net Zero Roadmap and further influence policy to help accelerate progress and embed

net zero solutions for business and consumers alike.

2.96 The report is clear that Net Zero must be at the heart of all future policy accelerated through a cultural change. During preparations of the report evidence was given, and regret expressed, about the lack of long-term climate goals being incorporated into the 'build back better' response to the Covid-19 pandemic. The APPG stress that there are many opportunities for decarbonising the energy sector which must be taken simultaneously in order to achieve Net-Zero in time.

### *Renewable Energy Planning Policies*

2.97 The Planning Statement submitted in support of the application discusses the planning policy position in detail. However, it is important to note that policy in relation to renewable energy is derived in the context of the identified need to decarbonise the energy system.

2.98 The National Planning Policy Framework (NPPF) (MHCLG, 2021b) provides the current legal basis and guidance for determining planning applications. Paragraph 158 of the

NPPF advises that local planning authorities should:

*'a) not require applicants for energy development to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*

*b) approve the application if its impacts are (or can be made) acceptable<sup>54</sup>. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should also expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas'.*

(Note: Footnote 54 does not apply to solar projects and so is not considered further in this Chapter).

2.99 In other words, against the backdrop identified in this chapter, the need for renewable and low carbon energy is established.

## The Rushcliffe Borough Council Response

2.100 Rushcliffe Borough Council declared a Climate Emergency in March 2019 five years after the current local plan was adopted. It is therefore expected that the required actions to resolve the climate emergency will be more strongly reflected in the emerging Greater Nottingham Strategic Plan. However, there are two Core Strategy Policies relating to climate change in the current local plan (Rushcliffe Borough Council, 2014).

2.101 POLICY 1 PRESUMPTION IN FAVOUR OF SUSTAINABLE DEVELOPMENT states:

*"the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework."*

2.102 POLICY 2 CLIMATE CHANGE states

*"All development proposals will be expected to mitigate against and adapt to climate change, and to comply with national and local targets on reducing carbon emissions and energy use, unless it can be clearly demonstrated*

*that full compliance with the policy is not viable or feasible."*

2.103 The policy goes on to refer to renewable energy specifically under section 3 - Reducing Carbon dioxide emissions:

*Development should demonstrate how carbon dioxide emissions have been minimised in accordance with the following energy hierarchy:*

*a) Using less energy through energy efficient building design and construction, including thermal insulation, passive ventilation and cooling;*

*b) Utilising energy efficient supplies, including connection to available heat and power networks;*

*c) Maximising use of renewable and low carbon energy systems.*

2.104 The policy then goes on to refer specifically to renewable energy generation in its own right under section 5 - Decentralised, Renewable and Low Carbon Energy Generation:

*The extension of existing or development of new decentralised, renewable and low-carbon energy schemes appropriate for Rushcliffe will be*

*promoted and encouraged, including biomass power generation, combined heat and power, wind, solar and micro generation systems, where these are compatible with environmental, heritage, landscape and other planning considerations. In line with the energy hierarchy, adjacent new developments will be expected utilise such energy wherever it is feasible and viable to do so.*

2.105 Policy 16 Renewable Energy of Land and Planning Policies Document details further when a renewable energy proposal would be deemed acceptable:

*1. Proposals for renewable energy schemes will be granted planning permission where they are acceptable in terms of:*

*a) compliance with Green Belt policy;*

*b) landscape and visual effects;*

*c) ecology and biodiversity;*

*d) best and most versatile agricultural land;*

*e) the historic environment;*

- f) open space and other recreational uses;
  - g) amenity of nearby properties;
  - h) grid connection;
  - i) form and siting;
  - j) mitigation;
  - k) the decommissioning and reinstatement of land at the end of the operational life of the development;
  - l) cumulative impact with existing and proposed development;
  - m) emissions to ground, water courses and/or air;
  - n) odour;
  - o) vehicular access and traffic; and
  - p) proximity of generating plants to the renewable energy source.
- 2.106 The Ruddington Neighbourhood Plan Policy 17 Sustainable Design refers to the policy providing a
- “...response at the village level to that declaration and seeks to contribute towards the Borough Council and government’s work to encourage local action against climate change.”*
- 2.107 The policy focusses on the delivery of sustainable buildings.
- 2.108 The Fair Oaks Renewable Energy Park extends into the furthest extent of Gotham Parish and Barton in Fabis Parish where the boundary extends east over Fairham Brook.
- 2.109 The Gotham Neighbourhood Plan refers to sustainable transport but has no other specific policies associated with reducing carbon emissions or the adaption to climate change.
- 2.110 A complete discussion of the relevant planning policies to the Proposal, at National and Local level, is contained in the Planning Statement submitted alongside this Environmental Statement.

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## INTRODUCTION AND POLICY BACKGROUND

3.1 This chapter discusses the site selection process undertaken to identify the Fair Oaks Renewable Energy Park location, and the evolution of the site layout throughout the EIA process. Following an outline of the background policy relevant to site selection and design, this chapter considers the specific site design

criteria that are presented across the various applicable national policies and local policies and guidance provided by Rushcliffe Borough Council.

3.2 The site design criteria considered within this chapter are derived from the combined current applicable policies, alongside standard industry practice.

### National Policy and Guidance

3.3 The site design criteria considered within this chapter is formed via a combination of applicable guidance from each of the relevant policies to solar energy and infrastructure development. Guidance was taken from the NPPF, NPPG, NPS EN-1 and NPS EN-3. The main planning and environmental issues identified in planning policy for the selection of solar energy and Battery Energy Storage System (BESS) sites are discussed in the following sections.

### National Planning Policy Framework (NPPF)

3.4 The National Planning Policy Framework (NPPF) (MHCLG, 2021a) requires local planning authorities to:

*'help increase the use and supply of renewable and low carbon energy and heat, plans should:*

*a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*

*b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and ...' (Paragraph 155).*

3.5 The NPPF continues in Paragraph 158 to state:

*'When determining planning applications for renewable and low carbon development, local planning authorities should:*

*a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and*

*b) approve the application if its impacts are (or can be made) acceptable. Once*



*suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.'*

## National Planning Policy Guidance (NPPG)

3.6 National Planning Practice Guidance (NPPG) was published as an online resource by the Department of Communities and Local Government in March 2014. Each part of the guidance is updated as necessary. At the time of writing, the last update made was 24<sup>th</sup> June 2021 (MHCLG, 2021b), but the section for renewable and low carbon energy has not been updated since it was first published in 2015.

3.7 The National Guidance suggests that the key determining factors for identifying suitable locations for renewable energy schemes are:

- Neighbourhood Plans - 'The National Planning Policy Framework explains that all

*communities have a responsibility to help increase the use and supply of green energy, but this does not mean that the need for renewable energy automatically overrides environmental protections and the planning concerns of local communities'* [Paragraph Reference ID: 5-003-20140306];

- Landscape Character - 'In considering impacts, assessments can use tools to identify where impacts are likely to be acceptable. For example, landscape character areas could form the basis for considering which technologies at which scale may be appropriate in different types of location' [Paragraph Reference ID: 5-005-20150618]; and
- Cumulative impacts, local topography, heritage assets and local amenity [all mentioned at Paragraph Reference ID: 5-007-20140306].

3.8 However, 'Local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation

*distances'* [Paragraph Reference ID: 5-008-20140306].

3.9 The NPPG then goes on to consider the particular requirements for specific renewable energy technologies. For large scale ground mounted solar it states:

*'The deployment of large-scale solar farms can have a negative impact on the rural environment, particularly in undulating landscapes. However, the visual impact of a well-planned and well-screened solar farm can be properly addressed within the landscape if planned sensitively.*

*Particular factors a local planning authority will need to consider include:*

- *encouraging the effective use of land by focussing large scale solar farms on previously developed and non agricultural land, provided that it is not of high environmental value;*
- *where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to*



higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays. See also a speech by the Minister for Energy and Climate Change, the Rt Hon Gregory Barker MP, to the solar PV industry on 25 April 2013 and written ministerial statement on solar energy: protecting the local and global environment made on 25 March 2015;

- that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use;
- the proposal's visual impact, the effect on landscape of glint and glare (see guidance on landscape assessment) and on neighbouring uses and aircraft safety;
- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun;

- the need for, and impact of, security measures such as lights and fencing;
- great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large scale solar farms on such assets. Depending on their scale, design and prominence, a large scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset;
- the potential to mitigate landscape and visual impacts through, for example, screening with native hedges;
- the energy generating potential, which can vary for a number of reasons including, latitude and aspect.

*The approach to assessing cumulative landscape and visual impact of large*

*scale solar farms is likely to be the same as assessing the impact of wind turbines. However, in the case of ground-mounted solar panels it should be noted that with effective screening and appropriate land topography the area of a zone of visual influence could be zero' [Paragraph Reference ID: 5-013-20150327].*

### *National Policy Statements (NPS)*

- 3.10 In addition to the NPPF and NPPG, the National Policy Statements are also relevant in determining energy infrastructure projects. These documents include the Overarching National Policy Statement for Energy (EN-1) and the National Policy Statement for Renewable Energy (EN-3) (DECC, 2011a and 2011b; DBEIS, 2021).
- 3.11 Although there is no specific section within EN-3 for solar farms, guidance aimed at other technologies is considered applicable. The relevant topics and policy extracts to the Proposal are provided in the following paragraphs.

- Landscape and visual amenity:

*'Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology'* [Paragraph 2.4.2];

- Grid connection:

*'The connection of the proposed onshore wind farm into the relevant electricity network will be an important consideration for applicants...'* [Paragraph 2.7.8];

- Access:

*'Applicants will need to consider the suitability of the access routes to the proposed site for both the construction and operation...'* [Paragraph 2.7.10];

- Flexibility and Micrositing:

*'Flexibility in the project details should be allowed for in consent'* [from Paragraph 2.7.18]; and

*'Applicants are likely to need flexibility in a project consent to allow for any necessary micrositing of elements of the proposed wind farm after its consent and during its construction. This allows for unforeseen events which may arise.'* [Paragraph 2.17.23].

## *Revised National Policy Statements (2021)*

3.12 The Government has published a series of draft updates to the National Policy Statement documents.

3.13 A draft update to the National Policy Statement for Renewable Energy Infrastructure (EN-3) was published in September 2021. The consultation on the draft document closed on 30<sup>th</sup> November 2021.

3.14 This has not yet been adopted as formal policy, but the comprehensive section on solar photovoltaic generation provides the latest governmental thinking with respect to solar guidance.

3.15 Draft EN-3 lists the following factors that it considers will influence site selection by applicants:

- Irradiance and Site Topography:

*'Irradiance will be a key consideration for the applicant in identifying a potential site as the amount of electricity generated on site is directly affected by irradiance levels. Irradiance of a site will in turn be affected by surrounding topography, with an uncovered or exposed site of good elevation and*

*favourable south-facing aspect more likely to increase year-round irradiance levels. This in turn affects the carbon emission savings and the commercial viability of the site';*

- Proximity of a site to dwellings, with consideration to visual amenity and glint and glare;
- Capacity of a site:

*'Site layout must be designed so as to maximise irradiance levels, and the panel array spacing should also seek to maximise the potential power output of the site.'* *'The combined capacity of the installed inverters (measured in AC) should be used for the purposes of determining solar site capacity.'*

- Grid Connection:

*'The connection voltage, availability of network capacity, and the distance from the solar farm to the existing network can have a significant effect on the commercial feasibility of a development proposal. The applicant may choose a site based on nearby available grid export capacity. Locating solar farms at places with grid connection capacity enables the applicant to maximise existing grid infrastructure, minimise disruption to local community*

*infrastructure or biodiversity and reduce overall costs. Where this is the case, consideration should be given to the cumulative impacts of situating a solar farm in proximity to other energy generating stations and infrastructure.’;*

- Agricultural land classification and land type:

*‘Where possible, ground mounted Solar PV projects should utilise previously developed land, brownfield land, contaminated land, industrial land, or agricultural land preferably of classification 3b, 4, and 5 (avoiding the use of “Best and Most Versatile” cropland where possible). However, land type should not be a predominating factor in determining the suitability of the site location.’;*

- Accessibility:

*‘Applicants will need to consider the suitability of the access routes to the proposed site for both the construction and operation of the solar farm with the former likely to raise more issues. Given that potential solar farm sites are largely in rural areas, access for the delivery of solar arrays and associated infrastructure during construction can*

*be a significant consideration for solar farm siting’.*

3.16 The draft NPS also provides technical design considerations for the secretary of state, including:

- Access tracks: applications should include the full extent of the access routes for operation and maintenance;
- Layout design and appearance: consideration of the site layout including levels of irradiance, proximity to available grid, predominance of open land, topography, previous land use and ability to mitigate environmental impacts and any flood risk;
- Public Rights of Way: developers are encouraged to design the layout and appearance of the site to ensure continued recreational use of public rights of way, and to minimise as much as possible the visual outlook from existing footpaths;
- Security and lighting: perimeter security measures such as fencing, electronic security, CCTV and lighting may be needed. Issues

relating to intrusion from CCTV and light pollution in the vicinity of the site should be assessed;

- Project lifetimes: solar panel efficiency deteriorates over time and applicants may elect to replace panels during the lifetime of the site. Applicants may apply for consent for a specified period, based on the design life of the panels. Such consent, where granted, is described as temporary because there is a finite period for which it exists, after which the project would cease to have consent and therefore must seek to extend the period of consent or be decommissioned and removed;
- Flexibility: flexibility will be needed in relation to the dimensions of the panels and their layout and spacing.

3.17 Through an iterative considered approach to site design that inherently mitigates potential impacts wherever possible, the Proposal ensures full compliance with this guidance and consequently adheres to the spirit of EN-3.

## Rushcliffe Borough Policy and Guidance

3.18 Rushcliffe Borough Council's Adopted Local Plan is divided into five separate documents. Most notable for this proposal are 'Local Plan Part 1: Core Strategy' (RBC, 2014), which sets out the strategic approach to development and identifies the main strategic sites, and 'Local Plan Part 2: Land and Planning Policies' (RBC, 2019).

3.19 **Policy 2 - Climate Change** of the Local Authority's core strategy document shows support for renewable and low carbon energy generation, stating that:

*'The extension of existing or development of new decentralised, renewable and low-carbon energy schemes appropriate for Rushcliffe will be promoted and encouraged, including biomass power generation, combined heat and power, wind, solar and micro generation systems, where these are compatible with environmental, heritage, landscape and other planning considerations.'* (RBC, 2014).

3.20 In terms of detailed policies, **Policy 16 - Renewable Energy** provides the most relevant guidance relating to solar energy development:

*'Proposals for renewable energy schemes will be granted planning permission where they are acceptable in terms of:*

*a) compliance with Green Belt policy;*

*b) landscape and visual effects;*

*c) ecology and biodiversity;*

*d) best and most versatile agricultural land;*

*e) the historic environment;*

*f) open space and other recreational uses;*

*g) amenity of nearby properties;*

*h) grid connection;*

*i) form and siting;*

*j) mitigation;*

*k) the decommissioning and reinstatement of land at the end of the operational life of the development;*

*l) cumulative impact with existing and proposed development;*

*m) emissions to ground, water courses and/or air;*

*n) odour;*

*o) vehicular access and traffic; and*

*p) proximity of generating plants to the renewable energy source.'* (RBC, 2019).

3.21 Rushcliffe Borough Council forms part of the Greater Nottingham Partnership. Work is ongoing on the preparation of statutory strategic development plans to provide a coherent policy framework across Greater Nottingham. However, the emerging documents are still undergoing consultation and will not be considered further in this application.

3.22 Rushcliffe Borough Council is currently developing a Climate Change Strategy 2021 - 2030. The document confirms the Council's commitment to 'work towards becoming carbon neutral by 2030 for its own operations' and 'ensure the whole of Rushcliffe Borough will be Net Zero for our emissions by 2050 in line with government outcome from COP26' (RBC, 2021).

3.23 The proposed site is covered by the Ruddington Neighbourhood Plan (Ruddington Parish Council, 2021), which promotes renewable energy

development in the area, particularly in the context of business parks and community led renewable energy production.

- 3.24 The Fair Oaks Renewable Energy Park extends into the furthest extent of Gotham Parish and Barton in Fabis Parish. The boundary also extends into Gotham Parish to the south of Fairham Brook in the final design, although this area will be used for mitigation and no plant nor machinery will be located here.
- 3.25 The Gotham Neighbourhood Plan refers to sustainable transport but has no other specific policies associated with reducing carbon emissions or the adaption to climate change.
- 3.26 A complete discussion of the relevant planning policies to the Proposal, at National and Local level, is contained in the **Planning Statement** submitted alongside this Environmental Statement.

## ENVIRONMENTAL CONSIDERATIONS

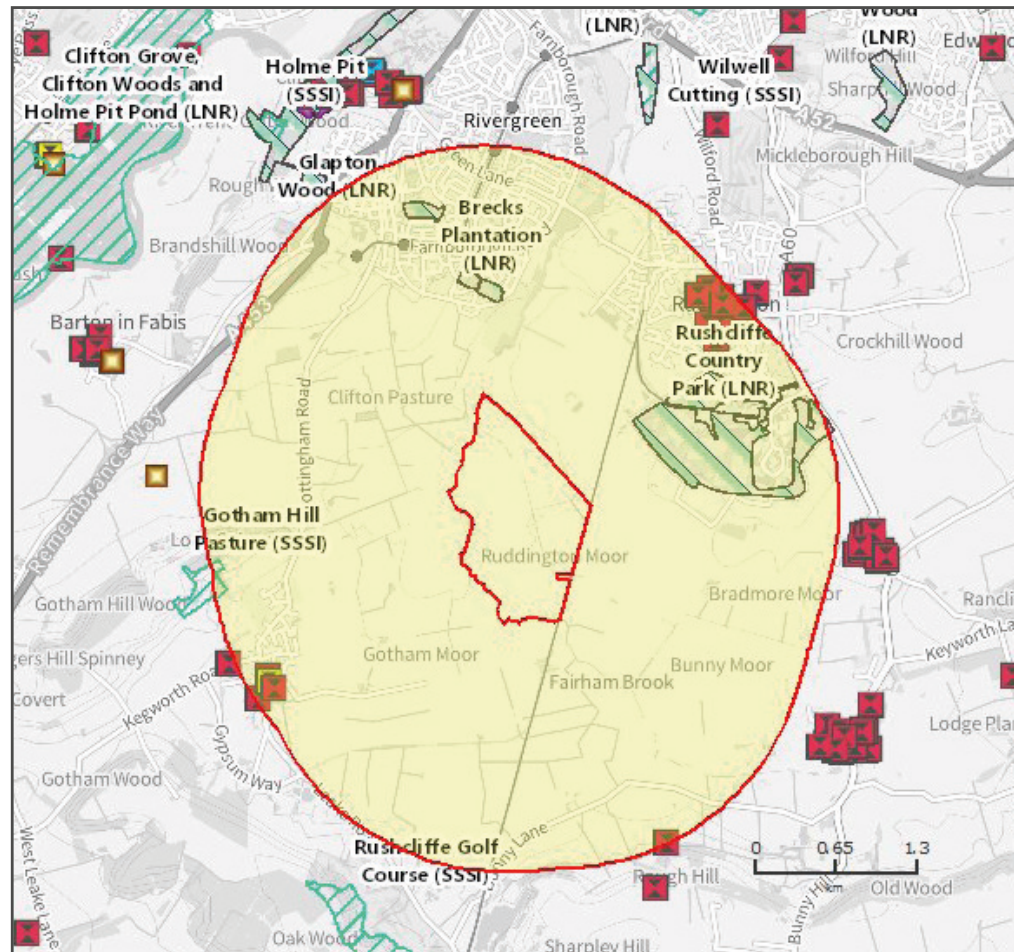
### Designations

- 3.27 In selecting the potential renewable energy park site, the developer considered the proximity to designated sites within the locality, including:
  - Areas of Outstanding Natural Beauty (AONB);
  - National Nature Reserves (NNR);
  - Local Nature Reserves (LNR);
  - National Parks;
  - Ramsar sites and Special Protection Areas (SPA);
  - Registered Parks and Gardens (RPG);
  - Scheduled Ancient Monuments (SAM);
  - Sites of Special Scientific Interest (SSSI);
  - Special Areas of Conservation (SAC);
  - World Heritage Sites; and

- Registered Battlefields.

- 3.28 Data for these designations were obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC) database.
- 3.29 There are no designations within the initial proposed site boundary. The following designations can be found within 2km of the site boundary (**Plate 3.1 on page 44**), with the approximate distances given from the initial site boundary at the closest point:
  - Gotham Hill Pasture Site of Special Scientific Interest (SSSI) - c. 1.9km west;
  - Three Local Nature Reserves:
    - Rushcliffe Country Park LNR - c. 670m east;
    - Brecks Plantation LNR - c. 790m north;
    - Glapton Wood LNR - c. 1.5km north;
  - Listed Buildings, including:
    - Church of St Lawrence (GI) - c. 1.8km south-west; and





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- |                           |                                       |                        |
|---------------------------|---------------------------------------|------------------------|
| ⌚ North                   | 🏠 Grade II Listed Building            | 🏛️ Scheduled Monument  |
| 🏠 Grade I Listed Building | 🌿 Site of Special Scientific Interest | 🌿 Local Nature Reserve |

Plate 3.1 - Designations within 2km of the Initial Development Site Boundary

- 14 GII Listed Buildings, predominately within the settlements of Ruddington and Gotham.

3.30 There are no local landscape designations covering the proposed site area. Further consideration is given to landscape related designations in the wider area around the proposed site in **Chapter 9 - Landscape and Visual Impact Assessment**.

3.31 There are no AONB, NNR, National Parks, SPA, Ramsar sites, Registered Parks and Gardens, SAM, SAC, Registered Battlefields or World Heritage Sites within 2km of the site. Designations within the search area are discussed further within **Chapter 4 - Existing Conditions** and full search results are at **Appendix 4.2**.

## Screening

3.32 The existing (limited) field boundary vegetation is an important consideration for the site design, as it has the potential to mitigate landscape and visual impacts if restored and improved. It is proposed that as part of the development existing hedgerows will be retained and improved. Substantial lengths of new hedgerows will be planted on

site as part of the Outline Landscape and Biodiversity Mitigation and Enhancement Plan (**Figure 8.3**).

3.33 Mitigation and enhancement elements are discussed further in **Chapter 8 - Ecology** and **Chapter 9 - Landscape and Visual Impact Assessment** and a detailed LBMEP will be secured by way of planning condition and will be agreed with Rushcliffe Borough Council.

## Ecology

3.34 As discussed from **Paragraph 3.27 on page 43** and as discussed further in **Chapter 8 - Ecology**, there are no ecological designations on the site but three Local Wildlife Sites in close proximity:

- West Rushcliffe District Disused Railway – adjacent to the eastern edge of the proposed development;
- Ruddington Moor Drain – approximately 180m north-east from the fenced development area; and
- Fairham Brook Nature Reserve – 440m north from the Proposal at the proposed grid connection location.

3.35 The site design has ensured that only lower quality habitats would be affected. Appropriate separation distances have been applied from ecological features such as watercourses and hedgerows contained in and around the site.

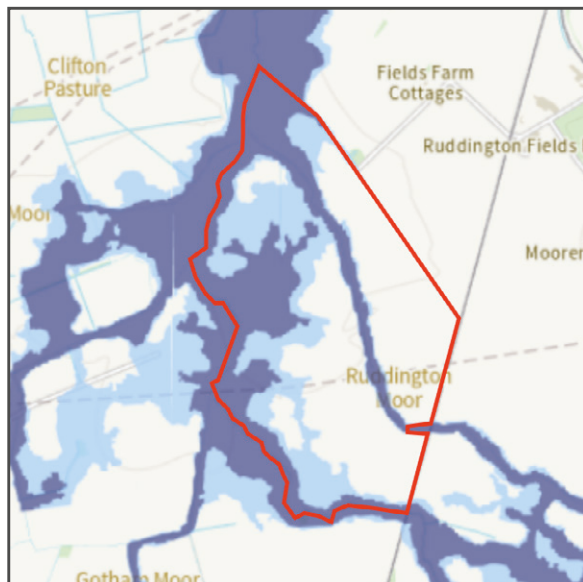
## Flood Risk

3.36 According to the NPPG, a sequential approach should be taken when designing individual projects, such that areas of lower flood risk are utilised in preference to land at higher risk of flooding where possible.

3.37 Overarching National Policy Statement for Energy, EN-1 (DECC, 2011a), advises that all applications for energy projects of 1ha or greater located in Flood Zone 1, and all proposals in Flood Zone 2 and 3, should be accompanied by a flood risk assessment.

3.38 As shown at **Plate 3.2**, the majority of the initial site boundary lies within Flood Zone 1, although Flood Zones 2 and 3 are also present within the site area, particularly on areas adjacent to the watercourses and drainage ditches crossing and bordering the site.

3.39 Solar panels, BESS modules and associated infrastructure have been sited on Flood Zone 1 areas wherever possible, in preference to areas of higher flood risk. Additionally, a minimum 9m buffer has been applied along the Fairham Brook flowing through the site and a minimum 5m buffer from all other watercourses/drainage ditches.



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Plate 3.2 - Flood Risk from Rivers or the Sea  
(Initial site boundary outlined in red; Flood Zone 1 - unshaded; Flood Zone 2 - shaded light blue; Flood Zone 3 - shaded dark blue)

40 Four transformer units have been located for engineering reasons within areas identified as subject to 1 in 100 annual exceedance probability (with climate change considerations) these will be elevated slightly above ground level on an open framework such that there is a 600mm separation between the calculated flood levels and the base of the equipment. A full Flood Risk and Surface Water Drainage assessment accompanies the planning application.

## Cultural Heritage

3.41 The NPPG states:

*'great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large scale solar farms on such assets. Depending on their scale, design and prominence, a large scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset'* [Paragraph Reference ID: 5-013-20150327].

3.42 As shown in **Plate 3.1 on page 44**, there are no Scheduled Monuments, World Heritage Sites, Registered Battlefields or Registered Parks and Gardens within the site or its immediate vicinity.

3.43 There are no listed buildings within the site area. In the wider 2km study area, listed buildings are located within the settlements of Ruddington and Gotham. As such, any potential views will be screened by built form and intervening landscape. A detailed heritage assessment considering potential archaeological features and built assets accompanies the planning application.

## TECHNICAL CONSIDERATIONS

3.44 The initial suitability of the landholding for a renewable energy park and the initial site design, within the boundaries of the landholding, was based on consideration of the following technical and environmental constraints and as guided by industry best practice, the NPPF, NPPG and National Policy Statements (EN-1 and EN-3).

## Land Availability and Existing Use

- 3.45 Initially, the developer identified a site with grid capacity for a solar farm and sufficient import capacity to support the charging of a BESS. More detailed environmental constraints were applied to these initial areas of interest to refine the potentially suitable host land. Interest of the relevant landowners was established and then detailed site surveys were commenced.
- 3.46 Discussions and knowledge sharing with the landowners has been instrumental in the development of the solar farm design from the initial stages, largely with respect to ensuring that plant and equipment are positioned so as to relate adequately to existing and future planned agricultural activities.

## Agricultural Land Quality

- 3.47 As noted at **Paragraph 3.9 on page 38**, the NPPG asks Local Authorities to consider the quality of land upon which the renewable energy park is proposed, as well as how the land can support agricultural use in the future.

- 48 The recent draft National Policy Statement for Renewable Energy (NPS-EN3)(DBEIS, 2021) states that; *'...land type should not be a predominating factor in determining the suitability of the site location'*.
- 3.49 A full consideration of current Agricultural Land Quality and also of soil quality after the life of the project was considered and is provided in the ALC report included within **Chapter 4 - Existing Conditions**.

## Temporary Structures

- 3.50 Guidance discusses that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use. The same principle applies to BESS infrastructure.
- 3.51 This was reflected in the initial and subsequent site designs, using modular units and minimal concrete, allowing the site to be decommissioned and removed at the end of its operating life. The site would return to agricultural use with the soils having benefited from being

rested from intensive production in the intervening years.

## Glint/Glare

- 3.52 The proposal is not located near any aerodromes and there are limited residential receptors and highways in the vicinity of the site. As a ground mounted scheme with panels up to an angle of 20-25 degrees and with some screening by hedgerows, glint and glare effects were considered unlikely. A full Glint and Glare assessment of the final layout accompanies the planning application.

## Active Solar Arrays

- 3.53 There may be additional impacts if solar arrays tilt to follow the daily movement of the sun. From the outset, this proposal has been for fixed panels that do not follow the movement of the sun. In this regard the impact was assumed to be consistent through the day with consideration of the sun's path through the sky.

## Security

- 3.54 The initial design considered there would be temporary, sensor



controlled, lighting during the construction phase while materials are stored on site. The construction phase was considered likely to last for nine to twelve months. No lighting will be erected for the operational phase.

3.55 The site was designed to be bounded by a stock proof fence with wooden posts, to minimise visual impact.

3.56 Inward-facing CCTV was considered to provide security monitoring with cameras mounted on 2m posts independent of the boundary fence. Any CCTV lighting would be infrared and so considered not visible to the naked eye.

## Resource and Spacing

3.57 As recognised in the NPPG, the energy generating potential of a solar farm can vary for a number of reasons including, latitude and aspect. The Applicant used 'PV Syst Photovoltaic Software' to predict the potential annual yield of the solar farm. This software takes the parameters of the site and proposes an optimal array configuration. Shading and losses are factored into the simulation to estimate the total energy production from the proposed layout.

3.58 Shadows from buildings, trees or other structures can reduce performance of the PV system. Accordingly stand off distances have been built into the layout initially just from existing vegetation and as the design evolved, also from proposed vegetation. Each bank of panels was aligned with the next and orientated so as to avoid shading from neighbouring panels.

3.59 With regards to the BESS compound, battery modules are typically spaced between 2m to 5m apart, depending upon the configuration of the support systems such as the PCS units and transformers and this format was adopted.

## Road Access

3.60 Delivery of solar farm and BESS components is a relatively straight forward process predominantly involving standard sized HGVs. Access was deemed as viable along Pasture Lane and then south to Asher Lane and then following existing farm tracks to the site. Existing field entrances and farm tracks were selected where possible. These access points and tracks were judged to already take agricultural vehicles and therefore HGVs. A temporary steel plate track would be laid on top of agricultural land in the field parallel to Pasture Lane.

3.61 Existing farm tracks, field entrances and breaks in hedgerows were selected in the internal site track design to minimise potential environmental impact. Public Rights of Way (PROWs) were avoided by the on-site access tracks as far as possible. Advanced notifications and safety measures such as banksmen will be deployed, when necessary, during construction along Pasture Lane and then south to Asher Lane.

3.62 The anticipated delivery route and construction traffic movements are discussed further in the **Transport and Access Statement** that accompanies the planning application, however, alternative delivery routes were an important consideration.

3.63 Access for the delivery of equipment was initially anticipated to be routed through Ruddington Village to site via Asher Lane. During public consultation, (as discussed further in **Chapter 5 - EIA**), valuable information was provided by the community which the Applicant considered and progressed.

3.64 Accordingly, the potential use of the privately owned track to the south of the country park (from the A60 to Asher Lane) was considered. Following consultation, the use of this



alternative route was unsuccessful and therefore this alternative option was not available. This was confirmed by the Nottinghamshire County Council Estates Surveyor 12<sup>th</sup> July, 2022. The heritage railway to the immediate south-east of the site was also considered as it is not in commercial use and has a large goods yard available which would be suitable for load transfer from HGVs. Whilst discussions were positive, it was judged that from a supply perspective, this option introduced considerable logistical challenges and thus is not considered to be available.

- 3.65 The Applicant entered into dialogue with relevant neighbouring landowners to identify a suitable alternative. Accordingly, construction access is now proposed to be routed via Pasture Lane from the north, via private land, then along a temporary and non-intrusive road surface parallel to Pasture Lane within agricultural fields to the site. Construction traffic is therefore no longer proposed to be routed via the village centre, as discussed further in **Chapter 7 - Construction, Operation and Decommissioning**.

- 3.66 When considering the layout of a solar farm, there is no statutory separation distance from the solar array or associated infrastructure to either public rights of way or the highway, and appropriate separation is therefore considered on an individual basis. Further details in relation to potential effects on users of nearby highways and public rights of way are included in **Chapter 9 - Landscape and Visual Impact Assessment**.

## Location of Utilities Infrastructure

- 3.67 Consultation with utilities operators including National Grid, Cadent Gas, Western Power Distribution, Zayo, and Mainline Pipelines was undertaken by the Applicant during the initial land investigations.

- 3.68 It was established that:

- there are 132kV overhead power lines to the north of the site, which will facilitate the point of connection for this development. The maximum sag distance between panels and the high voltage cables was calculated and identified as not being a constraint;
- a double 400kV overhead electricity transmission line on

pylons/towers crosses the central section of the site east to west heading towards Ratcliffe Power Station. An easement distance of 40m around the tower bases was provided as a constraint within the panel row arrangement with tower access provided to ensure future maintenance of the electrical network can continue uninterrupted;

- there is a Mainline Pipeline Limited pipeline to the south of the site boundary; and
- a Zayo duct follows the route of the disused railway line to the east of the site boundary.

- 3.69 May 2022, National Grid confirmed it had no objections to the proposed development.

- 3.70 Utilities operators will be re-consulted prior to construction commencing to ensure that the baseline is unchanged.

## Electricity Network Connection

- 3.71 A grid connection was secured to export and import power directly into and from the 132kV overhead lines to the north of the proposal, in the outskirts of Clifton. Such a secured connection offer is a key feasibility

constraint for the progression of a solar farm and BESS facility in England.

- 3.72 From the battery storage and substation compound, underground high voltage cables were routed to travel north following the approximate route of the Fairham Brook. Further details of the grid connection compound are provided in **Chapter 6 - Development Proposal**. Application for the connection will follow a separate consenting procedure and therefore whilst detail of this route is not currently available, this ES has considered the likely cable route in relevant assessments at a proportionate level of detail.

## THE DEVELOPER'S SITE SELECTION AND DESIGN APPROACH

- 3.73 The Developer has followed a detailed site selection process that considered a range of environmental and technical constraints as outlined in the preceding paragraphs. The site identification and validation process is described in more detail in the following sections.
- 3.74 As acknowledged by the Building Research Establishment's Planning Guidance (BRE, 2014a), the UK receives a significant amount of solar energy. At the proposed site, approximately 951 - 1 000kWh of solar irradiation falls on each square metre of horizontal surface, as shown at **Plate 3.3 on page 51**.
- 3.75 The next principal technical constraint is available grid connection. Within Rushcliffe Borough, the Developer secured a 49.9MW grid connection, with adequate import capacity to provide battery charging capacity on the 132kV overhead line to the south-east of Clifton, south of Nottingham.
- 3.76 Land within relative proximity of this connection location was then

screened to identify areas with enough contiguous land to have potential to host a solar farm meeting the 49.9MW secured connection capacity and the associated BESS facility. An arbitrary search radius was not applied, rather, a pragmatic review of proximate farmland was considered in light of environmental constraints. Considerations included:

- proximity to ecological, historic or landscape designations;
- proximity to settlements;
- access; and
- agricultural land classification.

- 3.77 Taking these constraints into account, land was identified to the south of Clifton and Ruddington. As discussed further in **Chapter 4 - Existing Conditions**, the land was observed to have an association with energy infrastructure, particularly the 400kV overhead lines that cross the site and 132kV powerlines to the west of the site and south of Clifton.
- 3.78 Landowners in the area were approached and their interest was ascertained. The area taken forward for further appraisal is shown at **Plate 3.4 on page 52**.

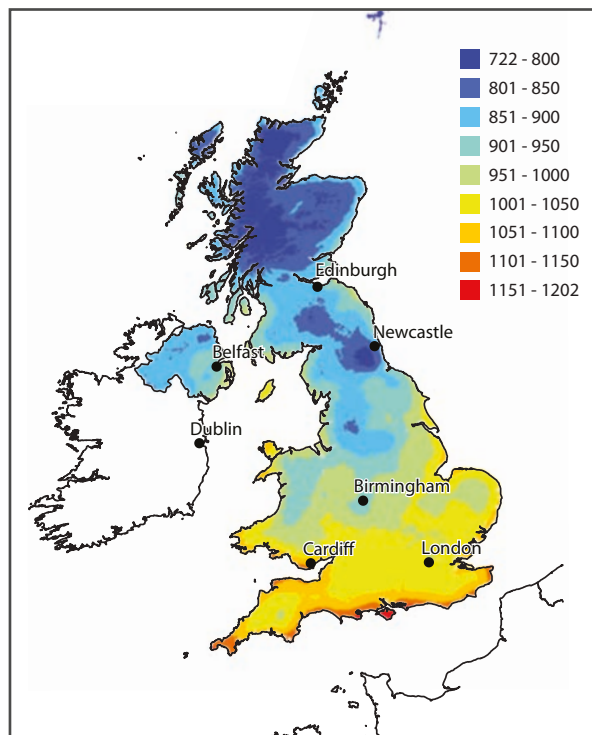


Plate 3.3 - UK Solar Irradiation Map. Yearly total of global irradiation in kWh/m<sup>2</sup>. Averaging period: 1997-2003. Map data courtesy of the Met Office (BRE, 2014a)

3.79 The large section of contiguous land to the south of Fields Farm Cottages was identified as the most suitable location for the proposed solar and BESS development, due to its distance from nearby settlements and residential dwellings.

3.80 It was recognised that this parcel of land was within Derby and Nottingham Greenbelt, and that there will be some 'harm' to the openness of the Greenbelt, however, it was judged that this would be of limited duration and is entirely reversible. As such, it will not permanently affect the Green Belt in terms of impacts to its openness. Further detailed consideration is included within the **Planning Statement** that accompanies this planning application.

3.81 The southern edge of the landholding in the area known as Gotham Moor was excluded from consideration for the placement of new infrastructure to avoid creation of a new crossing over Fairham Brook. Removing the field to the south also avoided the well used and locally valued public footpath running along the brook.

3.82 Following consideration of the environmental, physical and technical limitations associated with the land taken forward for initial appraisal, the central area of the landholding was progressed for assessment.

3.83 Early consultation was initiated with the Officers of Rushcliffe Borough Council. Formal contact was made for pre-application advice, then for EIA Screening (discussed further in

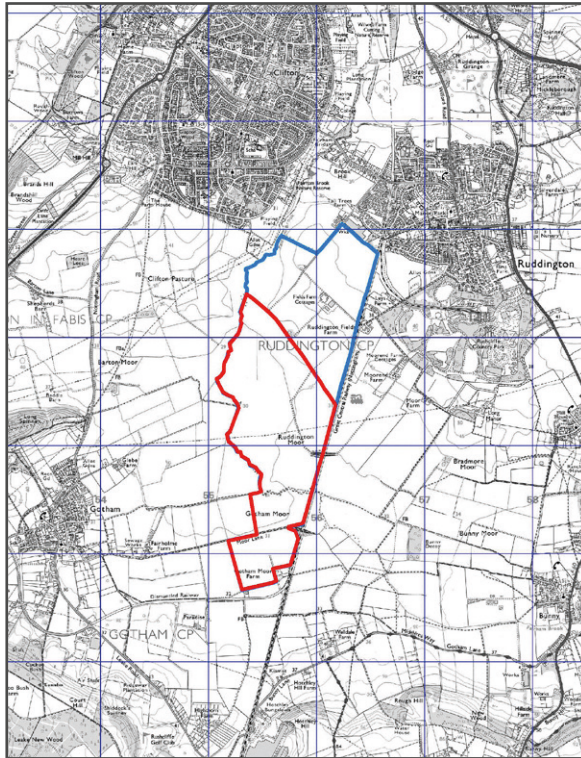
**Chapter 5 - Environmental Impact Assessment**). The development boundary proposed at project Screening is shown at **Plate 3.5 on page 52**.

3.84 The Applicant subsequently withdrew the Screening Request as a consequence of limited resource availability within Rushcliffe Borough Council and elected to voluntarily assess the proposals under EIA in respect of the potential for significant Ecology and Landscape and Visual impacts, which is considered a robust and proportionate approach to the assessment of environmental effects. This allows Rushcliffe Borough Council to have the relevant information in front of them upon which a planning determination can be made. All other matters were judged to be outside of the potential for significant effects and were scoped out of the EIA, albeit some additional assessments (i.e. Flood Risk, Glint and Glare, Heritage, Noise, Socio-economics and Traffic and Access) are included as accompanying the application but outside of the ES.

3.85 The Developer also undertook pre-application consultations with the local community, including parish councils.

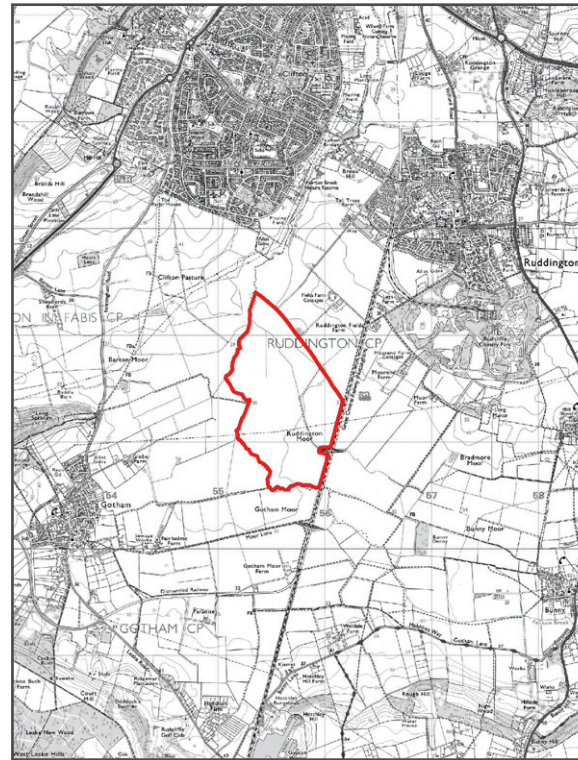


Public consultation is discussed further in **Chapter 5 - Environmental Impact Assessment** and the feedback received was constructive in refining the development design and mitigation proposals.



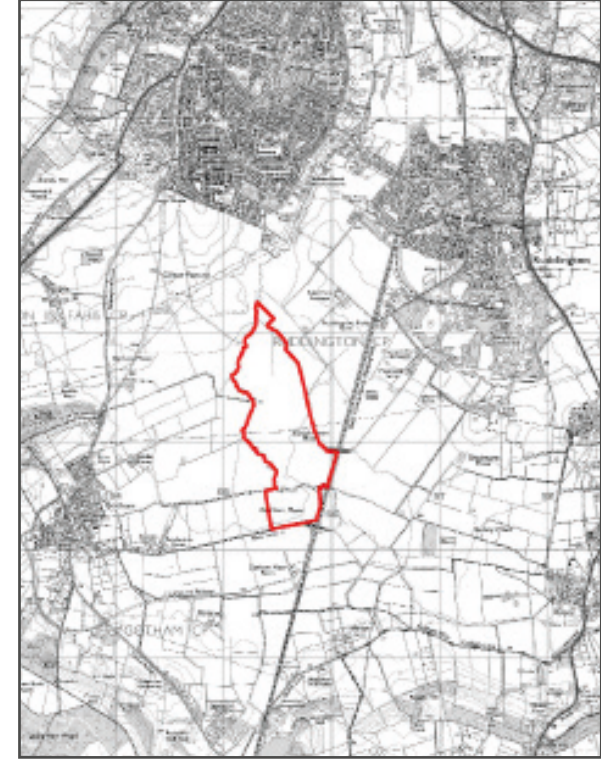
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Plate 3.4 - Land Area Taken Forward for Further Appraisal (red line - key area; blue line - potentially viable land)



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Plate 3.5 - Site Selection Stage 3 - Initial Development boundary considered during pre-application discussions with Rushcliffe Borough Council



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Plate 3.6 - Removal of land to the north and addition of land to the south of Fairham Brook

3.86 Following further analysis of the site and its constraints, land to the north east was dropped to increase separation distance to the footpath and to Ruddington. To accommodate that loss of capacity, land to the south of Fairham Brook was reintroduced. This iteration is shown in **Plate 3.6 on page 52**.

3.87 Concurrently with public consultation, the environmental assessments were commencing to determine the detailed arrangement of panels, BESS modules and site infrastructure.

3.88 Setbacks were provided from footpaths, overhead lines, electricity pylons, pipeline, boundary hedgerows and watercourses. The area to the south of Fairham Brook was re-removed from development as sufficient panels could be located to the north to take maximum benefit from the secured grid connection. An area south of Fairham Brook was instead set aside for ecological mitigation (see **Chapter 8 - Ecology**).

3.89 A design freeze meeting took place involving the EIA assessment team. The purpose of this was to ensure all technical and environmental parameters were accounted for and balanced with optimising the potential generation from the site.

3.90 The specific site design further evolved through the Environmental Impact Assessment process, whereby any impacts identified by the specialist assessment team or consultees were mitigated for, where possible, through alterations in the site design. Concurrently, the technical assessment team were challenged to identify opportunities to improve and enhance the site

relevant to their discipline. Measures proposed as mitigation and substantial landscape and habitat improvement include (please see **Figure 8.3 of ES Volume 3**):

- hedge planting (both new and improvement of existing hedges);
- tree planting; and
- use of wildflower seed.

3.91 The resulting layout assessed as reported in this ES, and progressed for submission is shown at **Plate 3.7 on page 54**, as well as **Figure 1.2** and **Figure 1.3** of the **ES Volume 3 - Figures**.

3.92 The Fair Oaks Renewable Energy Park was judged by the Developer and the EIA assessment team to be a location offering the prospect of a suitable balance of the site-specific features which render a solar and BESS development (with its associated environmental benefits) both technically and financially viable, and the need to keep any adverse environmental impact of such a development to an acceptable minimum.

## Industry Guidance

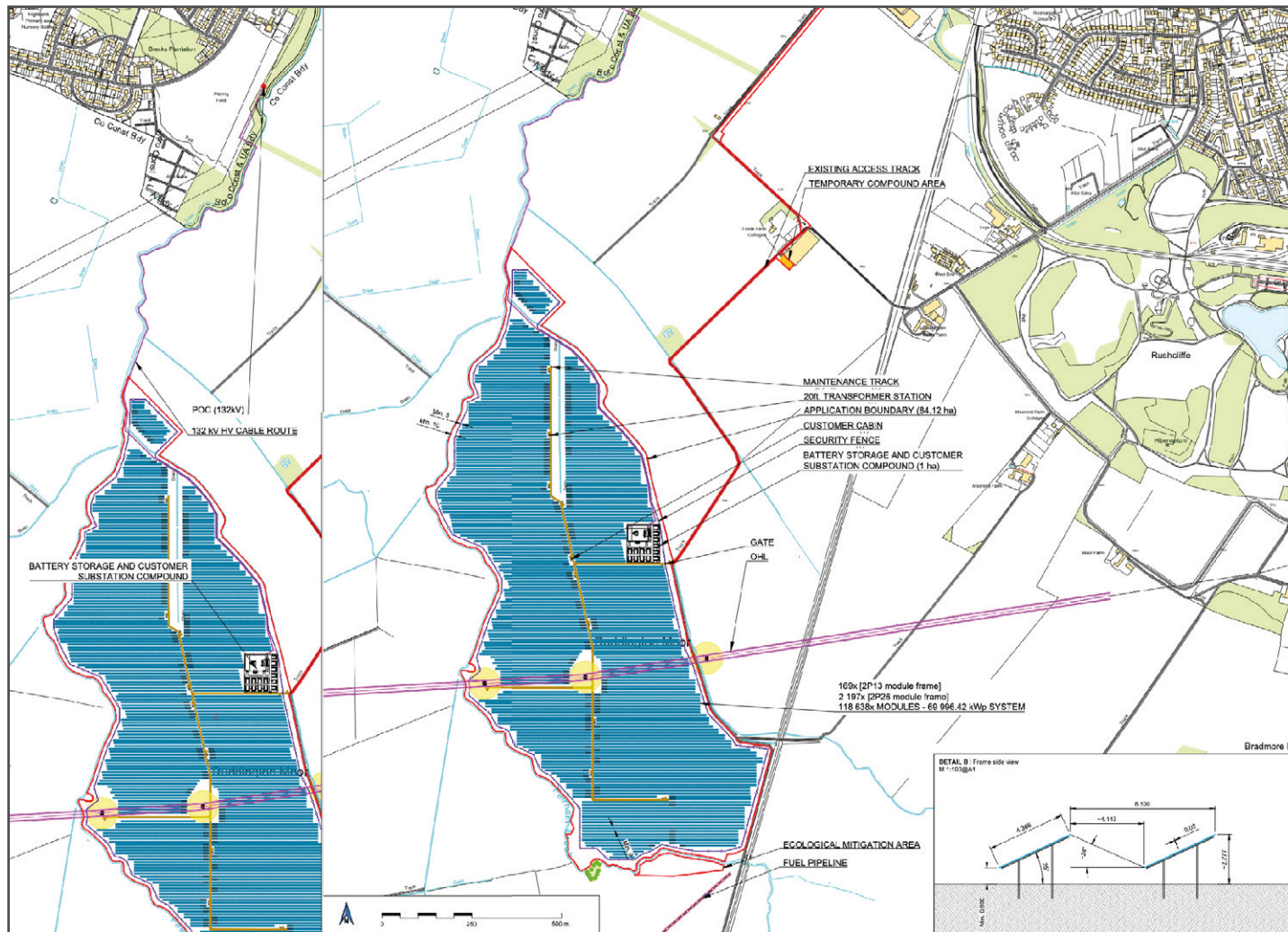
3.93 Throughout the design of the project, the following industry guidance has

been considered during the site design phase:

- Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems (Building Research Establishment (BRE), 2014a);
- Agricultural Good Practice Guidance for Solar Farms (BRE, 2014b);
- BRE National Solar Centre Biodiversity Guidance for Solar Developments (BRE, 2014c);
- Natural England Technical Information Note 101: Solar Parks: Maximising Environmental Benefits (Natural England, 2011); and
- UK Solar PV Strategy Part 2 (DECC, 2014).

3.94 Incorporating the guidance, the design aim is to minimise the potential visual and long-term land use impacts of the renewable energy park, enhance the site in relation to its biodiversity and landscape context, whilst generation through solar PV, providing stability to the grid network through the balancing action of the BESS.





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Plate 3.7 - Optimised Layout Determined through the EIA Process (extract from **Figure 1.2**)

## REFERENCES

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## INTRODUCTION

- 4.1 This chapter sets out the existing physical environment of the development site boundary (as shown at **Figures 1.1, Figure 1.2 and Figure 1.3 of ES Volume 3**) and its setting in the wider context, together with a summary of the solar energy developments in the area.

## SITE LOCATION

- 4.2 The proposed development is located on farmland to the south of the settlement of Clifton (0.7km), Ruddington is 1.4km northeast and Gotham is 1.6 km west.
- 4.3 The site falls within the jurisdiction of Rushcliffe Borough Council.
- 4.4 The location of the site within a wider area is illustrated in **Figure 1.1, Volume 3** of this Environmental Statement.
- 4.5 Dispersed dwellings and farms are situated alongside the minor roads surrounding the site.
- 4.6 There are no dwellings, within 500m of the boundary of the proposed solar farm. The closest dwellings to the proposal (within approximately 1.0km of the array boundary) and their approximate distance to the closest point of the development are listed in **Table 4.1 on page 60**.

## PAST AND PRESENT AND FUTURE LAND USE

### Existing Land Use

- 4.7 The site is currently agricultural land of mixed grade. Its geology comprises primarily loamy and clayey soils with naturally high groundwater.
- 4.8 The high level pre-1988 agricultural land classification map shows the land at the potential site as having a desktop classification at that time of Grade 2 and Grade 3 (Subgrades 3a and 3b). A soil survey has been conducted to identify the Agricultural Land Classification (ALC) conditions specific to the proposed site (as provided from **Paragraph 4.21 on page 63**).
- 4.9 A 400kV overhead power line crosses the site east-west with two pylons located within the site boundary. An underground pipeline is located just outside of the south of the site boundary traversing the fields in a north-east to south westerly direction (**Figure 1.2** (ES Volume 3)).

Table 4.1 - Dwellings closest to the proposed solar farm boundary

Dwelling(s)	Private or involved-landowner owned	Distance from nearest row of solar panels (to nearest 5m)	Direction from nearest row of solar panels
Fields Farm Cottages		0.6 km	north-east
Dwellings to the south-east of Clifton		from 0.7km	north-west
Ruddington Farm		0.8 km	north-east
Moorend Farm and Farm Cottages		1 km	east

4.10 The solar array and BESS and Substation compound area is formed by a single field, currently used for arable agriculture, this has been the case for at least twenty years with the deviation of the field for various crops changing over the years. The mitigation area to the south of Fairham Brook is also currently in arable production.

4.11 A field drain bisects the northern portion of the site in a north-south direction.

4.12 The terrain within the site is practically flat rising from 29m AOD at the north to 31m AOD at the south.

4.13 A digital terrain model is provided at **Plate 4.1** to visually assist with appreciation of the topography within and surrounding the proposed site.

4.14 **Chapter 9 - LVIA** provides a full description and appraisal of the landscape character. A selection of photographs to set the context of the development site are shown in **Plate 4.2 on page 62**, panoramic visualisations accompany the LVIA as presented in **ES Volume 4, Visualisations**.

4.15 The land will be available for future farming use at the end of the Proposal's 40 year lifetime.

## Geology and Hydrology

4.16 The site is underlain by the following sedimentary bedrock:

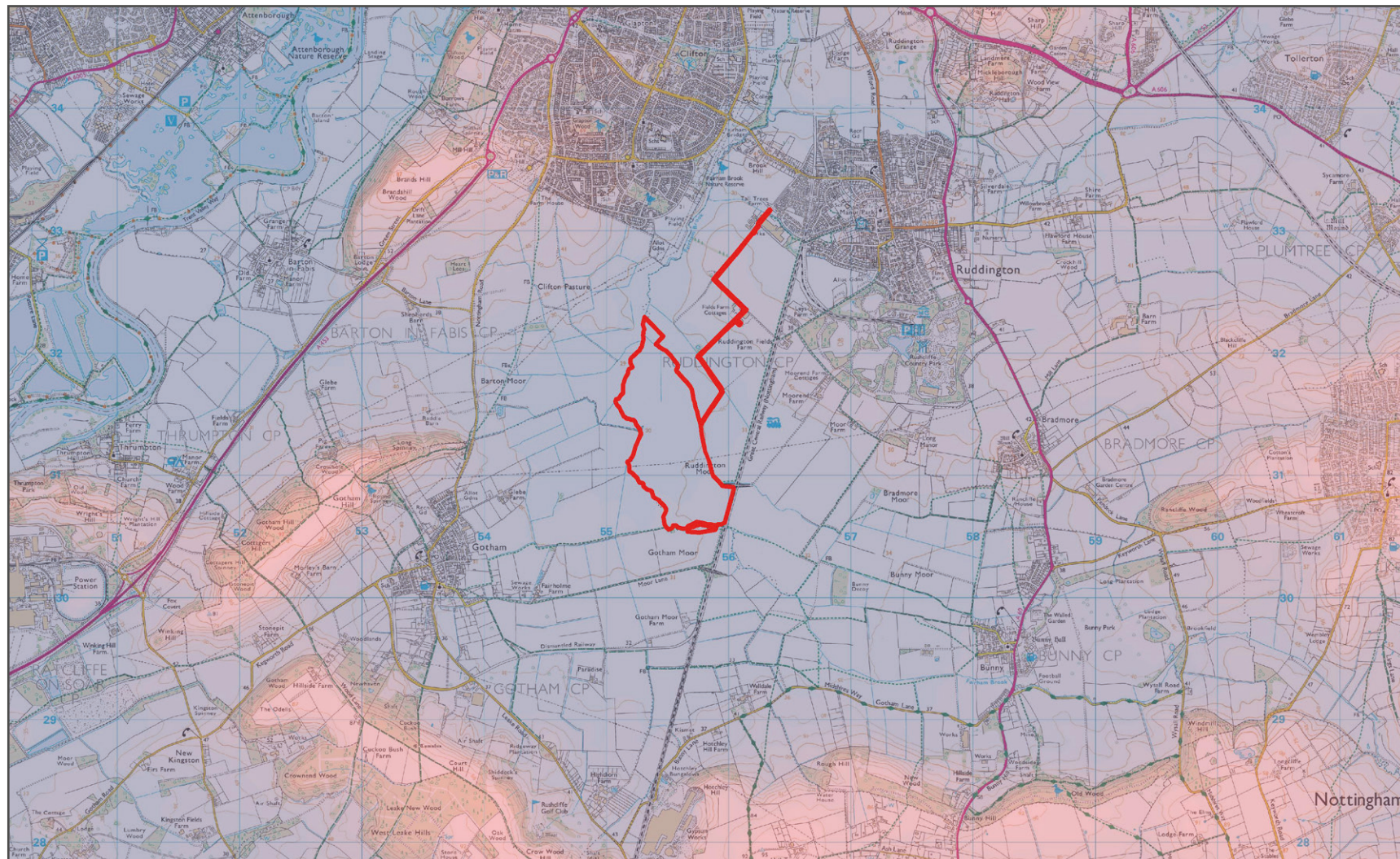
- Triassic Rocks (undifferentiated) - Mudstone, Siltstone And Sandstone. Sedimentary Bedrock formed approximately 200 to 251 million years ago in the Triassic Period. Local environment previously dominated by hot deserts, (British Geological Survey, 2022);

4.17 The proposed site comprises loamy and clayey floodplain soils with naturally higher groundwater (UKSO, 2021). Further discussion is contained within the flood risk and surface water assessment accompanying the planning application.

4.18 The Environment Agency Flood Map indicates that the majority of the site lies within Flood Zone 1, although Flood Zones 2 and 3 are also located within the site area.

4.19 Flood Zone 1 is defined as an area with a low probability of flooding, where the annual probability of flooding from river or sea is less than 0.1%. The parts of the site located within Flood Zone 2 have an annual probability of flooding between 0.1 and 1% (Medium Probability; Low Risk).





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Plate 4.1 - Digital Terrain Model (DTM) Showing Relative Topography Across the Site (outlined in red) and Surrounding Area





Plate 4.2 - *Photos of Existing Site Environment*

- 4.20 Flood zone 3 is allocated to land having a 1 in 100 or greater annual probability of river flooding.

## Agricultural Land Classification

### *Agricultural Land Survey Introduction and Policy Guidance*

- 4.21 An Agricultural Land Classification Assessment has been prepared by Daniel Baird Soil Consultancy Ltd. It provides an assessment of the quality and versatility of agricultural land at the proposed development site (provided in full at **Appendix 4.1**).
- 4.22 When surveyed in February 2022 agricultural land at the site was in arable use with no stock proof fencing.
- 4.23 Whilst it is noted a new version of the NPPF was issued for consultation (22/12/2022), the appraisal of agricultural land quality is consistent with the direction given by the extant National Planning Policy Framework (NPPF) (MHCLG, 2021). Paragraph 174 states: -
- 'Planning policies and decisions should contribute to and enhance the natural and local environment by:*
- a) protecting and enhancing valued landscapes, sites of biodiversity or*

*geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*

*b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*

*c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*

*d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*

*e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*

*f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'*

- 4.24 The glossary of the NPPF gives the following definition.

*'Best and most versatile agricultural land: Land in grades 1, 2 and 3a of the Agricultural Land Classification'.*

- 4.25 Accordingly a detailed assessment of the site was undertaken in February 2022 using the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for Agricultural Land Classification (ALC) published in October 1988.

- 4.26 Use of the ALC methodology is also supported by Natural England Technical Advice Note 049 (TIN049) published January 2009. TIN049 provides additional guidance on how an ALC field assessment should be undertaken, with a detailed assessment studying the soil profile to a depth of up to 1.2m at sample points with a density of approximately one per hectare across the site agricultural land.

- 4.27 To supplement the NPPF the Department of Communities and Local Government also provides an online library of Planning Practice Guidance.



Planning Practice Guidelines for Renewable and Low Carbon Energy (PPGRLCE), Paragraph 013 identifies particular planning considerations that relate to the development of large scale ground mounted solar PV sites. Regarding agricultural land, particular factors a local planning authority will need to consider include:

*'Where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays'.*

4.28 Paragraph 013 of the PPGRLCE makes reference to a speech by the then Minister for Energy and Climate Change in April 2013 in which they state that:

*'Where solar farms are not on brownfield land, you must be looking at low grade agricultural land which works with farmers to allow grazing in parallel with generation (...)'.*

4.29 Paragraph 013 also references a written ministerial statement of 25<sup>th</sup> March 2015 which states:

*'In light of these concerns we want it to be clear that any proposal for a solar farm involving the best and most versatile agricultural land would need to be justified by the most compelling evidence. Of course, planning is a quasi-judicial process, and every application needs to be considered on its individual merits, with due process, in light of the relevant material considerations'.*

4.30 The Rushcliffe Local Plan (adopted October 2019) provides local planning guidance for this site. Two policies of this Local Plan reference best and most versatile agricultural land. The first is Policy 1: Development Requirements. With reference to best and most versatile agricultural land the policy states:

*"Planning permission for new development, changes of use, conversions or extensions will be granted provided that, where relevant, the following criteria are met:*

*12. development should have regard to the best and most versatile*

*agricultural classification of the land, with a preference for the use of lower quality over higher quality agricultural land. Development should also aim to minimise soil disturbance as far as possible.*

4.31 The second is Policy 16: Renewable Energy. The policy states:

*"Proposals for renewable energy schemes will be granted planning permission where they are acceptable in terms of:*

*d) best and most versatile agricultural land;".*

## Methodology

4.32 The MAFF ALC system of grading land quality for use in land use planning purposes divides farmland into five grades according to the degree of limitation imposed upon land use by the inherent physical characteristics of climate, site and soils. Grade 1 land is of an excellent quality, whilst Grade 5 land has very severe limitations for agricultural use. The ALC system is designed to be independent of land management so that there is no incentive for poor management of land to obtain development consent.

Best and most versatile agricultural land that through sustained arable cropping has become exhausted, with diminished organic matter degrading the structural stability of the topsoil, is not downgraded in the ALC system.

4.33 The MAFF revised guidelines and criteria for ALC of October 1988 require that the following factors be investigated:

- Climate - Average Annual Rainfall (AAR) and Accumulated Temperature above 0°C between January and June (AT0);
- Site - Gradient, Micro Relief and Flooding;
- Soils - Texture, Structure, Depth, Stoniness, and Chemical Toxicity; and
- Interactive factors - Soil Wetness, Soil Droughtiness and Liability to Erosion.

## Assessment

### CLIMATE

4.34 Climatological data for ALC are provided for 5km intersections of the National Grid by the Meteorological

Office, in collaboration with the National Soil Resources Institute. The data from these points can be interpolated providing climate data for specific sites. Interpolated data for the Fair Oaks site is given in **Table 4.2**.

Table 4.2 - **Fair Oaks Renewable Energy Park Agricultural Land Classification Climate Data**

Reference Point:	SK 555 310
Altitude (m)	30
Average Annual Rainfall (AAR) (mm)	579
Accumulated Temperature AT0 (day degrees)	1 423
Moisture Deficit for wheat (mm)	114
Moisture Deficit for potatoes (mm)	108
Field Capacity Duration (days)	120

4.35 The main parameters used in the assessment of an overall climatic limitation are AAR as a measure of overall wetness, and AT0 as a measure of the warmth of the site in the growing season.

4.36 Climate does not impose an overall limitation on ALC grade at this site. Climate does however have an important influence on the interactive limitations, soil wetness and soil droughtiness. As the site has relatively low rainfall, soil wetness limitations are reduced. The maximum wetness class at this site is Wetness Class III (occasionally wet) where for much of lowland England, the dominant soil type found at this site would be Wetness Class IV (Commonly Wet).

### THE SITE

4.37 The site lies to the south of Nottingham, between the settlements of Ruddington and Gotham. Land within the site is level with several watercourses. These are deep and engineered channels with a V cut profile.

4.38 Environment Agency flood risk mapping shows significant areas of the site to be in Flood Zone 3, the highest category of flood risk in their three tier system. In addition to broad corridors along the water courses, there is a significant area of flood zone 3 land spreading out into the north and centre of the site. Flood Zone 2 land then extends beyond this. The watercourses within

and adjoining the site are the source of the elevated flood risk. More detailed flood mapping is available within the Flood Risk Assessment accompanying the application.

- 4.39 This flood risk categorisation does not present the level of details required on seasonality, frequency and duration of flooding required to definitively determine ALC grade according to flood risk. However the presence of the clearly elevated flood risk over a large portion of the site area reinforces the assessment of the land being limited to a maximum of ALC Grade 3a.

## SOILS AND PARENT MATERIALS

- 4.40 The British Geological Survey Geology of Britain Viewer shows the site to be underlain by three solid geology units. These are the Edwalton Member mudstone to the north, the Arden Sandstone formation in the centre and the Branscombe Mudstone formation to the south. All of these are overlain by a single superficial deposit of alluvium.
- 4.41 Field survey work found alluvium present at the surface across the site. In places this alluvium material is present to the full auger depth (1.2m) whereas in others it gives way

to material derived from the underlying solid geology within half a metre of the surface. Therefore as well as providing a consistent topsoil material across the site, the alluvium conceals the variation in depth to the underlying solid geology and character of the subsoil, imposing the flat landform observed.

- 4.42 Some subsoil is marbled with veins of white gypsum, and in the spoil from recently cleared watercourses, large pieces of satin spar gypsum can be found.
- 4.43 There are no soil limitations on overall ALC grade, but the nature of the soil profile has an important influence on the interactive limitations described below.

## INTERACTIVE FACTORS

- 4.44 A single uniform topsoil is found across this site with a very high clay content, stoneless to slightly stony and slightly calcareous. For the majority of this site, this topsoil is underlain by a subsoil to at least half a metre depth that also has a clay texture. This subsoil impedes the drainage of excess rainfall down through the soil profile leaving the land occasionally wet (Wetness Class III). In other locations the subsoil changes to

a much lighter texture including loamy sand and sand, permitting much more rapid drainage of excess water.

- 4.45 Where the land is Wetness Class III, soil wetness limits the land to Grade 3a, the high presence of Calcium being sufficient to reduce the limitation from Grade 3b to 3a. The standard field test for Calcium is using acid to check for effervescence from Calcium Carbonate. There was no reaction to acid in the field but a high presence of gypsum (Calcium Sulphate that does not effervesce with acid) was noted.
- 4.46 The more freely drained land is limited by soil droughtiness to Grades 2 and 3a, the degree of limitation being driven by the texture of the subsoil and its water holding capacity. However all sample points with the lower droughtiness limitation were found in locations with elevated flood risk, and limited to Grade 3a by flood risk.

## *Agricultural Land Classification of Land at Fair Oaks Renewable Energy Park*

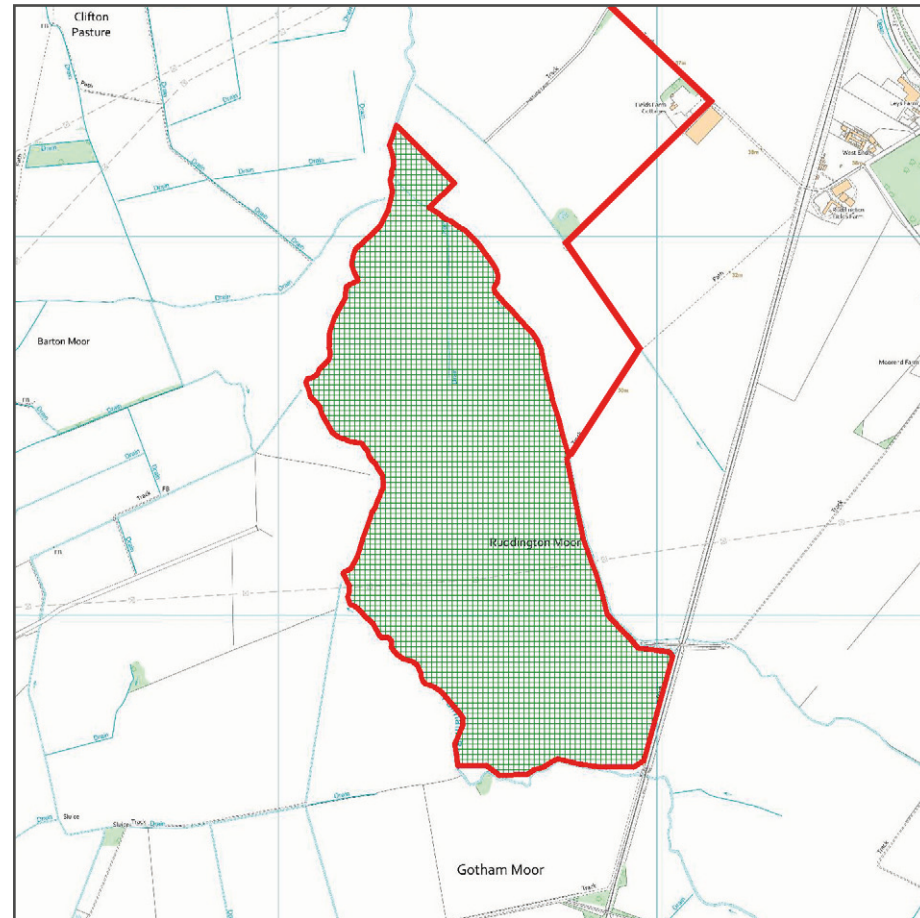
- 4.47 Detailed ALC survey of the site, following the guidance of TIN049, found agricultural land in ALC Grade 3a. **Plate 4.3 on page 67** shows

the ALC grade distribution within the site, with area estimates given in **Table 4.3**.

Table 4.3 - ALC Grade Distribution

ALC Grade	Area (ha)	%
3a	82.4	100
Total		100

- 4.48 Land is limited to a consistent Grade 3a across the site. The majority of the land has a clayey profile of sufficient depth to place the land in Wetness Class III. Normally a clay topsoil with the 120 field capacity days would limit this land to Grade 3b by soil wetness but the Calcium presence is sufficient to reduce the soil wetness limitation to Grade 3a.
- 4.49 Across the northern half of the site are scattered sample point locations where the land is more freely drained, the cover of alluvium derived clay soil being less than half a metre depth. Lighter textured sandy material is found below the clay. Most of this land is limited to Grade 3a by soil droughtiness with an additional Grade 3a limitation by flood risk for parts of this area.



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Plate 4.3 - Agricultural Land Classification Survey Results

## LAND QUALITY AND THE PROPOSED DEVELOPMENT.

- 4.50 As discussed above, the NPPF seeks to conserve the national resource of the best and most versatile agricultural land. Agricultural land and the soil associated with it is, for all practical intents and purposes, a non-renewable resource. Development of building foundations and infrastructure such as roads and rail lines effectively sterilise any further agricultural production from that land area. The soil resource associated with that land can be retained and beneficially reused, but an area of best and most versatile land cannot be translocated for all practical intents and purposes. Agricultural land quality is dependent upon characteristics of the location, not just the soil in isolation.
- 4.51 A solar farm and BESS development differs from built development in that the consent is temporary, is easily reversed and agricultural management can be maintained (though constrained) during the duration of the consent.
- 4.52 The supplementary PPGRE introduces the desirability of maintaining agricultural production and/or

enhancing biodiversity on farmland for the duration of any consent for large scale Solar Farms. In most instances the transition from combinable crops to a permanent green cover for 40 years should confer tangible biodiversity benefits, regardless of the presence of the Solar Farm development. Such biodiversity effects are however beyond the scope of this assessment, and are assessed in detail within **Chapter 8 - Ecology** of this ES.

- 4.53 When considering a Renewable Energy Park development proposal, the conservation of the agricultural land resource and quality is of greater importance than the maintenance of continuous arable production. This is as the agricultural land resource is non-renewable. Land use is transient, with productive use of agricultural land varying in response to drivers such as commodity prices, occupancy, diversification opportunities (such as livery) and not least, the current agricultural and environmental policy framework. For instance, in a shorter period of time than the proposed Solar Farm planning consent, Common Agricultural Policy transitioned from direct price support for commodities such as wheat, to area payments for

cropping in conjunction with 'set-aside' (the requirement to take a proportion of arable land out of any productive use including grazing), through to targeted payments for 'arable reversion' – payment made for a specific field to cease arable production in favour of biodiverse grassland management for an extended period of time. The future of farm support in England is at present under development but speeches by ministers have emphasised the need to maintain a transition towards rewarding land management for environmental services rather than agricultural production.

- 4.54 Grassland below a solar farm installation should be managed by cutting to control grass and shrub growth that could shade panels and impede access for maintenance. For the Fair Oaks Renewable Energy Park proposal, the developer intends to manage the grass using either specialist operational solar management teams, utilising small scale equipment to cut grassland annually, or via grazing stock (sheep) with the intention that a sheep grazing licence being entered into at the appropriate time. Further details of the land management measures are given in the Outline



Landscape and Biodiversity Mitigation and Enhancement Plan appended to this ES (**Figure 8.3**).

## AGRICULTURAL BENEFITS OF SOLAR PV

- 4.55 As noted above, the temporary consent for the Proposal would not result in the loss of agricultural land resource or the degradation of agricultural land quality. The Site remains agricultural land with a grass cover maintained, along with the possibility of the use of grazing stock for continued agricultural purposes. At the end of the temporary consent, decommissioning returns the land back to its prior agricultural function with no loss of extent or capability.
- 4.56 However, the presence of the Solar PV confers benefits to arable land through an extended fallow period. The organic matter content of UK arable soils is in long term decline. Cultivation promotes rapid breakdown of organic matter, the soil organic matter content declining to a lower equilibrium. A change of management with no cultivation under the Solar PV will enable a return towards a higher equilibrium of soil organic matter. Benefits of this change will be land that is more fertile, easier to cultivate, holds more water, slows

surface water runoff and permits more rapid infiltration of rainfall.

- 4.57 Compared to annual arable cropping, perennial plant cover will have time to develop a root network that can extend further down and through heavy subsoil, accelerating the drying process that helps aggregate soil into structures that improve drainage and further root exploitation of the soil. Although the ALC system deliberately omits soil characteristics that are sensitive to land management (avoiding any incentive to manage land badly to assist planning success), a long term fallow period will enhance the soils functional capacity for supporting agricultural production.
- 4.58 For the duration of the renewable energy development, the agricultural land will not be making its normal contribution to UK combinable crop production. However, Defra's United Kingdom Food Security Report is clear that the most significant threats to our food security are climate change and soil degradation. This proposed development will act to limit climate change, enable recovery of degraded soil and not have a significant impact on UK yield of combinable crops.

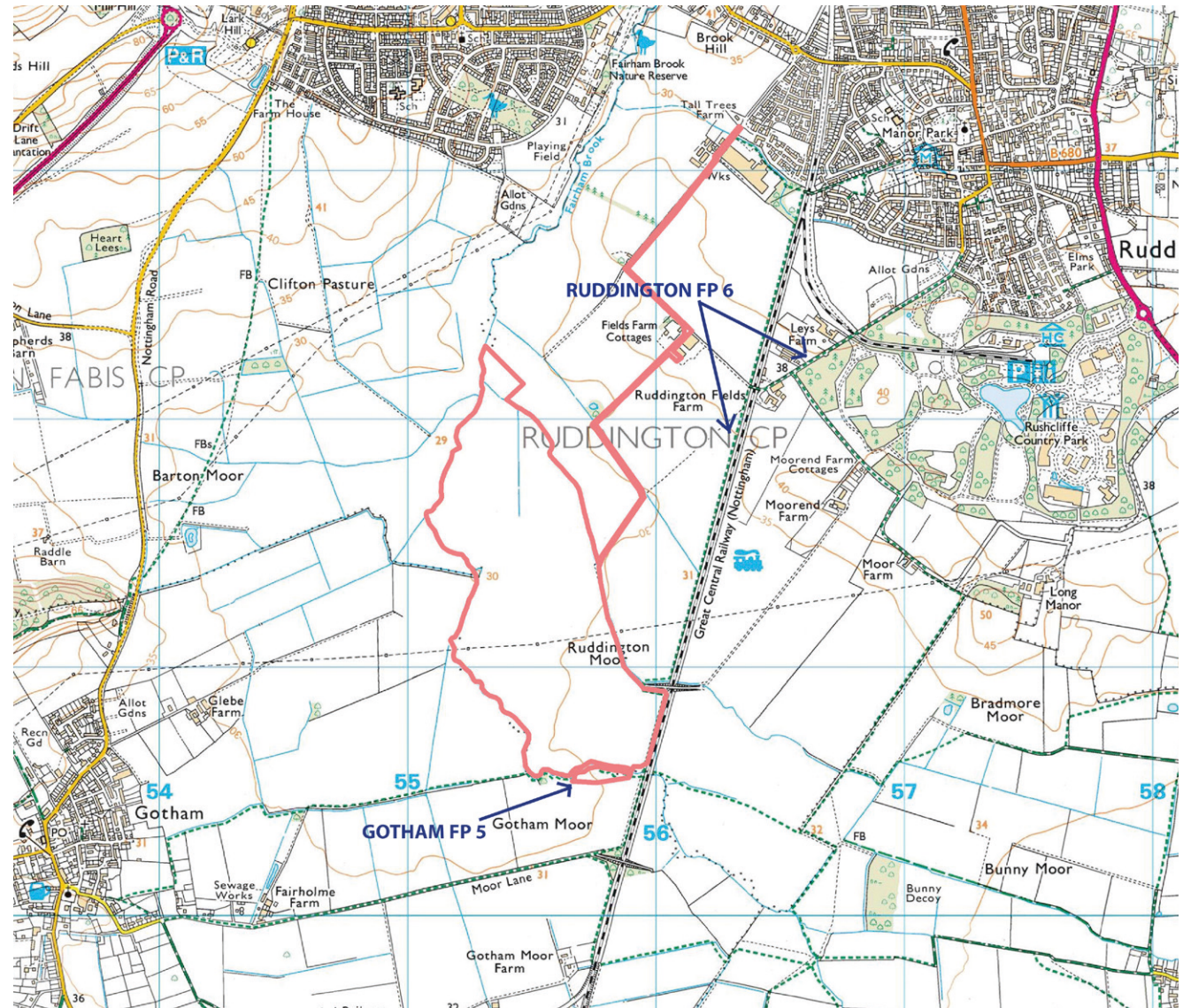
- 4.59 Furthermore the renewable energy generation provides the farm with a stable diversified enterprise that makes little demand on farm capital, machinery or manhours.

## CONCLUSION

- 4.60 The proposed development site is an area of approximately 84.12 ha of which 82.4ha is agricultural land classified as ALC Grade 3a land.
- 4.61 Grade 3a land is best and most versatile land, but the lowest quality of land to be considered best and most versatile. The proposed development is both temporary and does not result in any permanent loss of agricultural land resource. With no loss of agricultural land, the landowner can resume arable management of the site on decommissioning, exploiting the improvement in soil health gained from the fallow period. The planning guidance seeking to preserve a resource of best and most versatile agricultural land for the future, should be given correspondingly reduced weight when considering renewable energy development at this site.

## Public Rights of Way

- 4.62 There two footpaths following the site boundary and one which shares Asher Lane along the adopted highway:
- Ruddington FP6 following the railway line; and
  - Gotham FP5 - following Fairham Brook.
- 4.63 An annotated copy OS Explorer map for the area, showing those PRoW listed and additional footpaths surrounding the proposed Fair Oaks Renewable Energy Park is contained in **Plate 4.4**. Recreational routes and footpaths over a wider area are provided in **Figure 9.3** of **Volume 3 - Figures**.
- 4.64 There is no Open Access or Common Land within the proposed development area or its surrounds.
- 4.65 Impacts on users of the Public Rights of Way through and surrounding the site are assessed within **Chapter 9 - LVIA**.



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Plate 4.4 - Rights of Way - adjoining public footpaths identified; red outline - site outline)

## DESIGNATIONS

- 4.66 As noted in **Chapter 3 - Site Selection and Design**, National and local designations were identified to shape the site selection and design process. The results of the designations search via 'MAGIC' are shown in **Plate 4.5 on page 72** and listed in full at **Appendix 4.2**.
- 4.67 There are no designations in the proposed site area. Within 2km of the approximate site boundary there is one Grade I and 14 Grade II Listed Buildings.
- 4.68 There is one Site of Special Scientific Interest within 2km of the proposed site boundary (SSSI), discussed further in **Paragraph 4.72**.
- 4.69 There are no AONB, National Nature Reserves (NNR), National Parks, Ramsar sites, Special Protection Areas (SPA), Registered Battlefields, Special Areas of Conservation (SAC) or World Heritage Sites within 2km of the site.
- 4.70 There are three Local Nature Reserves - Becks plantation (0.8km north), Glapton Wood (1.6km north) and Rushcliffe Country Park (1.1km east).

- 4.71 The ecological, landscape and heritage designations surrounding the proposed site are listed below and discussed in greater detail within **Chapter 8 - Ecology** and **Chapter 9 - LVIA** and their accompanying Figures and Appendices.

### *Sites of Special Scientific Interest*

- 4.72 The following SSSI is within 2km of the boundary of the proposed site;
- Gotham Hill Pasture is approximately 1.9km west of the proposal and is described as Calcareous Grassland - Lowland.

### *Listed Buildings*

- 4.73 Of the identified listed buildings, there is one Grade I listed building, 'The Church of St Lawrence' which is situated in Leake Road, Gotham, approximately 1.5km west of the proposal.
- 4.74 There are 14 Grade II Listed Buildings, predominately within the settlements of Ruddington and Gotham.

## EXISTING AND PROPOSED RENEWABLE ENERGY DEVELOPMENTS

- 4.75 Inspection of Ordnance Survey mapping, 'renewables-map' and planning records were used to establish the cumulative baseline for the proposed Fair Oaks Renewable Energy Park.
- 4.76 The 'snapshot' of the cumulative solar schemes around Fair Oaks Renewable Energy Park is set out below, as identified in June 2022.

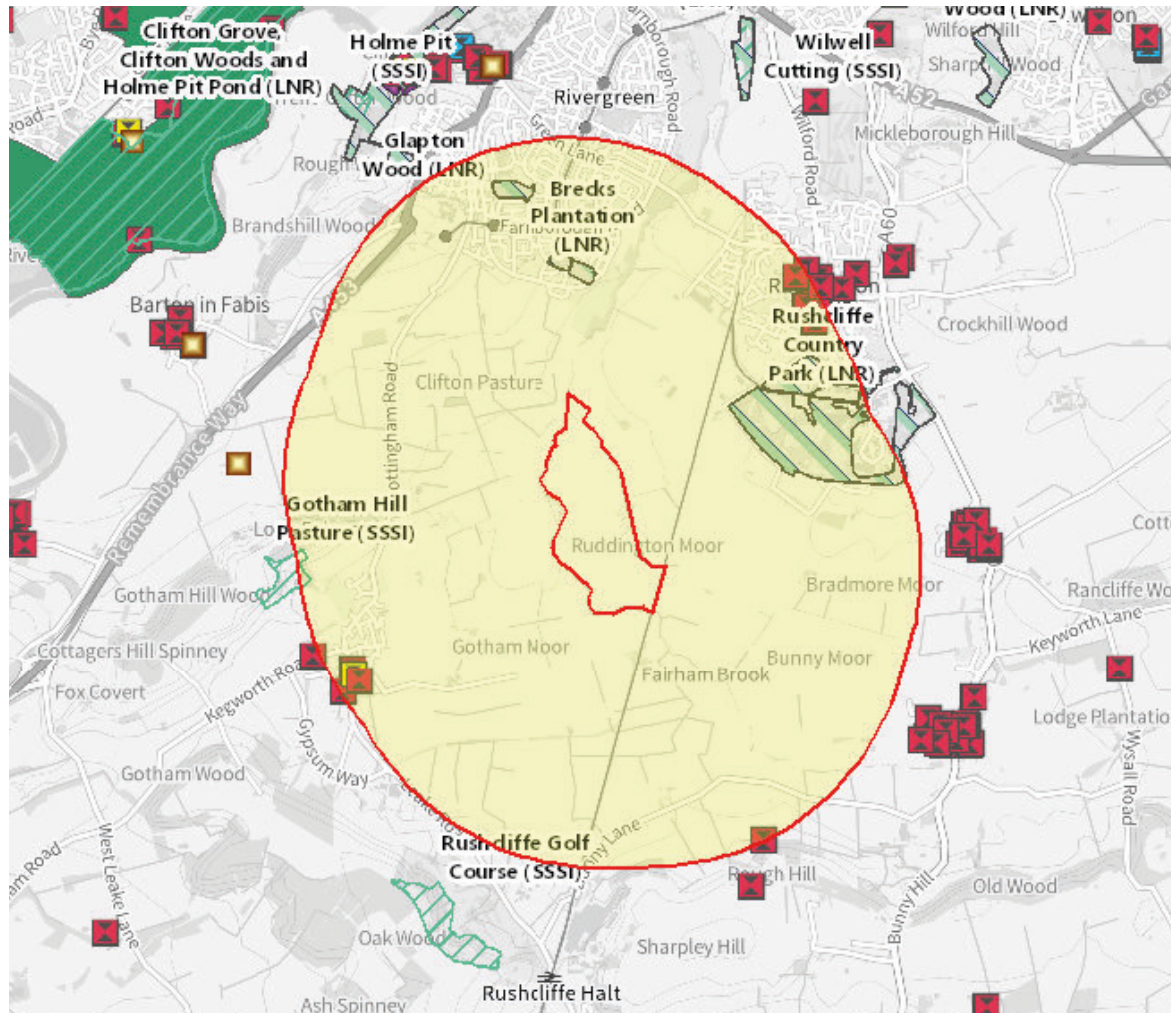
### Operating Solar Energy Developments

- 4.77 There are no known operational solar farms within 5km of the proposed site boundary.

### Consented Solar Energy Developments

- 4.78 A 4.2MW solar farm application (non-EIA) at Sharpley Hill (c.1.8km SE) is approved (21/00703/FUL). As is a small array (150m<sup>2</sup>) at Gotham Moor Farm, Gotham, 700m south of the Proposal.





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Plate 4.5 - Designation Search via MAGIC with 2km Buffer Around Solar and BESS Infrastructure (marked by red line)

- Ancient and Semi-Natural Woodland
- Ancient Replanted Woodland
- Local Nature Reserves (LNR)
- National Nature Reserves (NNR)
- Ramsar sites
- Sites of Special Scientific Interest (SSSI);
- Special Areas of Conservation (SAC);
- Special Protection Areas (SPA);
- Areas of Outstanding Natural Beauty (AONB);
- National Parks;
- Scheduled Monuments;
- Listed Buildings (Grade I, II, and II\*);
- World Heritage Sites;
- Registered Battlefields; and
- Registered Parks and Gardens.

*Note: Search included all designations in the key, but not all types of designation are present in the study area.*

## Proposed Solar Energy Developments

- 4.79 An application has been validated 18/02/2022 (22/00319/FUL) for a potential solar farm approximately 2.7km SW called the Kingston Solar Farm; and an application for a site at Highfields Farm, Costock was validated 22/02/2022 (22/00303/FUL). These proposals are identified on **Figure 9.6 of ES Volume 3 - Figures**. Applications at EIA Screening stage have not been considered within assessments in this ES, given the uncertainty of these schemes actually being proposed, lack of available detail to consider and that they are not considered to be 'existing and/or approved' in the context of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
- 4.80 Potential cumulative impacts of the Fair Oaks Renewable Energy Park are considered in the ecology assessment, **Chapter 8 - Ecology** and in the Landscape and Visual Assessment at **Chapter 9 - LVIA**.



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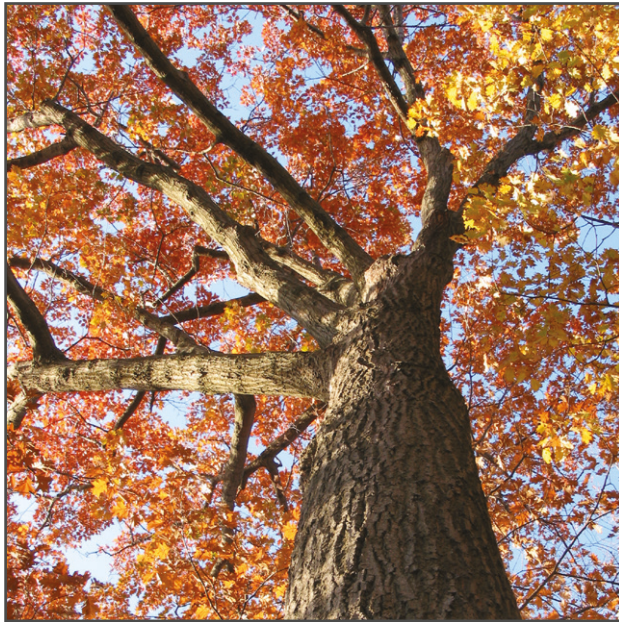
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## CHAPTER 5 - ENVIRONMENTAL IMPACT ASSESSMENT

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## THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

### The need for Environmental Impact Assessment - EIA Screening

5.1 The Town and Country Planning  
(Environmental Impact Assessment)

Regulations 2017 (as amended) require that certain types of development must be subject to environmental impact assessment (EIA). The types of development listed in Schedule 1 of the regulations must be subject to EIA, whilst those in Schedule 2 will only require this if they are likely to give rise to significant environmental effects. If an Environmental Statement is not volunteered, then a local planning authority should screen the proposal to consider whether EIA is required. The appropriate scope of an ES is determined through the Scoping exercise (although this is not mandatory).

5.2 Under these regulations the proposed Fair Oaks Renewable Energy Park is not classed as 'Schedule 1' development, for which all proposals will require an EIA. As such, a criteria based approach is used to determine if 'Schedule 2' development requires EIA.

5.3 At Schedule 2, Part 3 (a), the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended), defines what is classified as Schedule 2 development

in relation to the proposed form of development.

Column 1 - Description of development: '*(a) Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1);*'

Column 2 - Applicable thresholds and criteria: '*The area of the development exceeds 0.5 hectare.*'

5.4 A Screening Request was submitted to Rushcliffe Borough Council in October 2021. The report provided details of the proposed development and presented the screening process to be followed in line with the EIA Regulations. In addition, the Screening Request detailed the scope of works anticipated for the project and the guidance to be followed for each discipline.

5.5 No Screening Opinion was forthcoming from Rushcliffe Borough Council and on 9<sup>th</sup> December 2021, the Screening Request was formally withdrawn due to lack of resource availability within the Council. At this time, the applicant volunteered an EIA and identified that it would focus around Landscape and Visual Impact, as well as Ecology. On the 28<sup>th</sup> April, the proposed approach

was verbally agreed with the allocated planning officer, to progress with an elective EIA based on ecology and landscape and visual impacts as the only disciplines with the potential for significant impacts.

- 5.6 This ES has been prepared by a team of professional environmental assessors (see from **Paragraph 5.46 on page 83** for further details), following an Environmental Impact Assessment (EIA) carried out under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

## Scoping the Environmental Impact Assessment

- 5.7 Whilst formal EIA Scoping is not mandatory, the elective Scope of the EIA was agreed with Rushcliffe Borough Council in April 2022. No formal Scoping Opinion was sought to minimise workload on the authority.
- 5.8 The environmental assessments have been undertaken following well-established guidance in order to meet the requirements of Schedule 4 of the Town and Country Planning EIA Regulations 2017 (as amended) and

the appropriate Development Plan policies.

## Other Consultations

- 5.9 The viewpoint locations progressed for detailed analysis within the LVIA were identified in consultation with the Rushcliffe Borough Council's Design and Landscape Officer.

## Public Consultation

- 5.10 The following paragraphs are a brief summary of the public consultations that have taken place. The full report, including public feedback and copies of consultation material, is provided at **Appendix 5.1**.
- 5.11 Ridge Clean Energy Limited (the Developer) on behalf of Fair Oaks Renewable Energy Park Limited (the Applicant) has carried out a full programme of community consultation in support of its proposals for Fair Oaks Renewable Energy Park in line with Rushcliffe Borough Council's Statement of Community Involvement for Planning Policy and Planning Applications (2019). This section explains the public consultation that has been carried out in relation to this application.

## *Liaison with Parish Councils and Local MP*

- 5.12 In November 2021, Ruddington Parish Council offered the Applicant an informal parish council meeting as an opportunity to introduce the Proposed Development to Parish Council Members. Eleven Parish Council members attended along with members of the Ridge Clean Energy team who attended with a presentation and exhibition boards.
- 5.13 The presentation was followed by a question and answer session with the Ridge Clean Energy team.
- 5.14 Follow up letters were issued in early December 2021 to Gotham Parish Council, Barton in Fabis Parish Council and East Clifton Ward, no response was received.
- 5.15 In December 2021, the Applicant issued a list of questions and answers from the November meeting to Ruddington Parish Council members.
- 5.16 During the pre-application public consultation, a range of communication methods were used to provide information about the Proposed Development and ensure that the local community had the opportunity to provide their feedback.



5.17 In October 2021, an introductory letter was issued to the Conservative MP for Rushcliffe introducing the Proposed Development, the Applicant and offering the opportunity to meet and discuss the proposal. A meeting date was set for November 2022, however this was cancelled due to COVID-19.

## *Liaison with a group of local residents in Ruddington*

5.18 During the meeting held with Ruddington Parish Council in November, the Applicant learned of an ongoing project within the Parish to renovate a derelict youth centre into a new community centre. Given the Applicant's own experience of leading such a development elsewhere, continued liaison was held to share the Applicant's knowledge. This, and the liaison outlined below (which remains ongoing) was done under no obligation of support for the Proposed Development.

5.19 In January 2022, a virtual meeting was held with members of the Applicant's community liaison team to share further information and experience regarding the development of community centres.

5.20 In February 2022, a meeting was held in person in Ruddington with the volunteer Architectural Designer of the proposed community centre.

5.21 On the 15<sup>th</sup> June 2022, a virtual tour of the Charlbury Community Centre (Oxfordshire) was held with local Ruddington representatives, to further provide support and knowledge sharing of the applicant's own experience in such developments.

5.22 Other liaison work is being undertaken between the applicant and local residents, under no obligation to support the Proposed Development. In June 2022, the applicant met with volunteer residents and Co-op Members, in relation support for a community Food Pantry and allotments. Liaisons remain ongoing.

5.23 In September 2022, the applicant attended a local 'heat and eat' scheme in Ruddington with a view to develop relationships and identify opportunities to support this local initiative further.

## *Local Media*

5.24 In January 2022, the Applicant issued a press release to Ruddington Parish

Council, informing the public of the Applicant, that a solar and battery storage development was being proposed, and that further information would become available regarding dedicated public exhibitions for the proposal. The same press release was also sent to 'The Rudd' which was published on 14th February 2022. A copy of the press release is available within **Appendix 5.1**.

## *Public Exhibitions*

5.25 In early March 2022, invitations to the Applicant's public exhibitions were issued to residential dwellings (the consultation zone) is identified in **Plate 5.1 on page 80** below. The invitation contained details on the Applicant, Proposed Development, the dates and times for the two exhibitions and the Applicant's intentions for engagement and working with the local community. A copy of the invitation can be found at **Appendix 5.1**.

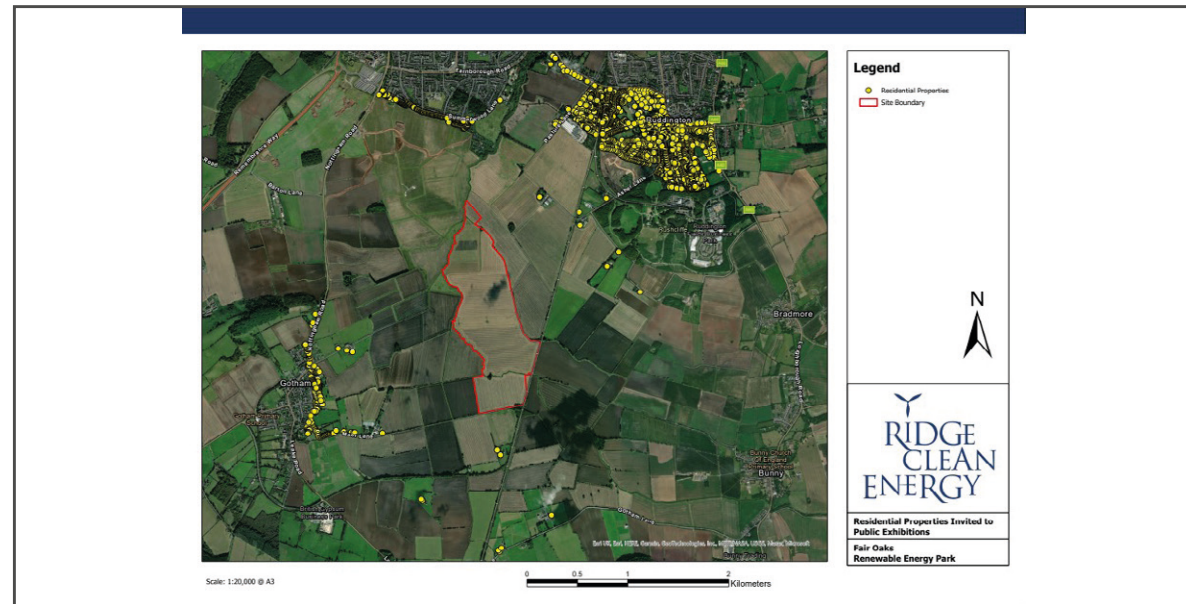
5.26 Copies of the invitation were also sent to Ruddington Parish Council, Gotham Parish Council and Barton in Fabis Parish Council. They were also digitally sent to the Conservative MP

for Rushcliffe, the portfolio holder for Communities and Climate Change at Rushcliffe Borough Council and the ward councillors for Ruddington.

5.27 At the same time as issuing the invitations to the public exhibitions, a dedicated project website was launched at [www.ridgecleanenergy.com/fairoaks](http://www.ridgecleanenergy.com/fairoaks), containing information on the project, the Applicant and contact details for the Applicant's project team.

5.28 The Applicant hosted two public exhibitions for the Proposed Development, on the 22nd and 25th March 2022 at St Peter's Rooms, Ruddington. The objective of the Public Exhibitions were:

- Present details of the Proposed Development that were known at the time to the local community;
- Learn from the local community and encourage feedback; and to seek to make enduring relationships with groups or individuals to enhance community life.
- Engage with the community to identify uses for the proposed community benefit fund and to identify local community initiatives that the Applicant could assist with.



Consultation addresses



Site Location

Plate 5.1 - Public Consultation Zone (extract from **Appendix 5.1**)

5.29 Large display boards were set up at the exhibitions providing information relating to:

- An overview of the Applicant;
- Indicative scheme details, including key facts and indicative timeline;
- An OS map showing distances from the Indicative Application Boundary;

- Proposed Site Design;
- Infrastructure;
- Information about the proposed technology;
- Acoustic, Heritage and Construction;
- Site Design, Biodiversity and Land Use;
- Proposed Environmental Benefits;

- Visualisations;
- Community Engagement; and
- Policy and Targets.

5.30 Following the event, the Applicant emailed those attendees who left contact details to thank them for attending the events and providing a link to the FAQ page on the dedicated project website.

## *Feedback and Applicant's Response*

5.31 Over the two public exhibition events held in the Village of Ruddington, at least 112 people were in attendance. Ridge Clean Energy requested all attendees to complete a feedback form upon entering the venue. Respondents had an opportunity to complete the form during the event or after the event through paid-postage envelopes. Fifty feedback forms were collected following the public exhibitions. In response to the question, 'Do you support renewable energy?', 45 out of 50 respondents, or 90 percent, indicated support answering 'Yes'.

5.32 A summary of all received comments is included within **Appendix 5.1**.

## APPROACH TO ENVIRONMENTAL IMPACT ASSESSMENT

### Purpose

5.33 The purpose of EIA and requirement for reporting in an ES is summarised by the Ministry of Housing, Communities and Local Government National Planning Practice Guidance (MHCLG, 2020):

*'The aim of Environmental Impact Assessment is to protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process.'* Paragraph Reference ID: 4-002-20140306.

*'The Environmental Statement must contain the information specified in regulation 18(3) and must meet the requirements of regulation 18(4). It must also include any additional information specified in Schedule 4 to the 2017 Regulations which is relevant to the*

*specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.'* Paragraph Reference ID: 4-035-20170728.

5.34 With this in mind, and having regard to requirements of Schedule 4 of the EIA Regulations, the Environmental Statement focuses upon those effects which are likely to be significant. The Environmental Statement aims to:

- obtain baseline information for the study area to identify those features that may be impacted upon by the development;
- identify and assess likely significant effects;
- identify those features of the development where environmental impacts can be avoided, and environmental benefits achieved, through careful consideration of design, construction, operational and decommissioning methodologies and through mitigation inherent within the site design; and
- with mitigation measures in place, assess the residual impacts of the Proposal.

## Scope of the EIA

### *Issues Not Considered Further in EIA*

- 5.35 The NPPF (MHCLG, 2021) and NPPG (MHCLG, 2020) are material planning considerations in the determination of planning applications with NPS EN-1 (DECC, 2011a) and EN-3 (DECC, 2011b) providing valuable guidance. These policy and guidance documents help direct the scope of work for Environmental Impact Assessment for renewable energy planning applications. This scope was used to inform the Scope agreed verbally with Rushcliffe Borough Council.
- 5.36 Other issues may not require further examination in the Environmental Impact Assessments for individual proposals but still require assessment to provide the information required to determine the application.
- 5.37 As such, additional assessments and reports accompany the planning application but do not form a part of this Environmental Statement, these include (as supplied by):

- Flood Risk and Surface Water (RAB Consultants);
- Glint and Glare (NEO Environmental);
- Heritage and Archaeology (Orion Heritage);
- Noise (Ion Acoustics);
- Socio-economics (Engena); and
- Traffic and Access (Engena).

- 5.38 Other matters are explained in the following paragraphs, but are not necessary to be considered any further within the Fair Oaks Renewable Energy Park Environmental Impact Assessment or this Environmental Statement (ES).

### CONSIDERATION OF ALTERNATIVES

- 5.39 The National Planning Policy Framework (MHCLG, 2021) at Paragraph 158 describes how it is not necessary for applicants of renewable or low carbon energy to demonstrate the overall need for such projects. The site selection and evolution process is detailed at **Chapter 3 - Site Selection and Design** but there is no further consideration of ranking of potential alternative sites or any form of sequential testing, as this is

not appropriate nor in accordance with Government Planning Policy and Guidance for the proposed form of development. The Rushcliffe Borough Council Brownfield Register records no sites of more than 3.45ha, considerably less than the required land area and so greenfield land was progressed.

- 5.40 Renewable energy projects such as the proposed project have a valuable role to play in offsetting emissions contributing to climate change. The 'do nothing' scenario is therefore considered in the round within **Chapter 2 - Development Rationale** with respect to climate change. The benefits of renewable energy parks are not just in abating climate change, but in producing domestic energy that is competitive in pricing with fossil fuels. Also with the proposed development there are substantial landscape and biodiversity enhancements (as detailed in the Outline Landscape and Biodiversity Environment Management Plan, **Figure 8.3**) which contribute to mitigating the ecological emergency.

- 5.41 Consideration of alternatives is therefore not considered further within individual chapters.



## CONTAMINATED LAND

- 5.42 Desktop research identified that past and present land uses do not offer potential for contamination to be present on site. Therefore further investigation with respect to contaminated land is not considered necessary at the proposed site, and the matter is not discussed further in this ES.

## ACCIDENTS AND DISASTERS

- 5.43 Schedule 4 (8) of the EIA Regulations require:

*A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks or major accidents and/or disasters which are relevant to the project concerned.*

- 5.44 The construction process does not require any unusual or hazardous substances (other than found on standard construction sites). Furthermore, it is considered that there are sufficient and standard construction control measures in place, which will be addressed in a CEMP, secured by way of planning condition. During operation, the

solar panels are relatively inert with no moving parts and are regularly monitored. The BESS units are self-regulated (see paragraph 6.38 of Chapter 6 of this ES). Accordingly, it is considered that the Proposed Development would not be vulnerable to accidents that would result in likely significant adverse effects to the environment.

- 5.45 The project is not considered to be vulnerable to disasters with the exception of flood events, which are addressed in section 4 of the accompanying Flood Risk Assessment. Accordingly, it is considered that the Proposed Development would not be vulnerable to disasters that would result in likely significant adverse effects to the environment.

## Environmental Impact Assessment Team

- 5.46 The Applicant appointed a specialist team to undertake the Environmental Impact Assessment and to produce the subsequent Environmental Statement.
- 5.47 The principal project manager for the Environmental Impact Assessment is Engena. Engena is an independent

renewable energy planning consultancy with 16-years and over a thousand Megawatts of development experience in the UK energy industry.

- 5.48 The company specialises in the design and development of renewable energy projects and provides support and management of all associated aspects, from site feasibility assessment through to layout design and the co-ordination of environmental impact assessments and planning applications.

- 5.49 For specific activities, such as landscape and visual and ecology assessments, Engena employs independent established specialists with an expert knowledge of the appropriate standards and methodologies required for Environmental Impact Assessment (EIA) and an understanding of the potential impacts associated with renewable energy park developments.

- 5.50 The independent specialists, each established in their field, who form the Environmental Impact Assessment team with Engena are:

- Ecology Consulting - Ecology and Ornithology; and
- HBA Environmental - LVIA.

5.51 The specialist assessments and their associated chapters have been authored in their entirety by the relevant consultants.

5.52 In addition, the following specialist consultants have been employed to provide background reports and analysis to inform the relevant Environmental Statement chapters:

- Daniel Baird Associates - Agricultural Land Classification Survey; and
- MS Environmental - Visualisations.

5.53 The Applicant is also able to demonstrate their credentials with the project manager being a full IEMA registered EIA Practitioner as well as being a Chartered Environmentalist (CEnv).

## Structure of Environmental Statement

5.54 The findings of the Environmental Impact Assessment are presented within this four-volume, five part, Environmental Statement consisting of:

- Volume 1: Non-Technical Summary – Summarising the proposal and key significant issues and

findings, in a format which is easily accessible to a non-technical audience;

- Volume 2A: Written Statement - The detailed Environmental Statement, containing the independent specialist assessments, proposed mitigation and predicted residual impacts;
- Volume 2B: Appendices - Containing the background research, surveys and assessments to the Written Statement;
- Volume 3: Figures - An A3 format document containing the site layout figures, construction figures and figures accompanying the chapter specific assessments; and
- Volume 4: Visualisations - A large format document presenting the visualisations referred to in the Landscape and Visual Impact Assessment within the Written Statement.

5.55 In addition to the four-volume, five part, Environmental Statement the Applicant has also submitted a Design and Access Statement and Planning Statement.

5.56 Whilst not forming part of the Environmental Statement, the Planning Statement is a key document within the overall submission summarising the National, County and Local policy context relevant to the development, including the identified need for solar energy. The document analyses the proposed development against these policies and the need to determine the acceptability of the development at this location.

5.57 Electronic copies of the Environmental Statement have been submitted to Rushcliffe Borough Council, where the document will be available for public viewing. A printed copy is available for viewing at:

Rushcliffe Borough Council  
Rushcliffe Arena  
Rugby Road  
West Bridgford  
NG2 7YG

5.58 Electronic copies of the Environmental Statement are also available from the project website: <https://ridgecleanenergy.com/fairoaks/>.

## Methodologies and Guidance

5.59 The Environmental Impact Assessment has been undertaken according to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended), and the ES produced to report on the findings of the EIA, following the identified scope.

5.60 Throughout, general guidance has also been used from the following documents:

- National Planning Policy Framework, MHCLG, 2021;
- National Planning Practice Guidance, MHCLG, 2020;
- Overarching National Policy Statement for Energy (EN-1), 2011a;
- National Policy Statement for Renewable Energy Infrastructure (EN-3), 2011b;
- Rushcliffe Local Plan 2014; and
- Ruddington and Gotham Neighbourhood Plans (Ruddington Parish Council, 2021 and Gotham Parish Council 2020).

5.61 Individual specialist sections of the assessment and subsequent chapters have been prepared according to the relevant standards and methodologies pertinent to each section. Standards and methodologies referenced are detailed by topic below and discussed in each chapter. Further references may be available in individual chapters to research papers and site specific resources, where appropriate.

## *Specific Standards, Guidance and Methods*

### CHAPTER 3 - SITE SELECTION

- Building Research Establishment (BRE) Planning guidance for the development of large scale ground mounted solar PV systems (2014);
- BRE Agricultural Good Practice Guidance for Solar Farms (2014);
- BRE National Solar Centre Biodiversity Guidance for Solar Developments (2014);
- Department of Energy and Climate Change UK Solar PV Strategy Part 2 (2014);

- Natural England Technical Information Note TIN101 - Solar parks: maximising environmental benefits (2011); and
- Natural England Technical Information Note TIN049 Edition 2 - Agricultural Land Classification: Protecting the best and most versatile agricultural land (2012).

### CHAPTER 4 - EXISTING CONDITIONS (AGRICULTURAL LAND CLASSIFICATION)

- Ministry of Agriculture Fisheries and Food, Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land (1988); and
- Natural England Technical Information Note TIN049 Edition 2 - Agricultural Land Classification: Protecting the best and most versatile agricultural land (2012).

## CHAPTER 8 - ECOLOGY

- The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, updated July 2021);
- 'Managing Natura 2000 Sites' (European Communities 2000), which gives guidance on the implementation of the Birds and Habitats Directives;
- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2021);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016);
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury et al. 2021); and
- The UK Post-2010 Biodiversity Framework.

## CHAPTER 9 - LANDSCAPE AND VISUAL IMPACT ASSESSMENT

- Guidelines for Landscape and Visual Impact Assessment;

3rd Edition; The Institute of Environmental Management and Assessment and the Landscape Institute (2013);

- Natural England Landscape Character Profiles;
- Natural England, An Approach to Landscape Character Assessment (2014); and
- Visual Representation of Development Proposals (LI Advice Note 06/19).
- Landscape Character Assessment: Technical Information Note 08/2015 (LI 2015), known as TIN 08/15.
- Assessing Landscape Value Outside National Designations: Technical Guidance Note 02/21 (LI 2021), known as TGN 02/21.
- Visual Representation of Development Proposals: Technical Guidance Note 06/19 (LI September 2019), known as TGN 06/19.

5.62 The process employed throughout the assessments has been developed to ensure a rigorous assessment and is outlined below:

- establishment of methodologies – in accordance with the relevant standards and published guidance detailed from **Paragraph 5.59 on page 85** and the relevant Planning Policies;
- identification of baseline conditions both of the site and the surrounding study area where appropriate. This includes for the sensitivity of the receptors which may be affected through changes in baseline conditions;
- assessment of predicted impacts and their significance;
- identification of mitigation measures where appropriate; and
- identification and assessment of residual impacts following implementation of mitigation measures.

5.63 The Environmental Statement as a whole follows the same format for the technical assessments (**Chapter 8 - Ecology** and **Chapter 9 - LVIA**) with a summary of mitigation measures and residual impacts at the end of the document.



## Study Area

- 5.64 As stated at **Paragraph 5.33 on page 81**, the Environmental Statement should focus upon potential significant effects to the baseline environment. With this in mind the study area was selected in order to allow studies to focus on significant effects.
- 5.65 Whilst each discipline will require a bespoke study area, the principal assessment which informs the establishment of the study area is the Landscape and Visual Impact Assessment (**Chapter 119**).
- 5.66 Based on ZTV intervisibility mapping, fieldwork observations and viewpoint appraisal, it was the professional opinion of the landscape architect, that a 7km radius study area would ensure adequate assessment of significant effects.
- 5.67 The Ecological assessment (**Chapter 108**) considers the potential impacts upon ecological receptors and designations across and proximate to the site. Designated sites and species of conservation concern at a national, regional and local level have been reviewed through data search as discussed at **Chapter 4 - Existing**

**Conditions.** The desk study to support this assessment covered all European protected sites (designated and proposed) within 20km of the Proposal, all nationally important sites within 5km and all other protected nature conservation sites within 2km.

- 5.68 The assessment states:
- “field survey areas were chosen to include all areas within the potential zone of ecological influence of the development, where there was habitat that could support important populations, plus an area around that to provide wider context to inform the assessment. The extended Phase 1 habitat survey, breeding bird surveys and protected species surveys covered the proposed development plus up to a 500m buffer (where access/viewing was possible), whilst the wintering bird surveys extended up to a 1km buffer.”*

## DIFFICULTIES AND LIMITATIONS

- 5.69 No specific difficulties or limitations have been reported in the ecological assessment (Chapter 8). The LVIA (Chapter 9) advises in respect of a

number of minor design modifications in the final stages of the EIA process:

*“The fence line has been amended in two places along the western boundary of the site to accommodate the revised application boundary, solar panels have been added to fill a gap where there was previously an internal access route in the middle of the southern part of the site and the four transformers along the drain in the middle of the northern part of the site have been raised by 0.62 – 0.94 mAGL to allow for the 1 in 100 annual exceedance probability fluvial flood area. None of these would make a noticeable difference to the ZTV or visualisations and reliance on the ZTVs and visualisations has not prevented a thorough and robust assessment upon which a planning determination can take place.”*

- 5.70 Despite this, a robust and comprehensive EIA has been undertaken as reported in this ES, providing Rushcliffe Borough Council with the information required to determine the application.

## REFERENCES

Act of Parliament, 2017 (as amended), Town and Country Planning (Environmental Impact Assessment) Regulations: Statutory Instrument 2017 no. 571, HMSO, UK.

Ministry of Communities, Housing and Local Government, 2021, National Planning Policy Framework, HMSO, UK.

Ministry of Housing, Communities and Local Government, 2020, Planning Practice Guidance, HMSO, UK, Online Resource, retrieved from: <https://www.gov.uk/guidance/environmental-impact-assessment> [Accessed 07/12/2021].

Department of Energy and Climate Change, 2011a, Overarching National Policy Statement for Energy (EN-1), HMSO, UK.

Department of Energy and Climate Change, 2011b, National Policy Statement for Renewable Energy Infrastructure (EN-3), HMSO, UK.

## CHAPTER 6 - DEVELOPMENT PROPOSAL

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## ELEMENTS OF THE FAIR OAKS RENEWABLE ENERGY PARK

6.1 The elements of the Fair Oaks Renewable Energy Park are described in this chapter. Where these elements may have potential impacts on the environment, reference is made to the Environmental Statement (ES) chapter where the impacts are discussed and assessed. The Transport Statement accompanying the application describes construction, operation

and decommissioning impacts on the highway network and users.

6.2 The Proposal comprises a solar array and Battery Energy Storage System (BESS) with the necessary electrical and supporting infrastructure to export and generate electricity to the grid and charge the battery. In addition to the technical equipment, a range of environmental enhancements are included with the application. These measures are discussed further from **Paragraph 6.55 on page 97**, while first the technical infrastructure is detailed, the arrangement of which is shown on **Figure 1.2 and Figure 1.3 of ES Volume 3 - Figures**.

### Solar Array

6.3 An array of ground-mounted solar photovoltaic panels is set out within a fenced area of approximately 76.3 hectares. The export capacity of the array is up to 49.9MW (3 S.F.).

6.4 The panels are typically grouped in blocks (or 'racks') of panels that are arranged in two rows of 26 panels in portrait format. Half 'racks' of 2 rows by 13 columns of panels are used to infill smaller areas.

6.5 Candidate model solar panels have been used for the purpose of the EIA, details of a typical panel are provided

in **Figure 6.1 of ES Volume 3**. The final solar panel model choice and dimensions will be selected prior to construction and will be within the parameters described from **Paragraph 6.6** below.

### Panel Frames and Anchors

6.6 The solar panels will be mounted on frames at an angle of approximately 20 to 25 degrees, with a maximum height of 3.0m (as has been assessed in **Chapter 8 - Landscape and Visual Impact Assessment (LVIA)**). The frames that support the panels are typically made of aluminium or galvanised steel simply pushed in to the ground. Typical frame details are provided at **Figure 6.2 of ES Volume 3** and shown at **Plate 6.1**.



Plate 6.1 - Typical Ground-Mounted Solar Array on Frame

- 6.7 The lower edge of the panels will be a minimum of 0.9m above the ground to avoid shading from meadow planting beneath the panels.
- 6.8 Space between frames is provided for maintenance access and to minimise shading from neighbouring panels (**Figure 6.2, ES Volume 3**).

## Site Access Tracks

- 6.9 Access within the site is required to the site transformers during construction, through operation, and finally during the decommissioning of the site at the end of the project's operational life.
- 6.10 Construction traffic will travel along Pasture Lane and south to Asher Lane to reach the site. A temporary steel plate track (each plate measuring 2.5 x 3 m) will be laid on top of agricultural land in the field parallel to the existing agricultural track at Pasture Lane.



Plate 6.2 - Installation of Temporary Trackway

- 6.11 There is a single point of entrance off the farm track after it leaves Asher Lane by Fields Farm Cottage. This is further discussed in the **Chapter 8 - Traffic and Access Report** that accompanies the application.
- 6.12 It is proposed that existing field entrance will be utilised and upgraded, where necessary, to allow access to the solar array, BESS and substation compound.
- 6.13 Where sections of new, upgraded or widened access track are required for the duration of the proposal, these will have the appearance of typical vernacular farm tracks with a crushed stone running surface (**Plate 6.3**) that

will grass over in time. Typical detail is shown in **Figure 6.3 (ES Volume 3)**, the running surface (4.5m wide) is laid over a permeable stone sub-surface on a surface-mounted geogrid base (e.g. Geotex).

- 6.14 The track will be permeable and no formal drainage is proposed. Water drainage off the track has also been considered in the track design and layout, and is assessed in the Flood Risk Assessment that accompanies the application.
- 6.15 The on-site access tracks within the renewable energy park need to remain in place through the lifetime of the project to facilitate access for routine maintenance.



Plate 6.3 - Typical New Site Access Track

## Inverters and Transformers

- 6.16 The solar panels generate Direct Current (DC) electricity, which must be converted to electricity with an Alternating Current (AC) before it is exported into the local distribution network. This conversion will be undertaken by string inverter units located behind the panels, and mounted onto the frame.
- 6.17 Each inverter unit is typically 100cm x 70cm x 37cm and approximately 232 would be required (**Plate 6.4 on page 93**). The panels and inverters are connected via cabling which is mounted onto the panel frames or suspended behind the panels. Underground communications and power cables link the inverters to the transformer units.
- 6.18 The transformers raise the voltage of the generated electricity to minimize electrical losses within the site. They are typically mounted in standard container units or GRP cabinets.
- 6.19 Approximately ten transformer units would be required, each unit would be approximately 6.1m long, 2.4m wide and 2.9m tall (**Plate 6.5 on**

**page 93**). Typical detail is provided in **Figure 6.4 (ES Volume 3)**. The external finish will be agreed with the Local Planning Authority prior to construction commencing.



Plate 6.4 - Typical string-inverter units



Plate 6.5 - Typical Transformer

- 6.20 The four northernmost transformers will be mounted on open frames to raise them above the once in 100 year potential flood levels to protect the electrical equipment. **Figure 6.4 (ES Volume 3)** shows typical detail. The finished levels vary between 94cm and 62cm above existing ground level as described in the Flood Risk Assessment accompanying the planning application.

## Customer Cabin

- 6.21 A single on-site customer cabin will contain the security and solar farm control systems, equipment for general maintenance and spare parts, should they be needed during the operational phase. These are glass reinforced plastic (GRP) or steel container-based cabinets typically 6.1m long, 2.4m wide and 2.9m high.
- 6.22 **Plate 6.6** shows a typical container-based cabinet. A drawing of a typical customer cabin is provided as **Figure 6.5 (ES Volume 3)**. The external finish will be agreed with the Local Planning Authority prior to construction commencing.





Plate 6.6 - Typical Steel Storage Unit

## Cables and Conduits

6.23 The solar panels are electrically connected to each other, with connections made for:

- electronic communication and control;
- low voltage power supply for the monitoring and operating systems;
- high voltage power export cables; and
- broadband telecommunication for remote site monitoring and management.

6.24 Cables between solar panels in the same row are hung in ducts fixed along the back of panels to the end of the row.

6.25 All connection cables will be run across the site in underground cable trenches. The typical detail of the cable trenches are shown on **Figure 6.6 (ES Volume 3)** and are designed to ensure safety and avoid disturbance from agricultural equipment and activities.

## Security

6.26 A perimeter fence would be installed to protect the panels from theft. The fence will be stock style fencing with wooden posts and open wire mesh up to 1.8m tall (as shown at **Plate 6.7**). A typical fence and accompanying wire mesh gate detail is shown in **Figure 6.7 (ES Volume 3)**. There will be a single gate at the site entrance from the existing farm track.

6.27 A 15cm gap at the base of the fence would allow the passage of small animals. Access points for wildlife will be included in the fence line to ensure permeability across habitat.



Plate 6.7 - Typical Site Perimeter Fence

6.28 Inward facing CCTV cameras will be located around the perimeter of the site. Cameras will be positioned on posts that are up to 2m tall, typical detail is shown **Figure 6.8 (ES Volume 3)**.

## Lighting

6.29 No visible lighting is proposed as part of the Fair Oaks Renewable Energy Park for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye.

6.30 During the construction phase, temporary lighting may be required



should deliveries be scheduled for after dusk, and security lighting on a sensor is typically utilised for the construction phase whilst machinery and materials are stored on site. Any lighting on site during the construction phase will be kept to a minimum to avoid disturbance to local residents and ecological species as far as practically possible whilst operating a safe site.

## Battery Energy Storage System

- 6.31 The BESS (along with the substation compound) will occupy an area of approximately 1.0ha.
- 6.32 There are various battery technologies available, each having their own arrangement of battery modules, power conversion systems, and transformers. **Plate 6.8 on page 95** shows a typical BESS.
- 6.33 The proposed BESS would comprise approximately 28 containerised battery modules. Rated at approximately 100MWh, the BESS would be able to provide a continuous 50MW output over a 2 hour period.
- 6.34 A Power Conversion System (PCS) unit converts the Direct Current (DC) electricity of the battery to the

Alternating Current (AC) electricity of the power network - and vice-versa - whilst charging.

- 6.35 A PCS unit is typically required for each battery container unit.
- 6.36 A switchgear container houses a 33kV transformer amongst other equipment generally serves each battery/PCS pair. This steps the system voltage up (or down) appropriately. Each switchgear container is typically 12.2m long, 2.45m deep and less than 3.5m high.



Plate 6.8 - Typical Battery Energy Storage System

- 6.37 The individual battery module and PCS containers are typically 6m long, 2.4m wide and 3.5m tall and 3.7m long,

2.4m wide and 3.5m tall respectively (height includes mounting plinths).

- 6.38 A detailed typical layout of the BESS is provided at **Figure 6.9**, with illustrative elevations provided as **Figure 6.10** and as block elevations in **Figure 6.11 (ES Volume 3)**.
- 6.39 Each component battery module contains a temperature monitoring system that will shut down the module if a battery overheats. In the unlikely event of a system fire, a fire suppressant system ensures that the fire is self contained within the module, and is quickly extinguished.

## Substation Compound

- 6.40 To connect to the local electricity distribution network for the export of power stored and generated, a link must be made between the energy park electrical network and the local electricity distribution network through appropriate equipment (e.g. cables and switchgear), isolation switches, metering equipment and site transformer.
- 6.41 The substation compound will be segregated in to an area for the operator's equipment and an area for the DNO's equipment. At this location the DNO is National Grid Electricity Distribution (NGED).

- 6.42 The tallest solid block elements of the substation compound are the NGED Control Room and Solar PV and BESS Substation buildings at 5.0m. The separate busbar elements would protrude approximately 1.2m above the roofline of these buildings.
- 6.43 Underground cables will run from the solar PV equipment and also BESS equipment to the energy park substation adjacent to the BESS site. The energy park substation comprises switchgear and segregated control/SCADA room. External ground mounted transformers are located adjacent to the substation.
- 6.44 From the on-site substation compound, underground cables will connect to the Distribution Network Operator's (DNO's) 132kV overhead line to the south of Clifton as shown on **Figure 1.2 (ES Volume 3)**. This would be subject to a separate consenting process, however is assessed proportionately in in **Chapter 8 - Ecology** and **Chapter 9 - LVIA**.
- 6.45 The substation compound buildings will be constructed of brick or Glass Reinforced Plastic (GRP) (as shown at **Plate 6.9**) finished in a colour to match the local vernacular and to be agreed with the Local Planning Authority.

A detailed typical layout of the Substation Compound is provided at **Figure 6.9**, with illustrative elevations provided as **Figure 6.10** and block illustrations as **Figure 6.11**.

- 6.46 For safety, the BESS and substation compound will be fenced with palisade fencing (**Figure 6.12**).



Plate 6.9 - Typical Substation Elements

## Temporary Construction Compound

- 6.47 For the duration of the construction (and decommissioning) periods, a temporary compound area will be required to provide secure storage of equipment and construction materials, welfare facilities and office accommodation for site staff.
- 6.48 The compound is located to the south of barns associated with Ruddington Fields Farm. Temporary welfare facilities will likely move around as the construction team move across the site.
- 6.49 Elements contained in the temporary construction compounds include the following:
- site office;
  - welfare facilities;
  - equipment storage area;
  - materials storage area;
  - waste separation and holding area;
  - wheel washing facilities at the start of the temporary trackway;
  - HGV turning area; and

- vehicle parking spaces.

6.50 The layout of elements within the construction compounds may vary but the overall dimensions will be approximately 40m by 20m.

## Operational Period

6.51 As noted at **Chapter 3 - Site Selection and Design**, solar farms are normally temporary structures and planning conditions are applied to ensure that the installations are removed at the end of their operational life and that the land is restored to its previous use. The proposed operational period for the Fair Oaks Renewable Energy Park is 40 years.

## PROPOSAL SUMMARY

6.52 In summary, the elements forming the Fair Oaks Renewable Energy Park are:

- solar photovoltaic panels with a total export capacity of up to 49.9MW up to 3m high;
- panel frames with ground anchors;
- new access track, up to 4.5m wide;

- a temporary steel plate track parallel to Pasture Lane;
- approximately 232 inverters mounted to the rear of the panels
- ten transformer units;
- a customer cabin;
- a perimeter fence, up to 1.8m tall with a single site entrance gate;
- cables and conduits;
- CCTV cameras on 2m posts;
- a 1ha BESS and substation compound with 28 containerised battery units, 28 attendant PCS modules and 14 switchgear containers;
- a substation compound; and
- a temporary construction compound with welfare, storage and office facilities.

6.53 The arrangement of these elements is shown on **Figure 1.2, Figure 1.3** and **Figure 6.9 (ES Volume 3)**.

6.54 In addition to the technical infrastructure required, a series of ecological and landscape enhancements are proposed. These are discussed further from

**Paragraph 6.55 on page 97** and detailed within **Chapter 8 - Ecology** and **Chapter 9 - LVIA**, and shown on **Figure 8.3 (ES Volume 3)**.

## SUMMARY OF ENHANCEMENTS

6.55 Alongside the technical infrastructure required to construct and operate the proposed renewable energy park, additional measures are proposed as part of the development.

6.56 **Chapter 8 - Ecology** and **Chapter 9 - LVIA** describe the ecological and landscape and visual assessments of the proposed renewable energy park and, where relevant, identify whether mitigation is required or enhancements are suitable. These measures are summarised at **Chapter 10 - Avoidance and Mitigation**.

6.57 The biodiversity enhancements will be incorporated with the development of the solar farm and managed over the project life in accordance with an outline Landscape and Biodiversity Mitigation and Enhancement Plan (LBMEP). As shown in **Figure 8.3, ES Volume 3**, the measures include:

- Woodland copses of native trees, one in the far north of the site and two along the western boundary.
- New hedgerows around the boundary of the site with occasional small native hedgerow trees along the western and northeastern boundaries of the site.
- Species-rich meadow across the entire site within the perimeter fencing including beneath the solar PV arrays (but not within the battery storage and substation compound).
- Grassland between the perimeter fence and the site boundary.
- A 1ha area of lapwing habitat to the south of Fairham Brook which would be left fallow, allowed to vegetate naturally and ploughed once a year to prevent the establishment of tall woody vegetation.

6.58 A mix of local native species will be used and will be agreed with Rushcliffe Borough Council through the OLBMEP (to be agreed under Condition). To avoid creating a uniform habitat, a mixture of specimen sizes will be used

and ongoing maintenance through grazing, mowing and rotational trimming will allow variation in height to result in a natural appearance whilst maximizing screening benefits. The planting has been specifically designed to reflect the wider pattern and scale of woodland and hedging in the area.

6.59 The environmental management of the site for the life of the project will be detailed within a LBEMP to be secured via planning condition and to be materially in accordance with the Outline BLEMP. This ensures that:

- specimens that do not survive are replaced to maintain screening;
- hedges and trees are maintained to appropriate heights;
- plans are in place to effectively and sensitively manage mowing/ grazing in conjunction with wild flower growth; and
- environmental best practice is adhered to during the construction, operation and decommissioning phases of the project.



## REFERENCES

Building Research Establishment National Solar Centre, 2014, Biodiversity Guidance for Solar Developments, BRE, UK.

Department for Transport (DfT), 2007, Manual for Streets, HMSO, UK.

Highways England, Transport Scotland, Welsh Government and Department for Infrastructure, 2020, The Design Manual for Roads and Bridges, Volume 6, Section 2, Part 6, CD 123 - Geometric design of at-grade priority and signal-controlled junctions revision 1, Highways England, UK.

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## INTRODUCTION

- 7.1 This chapter describes the construction, operation and decommissioning phases of the proposed Fair Oaks Renewable Energy Park
- 7.2 Potential impacts associated with the respective phases of the development are addressed individually within the following ES assessment chapters: **Chapter 8 - Ecology and Chapter**

**9 - Landscape and Visual Impact Assessment.** Where potential impacts have not been judged to be potentially significant in EIA terms, these have been assessed in the reports accompanying the application.

## THE RENEWABLE ENERGY PARK CONSTRUCTION PHASE

### Construction Process

- 7.3 The construction of a renewable energy park is a relatively straight forward process.
- 7.4 The principal phases to the construction are:
- temporary construction compound is established, site access tracks are laid, built or upgraded and site fencing is erected;
  - panel frames are push-driven into the ground and fixed in place;
  - panels are mounted to the frames and wired together;
  - cable trenches are dug to install the main cables;

- site containers are offloaded in situ;
- all electrical connections are made;
- the site is commissioned; and
- landscape mitigation planting takes place during the autumn.

7.5 It is envisaged that the proposed Fair Oaks Renewable Energy Park will take nine to twelve months to construct, with multiple teams working in different areas of the site simultaneously. Most of the construction time is associated with the solar panel delivery and erection.

7.6 A typical construction programme for a project of the scale of the Fair Oaks Renewable Energy Park is shown in **Table 7.1 on page 104.**

7.7 **Plate 7.1 on page 105** provides an overview of the construction process as a photographic sequence.

Table 7.1 - Typical Nine-Month Construction Programme

Activity	Programme Month								
	1	2	3	4	5	6	7	8	9
Construction compound, including gates, welfare and temporary surfacing									
Temporary trackway									
Security fencing and gates									
Foundation concrete for inverter/transformer units, customer cabin, welfare unit, store, substation and CCTV posts									
Site tracks & BESS/Substation compound (crushed stone over geogrid base)									
Inverters									
Cabling									
Cable trench sand									
Solar panels									
Mounting system									
Transformers									
Client container									
BESS & Substation Components									
Ecological works (seed, new hedge and woodland), subject to appropriate time of year.									
Site commissioning and site clearing									





Plate 7.1 - Photographic Sequence of Construction Process

## Groundworks

- |   |   |  |
|---|---|--|
| <p>7.8 Works across the site will be staged as the construction teams progress across the field comprising the site.</p> <p>7.9 There is a single construction point of access off of the Artex Factory site accessed off of Pasture Lane (Unique Street Reference Number (USRN): 33001773), Ruddington approximately 535m south of Clifton Lane/Road between Clifton and Ruddington.</p> <p>7.10 From the site entrance to the south of the Artex factory, steel track way will provide temporary access for the duration of construction, parallel to Pasture Lane in agricultural land to the point that Pasture Lane becomes Asher Lane. This will avoid construction traffic being routed along the publicly accessible stretch of Asher Lane. From the start of Asher Lane (north west of Fields Farm Cottages), the access will follow existing farm tracks as far as is possible and on to the BESS and substation compound and the transformer unit locations. Access tracks are kept to a minimum and are not required to access each row of panels. The existing field entrance has been used so that no new breaks in</p> | <p>7.11 Where new access tracks are required these will have a running width of 4.5m. As described in <b>Chapter 6 - Development Proposal</b>, the tracks will have the appearance of typical vernacular farm tracks with a crushed stone running surface built up over geotextile placed on top of prepared (scraped and levelled) topsoil at, or just below, existing ground level. The tracks will be allowed to grass over following completion of the construction phase. To minimise impacts on drainage across the site, tracks will be permeable. The 575m of temporary steel track way comes as 2.5m by 3m panels which are laid and secured. Holding pens and wheel-wash areas will be used to keep HGVs on site until Pasture Lane is clear for a vehicle to enter or leave site, as directed via banksmen. The steel track will be removed following construction.</p> <p>7.12 A temporary construction compound will be established to the south of barns associated with Ruddington Fields Farm. The compound will provide a secure store for materials</p> | <p>and equipment and welfare facilities and will be created following the same construction technique as for the access tracks. Construction of the temporary construction compound will commence at the start of works.</p> <p>7.13 The BESS and substation compound will be layed out with crushed stone over geotextile in the same manner as the site tracks.</p> <p>7.14 Stock proof fencing providing security will be installed around the perimeter of the solar farm. Fence posts will be driven into the ground wherever ground conditions permit. Wire mesh is then tensioned between the posts.</p> <p>7.15 Palisade fencing will be erected around the BESS and substation compound using concrete footings at each fence post.</p> <p>7.16 Concrete footings or piers are cast for the site cabinets, transformer units BESS and substations components where required. Concrete will also be used to anchor the posts holding the CCTV cameras.</p> <p>7.17 Cable trenches will be excavated from the array 'table' ends to the transformer unit pads, and from the transformer units to the substation</p> |
|---|---|--|



and electrical and telecommunication cables installed. The cables will be installed as the trench is excavated, and the trench filled immediately afterwards wherever possible.

- 7.18 The installation of the solar panel frame legs follows a similar approach to fencing installation, these are push-driven into the ground.
- 7.19 The frames are then assembled. Firstly the edges of the frames are installed, and then the horizontal bars are bolted on to form a lattice onto which the panels are installed.
- 7.20 The panels are then mounted onto the frames, and electrically connected with the wires carried behind the panels.
- 7.21 The wiring is then fed to the inverter units.
- 7.22 The various pre-assembled container units are delivered directly on to their pads and installed.
- 7.23 Following commissioning, the site is cleared and the temporary construction compound removed.
- 7.24 Planting is undertaken at the next planting season (autumn).

7.25 The approximate number of deliveries and removals associated with the groundworks, solar panel and associated infrastructure delivery throughout the construction process for the Fair Oaks Renewable Energy Park are outlined in the Traffic and Access Statement accompanying the planning application.

7.26 Whilst subject to a separate consenting procedure, an underground 132kV cable will run from the substation compound to the point of connection to the local distribution network approximately 900m north of the site, as shown on **Figure 1.2 (ES Volume 3 - Figures)**. The route along which the cable will be laid is subject to confirmation but is anticipated to follow the site boundary from the substation north-west towards Fairham Brook then follow it north along the eastern bank. Just south of the connection point, the connection will be directionally-drilled under the Brook to avoid disturbance to the waterway.

7.27 The connection route is considered further in **Chapter 8 - Ecology and Chapter 9 - Landscape and Visual Impact Assessment (LVIA)**.

## OPERATIONAL PHASE

7.28 Following the installation of the solar panels and the completion of commissioning, the panels begin generating and exporting electricity to the local distribution network.

7.29 The solar panels will be mounted at a fixed angle of approximately 25 degrees and will be approximately south facing to maximise generation throughout the day and over the year. The array is carefully designed to consider the specific ground conditions and to minimise shading between panel rows and from nearby features such as trees and hedges. The equipment selected will be fit for purpose for the projected 40-year development lifetime.

7.30 The site is remotely monitored and operated with an automated system alerting an engineer in case of component or system errors or component failures.

7.31 The use of remote monitoring reduces the number of site visits required. However, regular checks will be undertaken to ensure the panels, frames, fittings, inverters, batteries,

PCSS, substation components and fencing are all in good working order.

- 7.32 The operational site would be maintained (see **Chapter 8** and **9**), to allow benefits to biodiversity whilst allowing the potential for continued agricultural use in the form of sheep grazing (with the intention that a licence would be entered into at the appropriate time).
- 7.33 The panels will be cleaned periodically to ensure maximum production, as shown at **Plate 7.2**. This involves the transportation of a tractor unit, de-ionised water bowser and cleaning team (generally 3-4 personnel) to site once or twice a year.
- 7.34 The battery will charge either during daylight when the panels are generating or at times when electricity prices are low. It will be called on to generate at times of maximum demand or when immediate generation is required on the electricity network for example either because of a loss of a large generator elsewhere or on the network or when frequency support is required to balance load on the network.



Plate 7.2 - Typical Solar Farm Cleaning Unit

- 7.35 During normal operations, personnel will visit the site approximately once a month, in a light van or four-wheel drive vehicle.

## Predicted Electricity Generation

- 7.36 Fair Oaks Renewable Energy Park will connect directly in to the 132kV overhead power line south of Clifton. Whilst the site is generating it will supply electricity directly into the local distribution offsetting the import of power from the National Grid.
- 7.37 As stated at **Chapter 1 - Introduction** it is predicted that the renewable energy park at this site would offset

the equivalent annual electricity needs of approximately 11 200 Nottinghamshire homes (based on average domestic consumption per household of 3 900kWh (DBEIS, 2020)).

## Emissions

- 7.38 It has been predicted that the proposed solar farm will generate an annual average of approximately 43 700 000kWh (net) of electricity (to 3 S.F.).
- 7.39 The generation of this electricity will offset electricity generated from other sources. The project is connected in to the National Grid substation and all electricity generated by the site will be transferred to the electricity network. This means that whilst the solar array is generating electricity, it in turn reduces demand on the large fossil fuel power stations.
- 7.40 Different organisations have, historically, made differing assumptions for calculating the emissions offset associated with renewable energy generation, varying in their view of the power generation technology that is actually offset.

7.41 For carbon dioxide these assumptions range from 860gCO<sub>2</sub>/kWh (based upon coal generation) to 355gCO<sub>2</sub>/kWh (based upon gas generation).

7.42 The National Grid itself is dynamic and electricity is sourced from a variety of generators including coal, gas, oil, nuclear and renewable energy. As shown in **Table 7.2 on page 109** (as also discussed in **Chapter 2 - Development Rationale**), electricity is also imported from overseas.

7.43 It would therefore be incorrect to base any emissions offset calculation upon a single source of energy, particularly given the shifting energy mix as identified in **Table 7.2**.

7.44 A conservative approach is to utilise the UK Government Greenhouse Gas Conversion Factors (DBEIS, 2021c) for company reporting of annual carbon emissions.

7.45 It is a legal requirement for all UK quoted companies (listed on London Stock Exchange, EEA market, New York Stock Exchange or NASDAQ, unquoted large companies and large LLPs) to report on their global energy use in addition to greenhouse gas emissions.

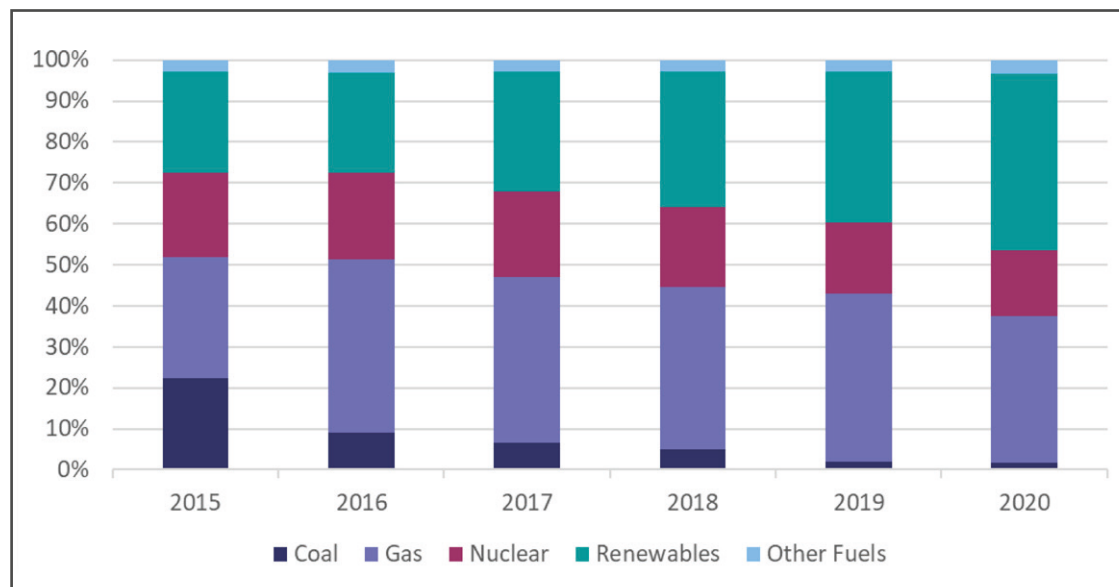


Table 7.2 - 2015 Electricity Fuel Mix Compared to 2020 Electricity Fuel Mix (Source: Digest of UK Energy Statistics (DBEIS, 2021))

7.46 The Government update the Greenhouse Gas Conversion Factors on an annual basis, and these include the average carbon emissions for UK electricity generation and UK transmission and distribution. The Government also require quoted Companies to use these conversion factors to calculate the emissions offset associated with their own renewable energy generators. These conversion factors are therefore

entirely appropriate as the basis for calculating the emissions offset associated with this proposal. As they are based upon the mix of generation sources (as shown in **Table 7.2**) they can be considered conservative as this mix includes for renewable energy sources and renewable energy generation is not used to offset itself.

7.47 The conversion factors for 2020, published in June 2021, provide the

most up to date figures as shown in **Table 7.3.**

Table 7.3 - 2021 GHG Conversion Factors (DBEIS, 2021c)

	kgCO <sub>2</sub> e/kWh
Electricity Generation	0.21233

7.48 On this basis the electricity produced by the Fair Oaks Renewable Energy Park will offset approximately **9 270 000kgCO<sub>2</sub>/annum or 9 270 tonnes CO<sub>2</sub> per annum** (to 3 S.F.). This can be considered a conservative estimate of the carbon offset by the Fair Oaks Renewable Energy Park.

7.49 DBEIS report that the CO<sub>2</sub> emissions associated with the average Nottinghamshire resident was 1.24 tonnes of CO<sub>2</sub> per annum based upon per capita emissions in 2020 (DBEIS, 2022). The 9 270 tonnes of CO<sub>2</sub> offset by the solar array would therefore compare to the total equivalent domestic emissions of some 7 480 (to 3 S.F.) average Nottinghamshire residents. To note, this is less than the number of households equivalent electricity needs met given transport

and heating contribute a large proportion to an individual's carbon footprint, although these numbers will converge as transport and domestic heating are electrified in the coming years.

7.50 This project therefore provides a material contribution to the net zero target by 2050 at both National (through the Climate Change Act) and Local level. The renewable energy and energy storage provided by the Proposal demonstrates supportive action to the 'Climate Emergency' Rushcliffe Borough Council declared in March 2019.

## DECOMMISSIONING PHASE

7.51 At the end of the operating life of the renewable energy park, the panels and associated infrastructure will be fully decommissioned unless a new application for a replacement solar energy development is made to, and granted by, the Local Planning Authority.

7.52 If a replacement development is both applied for and consented, then a partial decommissioning may be

undertaken, typically involving the removal of the existing solar panels. This process would be analysed within an Environmental Impact Assessment or Environmental Report for the replacement site application against the baseline environment at that time.

7.53 If a replacement development is neither applied for nor consented, then the decommissioning of the renewable energy park would follow the reverse of the construction phase over a shortened time period.

7.54 It is likely that a temporary compound similar in size and nature to the main temporary construction compound will be required for the secure storage of equipment and for worker welfare facilities during decommissioning. After, the compound area will be reinstated to agricultural land.

7.55 The solar panels and frames will be removed. The site will be reinstated with electrical cables removed.

7.56 The transformers, site containers and cabinets will be removed from the site and foundations removed down to a level where they would have no impact upon reintroduction of farming use of the site.



- 7.57 Fencing and CCTV equipment will be removed.
- 7.58 New site tracks would be left in place for use by the landowner for their farming practices, if required. Otherwise materials would be removed and the land returned for full agricultural use.
- 7.59 Materials recovered during decommissioning will be re-used or recycled in accordance with the waste management hierarchy.
- 7.60 A Decommissioning Transport Management Plan (secured by way of planning condition) will be prepared and agreed with the authority in advance of any decommissioning works commencing.

## PROTECTION MEASURES THROUGH CONSTRUCTION AND DECOMMISSIONING PHASES

- 7.61 A Construction Environment Management Plan (CEMP) will be agreed with the Local Planning Authority prior to construction commencing. This will include details of all mitigation measures proposed for

the safe and environmentally sensitive construction of the proposed Fair Oaks Renewable Energy Park. The CEMP overall sets out the management measures which all contractors on site will be required to adhere to at all times to control the construction effects on the environment and surrounding receptors, as well as the safety of construction personnel. It will outline how environmental issues will be handled to ensure compliance with relevant legislation. The CEMP can be secured through a Planning Condition should permission be granted.

## Geology and Soils

- 7.62 Potential impacts on geology and soils from the construction of the civil works associated with the renewable energy park (the solar panels and frames, inverter/transformer units and other site containers, foundations, and access track) are avoided through considered design of these elements and in the design of the site layout.
- 7.63 Wherever possible, the access track utilises existing farm tracks. Where new access tracks are required, a membrane layer at the base of the track will minimise the volumes of

stone required. Locally sourced construction materials will be used in construction works where possible.

- 7.64 The volumes of all footings and foundations are inherently designed to minimise the volumes of stone and concrete required within safe engineering margins.
- 7.65 Wheel washing facilities will be put in place for vehicles exiting the site to minimise potential for soil and debris to be transferred to the local highway.
- 7.66 A suitable drainage scheme at the site entrance will be designed in discussion with the Local Planning Authority, and incorporated into the CEMP to avoid the potential for water to leave the construction site and enter the highway. Wheel washing facilities, road cleaning and drain clearing will also be in place to avoid debris exiting site onto the public highway.
- 7.67 Pollution prevention guidance published by DEFRA and the Environment Agency (2019) will be adhered to throughout the construction, operation and decommissioning phases of the project. The guidance includes consideration of polluting substances, the correct use of drains, and the

appropriate storage of materials and wastes.

- 7.68 The soils and materials excavated during the construction and decommissioning phases of the Proposal will be stored in accordance with The Site Waste Management Plans Regulations, 2008 (Act of Parliament) which states at 6(5) that:

*'(a) all waste from the site is dealt with in accordance with the waste duty of care in section 34 of the Environmental Protection Act 1990(a) and the Environmental Protection (Duty of Care) Regulations 1991(b); and*

*(b) materials will be handled efficiently and waste managed appropriately.'*

- 7.69 In 2009 DEFRA published the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, for overarching guidance on soil use and management at each stage of the construction process. Alongside this, there is the Good Practice Guidelines as published by MAFF in 2000, for guidance on appropriate handling and storage of soils.

- 7.70 Wastes arising will be used wherever possible in the reinstatement of the

site. Any excess stored material will be disposed of off-site in full accordance with Environment Agency guidance to minimise the risk of pollution and degradation of habitats. Waste handling procedures will be detailed in a Site Waste Management Plan to be agreed with Rushcliffe Borough Council.

- 7.71 Locally sourced sub-soils and top-soils will be used in all reinstatement works where any are necessary.

## Health and Safety

- 7.72 Health and safety regulations and best practice guidelines will be followed during the construction of the Proposal to ensure that risks to personal safety and equipment on site are minimised.

- 7.73 Risk assessments will be conducted prior to all phases of the development. These would include, but would not be limited to: travel to the site; working on agricultural land in a rural environment; use of heavy tools and machinery; working around electrical equipment; working around highways and rail infrastructure; site visits to the operational renewable energy park;

and contagious diseases (such as SARS-Cov-2).

- 7.74 All construction personnel will be informed of the potential risks to health and safety upon arrival to site via a site induction and regular toolbox talks during the construction process. Site hazard and safety reminder signs will be located in and around the welfare areas during construction and, where appropriate, at electrical infrastructure during operation. All persons on site will be required to wear appropriate protective equipment at all times.

- 7.75 A tidy construction site will be maintained to minimise risk of personal injury. The correct equipment will be available for the required tasks, and equipment will be regularly checked and stored safely to minimise risks to personal safety.

- 7.76 All site work for the Fair Oaks Renewable Energy Park would comply with the Construction (Design and Management) Regulations 2007, and its associated approved code of practice (HSE, 2007). A transparent reporting process will be in place to monitor on-site safety and potential risks to health.

## Hazardous Substances

- 7.77 Any substances classed by regulation as hazardous that are used during the construction, operation (either during normal operations, scheduled maintenance or on the occasion of a major component replacement or repair) and decommissioning phases of the proposed renewable energy park development will be used and disposed of responsibly off site, in accordance with manufacturer's guidance and regulations governing use of the material. Materials with potential to be classified as hazardous are most likely to be coolants, oils, fuels and lubricants.
- 7.78 Fuels and oils kept in temporary construction and decommissioning site compounds will be stored in double-walled containers or lined bunds in accordance with Environmental Protection and Control of Pollution regulations.
- 7.79 Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance to regulations and manufacturer/supplier's guidelines.
- 7.80 No hazardous materials will be stored on site during the operational phase of the Proposal.

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## CHAPTER 8 - ECOLOGY

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## INTRODUCTION

8.1 This chapter presents an Ecological Impact Assessment (EclA) of the proposed Fair Oaks Renewable Energy Park, near Ruddington, Nottinghamshire (the 'proposed development') on the ecological resource in the vicinity of the proposed development. This Chapter is supported by the following Technical Appendix documents:

8.2

- **Appendix 8.1:** Preliminary Ecological Appraisal Report for the Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire, April 2022.
- **Appendix 8.2:** Fair Oaks Renewable Energy Park, Nottinghamshire: Wintering Bird Survey 2021-22, June 2022.
- **Appendix 8.3:** Fair Oaks Renewable Energy Park, Nottinghamshire: Breeding Bird Survey 2022 Interim Report, June 2022.
- **Appendix 8.4:** Ecology Report for the Fair Oaks Renewable Energy Park, Ruddington, Nottinghamshire: Protected Species Surveys for Water Voles and Great Crested Newts, June 2022.
- **Appendix 8.5** Confidential Badger Report, June 2022.

This chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;

- Baseline Conditions;
- Assessment of Potential Effects including mitigation measures later detailed;
- Mitigation and Residual Effects;
- Cumulative Ecological Assessment;
- Summary of Effects; and
- Statement of Significance.

8.3

A full description of the Development is provided in **Chapter 6 – Development Proposal**. The site selection and design evolution is provided in **Chapter 3 – Site Selection and Design**.

8.4

This assessment was undertaken by Dr Steve Percival, a highly experienced ecological surveyor. He has a B.Sc. (Hons) degree in Biological Sciences from the University of Durham, UK (awarded in 1984) and a Ph.D. in Zoology from the University of Glasgow, UK (awarded in 1988), and is a member of the Chartered Institute for Ecology and Environmental Management (UK), the British Ecological Society and the British Ornithologists' Union. As principal of his own private practice,



Ecology Consulting, he has a wide experience of nature conservation and renewable energy issues, and has been involved in over 380 renewable energy projects, including carrying out ecological assessments, preparation of ecological material for environmental statements and giving evidence at public inquiries, in the UK and internationally.

## LEGISLATION, POLICY AND GUIDANCE

8.5 The following documents have been taken into account in the ornithological assessment.

### Legislation

- The Wildlife and Countryside Act 1981, as amended;
- The Countryside and Rights of Way [CRoW] Act 2000;
- EU Council Directive 79/409/EEC and 2009/147/EC on the Conservation of wild birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of natural

habitats and of wild fauna and flora (the 'Habitats Directive');

- Environmental Impact Assessment Directive 85/337/EEC, as amended (the EIA Directive);
- The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'), which consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments and translates the Birds and Habitats Directives into UK Law; and
- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

### National Policy and National Policy Guidance

- The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, updated July 2021);
- 'Managing Natura 2000 Sites' (European Communities 2000), which gives guidance on the

implementation of the Birds and Habitats Directives;

- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016);
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man (Stanbury et al. 2021); and
- The UK Post-2010 Biodiversity Framework.

### Local Guidance

- 8.6 The Planning Statement accompanying this planning application details a review of the local policy context, a summary with respect to policies relevant to this assessment is given below.
- 8.7 The adopted Development Plan comprises:
- the Rushcliffe Local Plan Part 1: Core Strategy (adopted December 2014)<sup>39</sup>; and



- the Rushcliffe Local Plan Part 2: Land and Planning Policies (adopted October 2019)

8.8 Policy 16 advises :

*Proposals for renewable energy schemes will be granted planning permission where they are acceptable in terms of:*

*[in respect of ecology]*

*c) ecology and biodiversity;*

8.9 Policy 17 seeks to increase biodiversity in the area through creation of new habitats and biodiversity features and improvements to existing biodiversity features where appropriate. Policy 37 refers to Trees and Woodlands.

8.10 Ruddington Neighbourhood Plan in Policy 19 seeks new development to provide net gain for local biodiversity where possible.

8.11 Gotham Neighbourhood Plan Policy GS1 seeks to encourages development opportunities that retain, enhance and incorporate features which are beneficial for wildlife and habitat creation and which applies Green Belt protective policies to designated local green spaces.

8.12 The Greater Nottingham Strategic Plan is at a very early stage and as such carries very limited weight.

## Scope of Assessment

8.13 The key issues for the assessment of potential ornithological effects relating to the Development were identified as the following:

- Habitat loss during construction;
- Pollution from noise, vibration, dust, surface water run-off during construction.
- Disturbance/harm during construction;
- Change in habitat during operational phase (causing displacement of species (dependent on the management of the site after construction));
- Disturbance during operation (if species are displaced as a result of the presence of the solar panels); and
- Cumulative effects.

## Key Target Species (Valued Ecological Receptors)

8.14 Key target species for the assessment have been identified using the following criteria:

- Bird species listed in Annex 1 of the EU Birds Directive and/or on Schedule 1 of the 1981 Wildlife & Countryside Act;
- European Protected Species, protected under The Conservation of Species and Habitats Regulations 2010;
- Species protected under Schedule 5 of the Wildlife and Countryside Act 1981;
- Priority Habitats identified under the Natural Environment and Rural Communities Act (2006) Section 41 as habitats of principal importance; and
- Red-listed species on the Birds of Conservation Concern list (Stanbury et al. 2021), or other national/international red lists.

8.15 The ecological assessment has, therefore, given particular consideration to all species/communities recorded during the

baseline surveys present in the study area that meet any of these criteria.

## Elements Scoped Out of Assessment

- 8.16 No ecological issues were scoped out from this assessment.

## Study Areas

- 8.17 The desk study to support this assessment covered all European protected sites (designated and proposed) within 20km of the proposed development, all nationally important sites within 5km and all other protected nature conservation sites within 2km.
- 8.18 The field survey areas were chosen to include all areas within the potential zone of ecological influence of the development, where there was habitat that could support important populations, plus an area around that to provide wider context to inform the assessment. The extended Phase 1 habitat survey, breeding bird surveys and protected species surveys covered the proposed development plus up to a 500m buffer (where access/viewing was possible), whilst the wintering bird surveys extended up to a 1km buffer.

Table 8.1 - *Value (conservation importance) of species/communities*

Value	Definition
Very High	Cited interest of a Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar site or Site of Special Scientific Interest (SSSI). Cited means mentioned in the citation text for the protected site as a species for which the site is designated (SPAs) or notified SSSIs.
High	Other species that contribute to the integrity of a SPA, SAC, Ramsar site or SSSI, such as part of an assemblage where this is a notified feature.  A local population of more than 1% of the national population of a species.  Any ecologically sensitive species, e.g. rare birds with <300 breeding pairs in the UK.  EU Birds/Habitats Directive Annex I, Wildlife and Countryside Act (W&C Act) Schedule 1/5 species (if not covered above).
Medium	Regionally important population of a species, either because of population size or distributional context.  Other red-listed species where their value is not High or Very High.
Low	Any other species of conservation interest, e.g. species listed on the Birds of Conservation Concern (Stanbury et al. 2021) not covered above.
Nil	Green-listed species (Stanbury et al. 2021) of favourable conservation status.

Table 8.2 - Definition of terms relating to the magnitude of ecological impacts

Magnitude	Definition
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that post-development character/ composition/ attributes will be fundamentally changed and may be lost from the Site altogether. Guide: >80 % of population/habitat lost
High	Major alteration to key elements/ features of the baseline (pre-development) conditions such that post-development character/composition/attributes will be fundamentally changed. Guide: 20-80 % of population/habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/ composition/ attributes of baseline will be partially changed. Guide: 5-20 % of population/habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible but underlying character/ composition/ attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5 % of population/habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: <1 % of population/habitat lost

8.19 Where distances are provided, these are to the fenced boundary of proposed development works.

## Methodology for the Assessment of Effects

8.20 The significance of the potential effects of the proposed development has been classified by professional consideration of the value of the receptor and the magnitude of the potential impact.

8.21 The assessment includes a full evaluation of the ecological importance of the proposed development site and its surrounds and identification of any particularly sensitive ecological areas. It has been carried out with reference to the assessment methodology produced by the Chartered Institute for Ecological and Environmental Management (CIEEM) (2018) and with reference to Natural England standing advice.

8.22 The combined assessment of the magnitude of an impact and the value of the receptor was used to determine whether or not an adverse impact was significant. These two criteria were cross-tabulated to assess the overall

significance of that impact (**Table 8.3 on page 122**). This gives a guide as to the determination of significance, though the final assessment was still subject to professional judgment.

8.23 The interpretation of these significance categories was as follows:

- Minor and Negligible are not normally of concern, though normal design care should be exercised to minimise adverse effects;

- Major and Major-Moderate represent effects on bird populations which are regarded as significant for the purposes of EIA; and
- Moderate represents a potentially significant effect on which specific professional judgment has to be made, though for which it is likely that mitigation will reduce it below the significance threshold for adverse effects.

Table 8.3 - Matrix of magnitude of impact and receptor value used to test the significance of effects. The significance category of each combination is shown in each cell. Darker shaded cells indicate significant effects in terms of the Environmental Impact Assessment (EIA) Regulations.

MAGNITUDE	VALUE				
		Very high	High	Medium	Low
	Very high	Major	Major	Major-Moderate	Moderate
	High	Major	Major	Moderate	Minor
	Medium	Major	Major-Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

## Assessment Limitations

8.24 No significant information gaps have been identified. Inevitably with any ecological survey it cannot be guaranteed to detect all target species/individuals and surveys cannot be fully representative of all conditions (e.g. severely reduced visibility). However, in this case it was concluded that the baseline surveys provide a robust data set on which to carry out the assessment. The breeding bird surveys have not yet been fully completed, but given the work undertaken to date it is considered unlikely that this will make any material difference to the assessment. Reporting for the final surveys undertaken will be submitted as supplementary information to the application.



## BASELINE ECOLOGICAL CONDITIONS

### Statutory Designations: International and Nationally Important Sites

- 8.25 There are no European Protected Sites (Special Protection Area (SPA), Special Area for Conservation (SAC) or Ramsar Sites) within 20km of the Proposed Development, so none would be affected.
- 8.26 There are six Sites of Special Scientific Interest (SSSI) within 5km of the proposed development. Details are given in Appendix 8.1. None of these are within 1km of the site and none would be affected by the proposed development.

### Local Wildlife Sites

- 8.27 Three Local Wildlife Sites (LWS) are located within 1km of the proposed development and could potentially be affected by it (their locations are shown in **Appendix 8.1 Figure 2**):
- West Rushcliffe District Disused Railway – adjacent to the

eastern edge of the proposed development - a lengthy section of interesting disused railway with several uncommon species, including grizzled skipper and botanical interest.

- Ruddington Moor Drain – approximately 180m north-east from the fenced development area - a field drain with notable species (botanical interest).
- Fairham Brook Nature Reserve – 440m north from the fenced development area and at the proposed grid connection location - marsh and riparian habitat with botanical interest and water voles.

### Priority Habitats

- 8.28 There was no mapped priority habitat within the site itself, though the proposed grid connection (which would be an associated, but separate and future impact of the proposed development, secured through a separate application for planning permission) would pass underground through Lowland Fen at the Fairham Brook Nature Reserve (though would involve some ground disturbance).

The locations of priority habitats within 2km of the proposed development are shown in **Appendix 8.1 (Figure 3 and Table 1)**.

### Phase 1 Habitat Survey

- 8.29 The Extended Phase 1 survey map of the proposed development is shown in **Figure 8.1**. Each of the Phase 1 habitats that were recorded at the site during the survey are described in **Table 8.4**. The Table shows the areas of each habitat within the survey area, and within the proposed development. The proposed area in which the solar panels will be located is currently entirely arable land.
- 8.30 There are widespread intact species-poor hedgerow and defunct species-poor hedgerow across the survey area, but none within the proposed development itself.
- 8.31 There are 4.5km of wet drains/ditches within/adjacent to the site (and 21.2km across the whole survey area). All were on the site boundary apart from one 430m ditch in the northern part of the site.

Table 8.4 - Phase 1 habitats recorded in the proposed Fair Oaks Renewable Energy Park survey area (site plus 500m buffer) and the Proposed Development.

Phase 1 code	Phase 1 Habitat	Area (ha.) – whole survey area	% whole survey area	Area (ha.) – Renewable Energy Park	% Renewable Energy Park
A1.1.1	Broad-lyd woodland	0.5	0.1%	0	-
A1.1.2	Broad-lyd plantation	1.0	0.2%	0	-
A1.3.2	Mixed plantation	0.3	0.0%	0	-
A2.1	Scrub (dense)	4.2	0.7%	0	-
B2.1	Neutral grassland	9.8	1.5%	0	-
B4	Improved grassland	15.4	2.4%	0	-
C3.1	Tall ruderal	31.4	5.0%	0	-
F1	Swamp	3.2	0.5%	0	-
J1.1	Arable	522.4	82.5%	82.4	100%
J1.2	Amenity grassland	0.7	0.1%	0	-
J3.6	Buildings	4.5	0.7%	0	-
J4	Bare ground	39.7	6.3%	0	-

## Protected Species Surveys

### Bats

8.32 The desk study provided records of a range of bat species including noctule, brown long-eared, Daubenton's, common and soprano pipistrelle. Whilst all are common and widespread species, they are all specially protected as European Protected Species, and noctule, brown long-eared and soprano pipistrelle are also NERC Species of Principal Importance. The Phase 1 survey included an assessment of bat roost suitability, which identified a range of potential roosts within farm buildings, residential buildings, broad-leaved woodland/plantation and in more isolated hedgerow trees (see **Appendix 8.1, Figure 1**). None were located within the proposed development and none would be likely to be affected by it.

8.33 With regard to commuting/foraging habitat for bats, the main areas that would be likely to be used include the drains/ditches and their margins, and the edges of the small number of woodland plantations within/adjacent to the proposed development.

## Water Voles

- 8.34 The desk study confirmed the presence of this species within several of the watercourses within the survey area, including in proximity to the proposed development. From the habitat present, it was concluded that this species has the potential to occur in most of the main drains across the survey area.
- 8.35 Field surveys for water voles (**see Appendix 8.4**) found that they were widely distributed along the section of the Fairham Brook that abuts the western edge of the proposed development site, and in the drain to the north of the site, with smaller numbers of records along the part of the Fairham Brook along the southern boundary of the site and in the drain that forms the northern edge of the site.

## Badgers

- 8.36 Though there were no records from the desk study within 1km of the proposed development (and only a small number in the 1-2km zone), this appeared to be largely a result of low survey effort in this species

area rather than absence from the locality. As a species vulnerable to persecution the assessment needs to remain confidential and is provided in Confidential **Appendix 8.5**.

## Great Crested Newt

- 8.37 The desk study provided records of great crested newt in Rushcliffe Country Park (>1km from the fenced development area) and at Barton Moor (about 1km west from the site, outside the potential impact zone for this species). The Phase 1 field survey, however, located a pond in woodland 240m to the north-east of the fenced development area, that could potentially be suitable for this species. Its overall Habitat Suitability Index score, however, was 0.44, indicating poor suitability for great crested newts. Notwithstanding this, an eDNA survey was undertaken to confirm this species' absence or inform the need for any mitigation.
- 8.38 The result of this test was negative, indicating that great crested newt eDNA was not detected (or was below the threshold detection level). Overall, in combination with the low habitat suitability, this indicates that it would

be very unlikely that this species was present in this pond (and that no further surveys or mitigation would be required).

## Breeding Bird Surveys

- 8.39 The survey area supports a typical range of farmland breeding birds, including a range of NERC priority species. One species specially protected under Schedule 1 of the Wildlife and Countryside Act from disturbance during breeding was found during the 2022 surveys, kingfisher. No specific nest site was located but this species was seen in suitable breeding habitat along the Fairham Brook. Given the habitats present, it is possible that Schedule 1 species such as peregrine, hobby, barn owl and quail could breed there in the future.
- 8.40 Twelve breeding species were classed as medium conservation value: grey partridge, lapwing, skylark, yellow wagtail, dunnoek, song thrush, starling, house sparrow, linnet, bullfinch, yellowhammer and reed bunting. All were classed as medium value for their listing as NERC Act Section 41 priority species. Lapwing were also breeding in sufficient numbers to be

considered regionally important (>1% county population). These species are mostly farmland species that have declined widely across Britain but are still mostly common and widespread.

- 8.41 A further ten breeding species were classed as low value, through their listing on RSPB et al.'s (Stanbury et al. 2021) red/amber lists of birds of conservation concern.

### *Wintering Bird Surveys*

- 8.42 The 2021-22 wintering bird surveys found a range of wintering bird populations of conservation importance but with generally only low numbers within/in proximity to the proposed renewable energy park in numerical terms and in the context of their regional (county) populations. The key wintering birds recorded were as follows:

- Pink-footed Goose – the only record of this species was a flock of 65 migrating over the site on 4/10/21. This count though was sufficient to be classed as regionally important (>1% region), and hence medium value.
- Little Egret – this EU Annex 1 (and hence high value) species was seen regularly in small numbers (peak 2) during the field count and the VP

surveys. Most were recorded in the southern part of the site along the Fairham Brook.

- Wintering waders - Golden Plover, Lapwing and Green Sandpiper – these three waders were classed as high (EU Birds Directive Annex 1), medium (NERC priority species) and high (Wildlife and Countryside Act Schedule 1 species) value respectively. However, numbers of all three species were low, with peak counts of only 2, 4 and 1 respectively and no records at all from the VP surveys. There was no indication that the survey area was important to any of these species at this time of year.
- Peregrine – there were a total of 25 records of this species during the VP surveys and it was also seen regularly during the field count surveys (peak 2). Peregrine is listed on EU Birds Directive Annex 1 and Wildlife and Countryside Act Schedule 1, so is a high value species. Most of the peregrine activity was along the pylon lines, which they used regularly to perch/roost.
- Other scarce birds of prey – red kite, marsh harrier, hen harrier

and hobby were seen over-flying the study area during the VP surveys, but only irregularly and only in small numbers – there were 2, 1, 5 and 4 records of each species respectively. All are high value as they are EU Birds Directive Annex 1/Wildlife and Countryside Act Schedule 1 species. There was no indication that the survey area was important to any of these species at this time of year.

- Herring Gull and Black-headed Gull – black-headed gull was recorded in regionally important numbers within the survey area and herring gull is a red-listed NERC priority species (and hence are both of medium value). They were both seen regularly over-flying the site, and additionally black-headed gulls were regularly recorded feeding within the survey area (peak 275). There was only a single record of a single herring gull during these surveys. Black-headed gulls were widely distributed (associated particularly with field ploughing) but with few records within the site boundary – the proposed development did not appear to be particularly important for this species.



- 8.43 Overall, the surveys did not identify any important wintering bird populations that would likely to be affected by the proposed renewable energy park, or any areas of particular importance for wintering birds that should be avoided in the site design process.

## ECOLOGICAL CONSERVATION EVALUATION

### Priority Habitats

- 8.44 No Priority Habitat would be lost to the development, so this has not been taken forward for assessment as valued ecological receptors.

### Protected Species

- 8.45 Several protected species have been recorded at/around the development site, from the desk study and from the baseline field surveys. Each is screened for further assessment below.

#### *Water vole*

- 8.46 Water voles were widely distributed along the section of the Fairham Brook that abuts the western edge of

the proposed development site and was also found in several of the other surrounding drains. This species is protected under Schedule 5 of the 1981 Wildlife and Countryside Act, so it has been classed as high value and has been taken forward for further assessment.

#### *Badger*

- 8.47 Badgers were recorded widely across the survey area during the field surveys. Though no setts were found within the proposed development itself, there were setts nearby and it is possible that setts could be established within the site or along the access tracks into the site in the future. As a specially protected species under the Badgers Act, this species has been classed as high value and has been taken forward for further assessment

#### *Bats*

- 8.48 No likely bat roosts or potential bat roosting habitat were located within the proposed development, so none would be likely to be affected by it. However, there would be changes to bat foraging habitat as a result of the development. The desk study

provided records of a range of bat species including noctule, brown long-eared, Daubenton's, common and soprano pipistrelle. Whilst all are common and widespread species, they are all specially protected as European Protected Species (so all have been classed as high value), and noctule, brown long-eared and soprano pipistrelle are also NERC Species of Principal Importance. Bats have therefore been taken forward for further assessment.

#### *Great Crested Newt*

- 8.49 Only a single pond was located within 500m of the proposed development, and this had a low Habitat Suitability Index (after Oldham et al. 2000) and a negative eDNA test result. Together these indicates that it would be very unlikely that this species was present in this pond, so no further assessment has been carried out for this species.

#### *Breeding Birds*

- 8.50 The value of the breeding bird populations recorded during the surveys was determined using the criteria specified in **Table 8.1 on page 120**. The results of this evaluation are summarised in **Table 8.5**.

Table 8.5 - Conservation evaluation of the breeding bird populations in the Fair Oaks Renewable Energy Park survey area, April-May 2022.

Species	Peak Breeding Pairs	EU Annex 1	W&C Sch 1	Red [R]/ Amber [A] List sp	NERC Priority sp.	Conservation Value
Mute Swan	1					Nil
Gadwall	2			A		Low
Mallard	13			A		Low
Red-legged Partridge	5					Nil
Grey Partridge	10			R	✓	Medium
Pheasant	13					Nil
Buzzard	1					Nil
Moorhen	1			A		Low
Lapwing	10 R			R	✓	Medium
Feral Pigeon	5					Nil
Stock Dove	11			A		Low
Woodpigeon	29			A		Low
Kingfisher	1	✓	✓			High
Green Woodpecker	1					Nil
Great Spotted Woodpecker	2					Nil
Skylark	122			R	✓	Medium
Swallow	3					Nil
Meadow Pipit	16			A		Low
Yellow Wagtail	12			R	✓	Medium
Grey Wagtail	2			A		Low
Pied Wagtail	1					Nil
Wren	18			A		Low
Dunnock	10			A	✓	Medium
Robin	12					Nil

Species	Peak Breeding Pairs	EU Annex 1	W&C Sch 1	Red [R]/ Amber [A] List sp	NERC Priority sp.	Conservation Value
Blackbird	19					Nil
Song Thrush	4			A	✓	Medium
Sedge Warbler	7			A		Low
Reed Warbler	1					Nil
Blackcap	6					Nil
Lesser Whitethroat	1					Nil
Whitethroat	24					Nil
Chiffchaff	3					Nil
Goldcrest	1					Nil
Long-tailed Tit	2					Nil
Blue Tit	8					Nil
Great Tit	3					Nil
Magpie	6					Nil
Jackdaw	2					Nil
Carrion Crow	8					Nil
Starling	1			R	✓	Medium
House Sparrow	2			R	✓	Medium
Chaffinch	8					Nil
Greenfinch	2			R		Low
Goldfinch	9					Nil
Linnet	11			R	✓	Medium
Bullfinch	1			A	✓	Medium
Yellowhammer	26			R	✓	Medium
Reed Bunting	21			A	✓	Medium

Note: 'R' peak count indicates regionally important (>1% region)

- 8.51 One high value species was recorded breeding within the survey area during 2022, kingfisher. Though no specific nest site was located, this species is likely to have been breeding in the area and, as a Wildlife and Countryside Act Schedule 1 species specially protected from disturbance during breeding, has been taken forward for further assessment.
- 8.52 Of the twelve breeding species classed as medium conservation value five have been taken forward for further assessment, as they are open ground species that occurred within the proposed development site or in proximity to it, and so could potentially be affected: grey partridge, lapwing, skylark, yellow wagtail and reed bunting. All were classed as medium value for their listing as NERC Act Section 41 priority species. Lapwing were also breeding in sufficient numbers to be considered regionally important (>1% county population). The other species that have not been taken forward are predominantly hedgerow/woodland species that would not be likely to be affected by the proposed development.

### *Wintering Birds*

- 8.53 The conservation value of the autumn/winter bird populations recorded during the surveys was determined using the criteria specified in **Table 8.2 on page 121**. The results of this evaluation are summarised in **Table 8.6 on page 131**.
- 8.54 Key species identified in this evaluation were taken forward for further analysis and assessment. Though eight high value and four medium value species were recorded, only three of these (little egret, peregrine and black-headed gull) were taken forward for further assessment as the others were only present irregularly in very small numbers.

## ECOLOGICAL IMPACT ASSESSMENT

### Potential Ecological Effects of the Development

- 8.55 The main potential effects of solar farms on ecology are direct loss of breeding or feeding habitat, indirect loss of habitat from disturbance

(either temporary during construction or more permanent from operational solar panels), and (for birds) collision risk with solar panels structures and new overhead lines (Harrison et al. 2016, Jenkins et al. 2017).

- 8.56 Habitat loss is the potential impact from large-scale solar PV development that has raised most concern to date in relation to birds (Lovich and Ennen 2011, Smit 2012, UNEP/CMS 2015), particularly in relation to species with restricted ranges and very specific habitat requirements (though this would not be a factor at this site as no such species would be affected). The greatest impacts would be if key species were displaced from restricted habitat that is not available elsewhere, and in that case, it would be expected in that case to lead to local population reduction.
- 8.57 Management of site during operation can also be important. In some case vegetation may be removed altogether, but in others it has been managed to promote biodiversity interests and can provide opportunities for habitat enhancements (Blaydes et al. 2021).



Table 8.6 - Conservation evaluation of the wintering bird populations in the Fair Oaks Renewable Energy Park survey area, September 2021 – March 2022.

Species	Peak Count	EU Annex 1	W&C Sch 1	Red [R]/ Amber [A] List sp	NERC Priority sp.	Conservation Value
Mute Swan	8					Nil
Pink-footed Goose R	65			A		Medium
Greylag Goose	13			A		Low
Mallard	3			A		Low
Cormorant	2					Nil
Little Egret	2	√				High
Grey Heron	2					Nil
Red Kite R	1	√	√			High
Marsh Harrier R	1	√	√	A		High
Hen Harrier R	1	√	√	R		High
Sparrowhawk	2			A		Low
Buzzard	5					Nil
Kestrel	3			A		Low
Hobby R	2		√			High
Peregrine R	2	√	√			High
Golden Plover	2	√				High
Lapwing	4			R	√	Medium
Green Sandpiper R	1		√	A		High
Common Gull	5			A		Low
Lesser Black-backed Gull	8			A		Low
Herring Gull	8			R	√	Medium
Black-headed Gull R	275			A		Medium

Note: 'R' peak count indicates regionally important (>1% region)

8.58 Bird collision with solar panels has been recorded, and is thought to be associated with polarised light pollution and/or with waterbirds mistaking large arrays of PV panels as wetlands (Horváth et al. 2009; Lovich and Ennen 2011). Though not reported as a widespread problem with solar, it has been significant at some sites (H.T. Harvey and Associates 2014; Kagan et al. 2014), and therefore requires consideration in the assessment process.

8.59 Other possible impacts of solar PV farms (Jenkins et al. 2017) include noise and disturbance generated by construction and maintenance activities, and the attraction of novel species to an area by the artificial provision of otherwise scarce resources – for example perches, nest sites and shade (DeVault et al. 2014).

8.60 The solar farm associated infrastructure also has the potential to adversely affect local ecological populations, including the construction and maintenance of sub-stations, powerlines, and site access tracks. This includes general habitat loss, and, for overhead lines particularly, the risk of collision and electrocution (Lehman et al. 2007; Jenkins et al. 2010; Dwyer et al. 2014). Overhead

lines would not be an issue with this development as no new overhead wires will be required.

8.61 The Fair Oaks Renewable Energy Park has the potential to cause a range of ecological impacts including:

- Habitat loss during construction;
- Pollution from noise, vibration, dust, surface water run-off during construction;
- Increased risk of vehicle collision due to solar farm traffic;
- Disturbance/harm during construction;
- Change in habitat during operational phase (dependent on the management of the site after construction);
- Habitat fragmentation, where species cannot move through the solar farm so the site acts as a barrier to movement;
- Disturbance during operation (if species are displaced as a result of the presence of the solar panels); and
- Decommissioning effects - a reduced and expedited reversal of the construction activities with tracks remaining in place.

## Potential Ecological Effects of the Development during Construction

### *Habitat Loss*

8.62 The extent of the development is shown in Figure 8.1 and summarised in **Table 8.7 on page 133**. It includes:

- Site boundary;
- Site fence line;
- Solar panels;
- Access Tracks;
- Substation/site compound/battery storage facility.

8.63 The solar panels and associated infrastructure would all be located on land that is currently arable farmland. The panels will cover about 30ha of the 84.12ha. total land within the proposed development. Only a small proportion of this area of arable farmland would actually be lost. With the solar panels raised above the ground, the permanent land take would typically be only about 5% of the site (BRE 2014).

8.64 There would be 2.0km of new access track, a loss of 1ha. for the substation/site compound/battery storage facility and 0.014ha for the ten transformers.

There would also be a temporary loss of 0.62ha. for access during the construction period only alongside Pasture Lane.

8.65 The only loss of habitat would, therefore, be to arable farmland. This receptor is of low ecological value, and with a high impact magnitude, effects would be minor adverse and temporary which is not significant.

8.66 There would be no loss of any habitat associated with the three Local Wildlife Sites (LWS) located in proximity to the proposed development: West Rushcliffe District Disused Railway, Ruddington Moor Drain and the Fairham Brook Nature Reserve, nor of any Priority Habitat.

## Pollution

8.67 There would be a risk during construction of spillage of fuel or other contaminants into the watercourses. Any pollution incidents would be highly localised and temporary, and there would be a negligible risk of this impact occurring, which would not be significant. As a result, this would not be expected to result in any significant ecological impact.

Table 8.7 - Fair Oaks Renewable Energy Park: development details and habitats affected.

Description	Area/Length Affected	Habitat Type
Solar Panels	30.5ha.	Arable farmland
Construction compound temporary surfacing	0.08 ha.	Arable farmland
Substation and battery storage facility	1 ha.	Arable farmland
Transformers (ten)	0.014 ha.	Arable farmland
New access track (4m wide)	0.81 ha. (2.02 km)	Arable farmland
Temporary site access (construction only)	0.62ha.	Arable farmland

## Disturbance/harm during Construction

8.68 The potential effects of disturbance/harm on each of the key ecological receptors at the site during construction are assessed in turn below.

### WATER VOLES

8.69 Water voles were found in the Fairham Brook and several of the other drains surrounding the site. This species is largely restricted to watercourses and their immediate proximity (rarely being found more than 5m from one), so all watercourses have been buffered from the development by at

least 9m to ensure that this species is not affected. This receptor is of high ecological value, and with a negligible impact magnitude, effects would be negligible which is not significant.

### BADGERS

8.70 Badgers were widespread across the survey area, with several setts located. None were within the 30m distance from the development at which disturbance to this species may occur. It is possible, however, that new setts could be established within the site prior to construction (as several were located nearby), so further checks would be required pre-construction to confirm their absence or to inform the need for any further mitigation if they

were found to be present at that time. This receptor is of high ecological value, and with a negligible impact magnitude, effects would be negligible which is not significant.

## BATS

- 8.71 As there are no potential bat roosting sites within the development site, the only disturbance effect during construction would be to commuting/foraging habitat for bats. However, the main areas that these species would be likely to use (the drains/ditches and their margins, and the edges of the small number of woodland plantations within/adjacent to the site) have been buffered by at least 5m. This receptor is of high ecological value, and with a negligible impact magnitude, effects would be negligible which is not significant.

## BREEDING BIRDS

- 8.72 One high value (kingfisher) and five medium value breeding species were taken forward for further assessment, as they are open ground species that occurred within the proposed development site or in proximity to it, and so could potentially be either displaced by disturbance, or have their nests damaged/destroyed: grey

partridge, lapwing, skylark, yellow wagtail and reed bunting. As well as being NERC Act Section 41 priority species, lapwing were also breeding in sufficient numbers to be considered regionally important (>1% county population).

- 8.73 Of these species only grey partridge, skylark and reed bunting were found within the development site but it is likely that other species could breed there in future years (given their occurrence nearby).
- 8.74 There will need to be a Breeding Bird Protection Plan to ensure compliance with the 1981 Wildlife and Countryside Act (which protects Schedule 1 species from disturbance and all active birds' nests from destruction). Further details are given in the mitigation section below. This receptor is of high/medium ecological value, and with a low impact magnitude, effects would be minor adverse and temporary which is not significant.

## WINTERING BIRDS

- 8.75 Three wintering bird species were taken forward for assessment: little egret, peregrine and black-headed gull. The first two are high value

species that were seen regularly through the winter surveys, and the third a medium value species present in regionally important numbers. Whilst some displacement from the development site and its surrounds may occur during construction, the area from which any such displacement may occur was not particularly important for any of these species and did not hold any habitat that was not widely available nearby. This receptor is of high/medium ecological value, and with a low impact magnitude, effects would be minor adverse and temporary which is not significant.

## Potential Ecological Effects of the Development during Operation

### *Habitat Change*

- 8.76 The habitat within the development site will change from open arable farmland to wildflower meadow with solar panels after construction as discussed from **paragraph 8.87 on page 136**. The grassland will be managed to provide a more ecologically rich habitat than is currently present (as detailed in the Outline Landscape and Biodiversity Mitigation and Enhancement Plan



(OLBMEP) set out below and in Chapter 9 - Landscape and Visual Impact Assessment (LVIA)). It is proposed delivery of this is controlled through planning condition. This will result in a positive beneficial ecological impact. Furthermore, the site will be buffered by open grassland habitat around all of the watercourses and hedgerow/woodland habitat, which too will deliver an ecological gain.

## *Disturbance*

- 8.77 It is likely that some breeding bird species, particularly those that prefer more open ground, could be displaced from the site as a result of the presence of the solar panels. Of the key ecological receptors, those most likely to be affected include grey partridge, lapwing and skylark. Mitigation measures are set out below that will deliver a net gain to these species and enable the local populations to be maintained. This receptor is of high/medium ecological value, and with a low impact magnitude, effects would be minor adverse and temporary which is not significant.
- 8.78 There could also be some operational phase disturbance effects on wintering

birds. The area from which any such displacement may occur was not particularly important for any of the key species and did not hold any habitat that was not widely available nearby. This receptor is of high/medium ecological value, and with a low impact magnitude, effects would be minor adverse and temporary which is not significant.

## MITIGATION MEASURES AND HABITAT ENHANCEMENT

### Mitigation through Avoidance in Design

- 8.79 Buffers to the development have been applied to avoid the more ecologically sensitive habitats within the site. This included:
- Minimum 9m buffer along the Fairham Brook flowing through the site.
  - Minimum 5m buffer from all other watercourses/drainage ditches.
  - Minimum 5m buffer from all hedgerows, woodland and isolated trees.

- 8.80 The site has also been designed to avoid any loss of hedgerow or trees by using existing breaks and farm tracks, avoid any tree felling/damage, and use existing watercourse crossing (so no new watercourse crossing is required). These measures have been considered as applied in the assessments above.

### Mitigation for Breeding Birds

- 8.81 No species specially protected under Schedule 1 of the Wildlife and Countryside Act from disturbance during breeding were found during the 2022 surveys, but given the habitat present it is possible that species such as barn owl and quail could breed there in the future. It would be important to ensure that no Schedule 1 species are disturbed during the breeding season, particularly during the construction phase of the development. Given the potential to breed within the proposed development, a Breeding Bird Protection Plan (BBPP) will be developed and implemented and secured by way of planning condition. This will include further surveys for Schedule 1 species at fortnightly intervals through the breeding season (March-August) for the construction

period to inform the BBPP and ensure compliance with the 1981 Wildlife and Countryside Act.

- 8.82 The BBPP will also include measures to ensure the protection of all other nesting birds. Where works affecting habitats that could be used by nesting birds must take place between March and August (inclusive), they will only be carried out following an on-site check for nesting birds by an experienced ecologist, to ensure compliance with the 1981 Wildlife and Countryside Act.
- 8.83 It is likely that some breeding birds will be displaced from the site during the operational phase by the presence of the solar panels, particular open ground species such as lapwing, grey partridge and skylark. All these species are NERC Act Species of Principal Importance. Measures to deliver benefit for these species will be delivered as part of the LBMEP and controlled through planning condition.

### Mitigation for Other Protected Species

- 8.84 No other protected species likely to be affected by the development given results from the ecological surveys, but

badgers could move into the impact zone, and for which, therefore, check surveys should be undertaken prior to construction (to inform the need for any mitigation measures). Pre-construction surveys for badgers will therefore be undertaken within 30m of the development footprint. If they were found to be present where they could be affected by the construction works, then further consultation would be needed with Natural England to determine the licensing and mitigation requirement.

- 8.85 Best practice construction methods will be followed such as clearing all refuse piles daily, covering nightly or providing exit ramps to any excavations and minimising on site noise.

### Cumulative Ecological Effects

- 8.86 The assessment of effects to ecological receptors arising from the proposed development in isolation (reported above), has not identified any effects above 'minor' adverse. Upon consideration of the ecological context and connectivity of the proposed development site, and the substantial benefits to be brought

by the proposed enhancement, it is not considered that the proposed development would materially contribute to adverse cumulative effects on relevant ecology. Accordingly, it is not considered that a detailed cumulative assessment would be necessary or proportionate for the proposed development.

### Biodiversity Net Gain

- 8.87 The data gathered during the desk study and the field surveys have been used to undertake a biodiversity net gain calculation for the project, following the DEFRA/Natural England Biodiversity Metric 3.0 methodology (Parks et al. 2021). The DEFRA Biodiversity Metric 3.0 Tool was used to audit the habitats present on the site, the losses that would occur as a result of the development and the biodiversity net gain that would be achieved through the OLBMEP - **Figure 8.3 of ES Volume 3.**
- 8.88 Four specific habitat enhancement measures are proposed within the site boundary:
- Restoration of lowland meadow – the large majority of the site is

currently arable farmland of low diversity and low ecological value. This grassland will be managed after construction of the solar farm to promote the re-establishment of a diverse meadow plant community. The target will be to enhance 83ha of improved grassland to a more biodiverse neutral grassland.

- Native hedgerow planting – 3.2km of new native hedgerow will be planted as detailed in the HMP.
- Native woodland planting – 0.45ha. of new native broad-leaved woodland will be planted in the south-west and north-west corners of the site.
- Provision of 1ha. plot on the southern edge of the site (outside the area in which the solar panels would be located, for ground-nesting birds (including lapwing and skylark).

8.89 Further details of these measures are provided in the Outline Landscape and Biodiversity Mitigation and Enhancement Plan (OLBMEP) section of **Chapter 9 - LVIA**.

8.90 Ongoing management of the grassland will be carried out primarily by specialist operational solar management teams, utilising small scale equipment to cut grassland annually or via grazing stock (sheep) with the intention that a sheep grazing licence being entered into at the appropriate time.

8.91 Management of the lapwing plot will follow Natural England guidance . The plot will be cultivated each year prior to 20 March and left fallow through until at least 31 July.

8.92 With regard to ongoing management of the new hedgerows, the hedges will be trimmed annually (between January and March) in the first three years after planting to encourage bush growth. Thereafter it will be trimmed once every three years. A target 3m height will be maintained through lifetime of the solar farm.

8.93 A range of bird and bat boxes will be installed to improve the availability of nesting and roosting resources, all to be manufactured from high quality long-lasting material such as 'Woodcrete'. This will include:

- Barn owl boxes – two to be erected at a secure location within the site (specific location confidential to avoid disturbance to this species which is specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act).
- Songbird nest boxes – 20 boxes of mixed type (5 x small hole for tits, 5 x larger hole for sparrows, 5 x larger boxes for starlings and 5 x open-fronted boxes for flycatchers/robins/thrushes). These will be erected within woodland patches (including in the trees along the main stream through the site (see **Figure 8.3**) and on trees within existing hedgerows/field boundaries.
- Bat boxes – 10 boxes – same locations as songbird nest boxes.

8.94 Measures will be implemented to ensure that mammal access routes across the site are not impeded by site fences. This will be achieved by either leaving a minimum gap of 20cm between the ground and the fence, cutting gaps at the bottom of fences to allow passage through, or installation of mammal 'gates'. In addition, the

restoration of flower-rich lowland meadow will provide enhanced habitat and feeding resources for the local bee populations.

8.95 In order to ensure that the LBMEP is delivering its objectives and that a net gain is being achieved, an ecological monitoring programme will be implemented. This will include an annual visit to assess the site's habitat condition, in years 1-3, 5, 10 and 15 of operation. During each visit the condition of the site's habitats will be assessed, and recommendations made to fine-tune the future management of the site.

8.96 Additionally, breeding bird surveys will be carried out to inform the implementation of the BMP. Surveys will follow the same methodology as the baseline surveys carried out in 2022 (so they will be directly comparable) and will be undertaken during the first three years of the operation of the solar farm. After that the results will be reviewed and the surveys discontinued as long as the BMP has delivered the required net gain to the local breeding bird population. If not then measures to improve the site's management will be recommended and the survey continued in years 5, 10 and 15.

Table 8.8 - Biodiversity Net Gain Headline Results

On-site Baseline	Habitat units	164.8
	Hedgerow units	0.00
	River units	0.00
On-site Post-intervention (Including habitat retention, creation & enhancement)	Habitat units	287.9
	Hedgerow units	24.6
	River units	0.00
On-site net % change (Including habitat retention, creation & enhancement)	Habitat units	74.7%
	Hedgerow units	100.00%
	River units	0.00
Off-site baseline	Habitat units	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	Habitat units	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (Including all on-site & off-site habitat retention, creation & enhancement)	Habitat units	123.1
	Hedgerow units	24.6
	River units	0.00
Total on-site net % change plus off-site surplus (Including all on-site & off-site habitat retention, creation & enhancement)	Habitat units	74.7%
	Hedgerow units	100.00%
	River units	0.00%
Trading rules Satisfied?	Yes	

- 8.97 An Outline Landscape and Biodiversity Mitigation and Enhancement Plan OLBMEP has been submitted as part of this application for planning permission (**Figure 8.3 of ES Volume 3**), to be managed in accordance with the above management principles. A detailed LBMEP will be secured and controlled via planning condition.
- 8.98 The biodiversity net gain calculation headline results are shown in **Table 8.8 on page 138** below. Whilst there will be a small loss of arable farmland habitat to the development, the proposed enhancement measures set out above will deliver a clear net gain. There will be a net 75% gain in habitat units, from 165 to 288 Biodiversity Units. Hedgerow units will increase from 0 to 25 Units.
- 8.99 Additional measures will also be implemented to deliver further biodiversity gain through the provision of nest boxes for barn owls and tree sparrows, and roost boxes for bats. Further details of these are given in the OLBMEP (**Figure 8.3 of ES Volume 3**).

## CONCLUSIONS

- 8.100 The proposed Fair Oaks Renewable Energy Park will not have any effect on any statutory protected nature conservation sites. There are three Local Wildlife Sites in proximity to the development, but none of these would be adversely affected.
- 8.101 The proposed development is located on arable farmland, and this is the only habitat that would be lost to the development. There will be no need for any tree felling or hedgerow removal, and existing watercourse crossings have been used, so no new drain crossings are required.
- 8.102 The site design has ensured that only lower quality habitats would be affected, with buffers applied from the watercourses flowing through the site (minimum 9m), from all other watercourse (minimum 5m) and all hedgerows (minimum 5m). These buffers will also ensure that any adverse effects on bats are avoided.
- 8.103 Mitigation measures will be required during construction to avoid any significant impacts on breeding birds, through the implementation of a Breeding Bird Protection Plan.
- 8.104 Pre-construction survey checks will also be required for badgers, to inform any additional mitigation for these species (in case they have moved into the site prior to construction).
- 8.105 The OLBMEP will deliver a net gain of 123 habitat units (an increase of 75%) and 25 hedgerow units (there is no hedgerow in this area currently).
- 8.106 Overall, with the proposed mitigation in place, there would be no significant residual adverse ecological effects from the proposed Fair Oaks Renewable Energy Park.



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## CHAPTER 9 - LANDSCAPE AND VISUAL ASSESSMENT

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## INTRODUCTION

9.1 The Fair Oaks Renewable Energy Park (the proposed development) is a proposal for a solar farm consisting of arrays of ground-mounted solar PV panels plus a battery energy storage system (BESS) and ancillary infrastructure. It would have an export capacity of up to 49.9MW and an anticipated generating life of 40 years and would be located on land

to the southwest of Ruddington in Nottinghamshire. The local planning authority (LPA) is Rushcliffe Borough Council (the Council).

9.2 This chapter presents the findings of a landscape and visual impact assessment (LVIA) that has examined the effects of the proposed development on the landscape resources and visual receptors of the site and surrounding area. It also presents a cumulative LVIA (CLVIA) that has examined the additional effects of the proposed development in the event that the permitted, other proposed and possible solar farms in the study area (see **Table 9.1** below) were built and operational during the life of the proposed development.

9.3 The LVIA and CLVIA have been undertaken in accordance with relevant legislation, policy and guidance, with the scope of the assessments being proportional to the scale, nature and location of the proposed development, and with the viewpoint locations identified in consultation with the Council's Design and Landscape Officer.

9.4 The LVIA has focussed on identifying all "likely significant landscape and visual effects", i.e. landscape and visual effects that are material to the decision making process (see **Appendix 9.2**, paragraph A2.15). It has identified and taken into account the landscape and visual mitigation and enhancement measures that have been embedded into the siting, design, construction, operation and decommissioning of this proposed development, as well as those proposed to further mitigate effects during operation and decommissioning and aims to provide the environmental information on landscape and visual matters needed by the Council to inform its planning decision.

9.5 The CLVIA has focussed on identifying all "likely significant landscape and visual additional cumulative effects" (ie additional cumulative landscape and visual effects that could be material to the decision making process) using publicly available information on the permitted, other proposed and possible solar developments in the study area.

## COMPETENT EXPERTS

- 9.6 The LVIA, CLVIA and baseline plans (**Figures 9.1 – 9.3 and 9.6**) have been undertaken by Kay Hawkins, Chartered Landscape Architect (CMLI) and Director of Hawkins Bell Associates Ltd (t/a H:B:A Environment), a landscape practice and environmental consultancy based in Shropshire. Kay has been undertaking LVIA's and CLVIA's for a wide range of developments for over 30 years. Her relevant experience and expertise are provided in **Appendix 9.1**.
- 9.7 The zones of theoretical visibility and visualisations that illustrate and have informed the LVIA and CLVIA (**Figures 9.4a/b – 9.5.9**) have been produced by Mike Spence and his team at MSEnvironmental, based in Oxenhope, West Yorkshire. Mike is a Chartered Landscape Architect (CMLI), Registered EIA Practitioner (REIA) and Fellow of the Royal Geographical Society (FRGS). The relevant experience and expertise of Mike and his team are also provided in **Appendix 9.1**.

## SCOPE OF ASSESSMENT

- 9.8 This assessment is presented in the following sections:
- Method of Assessment – with further detail in **Appendix 9.2** (Method of Assessment) and **Appendix 9.3** (Technical Appendix).
  - Pre-Application Consultations – with the Council, Parish Councils and the public.
  - Legislation, Policy and Guidance – as relevant to the type, scale and location of the proposed development and the scope and method of assessment.
  - Initial Visibility and Viewpoint Appraisal – to identify the extent of the study area and preliminary viewpoints.
  - Landscape and Visual Baselines – the landscape resources and visual receptors within the study area (current baseline) plus permitted and other proposed development that could form part of likely and possible future baselines.

- Proposed Development, Mitigation and Enhancement – those aspects of the proposed development that could have an effect on the landscape resources and visual amenity of the site and study area (incorporating the embedded mitigation) and a description of the landscape and biodiversity mitigation and enhancement scheme (the further mitigation).
- Visibility and Viewpoint Analysis – the theoretical visibility of the proposed development (based on terrain data only), the selection of nine viewpoints and an analysis of the effects of the construction, operational and decommissioning phases of the development (incorporating both the embedded and further mitigation) at nine locations that represent the landscape character areas and visual receptors in the study area.
- Assessment of Effects on Landscape Resources and Visual Amenity - on the landscape fabric of the site, the landscape character of the site and study area and the visual amenity of visual receptors in the study area.

- Assessment of Cumulative Effects on Landscape Resources and Visual Amenity – on landscape character and the visual amenity of visual receptors in the study area, in the event that the permitted and other proposed solar farms are constructed and operational during the lifetime of the proposed development.
- Conclusions – on the effects of the proposed development on landscape resources and visual amenity.
- References – the documents, data and other information that have informed the LVIA.

9.9 This assessment is illustrated by **Figures 9.1 – 9.6** and is supported by information provided in **Appendices 9.1 – 9.4**.

## METHOD OF ASSESSMENT

9.10 This LVIA and CLVIA have been undertaken in accordance with the generic method of assessment described in **Appendix 9.2**, with the assessment process and stages described below. The 3D model,

zones of theoretical visibility (ZTVs), photography and visualisations that illustrate this LVIA and CLVIA have been produced in accordance with the Technical Appendix in **Appendix 9.3**.

## Assessment Process

9.11 The assessment is an iterative process, undertaken in a series of stages, with each stage revisited during the assessment process and drawing on the assessments undertaken by other disciplines, so that the findings of each stage have been incorporated into the proposed development and have been taken into account in the assessments of residual effects (see **Plate 9.1**).

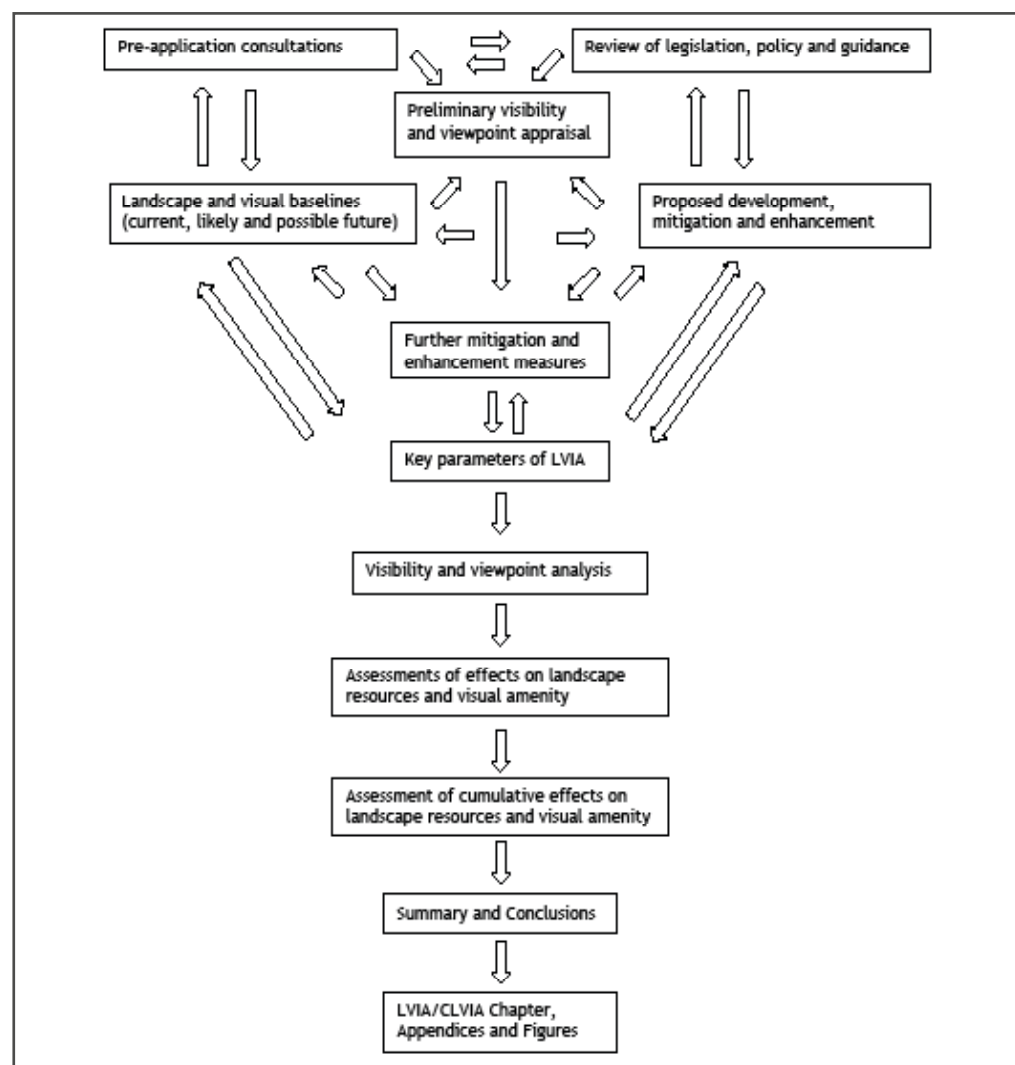
9.12 The assessment process has involved consultations, document and data review, fieldwork observations and photography, computer modelling, computer-generated visibility plans and visualisations, objective measurements and subjective professional judgement.

## Assessment Stages

### *Pre-application Consultations*

9.13 Pre-application consultation responses were sought and received from the Council, and feedback was provided by the Parish Councils and the public. These have helped to ensure that all important local landscape and visual issues have been taken into account in the LVIA and CLVIA. The pre-application consultations pertinent to the assessments are discussed in **Paragraphs 9.43 to 9.52**.

Plate 9.1 - Assessment Process



## Review of Legislation, Policy and Good Practice Guidance

9.14 Relevant legislation, national and local plan policies and good practice guidance have been reviewed to ensure that the LVIA addresses the legal requirements and policy context for this development type, scale and location and follows the latest good practice guidance. The legislation, national and local policy framework and good practice guidance that apply to this type of development are described in **Appendix 9.2** and the specific aspects of this legislation, policy and guidance that are relevant to this development and its location are discussed in **Paragraphs 9.53 to 9.72**.

## Preliminary Visibility and Viewpoint Appraisal

9.15 At an early stage in the design and assessment process, a “bare earth” intervisibility map was generated, extending at least 6 km from the site, and overlaid onto the Ordnance Survey (OS) 1:25,000 Explorer map (Figure SC 2, RCE/Engena October 2021). This was generated using OS terrain 5 data to create a digital terrain

model (DTM), 8 target points across the site (at 3 mAGL to represent the maximum solar PV array height) and an observer eye height of 1.8 mAGL.

9.16 This intervisibility map indicated the locations in the study area where the terrain would screen the target points (and was, therefore, likely to screen solar PV panels on the site) (no colour over the base map), and the locations where the terrain would permit views of up to 25% (1 – 2), 50% (3 – 4), 75% (5 – 6) and 100% (7 – 8) of the target points (and was, therefore, likely to permit views of solar PV panels on the site). This intervisibility map suggested that, based on screening by terrain only, zones of theoretical visibility would be largely within an area that extended 3.5 km south, 4 km southwest, 2 km west, 3 km northwest, 2.5 km north, 1 km northeast, 2 km east and at least 5km southeast of the site centre.

9.17 This intervisibility map and fieldwork observations enabled the identification and appraisal of five preliminary viewpoints which were provided to the Council during the pre-application consultations.

9.18 In addition to the terrain, a further degree of screening is provided by surface features such as built development and vegetation and so, based on the intervisibility map, fieldwork observations and viewpoint appraisal, a study area extending to 7 km x 7 km, with the site slightly off-centre towards the north, was selected for the more detailed assessments (see **Figures 9.1 – 9.3**). This is the study area referred to throughout this assessment.

## *Current Landscape and Visual Baseline*

9.19 The landscape resources in the study area have been examined from publicly available aerial photography and databases, published landscape character assessments and fieldwork observations, to identify the landscape fabric of the site and the landscape character of the site and study area. There are no national or local landscape designations in this study area but there are some planning designations which have also been noted.

9.20 The visual receptor types and locations within the study area have been identified from Ordnance Survey maps, aerial photography, databases, and fieldwork observations.

9.21 The current baseline also includes all built and under construction development. There are no operational solar farms in the current baseline.

## *Likely and Possible Future Landscape and Visual Baselines*

9.22 There is one permitted solar farm and one permitted solar array in the study area, which are likely to be constructed and operational during the lifetime of the development. There is also an extensive permitted residential and employment development called Fairham Pastures immediately south of Clifton, which is also likely to be constructed during the lifetime of the development, so all of these have been included in a “likely future baseline”.

9.23 Within the study area, there are also two solar farms with validated planning applications, which could be permitted and operational during the lifetime of the development, so these have also been included in order to consider a “possible future baseline”.

9.24 No other potential changes to the current baseline have been considered.



- 9.25 The current, likely and possible future landscape and visual baselines are described in **Paragraphs 9.73 to 9.113** and **Table 9.3 to Table 9.6**.

### *Development, Mitigation and Enhancement*

- 9.26 The construction, operational and decommissioning phases of the proposed development have been reviewed to identify those aspects with the potential to affect the landscape resources and/or visual amenity of the site and study area. These are described, together with the mitigation and enhancement measures that have been embedded into the proposed development design (see **Paragraphs 9.114 to 9.123**).

### *Further Mitigation and Enhancement Measures*

- 9.27 Measures to further mitigate effects on biodiversity, landscape and views and, where possible, enhance biodiversity, landscape fabric, landscape character and visual amenity were identified during the assessment process (informed by the pre-application consultations,

the review of legislation, policy and guidance, the initial visibility appraisal, the landscape and visual baselines, the characteristics of the proposed development and the Ecological Assessment). These measures have been incorporated into the Outline Landscape and Biodiversity Mitigation and Enhancement Plan (LBMEP, see **Figure 8.3**), and are described in **Paragraphs 9.124 to 9.135**.

### *Key Parameters of the LVIA*

- 9.28 The above stages have informed the scope and key parameters of the LVIA, as listed in **Table 9.1** (based on Table A2.1a in **Appendix 9.2**):

### *Key Parameters of the CLVIA*

- 9.29 The above stages have also informed the scope and key parameters of the CLVIA, as listed in **Table 9.2** (based on Table A2.1b in **Appendix 9.2**):

Table 9.1 - LVIA Parameters

LVIA Parameters	Description
Study area	A 7 km x 7 km study area extending at least 3 km east and west, 2 km north and 3.5 km south of the boundary of the proposed development site. This study area has been selected based on the extent of the theoretical zones of visibility (see <b>Figures 9.4a and 9.4b</b> ).
Baseline	The current landscape resources and visual receptors in the study area, including all existing developments. There are no operational solar farms in the study area.
Landscape resources	Landscape fabric of the development site and the landscape character of the site and study area. There are no national or local landscape designations in the study area.
Visual receptors	Residents in villages and individual properties, walkers, cyclists and equestrians on the public rights of way network, visitors to tourist attractions and motorists on the main and minor roads.
Viewpoints	Nine viewpoints have been selected to represent the landscape resources and visual receptor types and locations in the study area. In accordance with the GLVIA3 ( <b>Paragraph 6.19</b> ) these are representative viewpoints.
Aspects of proposed development	Elements and activities of the construction, operational and decommissioning phases of the proposed development with the potential to give rise to significant effects on landscape and/or visual amenity.
Temporal limits	The timescales taken into account in the assessments are the length of the construction phase (9 months), operational phase (40 years) and decommissioning phase (9 months), and the timescale selected to illustrate the effectiveness of the mitigation measures (5 – 40 years).
Nature of effects	Discrete effects - the direct/indirect, short/medium/ long-term temporary, permanent, beneficial/ adverse effects of the proposed development in the context of the current baseline.  The site is not near to any country borders and there will not be any transboundary landscape or visual effects.

Table 9.2 - CLVIA Parameters

CLVIA Parameters	Description
Cumulative study area	A 7 km x 7 km study area extending at least 3 km east and west, 2 km north and 3.5 km south of the boundary of the proposed development site.
Cumulative effects	Inter-project (between project) cumulative effects – arising from the effects of the proposed development in the context of other development on landscape and visual amenity.  Intra-project effects have not been considered.
Types of development	The same type of development, ie other solar farms, and also an extensive proposed residential and commercial development.
Status of developments	The status of the developments to be included in the cumulative assessments as of July 2022:  Permitted developments – developments with an extant planning permission but which are not yet built.  Other proposed developments – developments with a validated planning application or outstanding appeal.
Baseline(s)	The landscape and visual baseline(s) against which the predicted cumulative effects have been assessed are:  Likely future baseline – current baseline plus permitted developments.  Possible future baseline – the likely future baseline plus other proposed developments.
Nature and type of cumulative effects	Cumulative effects – the direct/indirect, short/medium/long-term temporary, permanent, beneficial/adverse additional cumulative effects of the proposed development in the context of the likely future and possible future baselines.

## Visibility Analysis

9.30 Zones of theoretical visibility (ZTVs) have been generated using LIDAR 2m DTM data and a 3D model of the proposed development, overlaid onto the OS 1:25,000 Explorer map (see Appendix 9.3). Two ZTVs have been generated:

- ZTV - Solar PV Panels (**Figure 9.4a of ES Volume 3**) - using 200 target points across the site located along the back (top) edges of the solar PV panels (3 mAGL) and an eye height of 1.6 mAGL, to illustrate the theoretical visibility of the solar PV panels. It should be noted that this ZTV was generated on a solar PV panel layout that still included an on-site track that ran north-south in the southern part of the site (as illustrated in the model in Appendix 9.3), which has since been removed and filled in with panels. However, the final site layout would not noticeably change the zones of theoretical visibility predicted by this ZTV which has, therefore, been used to inform this LVIA.

- ZTV - Substation and BESS Infrastructure (**Figure 9.4b of ES Volume 3**) – using 9 target points within the substation compound (5.04 mAGL) and an eye height of 1.6 mAGL, to illustrate the theoretical visibility of the substation and BESS infrastructure. It should be noted that this ZTV was generated prior to the addition of taller busbars within the substation compound, so the additional height of these (approximately 1.2 m above the control room ridgeline) is not modelled by the target points in this ZTV. However, increasing some of the target point heights by 1.2 m to represent the locations and heights of the taller busbars would not noticeably extend the zones of theoretical visibility predicted by this ZTV due to the nature of the surrounding topography (which is flat and enclosed by the surrounding hills).

9.31 These ZTVs have identified the locations in the study area where the terrain would screen the solar panels and/or battery storage containers, control building and transformer (no colour over the base map), and the locations where the terrain would permit views of at least parts of the

proposed development. These have informed the selection of viewpoints and enabled the fieldwork observations to concentrate on those locations where there could be views of the proposed development.

9.32 As these ZTVs are based on terrain data only and do not take into account screening by surface features, such as buildings, hedgerows and woodlands, they illustrate theoretical areas of visibility that are more extensive than the actual areas of visibility for the proposed development.

9.33 The Technical Appendix (**Appendix 9.3**) explains how the 3D model and ZTVs were constructed. The visibility analysis is described in **Paragraphs 9.136 to 9.141**.

## Viewpoint Analysis

9.34 Nine viewpoint locations have been selected to represent the more open views of the proposed development from publicly accessible locations within the various landscape character areas and visual receptor locations in the study area. These viewpoint locations were identified in consultation with the Council's Design and Landscape Officer (RBC 3 January 2022).

9.35 A viewpoint analysis was then undertaken at each viewpoint to predict the likely changes in landscape character and views at these locations as a consequence of the construction, operational and decommissioning phases of the proposed development and to identify whether these changes would be significant. The viewpoint analysis was undertaken in accordance with the method of assessment for the viewpoint analysis explained in **Appendix 9.2**. The definition of “significant effects” used in this assessment is “effects that are material to the decision-making process” (see **Appendix 9.2**, paragraph A2.15).

9.36 The viewpoint analysis is illustrated by photo-panoramas and visualisations (wireframes and photomontages) for Viewpoints 1 – 9 (see **Figures 9.5.1 – 9.5.9 of ES Volume 4**). The photographs were taken on 17 November 2021 and 17 February 2022 (when deciduous vegetation was not in leaf) and so the photomontages illustrate the worst case, ie the extent to which the proposed development would be visible in late autumn through to early spring. Some additional screening would be provided by

vegetation in late spring, summer and early autumn when deciduous trees and hedgerows are in leaf and hedgerows may be taller (prior to seasonal pruning).

9.37 The viewpoint analysis has also considered the extent to which the changes in landscape character and views could be progressively mitigated during the operational phase as the proposed further mitigation and enhancement measures illustrated in the Outline LBMEP (new boundary hedgerows, hedgerow trees and wooded copses) establish. The viewpoint analysis is provided in **Paragraphs 9.142 to 9.317**.

9.38 The Technical Appendix (**Appendix 9.3**) explains how the viewpoint photography was undertaken and how the photo-panoramas and visualisations have been constructed. The visualisations are Type 4, as defined in TGN 06/19. The viewpoint locations range from adjacent to the site boundary and up to 2.75 km away, so the visualisations have a mix of horizontal fields of view (HFOV). The two closest viewpoints, Viewpoints 1 and 2, have HFOVs of 270° displayed over 3 x A1 sheets (2,523 mm wide)

and 180° displayed over 2 x A1 sheets (1682 mm wide) respectively, and the remaining viewpoints have HFOVs of 90° displayed over one A1 sheet (841 mm wide). All the visualisations are at the same scale and have a principal viewing distance of approximately 500 mm when printed or viewed as an A1 image. As per the ZTVs of the Solar PV Panels and Substation and BESS Infrastructure (**Paragraph 9.30 on page 153**), these visualisations were generated prior to the removal of the on-site track and addition of the taller busbars within the substation compound (and other minor changes to the layout as described in **Paragraph 9.42 on page 155**), so the taller busbars are not modelled into the visualisations. However, the additional solar PV panels in the centre of the site and other minor changes to the layout would not be noticeable on the visualisations and views of the taller busbars (which would be slender, discrete elements above the compound) have been taken into account in the viewpoint analysis.



## *Assessment of Effects on Landscape Resources and Visual Amenity*

- 9.39 An assessment has been undertaken of the effects of the proposed development, incorporating the embedded mitigation and the effects of the further mitigation and enhancement measures (after approximately 5 years), on the landscape fabric of the site, the character of each landscape character area and a range of receptor types and locations. This has drawn on the visibility and viewpoint analyses and other observations and has been undertaken in accordance with the methods of assessment of effects on landscape fabric, character and visual amenity, as described in **Appendix 9.2**.
- 9.40 The viewpoint analysis is only a sample of locations in the study area, so it is necessary to undertake this further step in the assessment so that all likely significant effects of the proposed development on landscape resources and the visual amenity of receptors in the study area have been identified. The assessment of effects

on landscape resources and visual amenity is provided in **Paragraphs 9.318 to 9.363**.

## *Assessment of Cumulative Effects on Landscape Resources and Visual Amenity*

- 9.41 An assessment has also been undertaken of the likely cumulative effects of the proposed development on the character of each landscape character area and a range of receptor types and locations, taking into account the likely future and possible future baselines in the study area. This has drawn on the visibility and viewpoint analyses and other observations and has been undertaken in accordance with the method of assessment of cumulative effects, as described in **Appendix 9.2**. The assessment of cumulative effects is provided in **Paragraphs 9.364 to 9.379**.

## *Limitations*

- 9.42 It should be noted that the ZTVs and visualisations were produced on a final draft layout (illustrated in **Appendix 9.3**) which has since been

modified slightly. The fence line has been amended in two places along the western boundary of the site to accommodate the revised application boundary, solar panels have been added to fill a gap where there was previously an internal access route in the middle of the southern part of the site and the four transformers along the drain in the middle of the northern part of the site have been raised by 0.62 – 0.94 mAGL to allow for the 1 in 100 annual exceedance probability fluvial flood area. Also, as noted in **paragraph 9.30 and 9.38** above, there are now slightly taller busbars within the substation compound which would extend above the control room ridgeline (by approximately 1.2 m). None of these changes would make a noticeable difference to the ZTV or visualisations and reliance on the ZTVs and visualisations has not prevented a thorough and robust assessment upon which a planning determination can take place.

## PRE-APPLICATION CONSULTATIONS

### Screening

- 9.43 The applicant submitted a Screening Request (RCE and Engena October 2021) to the Council. It noted that the proposal is a Schedule 2 development under the EIA Regulations but that the proposed development would be located outside any 'sensitive' areas and the initial ZTVs showed that the potential for significant visual effects would be limited. Therefore, it concluded that an Environmental Impact Assessment (EIA) would not be required but, to inform a future planning application, detailed reports on environmental and technical impacts (including landscape) would accompany the planning application.
- 9.44 The applicant subsequently withdrew the Screening Request and elected to voluntarily assess the proposals under the EIA Regulations in respect of the potential for significant ecology and landscape and visual impacts. All other matters were judged to be outside of the potential for significant

effects and so were scoped out of the EIA. Detailed assessments have, however, been undertaken with regards to other disciplines and these have been submitted in support of the application but outside of the Environmental Statement (ES).

### Pre-Application Consultations with the Council

- 9.45 Some of the pre-application consultation responses sought from the Council, the Parish Council and feedback provided by the public following public consultation events have influenced the design of the scheme, the mitigation and enhancement measures incorporated into the Outline LBMEP and the selection of viewpoints to illustrate the LVIA. This is further discussed in **Chapter 4 – Site Selection and Design**.

### *Response from Council's Environmental Sustainability Officer (RBC 27 October 2021)*

- 9.46 This response was submitted during the screening stage. This noted, amongst other matters, the applicant's

intention to submit various detailed reports on environmental and technical impacts (including landscape), the need for a Construction Environmental Management Plan (CEMP), the use of wildflower rich grassland underplanting the panels and along the borders to fields and a Landscape and Ecological Management Plan (LEMP).

### *Consultations with the Council's Design and Landscape Officer, (RBC 21 December 2021)*

- 9.47 The assessor wrote to the Council's Design and Landscape Officer setting out the proposed scope of the LVIA and CLVIA (HBA 20 December 2021) and asking for his comments and agreement on the proposed study area, baseline resources, other solar schemes to include in the CLVIA, the five preliminary viewpoint locations (now Viewpoints 1, 4, 5, 6 and 7) and the format of viewpoint illustrations. His advice was also sought on the appropriate landscape character assessment for the study area.

9.48 In his response (RBC 21 December 2021), the Council's Design and Landscape Officer suggested an additional four viewpoint locations and provided his reasons for selecting these. These are now Viewpoints 2, 3, 8 and 9 (see **Figures 9.1 - 9.3 of ES Volume 3**). He also confirmed that The Greater Nottingham LCA was the most relevant assessment to use and provided a link to the document. He was not aware of any other solar sites in the area.

## Consultations with the Parish Council

9.49 The applicant met with Parish Councils to discuss the project and receive their feedback. The main issue raised by Parish Councillors was access for construction traffic through Ruddington Village. Accordingly, construction traffic has now been routed via Pasture Lane and not via the village.

## Consultations with the Public

9.50 The applicant sought feedback from the public at public exhibitions held in March 2022.

9.51 Suggestions from the public relating to landscape and visual issues included:

- Access for construction traffic – it was suggested that access could be achieved via alternative routes (see Transport and Access for further information) .
- Extent of development - should be more compact and not to the south of Fairham Brook.
- Ground and boundary treatments – should be sympathetic to the area and should include wildflower meadows beneath the panels and the restoration of lost hedgerows along the boundaries, particularly those close to footpaths, to encourage more wildlife, and to provide adequate screening from the country park.

9.52 These suggestions have been taken into account in the design and mitigation of the proposed development where viable. Construction traffic will now be routed via Pasture Lane and not via Ruddington Village. The development is more compact as it now excludes the southern field on Gotham Moor to the south of Fairham Brook avoiding a new crossing of this Brook. The

Outline LBMEP has been devised with a view to enhancing the landscape character and biodiversity of the site. There are wildflower meadows beneath the panels and hedgerows proposed along all the boundaries of the site, which will provide a range of wildlife habitats and help to screen views from the nearby public footpaths and from Rushcliffe Country Park.

## LEGISLATION, POLICY AND GUIDANCE

### Introduction

9.53 The legislation, national and local policies and good practice guidance that require and guide LVIA and CLVIA for EIA developments in general are discussed in **Appendix 9.2**. The legislation, national and local policies and guidance of particular relevance to this proposed development and location, to the LVIA and CLVIA scope and assessment process and to the Outline LBMEP are summarised below.

## Legislation

- 9.54 This proposed development is an installation for the production of energy (electricity) with a development area exceeding 0.5ha, and so comes under section 3 (a) of Schedule 2 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended 2018) (the EIA Regulations 2017). As noted in **Paragraphs 9.43 to 9.44** above, in its Screening Request (RCE and Engena October 2021) the applicant concluded that the proposed development would be located outside any 'sensitive' areas and the potential for significant visual effects were limited. However, the applicant has voluntarily submitted this ES, hence the EIA Regulations apply to this LVIA and CLVIA.
- 9.55 Accordingly, this LVIA and CLVIA and the accompanying Outline LBMEP (**Figure 8.3 of ES Volume 3**) provide the landscape and visual information set out in Schedule 4 of the EIA Regulations (**Appendix 9.2**, paragraph A2.14).

## National Policy

- 9.56 The National Planning Policy Framework (NPPF, MHCLG July 2021) sets out the Government's planning policies for England and how these should be applied. Various planning policies in the NPPF have influenced the scope and approach of this assessment, and the mitigation measures incorporated into the design of the proposed development and the Outline LBMEP.
- 9.57 For example, with regards to Achieving Sustainable Development (Section 2), the NPPF has a presumption in favour of sustainable development (paragraphs 10 and 11) with the objective of sustainable development summarised as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (paragraph 7, quoting Resolution 42/187 of the United Nations General Assembly).
- 9.58 With regards to Decision Making (section 4) and pre-application consultations, the NPPF encourages applicants to discuss what information is needed with the local planning authority (LPA) and expert

bodies (paragraph 43) and local planning authorities should only request supporting information that is relevant, necessary and material to the application (paragraph 44).

- 9.59 With regards to Building a Strong, Competitive Economy (section 6) and supporting a prosperous rural economy, the NPPF states that planning policies and decisions should enable, amongst other matters (a) the sustainable growth and expansion of all types of businesses in rural areas, both through the conversion of existing buildings and well-designed new buildings; and (b) the development and diversification of agricultural and other land-based rural businesses (paragraph 84). It notes that sites to meet local business in rural areas may have to be found adjacent or beyond existing settlements and, in these circumstances, it will be important to ensure that development is sensitive to its surroundings, does not have an unacceptable impact on local roads and exploits any opportunities to make a location more sustainable (paragraph 85).

- 9.60 With regards to Making Effective Use of Land (section 11), the NPPF states that planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions (paragraph 119).
- 9.61 With regards to Achieving Well-designed Places (section 12), the NPPF states that planning policies and decisions should ensure that developments, amongst other matters, (a) function well and add to the overall quality of the area over the lifetime of the development; (b) are visually attractive, with appropriate and effective landscaping; (c) are sympathetic to the local character and history, surrounding built environment and landscape setting; (d) establish or maintain a strong sense of place; and e) optimise the potential of the site to accommodate and sustain an appropriate amount and mix of development (para 130). The NPPF notes that trees make an important contribution to the character and quality of urban environments, can also help mitigate and adapt to climate change, that existing trees are retained wherever possible and that appropriate measures are in place to secure the long-term maintenance of newly planted trees (paragraph 131). Whilst this policy refers to trees in urban environments, trees also make an important contribution to the character and quality of rural environments, such as in this location.
- 9.62 With regards to Protecting Green Belt land (section 13), the NPPF states that the fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open and the essential characteristics of Green Belts are their openness and their permanence (paragraph 137). It lists the five purposes of Green Belt (paragraph 138) as:
- a) to check the unrestricted sprawl of large built-up areas;*
  - b) to prevent neighbouring towns merging into one another;*
  - c) to assist in safeguarding the countryside from encroachment;*
  - d) to preserve the setting and special character of historic towns; and*
  - e) to assist in urban regeneration, by encouraging the recycling of derelict and other urban land.*
- 9.63 It states that local planning authorities should plan positively to enhance their beneficial use, such as looking for opportunities to provide access, outdoor sport and recreation, to retain and enhance landscapes, visual amenity and biodiversity, or to improve damaged and derelict land (paragraph 145). It notes that elements of many renewable energy projects will comprise inappropriate development when located in the Green Belt and, in such cases, developers will need to demonstrate very special circumstances, such as the wider environmental benefits associated with increased production of energy from renewable sources (paragraph 151).
- 9.64 With regards to Meeting the Challenge of Climate Change, Flooding and Coastal Change (section 14), the NPPF states that new development should be planned for in ways that (a) avoid increased vulnerability to the range of impacts arising from climate change and (b) can help reduce greenhouse gas emissions.



9.65 With regards to Conserving and Enhancing the Natural Environment (section 15), the NPPF states that planning policies and decisions should contribute to and enhance the natural and local environment by, amongst other matters, (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services, including the economic and other benefits of trees and woodland (paragraph 174).

9.66 Based on the above policies in the NPPF, this LVIA and the accompanying Outline LBMEP have sought to:

- Agree the scope of the assessment in consultation with the LPA (see **Paragraphs 9.47 to 9.48**) in order to focus the assessment on “likely significant landscape and visual effects” and to provide the information necessary and material to the planning decision.
- Describe the intrinsic character of the countryside in this location and identify those valued aspects of the landscape and visual baseline that should be safeguarded.

- Examine the effects of the development on its location and identify the embedded and further mitigation that would help to assimilate the development into the local area for the benefit of current and future generations.
- Identify ways in which this proposed development could protect and add to the overall quality of the area, with appropriate and effective landscaping, including hedgerow and tree planting, which will be visually attractive, optimise the site for its intended use, could reduce its vulnerability to climate change and offset its greenhouse gas emissions.

## Local Policy and Guidance

### *Rushcliffe Local Plan*

9.67 The Rushcliffe Local Plan is in two parts – Part 1: Core Strategy Adopted December 2014 (RBC 2014) and Part 2: Land and Planning Policies Adopted October 2019 (RBC 2019).

9.68 The policies relevant to the design and assessment of impacts of the proposed development on landscape and visual amenity in this locality, include:

## PART 1: CORE STRATEGY:

- Policy 2: Climate Change – this promotes the development of new decentralised renewable and low-carbon energy schemes appropriate for Rushcliffe, including solar, where these are compatible with environmental, heritage, landscape and other planning considerations.
- Policy 16: Green Infrastructure, Landscape, Parks and Open Space – this requires existing and potential Green Infrastructure (GI) corridors and assets to be protected and enhanced (the Fairham Brook is identified as an existing GI corridor, see **Figure 9.2 of ES Volume 3**). It requires landscape character to be protected, conserved or enhanced where appropriate in line with recommendations in The Greater Nottingham Landscape Character Assessment (see **Figure 9.1 of ES Volume 3**). It also states that criteria for the assessment of proposals and any areas of locally valued landscape requiring additional protection will be included in the Local Plan Part 2 (see Policies 34, 35 and 37 below).

## PART 2: LAND AND PLANNING POLICIES:

- Policy 16: Renewable Energy – this states that proposals for renewable energy schemes will be granted planning permission where they are acceptable in terms of 17 criteria, including landscape and visual effects, open space and other recreational uses, the amenity of nearby properties, grid connection, form and siting, mitigation, decommissioning and reinstatement of land at the end of the operational life, and cumulative impact with existing and proposed development.
- Policy 19: Development affecting Watercourses – this states that the Council will support development proposals that, amongst other matters, seek to conserve and enhance the biodiversity, landscape and recreational value of the watercourse and corridor through good design; and provides a minimum 10 m buffer where physically feasible between the top of the watercourse and the development site which is free of built development, and includes

the long term landscape and ecological management plan for this buffer. (Note: this is greater than the 5 m separation required to protect water voles (**Chapter 9 – Ecology**) and the 9 m separation required by the Internal Drainage Board (IDB) (**Chapter 3 – Site Selection and Design**)).

- Policy 21: Green Belt and the Countryside – this states that applications for development in the Green Belt will be determined in accordance with the NPPF (see **Paragraph 9.62 on page 159**).
- Policy 34: Green Infrastructure and Open Space Assets – this identifies the GI assets that will be protected from development that adversely affects their green infrastructure function. These include rights of way.
- Policy 35: Green Infrastructure Network and Urban Fringe – this states that proposals within Strategic Green Corridors or Local Green Corridors, as identified in Appendix D, should ensure that the primary functions of the network are maintained and enhanced. The Green Infrastructure Corridors

listed in Appendix D that are within or partly within the study area, include:

- 3: River Trent – Trent Washlands to Holme Pierrepont Green Corridor – its primary functions are sports and recreation, ecological (wetland, grassland and woodland creation, protection and enhancement), floodwater storage, and improved pedestrian and cycling connectivity.
- 7: Fairham Brook/Packman Dyke and Rushcliffe Country Park Green Corridor - its primary functions are ecological networks (wetland, grassland and woodland creation, protection and enhancement), floodwater storage, and improved pedestrian and cycling connectivity.
- 15: Edwalton/Sharphill Wood/Ruddington Corridor - its primary functions are habitat protection, creation and enhancement (woodland and grassland), and improved pedestrian and cycle connectivity between Edwalton/West Bridgford and Ruddington.

- Policy 35: Green Infrastructure Network and Urban Fringe - also states that development within the urban fringe must, where possible and appropriate, incorporate accessible infrastructure that provides recreational opportunities, wildlife benefits and enables pedestrian and cycle access to the wider countryside.

- Policy 37: Trees and Woodlands – this states that adverse impacts on mature trees must be avoided, mitigated or if removal of trees is justified should be replaced. Replacements must follow the principle of the “right tree in the right place”. Wherever tree planting would provide the most appropriate net-gains in biodiversity, the planting should be of locally native trees and, to ensure the planting is resilient to climate change and diseases, a wide range of species should be included on each site.

9.69 Hence the Outline LBMEP protects and enhances the Fairham Brook (GI corridor), retaining a buffer between the watercourse and any built development, provides a long-term landscape and ecological enhancement and management plan

for this buffer, including grassland, hedgerows and small new woodlands which will have wildlife benefits. A wide range of locally native wildflower, grassland, hedgerow and tree species are proposed to enable the establishing vegetation to adapt to the varying conditions across the site.

## *Supplementary Planning Documents*

- 9.70 There are several Supplementary Planning Documents (SPDs) on the Council's website, but none are relevant to the design and assessment of the effects of the proposed development on the landscape and visual amenity in this locality.

## Good Practice Guidance

- 9.71 There is currently no good practice guidance for LVIA and CLVIA for solar farms specifically. However, there are several good practice guidance documents published by the Landscape Institute that have guided this LVIA and CLVIA:

- Guidelines for Landscape and Visual Assessment 3rd edition (LI/ IEMA 2013), known as GLVIA3 – this provides guidance on landscape and visual impact assessment for all development types throughout the UK.

- Landscape Character Assessment: Technical Information Note 08/2015 (LI 2015), known as TIN 08/15 – this provides information on the process of landscape character assessment and the guidance documents and landscape character assessments provided in England, Scotland, Wales and Northern Ireland.

- Assessing Landscape Value Outside National Designations: Technical Guidance Note 02/21 (LI 2021), known as TGN 02/21 – this provides information and guidance for those who need to make judgements about the value of a landscape outside of national landscape designations in the UK and for those who review those judgements.

- Visual Representation of Development Proposals: Technical Guidance Note 06/19 (LI September 2019), known as TGN 06/19 – this aims to help landscape professionals, planning officers and stakeholders to select the types of visualisations that are appropriate to the circumstances in which they will be used.

9.72 Further information on these guidance documents that are of particular relevance to this LVIA are set out in **Appendix 9.2**. With regards to the recommendations in TGN 06/19, it has been decided to illustrate this LVIA with type 4 visualisations. The Technical Appendix in **Appendix 9.3** explains how the photography has been undertaken and how the 3D model, ZTVs and visualisations have been constructed.

## LANDSCAPE AND VISUAL BASELINE

### Site Location and Context

9.73 As shown on the Site Location Plan (**Figure 1.1 of ES Volume 3**), the proposed development site is located on Ruddington Moor, to the south of the city of Nottingham, in Rushcliffe Borough.

9.74 The site is located within an extensive area of flat, low-lying (30 m AOD), arable farmland, drained by Fairham Brook and man-made ditches. These drain into the River Trent which meanders across a wide valley floor

(over 3.7 km northwest and west). A line of low hills, rising to just over 95 m AOD, curve around this low-lying land to the northwest, west and south, including Brands Hill (2 km northwest), Gotham Hill (over 1.2 km west), the West Leake Hills (over 2 km south), and Hotchley, Rough and Bunny Hills (1.5 – 3 km south to southeast).

9.75 There are several settlements in the surrounding area, including Clifton (0.7 km north), Ruddington (1.4 km northeast), Bradmore (2.1 km east), Bunny (2.2 km east-southeast), East Leake (3 km south), Gotham (1.6 km west) and Barton in Fabis (2.8 km west) of the site boundary. Outside of the main settlements there are a few scattered farmsteads and cottages, such as Fields Farm Cottages (0.65 km north), Ruddington Farm (0.8 km northeast), Moorend Farm and Farm Cottages (1 km east), Long Manor (1.6 km east), Gotham Moor Farm (0.7 km south), Fairholme Farm (1.2 km southwest), Glebe Farm (1.1 km west), and Top Barn Cottage (1.9 km west-northwest).

9.76 The Nottingham Road, from Clifton to Gotham, runs north/south (over 1 km west), and the Great Central Railway

line runs north-northeast/south-southwest (<25 m east). Further afield is the A543 and Green Street (over 2 km northwest and west) and the A60 (over 2.5 km east). There is also a network of public rights of way (footpaths, bridleways and a restricted Byway) in the study area, some of which form part of two long distance trails and several promoted short circular routes in the study area (see **Paragraphs 9.97 to 9.101** and **Figure 9.3 of ES Volume 4**).

9.77 There are several small industrial estates in the surrounding area, including on Pasture Lane to the north of the site and adjacent to Top Barn Cottage (1.9 km west-northwest). Two lines of pylons run southwest/northeast across the study area from the Trent Valley power station (west of Gotham Hill) to Nottingham (between Clifton and Ruddington). Another line of pylons runs east/west across the study area from just south of Gotham Hill, across the site and onwards to the east just south of Rushcliffe Country Park.

9.78 Rushcliffe Country Park is to the east of the railway line (1 km east-northeast). There are also several allotment sites on the edges of the surrounding settlements, including Ruddington, Clifton and Gotham.

9.79 Rushcliffe Country Park and the low hills are well-wooded with a mix of coniferous and deciduous woodlands. On the low-lying farmland around the site, there are some small blocks of woodland, an intermittent row of Oak trees and some scrubby vegetation along the railway line and also some small trees along some of the drainage ditches but the majority of the low-lying farmland is open with few trees or hedgerows.

## Site Description

9.80 The area of the site within the perimeter fence is approximately 75.2 ha and almost flat (approximately 30 mAOD). It is bounded by Fairham Brook to the west and south (with a further 1.0 ha set aside as a mitigation area for lapwing habitat to the south of the Brook), a drainage ditch to the northeast and the railway line to the southeast. On the site, there is a short (430 m) length of drainage ditch running south/north in the northern part of the site and draining into the drainage ditch to the north.

9.81 The site consists of one very large field bounded by the Brook and drainage ditches, plus a small area of another large field to the north of the main drainage ditch and a small area to the south of the Brook. At the time of the assessment (July 2022), the site was in arable crop production with narrow headlands and buffers of low vegetation alongside the Brook and drainage ditches. There is one small copse at the northern end of the site but no existing hedgerows or hedgerow trees within the proposed perimeter fence, although there are small woodlands and trees close to the Brook and drainage ditches outside the application boundary.

9.82 An existing farm track runs alongside the drainage ditch and railway, just outside the northeastern and eastern boundaries. There are no residential properties, roads or public rights of way on the site.

9.83 There are three National Grid High Voltage Transmission Overhead Lines on and close to the site. One of the pylon lines crosses the site and the other two pylon lines run just north of the site and then northwards alongside Fairham Brook.

9.84 As described in **Paragraphs 9.121 to 9.122** below, the route of the cable exporting electricity from the substation on site to the point of connection to the local distribution network cannot yet be finalised and is subject to confirmation and a separate consenting process. However, this is expected to run from the substation to Fairham Brook, just inside the northeastern site boundary, then northwards parallel to Fairham Brook, then beneath the Brook to a connection point on one of the pylon lines to the north of the site. This indicative route is described further in **Chapter 3 – Site Selection and Design**. All cabling would be underground. There are no residential properties, roads or public rights of way along this route but there is some lowland fen vegetation alongside Fairham Brook (see **Appendix 8.1**).

## Landscape Resources

9.85 The existing landscape resources of the development site and surrounding area are the existing landscape elements (landscape fabric) and landscape character. There are no national or local landscape designations in this study area.



## *Landscape Fabric*

- 9.86 The landscape fabric of the development site consists of the existing field pattern, the drainage ditch and the low vegetation around the edges of the fields, as described in **Paragraphs 9.80 to 9.83** above.
- 9.87 The landscape fabric of the grid connection route consists of the vegetation along the route, including the lowland fen vegetation alongside Fairham Brook, as described in **Paragraph 9.84 on page 164**.

## *Landscape Character*

### REGIONAL LANDSCAPE CHARACTER AREAS AND DRAFT POLICY ZONES

- 9.88 The landscapes of Rushcliffe Borough are described and characterised as part of The Greater Nottingham Landscape Character Assessment (TEP June 2009). This identifies nine regional landscape character areas (RLCAs) each of which is sub-divided into one or more Draft Policy Zones (DPZs).
- 9.89 Each DPZ is a distinct and unique area of landscape, relatively homogeneous in character, with a particular combination of geology,

soils, topography, drainage, land use, vegetation, field, road and settlement patterns, and perceptual and aesthetic attributes.

- 9.90 The study area extends across three RLCAs and six component DPZs. The locations of the RLCAs and DPZs within the study area are illustrated on **Figure 9.1 of ES Volume 3**.
- 9.91 The site is in the South Nottinghamshire Farmlands RLCA and the ZTVs for the solar PV arrays and Substation and BESS Infrastructure (see **Figures 9.4a and 9.4b of ES Volume 3**) extend into the Nottinghamshire Wolds RLCA to the south but not into the Trent and Soar Valley RLCA to the northwest of the site.
- 9.92 The site is within SN02: Ruddington Alluvial Fringe DPZ and the ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) extend into SN01: Clifton Slopes, SN04: Cotgrave and Tollerton Village Farmlands and NW01: Gotham and West Leake Wooded Hills and Scarps DPZs.
- 9.93 Consequently, the baseline landscape character analysis and assessment of effects on landscape character have focussed on DPZs SN01, SN02, SN04 and NW01 (see **Tables 9.3 – 9.6**).

## PLANNING DESIGNATIONS

- 9.94 As shown on **Figure 9.2 of ES Volume 3**, the site is located in the Green Belt, in an Urban Fringe Enhancement Area and the Fairham Brook is a Green Infrastructure Corridor, as defined in the Rushcliffe Local Plan – Part 1: Core Strategy Adopted December 2014 (RBC 2014) and Part 2: Land and Planning Policies Adopted October 2019 (RBC 2019).
- 9.95 The fundamental aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open (NPPF, paragraph 137, see **Paragraph 9.62 on page 159**). The purpose of the Urban Fringe Enhancement Area is to encourage development within the urban fringe to incorporate accessible infrastructure that provides recreational opportunities, wildlife benefits and enables pedestrian and cycle access to the wider countryside (see Policy 35, **Paragraph 9.68 on page 160**). The purpose of the Green Infrastructure Corridor is to ensure that the primary functions of the GI network are maintained and enhanced, and the primary functions for GI Corridors 3, 7 and 15 are ecological networks (wetland, grassland and woodland creation,

protection and enhancement), floodwater storage, and improved pedestrian and cycling connectivity (see Policy 35, **Paragraph 9.68 on page 160**).

- 9.96 These are not areas designated for the quality of the landscape and so are not landscape designations, but the indirect effect of these planning designations is to conserve and, in some cases, enhance the character of the landscape, and so they have been noted in the assessments of landscape character in **Tables 9.3 – 9.6** below.

## RECREATIONAL OPPORTUNITIES

- 9.97 Recreational opportunities within the study area are illustrated on **Figure 9.3 of ES Volume 3**. These include long distance trails, promoted short circular routes, local public rights of way and visitor attractions.

- 9.98 There are sections of two long distance multi-use trails (suitable for cyclists, equestrians and walkers):

- Trent Valley Way – a 174 km route that passes through Nottingham, Newark, Gainsborough and Scunthorpe on its way to the Humber Estuary. A very short section is in the far northwest of the study area and outside the ZTV.

- Midshires Way – a 362 km route that starts in Buckinghamshire and ends in Greater Manchester, linking the Ridgeway National Trail with the Trans Pennine Trail, and passing through several counties including Nottinghamshire. Sections of the trail cross the southern part of the study area and parts are within the ZTV.

- 9.99 There are two promoted short circular routes around Gotham:

- Gotham Heritage Trail – this is a 7.25 km trail created to mark the passing of the Millennium in 2000. It is a circular walk around the village of Gotham, taking in Gotham Hills and part of West Leake Hills, returning via the village streets. It is promoted as a walk but follows bridleways and minor roads, so could also be used by cyclists and equestrians.
- Gotham ride – this is a 12 km ride promoted by the British Horse Society (BHS) that follows a “figure of 8” route along bridleways and minor roads, taking in Gotham Hills, the West Leake Hills and the village of Gotham. Sections of the route follow parts of the Gotham Heritage Trail and Midshires Way.

- 9.100 There are also four promoted short circular routes that start and end in the centre of Ruddington:

- Ruddington Walk #1: A Short Circular Stroll around Ruddington (c 5.6 km) – this walk takes in St Peter’s Church, the human sundial, Rushcliffe Country Park, Nottingham Transport Heritage Centre, the Great Central Railway and steam railway, the lake and Visitor Centre, Asher Lane bridge over the railway line, ‘Fifty Steps Bridge’ over the railway line, and Vicarage Lane Cemetery.
- Ruddington Walk #2: Ruddington to Sharphill Wood and back (c 8 km) – this walk follows village streets, bridleways and footpaths to Sharpley Wood (outside the study area) and back.
- Ruddington Walk #3: Ruddington to Clifton’s Greatest Hits (c 8.8 km) – this walk takes in the ‘Fifty Steps Bridge’ over the railway line, Pasture Lane, Fairham Brook Nature Reserve, a viaduct, the River Trent, Clifton Grove Local Nature Reserve, St Mary’s Church and Clifton Hall with a bus or further 3km walk back to Ruddington.

- Ruddington Walk #4: Ruddington to Bradmore and back (c 7.2 km) – this walk takes in the human sundial, Rushcliffe Country Park and the village of Bradmore.

9.101 There is a network of public rights of way including:

- Footpaths – alongside the railway line to the immediate east of the site (Ruddington FP6), from Clifton to Gotham (0.9 km west, Barton in Fabis FP4), and two parallel footpaths from Gotham to the railway line, one along the southern boundary of the site (Gotham FP5) and one 0.3 km to the south (Gotham FP7). To the east of the railway line are several footpaths, including from Ruddington around the periphery of Rushcliffe Country Park and several crossing Bradmore Moor and Bunny Moor. Further afield, there are footpaths over Gotham Hill and the West Leake Hills over 2 km southeast and south of the site.
- Bridleways – over Gotham Hill, over West Leake Hills, two short bridleways on Bradmore Moor and Bunny Moor, Mill Lane and other bridleways to the east of the A60.

- Restricted byway - along Lantern Lane (between Hotchley and Rough Hills).

9.102 There are several visitor and leisure attractions, including:

- (A) Rushcliffe Country Park (1 km east-northeast of the site).
- (B) Nottingham Transport Heritage Centre and Nottingham Heritage Railway (1.9 km east-northeast of the site). The steam railway runs along approx. 9.5 km of the Great Central Railway (Nottingham) line from the Ruddington Fields railway station in Rushcliffe Country Park.
- (C) Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington (1.8 – 2 km northeast of the site)
- (D) Rushcliffe Golf Club (2 km south of the site) – on the north facing slopes of the West Leake Hills at elevations of 40 – 60 mAOD.

## BASELINE LANDSCAPE CHARACTER ANALYSIS

9.103 As noted in **Paragraph 9.93 on page 165** above, the baseline landscape character analysis has focussed on DPZs SN01, SN02, SN04 and NW01.

**Tables 9.3 – 9.6** below summarise their locations, key characteristics, aesthetic and perceptual factors, other development, planning designations (**Figure 9.2 of ES Volume 3**), recreational opportunities (**Figure 9.3 of ES Volume 3**), natural and cultural heritage, associations, functions, the nature of views and relevant landscape policies and strategies (see **Appendix 9.2**, paragraph A2.36), focussing on the parts of these DPZs that are within the study area.

9.104 This information is based on fieldwork observations, the Ordnance Survey Explorer sheets 246 and 260, aerial photography, The Greater Nottingham Landscape Character Assessment (TEP June 2009) (see extracts in **Appendix 9.4**), the Rushcliffe Local Plan (RBC 2014 and RBC 2019) and other published information.

9.105 Each DPZ has then been evaluated to identify its value and susceptibility to the type of changes that could be brought about by a development of this nature, scale and location, in order to define its sensitivity to this type of development, using the criteria set out in **Appendix 9.2** (paragraphs A2.56 - A2.61 and Tables A2.2 – A2.4).

Table 9.3 - SN01: Clifton Slopes

Aspect	Description
Location	Within South Nottinghamshire Farmlands RLCA to the southwest of Clifton.
Key characteristics	<ul style="list-style-type: none"> <li>• Geology and soils – a prominent Mercia Mudstone outcrop (Brands Hill) forming a distinctive escarpment bordering the River Trent.</li> <li>• Topography and drainage – the escarpment rises to 87 mAOD and has a steep scarp slope down to the river and gentler dip slopes down to the alluvial farmland at Ruddington Moor.</li> <li>• Land uses – mainly arable production with pockets of pasture.</li> <li>• Vegetation – broadleaved woodland on scarp slope and a small woodland block (Heart Lees) on the dip slope with fragmented hedgerows, some established and newly planted roadside hedgerows but few hedgerow trees.</li> <li>• Field patterns – open, large scale field pattern.</li> <li>• Road pattern – crossed by Nottingham Road, Green Street and the A453.</li> <li>• Settlement pattern – sparsely populated with a few large farms.</li> </ul>
Aesthetic and perceptual factors	This combination of characteristics has created a large scale, relatively elevated agricultural landscape, with a distinct and simple composition, open, with regular rectilinear patterns. It is a managed and relatively peaceful landscape (noisy along the A453), in moderate condition, with a pleasant scenic quality, a good sense of place, limited access via the road and PROW network, and is part of an extensive RLCA (South Nottinghamshire Farmlands).
Other built development	Eastern boundary defined by two pylon lines. New residential development on Clifton Pasture will occupy and change the character of a large part of this DPZ.
Planning designations	Sits within the Greenbelt, partly within the Urban Fringe Enhancement Area and partly within GI corridor 3 (River Trent).
Recreational opportunities	One public footpath across Clifton Pasture and a bridleway around the base of the escarpment.
Natural heritage	Some habitat value in the woodlands, roadside hedgerows and pockets of pasture.
Cultural heritage	No information provided in The Greater Nottinghamshire LCA.

Aspect	Description
Associations	None known.
Function	This is a very functional landscape (agricultural, transport) that may have a limited contribution to the healthy functioning of the wider landscape.
Views	Elevated views from the top of Brands Hill westwards towards the River Trent valley, southeastwards towards the low lying landscapes to the southeast, and southwestwards to the cooling towers and chimney of the Ratcliffe on Soar Power Station.
Landscape policies and strategies	<p>The National Planning Policy Framework (NPPF) Section 13 (MHCLG July 2021) which states that the aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open and the essential characteristics of Green Belts are their openness and their permanence.</p> <p>The Rushcliffe Local Plan - Part 1: Core Strategy (RBC 2014) and Part 2: Land and Planning Policies (RBC 2019):</p> <p>Policy 2: Climate Change and Policy 16: Renewable Energy, which promote renewable and low-carbon energy schemes including solar where these are compatible/ acceptable in terms of landscape and other planning considerations.</p> <p>Policies 34 and 35: Green Infrastructure and Urban Fringe – which supports developments that ensure the primary functions of the network are maintained and enhanced.</p> <p>The Greater Nottingham Landscape Character Assessment (TEP June 2009):</p> <p>Figure no 019: Landscape Management Strategies: recommends “enhance and restore”.</p>
Landscape value	Local value – an undesignated landscape with natural assets that form distinctive landscape features (escarpment), where the landscape is in good physical condition, offers very limited recreational opportunities, is distinctive with a good sense of place and a pleasant scenic quality (see <b>Appendix 9.2</b> , Table A2.2).
Susceptibility to this type of development	Moderate susceptibility - as the key characteristics are clearly expressed; their robustness to change is moderately strong; views make a contribution to landscape character; policies and strategies support developments that respect the intrinsic qualities of the landscape and seek to protect and enhance landscape characteristics and features; and the changes to landscape character that could be brought about by a development of this type and scale in this location could have a degree of compatibility with these factors (see <b>Appendix 9.2</b> , Table A2.3).
Sensitivity to this type of development	Medium sensitivity - a landscape with local value and a moderate susceptibility to the type, scale and location of development proposed (see <b>Appendix 9.2</b> , Table A2.4).



Table 9.4 - SN02: Ruddington Alluvial Fringe

Location	Description
Location	Within South Nottinghamshire Farmlands RLCA to the south of Clifton and Ruddington.
Key characteristics	<ul style="list-style-type: none"> <li>• Geology and soils – Mercia Mudstones.</li> <li>• Topography and drainage – low-lying flat alluvial land at around 30mAOD drained by streams such as Fairham Brook and straight man-made drainage ditches with engineered uniform banks.</li> <li>• Land uses – mainly large-scale arable production with pockets of pasture close to villages.</li> <li>• Vegetation – infrequent small geometric plantations or coverts along stream sides, along the railway, and around villages and farmsteads. Hedgerows and hedgerow trees virtually absent.</li> <li>• Field patterns – open, large scale field pattern with a mix of regular and irregular field shapes and a wide variety of field sizes.</li> <li>• Road pattern – bounded by Nottingham Road, Leake Road, Gotham Road and the A60 but no roads within this DPZ.</li> <li>• Settlement pattern – sparsely populated with a few large farms and the villages of Gotham and Bunny on the periphery.</li> </ul>
Aesthetic and perceptual factors	This combination of characteristics has created a very large scale, flat and low-lying agricultural landscape, with a distinct and simple composition, open, with a mix of regular rectilinear and irregular patterns. It is a managed and relatively peaceful landscape (noisy along the A60), in poor condition, with limited scenic quality, some sense of place, limited access via the peripheral roads and PROW network, and is part of an extensive RLCA (South Nottinghamshire Farmlands).
Other built development	Northwestern boundary defined by two pylon lines. Crossed by the very straight route of the Great Central Railway/Nottingham Heritage Railway.
Planning designations	Sits within the Greenbelt, partly within the Urban Fringe Enhancement Area and contains GI corridor 7 (Fairham Brook).
Recreational opportunities	Criss-crossed by public footpaths - alongside the railway line, part of the footpath from Clifton to Gotham, from Gotham to the railway line, and several crossing Bradmore Moor and Bunny Moor to the east of the railway line

Location	Description
Natural heritage	Some habitat value in the woodlands, streams, drainage ditches and pockets of pasture.
Cultural heritage	No information provided in The Greater Nottinghamshire LCA.
Associations	None known.
Function	This is a very functional landscape (agricultural, rail transport) that may have a limited contribution to the healthy functioning of the wider landscape.
Views	Low-lying views across the flat landscape to the surrounding hills to the northwest (Brands Hill), west (Gotham Hill), southwest (West Leake Hills) and south (Hotchley, Rough and Bunny Hills). The cooling towers and chimney of the Ratcliffe on Soar Power Station are also visible behind Gotham Hill from most of this DPZ.

Location	Description
Landscape policies and strategies	<p>The National Planning Policy Framework (NPPF) Section 13 (MHCLG July 2021) which states that the aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open and the essential characteristics of Green Belts are their openness and their permanence.</p> <p>The Rushcliffe Local Plan - Part 1: Core Strategy (RBC 2014) and Part 2: Land and Planning Policies (RBC 2019):</p> <p>Policy 2: Climate Change and Policy 16: Renewable Energy, which promote renewable and low-carbon energy schemes including solar where these are compatible/ acceptable in terms of landscape and other planning considerations.</p> <p>Policy 19: Development affecting Watercourses – which supports development proposals that seek to conserve and enhance the biodiversity, landscape and recreational value of watercourses and their corridors.</p> <p>Policies 34 and 35: Green Infrastructure and Urban Fringe – which supports developments that ensure the primary functions of the network are maintained and enhanced.</p> <p>The Greater Nottingham Landscape Character Assessment (TEP June 2009): Figure no 019: Landscape Management Strategies: recommends “enhance and restore” with landscape measures that include: planting native species hedgerows and hedgerow trees, riparian vegetation along ditches and streams, small scale woodlands around farms, the railway and streams; recreating low-lying wet pasture moor and fen close to watercourses; conserving the expansive views contained by the wooded ridgelines and hills; and enhancing Fairham Brook by planting small-scale groups of riparian trees and scrub to denote its position within the landscape.</p>
Landscape value	<p>Local value – an undesignated landscape with natural assets that form distinctive landscape features (Fairham Brook and drainage ditches, small plantations and coverts along stream sides and the railway, and around villages and farmsteads), where the landscape is in poor physical condition, offers some recreational opportunities (footpaths), is distinctive with some sense of place and limited scenic quality (see <b>Appendix 9.2</b>, Table A2.2).</p>
Susceptibility to this type of development	<p>Moderate susceptibility - as the key characteristics are clearly expressed; their robustness to change is moderately strong; views to the surrounding hills make a contribution to landscape character; policies and strategies support developments that respect the intrinsic qualities of the landscape and seek to protect and enhance landscape characteristics and features; and the changes to landscape character that could be brought about by a development of this type and scale in this location could have a degree of compatibility with these factors (see <b>Appendix 9.2</b>, Table A2.3).</p>
Sensitivity to this type of development	<p>Medium sensitivity - a landscape with local value and a moderate susceptibility to the type, scale and location of development proposed (see <b>Appendix 9.2</b>, Table A2.4).</p>

Table 9.5 - SN04: Cotgrave and Tollerton Village Farmlands

Aspect	Description
Location	Within South Nottinghamshire Farmlands RLCA to the west, south and east of Ruddington (and extending to the northeast outside the study area).
Key characteristics	<ul style="list-style-type: none"> <li>• Geology and soils – Mercia Mudstones.</li> <li>• Topography and drainage – gently undulating (between c 30 – 48mAOD in the study area) and drained by streams.</li> <li>• Land uses – mainly arable production with pasture common around fringes of villages and along watercourses.</li> <li>• Vegetation – riparian vegetation along watercourses, field and roadside hedgerows with some hedgerow trees. Dense woodland cover in Rushcliffe Country Park.</li> <li>• Field patterns – predominantly modern pattern of medium and large-scale fields with older enclosure patterns of small fields around village fringes.</li> <li>• Road pattern – crossed by the A60 and minor roads.</li> <li>• Settlement pattern – sparsely populated with a few large farms and the village of Bradmore within the study area.</li> </ul>
Aesthetic and perceptual factors	This combination of characteristics has created a medium to large scale, undulating rural landscape, with a distinct and varied composition, open and enclosed in places, with a mix of regular rectilinear and irregular patterns. It is a managed and relatively peaceful landscape (noisy along the A60), in moderate condition, with pleasant scenic quality, a sense of place, limited access via the roads and PROW network, and is part of an extensive RLCA (South Nottinghamshire Farmlands).
Other built development	Crossed by a pylon line.
Planning designations	Sits within the Greenbelt and within the Urban Fringe Enhancement Area.
Recreational opportunities	<p>Rushcliffe Country Park, Nottingham Transport Heritage Centre, Nottingham Heritage Railway, Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington.</p> <p>Parts of Rushcliffe Walks # 1, 3 and 4.</p> <p>Public footpaths – from Ruddington around the periphery of Rushcliffe Country Park.</p> <p>Bridleways - along Mill Lane and other routes to the east of the A60.</p>

Aspect	Description
Natural heritage	Some habitat value in the riparian vegetation, field and roadside hedgerows, hedgerow trees and woodland in Rushcliffe Country Park.
Cultural heritage	No information provided in The Greater Nottinghamshire LCA.
Associations	None known.
Function	This is a functional landscape (agricultural and recreational) that may have a limited contribution to the healthy functioning of the wider landscape.
Views	Mix of low-lying and slightly more elevated views across the undulating landscape, open in places but also contained by vegetation in others, with few views westwards of the low-lying landscape of SN02.
Landscape policies and strategies	<p>The National Planning Policy Framework (NPPF) Section 13 (MHCLG July 2021) which states that the aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open and the essential characteristics of Green Belts are their openness and their permanence.</p> <p>The Rushcliffe Local Plan - Part 1: Core Strategy (RBC 2014) and Part 2: Land and Planning Policies (RBC 2019):</p> <p>Policy 2: Climate Change and Policy 16: Renewable Energy, which promote renewable and low-carbon energy schemes including solar where these are compatible/ acceptable in terms of landscape and other planning considerations.</p> <p>Policies 34 and 35: Green Infrastructure and Urban Fringe – which supports developments that ensure the primary functions of the network are maintained and enhanced.</p> <p>The Greater Nottingham Landscape Character Assessment (TEP June 2009): Figure no 019: Landscape Management Strategies: recommends “enhance”.</p>
Landscape value	Local value – an undesignated landscape with natural assets that form distinctive landscape features (riparian vegetation, field and roadside hedgerows, hedgerow trees and woodland in Rushcliffe Country Park), where the landscape is in moderate physical condition, offers some recreational opportunities (footpaths and bridleways), is distinctive with a sense of place and a pleasant scenic quality (see <b>Appendix 9.2</b> , Table A2.2).
Susceptibility to this type of development	Moderate susceptibility - as the key characteristics are clearly expressed; their robustness to change is moderately strong; views to the surrounding hills make a contribution to landscape character; policies and strategies support developments that respect the intrinsic qualities of the landscape and seek to protect and enhance landscape characteristics and features; and the changes to landscape character that could be brought about by a development of this type and scale in this location could have a degree of compatibility with these factors (see <b>Appendix 9.2</b> , Table A2.3).
Sensitivity to this type of development	Medium sensitivity - a landscape with local value and a moderate susceptibility to the type, scale and location of development proposed (see <b>Appendix 9.2</b> , Table A2.4).



Table 9.6 - NW01: Gotham and West Leake Wooded Hills and Scarps

Aspect	Description
Location	Within Nottinghamshire Wolds RLCA to the west and south of Gotham and to the west and east of East Leake.
Key characteristics	<ul style="list-style-type: none"> <li>• Geology and soils – Lower Lias and Rhaetic Beds overlain with variable thicknesses of boulder clay. Soils are predominantly strong clayey matrix containing chalk stones and lenses of fine loamy material which are difficult to cultivate, with loamy coarse soils in the west.</li> <li>• Topography and drainage – a series of prominent individual hills with steep scarp slopes and broad plateaus, generally rising to c95mAOD.</li> <li>• Land uses – mix of woodland on the higher ground, arable on the lower, more gentle slopes and pasture close to rivers and settlements, with scarp grassland where the land is steeply sloping.</li> <li>• Vegetation – mixed coniferous and broadleaved plantations and smaller woodlands, and field boundary hedgerows.</li> <li>• Field patterns – mostly modern, with pockets of older field systems, resulting in a mixed pattern of large and small fields, regular and irregular.</li> <li>• Road pattern – crossed by the A60 and minor roads.</li> <li>• Settlement pattern – sparsely populated with a few large farms and the villages of Gotham and East Leake.</li> </ul>
Aesthetic and perceptual factors	This combination of characteristics has created a medium to large scale, relatively elevated rural landscape, with a distinct and varied composition, open and enclosed in places, with regular and irregular patterns. It is a managed and relatively peaceful landscape (noisy along the A60), in good condition, with a good scenic quality, a strong sense of place, good access via the road and PROW network, and is part of an extensive RLCA (Nottinghamshire Wolds).
Other built development	Gypsum works at East Leake and Gotham.
Planning designations	Sits partly within the Greenbelt, but outside the Urban Fringe Enhancement Area and outside any GI corridors defined in the LDP.
Recreational opportunities	<p>Rushcliffe Golf Club</p> <p>Crossed by the Midshires Way</p> <p>Gotham Heritage Walk and Gotham Ride</p> <p>Restricted byway - along Lantern Lane (between Hotchley and Rough Hills)</p> <p>Several footpaths and bridleways - over Gotham Hill and West Leake Hills</p>
Natural heritage	Habitat value in the woodlands, field boundary hedgerows, pasture and scarp grassland.

Aspect	Description
Cultural heritage	No information provided in The Greater Nottinghamshire LCA.
Associations	None known.
Function	This is a functional landscape (agricultural, recreation) that contributes to the healthy functioning of the wider landscape.
Views	Elevated views from the open slopes of Gotham Hill and the West Leake Hills, towards the low-lying landscapes to the east and north, in which the pylon lines are prominent.
Landscape policies and strategies	<p>The National Planning Policy Framework (NPPF) Section 13 (MHCLG July 2021) which states that the aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open and the essential characteristics of Green Belts are their openness and their permanence.</p> <p>The Rushcliffe Local Plan - Part 1: Core Strategy (RBC 2014) and Part 2: Land and Planning Policies (RBC 2019):</p> <p>Policy 2: Climate Change and Policy 16: Renewable Energy, which promote renewable and low-carbon energy schemes including solar where these are compatible/ acceptable in terms of landscape and other planning considerations.</p> <p>The Greater Nottingham Landscape Character Assessment (TEP June 2009):</p> <p>Figure no 019: Landscape Management Strategies: recommends “conserve”.</p>
Landscape value	County value – an undesignated landscape with natural assets that form distinctive landscape features (hills), where the landscape is in good physical condition, offers recreational opportunities, is distinctive with a strong sense of place and a good scenic quality (see <b>Appendix 9.2</b> , Table A2.2).
Susceptibility to this type of development	Susceptible - as the key characteristics are strongly expressed; their robustness to change is moderately strong; views are an important characteristic; policies and strategies support developments that respect the intrinsic qualities of the landscape and aim to conserve the key characteristics; and the changes to landscape character that could be brought about by a development of this type and scale in this location could have a degree of compatibility with these factors (see <b>Appendix 9.2</b> , Table A2.3).
Sensitivity to this type of development	High/medium sensitivity - a landscape with County value and susceptible to the type, scale and location of development proposed (see <b>Appendix 9.2</b> , Table A2.4).

## Visual Receptor Groups and Locations

9.106 The visual baseline of the development site and study area is composed of the existing views and visual amenity enjoyed by visual receptors in the locality.

9.107 The main visual receptor groups and their locations in the study area are shown on **Figure 9.3 of ES Volume 3** and include:

- Residents – in properties in Ruddington, Clifton, East Leake and the villages of Bradmore, Bunny, Gotham and Barton in Fabis.
- Residents – in farmsteads on the open farmland, including Fields Farm Cottages, Ruddington Farm, Moorend Farm and Farm Cottages, Moor Farm, Long Manor, Gotham Moor Farm, Fairholme Farm, Glebe Farm, and Top Barn Cottage.
- Visitors – to the visitor and leisure attractions including (A) Rushcliffe Country Park, (B) Nottingham Transport Heritage Centre and Nottingham Heritage Railway, (C)

Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington and (D) Rushcliffe Golf Club.

- Cyclists, equestrians and walkers – on Trent Valley Way, Midshires Way, Gotham Heritage Trail, Gotham ride, Ruddington Walks # 1 - 4 and the local rights of way network. Motorists – on the A543, Green Street, Nottingham Road and A60.

9.108 There is no open access land within the study area.

## Other Development

9.109 All existing built developments in the study area form part of the current landscape and visual baseline. There are no operational solar farms in the study area.

9.110 However, within the study area, there is one permitted solar farm (Sharpley Hill) and one permitted small scale solar array (Gotham Moor Farm), and two proposed solar farms with validated planning applications (Kingston and Highfields Farm).

9.111 The locations of these are shown on **Figure 9.6 of ES Volume 3** and their outline details provided in **Table 9.7**.

9.112 There is also an extensive permitted residential and employment development at Fairham Pasture 0.4 km northwest of the site, the location of which is also shown on **Figure 9.6 of ES Volume 3**.

9.113 There is another permitted 49.9 MW solar farm located 5.1 km southwest of the proposed development site (Church Farm Solar Farm near Kingston on Soar) which was also considered in the initial stages of the CLVIA. However, the ZTV shows no visibility of the development on or around this other solar farm and fieldwork observations suggest that there would not be any locations in the study area where both schemes would be visible, hence the study area does not extend to include Church Farm, and this other scheme is not considered in the CLVIA (**Paragraphs 9.364 to 9.385**).

Table 9.7 - Other Solar Farm Developments

Solar Farm	Status	Planning ref	Site Area	Installed capacity	Location
Sharpley Hill, East Leake	Permitted, 02/12/2021 Discharging conditions	21/00703/ FUL 22/01067/ DISCON	10.8 ha	4.2 MW	2.5 km S of Fair Oaks
Gotham Moor Farm, Gotham	Permitted, 13/06/2022	22/00574/FUL	150 m2	Not specified	0.7 km S of Fair Oaks
Kingston, Gotham	Validated, 18/02/2022	22/00319/FUL	80.65 ha	49.9 MW	2.7 km SW of Fair Oaks
Highfields Farm, Costock	Validated, 22/02/2022	22/00303/FUL	81.58 ha	49.9 MW	3.4 km SE of Fair Oaks

## PROPOSED DEVELOPMENT, MITIGATION & ENHANCEMENT

### Proposed Development

9.114 The proposed development is a solar farm with a capacity of up to 49.9 MW and an anticipated generating life of 40 years, consisting of arrays of ground-mounted solar PV panels (up to 3 m in height) plus ancillary infrastructure including inverters (mounted behind the panels),

underground communication and transmission cables, access tracks, and a fenced compound housing a control room, a solar PV/BESS substation, busbars, a transformer unit, and battery storage containers, all enclosed within perimeter fencing and gates with CCTV.

9.115 There would also be an underground connection to the national electricity grid and a temporary construction compound. The development would be accessed from the north of the site via Pasture Lane, a temporary steel plate track, a short section of

Asher Lane and an existing farm track. The proposed development is described in detail in **Chapter 6 – The Development Proposal**. It would consist of a short construction phase, a long-term operational phase and a short decommissioning phase as described in **Chapter 7 – Construction, Operation and Decommissioning**. Those aspects with the potential to affect landscape and visual amenity are outlined below.

### Construction Phase

9.116 The construction phase would be short-term and phased with the works completed within approximately 9 months. The aspects of the construction phase with the potential to affect landscape and/or visual amenity would be:

- Installation of temporary protective fencing to any features of ecological, and/or landscape value that are to be retained (such as the small copse at the northern end of the site).
- Modifications to the access route, including resurfacing and the construction of passing places if required.

- Laying of temporary steel plate track and construction of temporary holding areas.
- Construction of on-site access and maintenance tracks.
- Construction of temporary construction compound alongside the access route at Fields Farm Cottages.
- Installation of the metal frames to support the solar PV arrays. These will have metal legs driven into the ground.
- Installation of the solar PV panels and inverters.
- Construction of the substation and control buildings.
- Installation of the battery storage containers, transformer and other electrical infrastructure in the BESS and substation compound.
- Excavation of trenches and the laying of underground power and communication cables between the solar PV arrays and the battery storage and substation compound, and also from the substation to the point of connection to the grid (see **Paragraphs 9.121 to 9.122 on page 180**).

- Construction of the security fencing and gates around the battery storage and substation compound and internal compound fencing.
- Construction of the perimeter fencing and gates around the development site and the installation of the CCTV cameras on poles.
- Vehicle movements along access route and on the site, including earth moving equipment, concrete delivery lorries and HGVs delivering the building materials, transformers, battery storage containers, and other infrastructure.
- Site restoration, including the removal of the temporary protective fencing, the backfilling of all trenches and the reinstatement of all land disturbed by the construction works using retained topsoil and reseeded.
- Landscape and biodiversity mitigation and enhancement proposals - (see **9.124 to 9.135 on page 183**).

## *Operational Phase*

9.117 The operational phase would be long-term (40 years) and the aspects of the operational phase with the potential to affect landscape and/or visual amenity would be:

- Perimeter fencing and gates (1.8m high stock/deer-proof mesh supported on wooden posts) and CCTV cameras on poles.
- Ground-mounted solar PV arrays (max 3 m high) with inverters mounted behind the panels.
- Compound (105.015 m x 92 m) surfaced with crushed stone, with internal roads (4.5 m wide), surrounded by 1.8m high palisade security fencing and a gated entrance containing:
  - Battery Energy Storage System (BESS) with batteries and associated infrastructure housed in 70 containers (max 3.5m high);
  - Substation compound with a control building (5.1m wide x 9m long x 5m high) housing the switch gear, an external transformer and busbars (approximately 1.2m above control building ridgeline; and



- Solar PV and BESS substation building (4m wide x 13m long x 5m high).
- Maintenance staff vehicles (occasional) arriving and leaving the site via the site entrance, access track and Asher Lane.
- Occasional HGV deliveries of components for repairs.
- Mitigation and enhancement measures (see below).

9.118 The substation and control buildings are likely to be constructed from blockwork with rendered walls beneath a slate roof (to be agreed with the Council).

## Decommissioning Phase

9.119 The aspects of the decommissioning phase with the potential to affect landscape and/or visual amenity would be:

- Installation of temporary protective fencing features of ecological, and/or landscape value.
- Decommissioning and removal of the battery storage containers, transformer and other electrical infrastructure in the battery storage and substation compound.

- Demolition and removal of the substation and control buildings.
- Decommissioning and removal of the ground mounted solar PV arrays.
- Removal of the perimeter fencing and gates around the development site, the CCTV cameras and poles and the security fencing in and around the battery storage and substation compound.
- Vehicle movements on the site, including HGVs transporting the demolition materials, transformers, battery storage containers, and other infrastructure off the site, and earth moving equipment restoring the site.
- Site restoration, including the removal of the temporary protective fencing, and the reinstatement of all land disturbed by the decommissioning works using retained topsoil and reseeded.

9.120 The underground power and communication cables between the PV arrays and the substation and battery storage compounds would likely be removed for reuse or recycling. The concrete foundations for the BESS, substation and ancillary

containers are shallow and would be removed and backfilled with locally sourced topsoil.

## Underground Grid Connection

9.121 The proposed development will be connected to the grid via an underground 132 kV HV power cable from the substation to the point of connection to the local distribution network approx. 0.9 km north of the site. The route is subject to confirmation and a separate consenting process but is expected to run just inside the northeastern boundary of the site from the substation to Fairham Brook, then northwards parallel to Fairham Brook. It will then be routed 1.5 – 2 m beneath the Brook between two Horizontal Directional Drill (HDD) launch and receiving pits, at least 9 m either side of the Brook. This is described further in **Chapter 3 – Site Selection and Design**.

9.122 All cabling would be underground and the HDD launch and receiving pits will also not be visible above ground. The Brook crossing point is in an area of lowland fen vegetation alongside Fairham Brook (see **Appendix 8.1**) and the woody vegetation over the route will be cleared and maintained as grass which will leave a clearing, about 6m wide, through this vegetation.

## Mitigation and Enhancement

### *Embedded Siting and Design Mitigation*

9.123 As further described in **Chapter 4 – Site Selection and Design**, a number of mitigation measures have been incorporated into the site selection, design and construction of this proposed development which will limit the effects on landscape and visual amenity. These include:

- Site access - utilising an existing farm track, a temporary steel plate track during construction and existing lanes, which would avoid effects on landscape fabric.
- Site access - utilising an existing farm track which would avoid effects on landscape fabric.
- Protection of existing features – using temporary protective fencing to protect features of ecological, and/or landscape value on the site during the construction phase.
- Internal access tracks – running a single site track up the centre spine of the site with only two side spurs, thereby minimising the amount of hard surfacing on the site.

- Solar PV arrays – locating these within the existing field pattern and utilising existing drainage crossing points, thereby avoiding the need to remove any vegetation or undertake any works to the drainage ditches.
- Battery storage and substation compound – locating this adjacent to the boundary of the site and away from public rights of way and residential properties, keeping the buildings and most of the infrastructure to 5m or below, thereby limiting the height and effects of these elements on landscape character and visual amenity.
- Services – laying all services underground.
- Lighting – no permanent external lighting is proposed, with safety lighting in the BESS and connection compound lit only as and when needed, such as to provide lighting for maintenance visits after dark (eg on winter afternoons).
- Site restoration – at the end of the construction phase all areas disturbed by the works will be

restored which will minimise the footprint of the development and the long-term effects on landscape and visual amenity.

- Decommissioning – at the end of the operational phase which will restore the site to agricultural use.

### *Further Landscape and Biodiversity Mitigation and Enhancement*

9.124 The further landscape and biodiversity mitigation and enhancement proposals appropriate for this site were informed by the pre-application consultations, this LVIA and the Ecological Assessment (**Chapter 8 - Ecology**) and are illustrated in the Outline Landscape and Biodiversity Mitigation and Enhancement Plan (LBMEP) (**Figure 8.3 of ES Volume 3**).

9.125 In accordance with NPPF (section 15, see paragraph 65), the Outline LBMEP has drawn on the intrinsic character of the countryside in this study area and sought to maximise the wider benefits from natural capital and ecosystem services, in particular, the benefits of hedgerows, trees and woodland, species-rich meadows and other habitats specific to this locality.

9.126 These measures are indicative and will be secured and delivery controlled by way of a planning condition(s) requiring the submission of a detailed LBMEP and a Landscape and Ecological Management Plan (LEMP).

9.127 The Outline LBMEP includes:

- Woodland copses of native trees, one in the far north of the site and two along the western boundary.
- New hedgerows around the boundary of the site with occasional small native hedgerow trees along the western and northeastern boundaries of the site.
- Species-rich meadow across the entire site within the perimeter fencing including beneath the solar PV arrays (but not within the battery storage and substation compound).
- Grassland between the perimeter fence and the site boundary.
- A 1ha area of lapwing habitat to the south of Fairham Brook which would be left fallow, allowed to vegetate naturally and ploughed once a year to prevent the establishment of tall woody vegetation.

- Further habitat enhancement measures, as described in **Chapter 8: Ecology**.

9.128 The new hedgerow planting would use a mix of native species, typically:

Hawthorn *Crataegus monogyna* 30%  
 Blackthorn *Prunus spinosa* 30%  
 Hazel *Corylus avellana* 15%  
 Field Maple *Acer campestre* 10%  
 Dogwood *Cornus sanguinea* 5%  
 Crab Apple *Malus sylvestris* 5%  
 Buckthorn *Rhamnus cathartica* 5%

9.129 There are a few small scrubby trees along the drainage ditches around the site and some hedgerow trees will be incorporated into the new hedgerow planting to provide some wildlife and visual diversity. These will be small native tree species commonly found in the field boundary hedgerows in the wider area, including Hawthorn (*Crataegus monogyna*), Hazel (*Corylus avellana*), Crab Apple (*Malus sylvestris*) and Field Maple (*Acer campestre*).

9.130 The aim would be to create a diverse meadow across the site, with a mosaic of habitats to benefit a range of flora and fauna, including bees.

The approach would be to select a commercially available and locally grown meadow seed mix with a range of species that would suit the varying microclimates across the site (due to variations in shade, soils and soil moisture) and allow the meadow to evolve into a mosaic of habitats to suit the varying microclimates. The meadow would be cut twice a year, in late summer and autumn, after the flowers have set seed, to ensure the continuance of the component species.

9.131 This planting and seeding would be undertaken in the first available planting and seeding seasons following the end of the construction phase. Further to this, there would be long-term management of the wooded copses, hedgerows, hedgerow trees, meadow, grassland and lapwing habitat on and around the site to maximise their wildlife value and also their amenity (screening) and aesthetic value.

9.132 These measures would be sympathetic to and would enhance the character, quality and biodiversity of the site and surrounding landscapes, would be visually attractive and would add to the overall quality of the area over

the lifetime of the development (in accordance with the NPPF (MHCLG July 2021) (see **Paragraph 9.61 on page 159**). They would improve the compatibility of this landscape to the type and scale of energy development proposed (in accordance with LDP Part 1 Policy 2, see **Paragraph 9.68 on page 160**) and protect and enhanced the Fairham Brook GI corridor (in accordance with LDP Part 1 Policy 16, see **Paragraph 9.68 on page 160**).

9.133 The Outline LBMEP would provide a buffer between the surrounding watercourses and the perimeter fence, would conserve and enhance the biodiversity, landscape and recreational value of the watercourse and corridor through good design and includes the long-term landscape and ecological management plan for this buffer (see LDP Part 2 Policy 19, **Paragraph 9.68 on page 160**).

9.134 These measures will also ensure that one of the primary functions of Green Infrastructure Corridor 7 : Fairham Brook/Packman Dyke and Rushcliffe Country Park Green Corridor, is maintained, ie its ecological networks (wetland, grassland and woodland creation, protection and enhancement), with enhancements

to its ecological value (in accordance with LDP Part 2 Policy 35, see **Paragraph 9.68 on page 160**).

9.135 No mature trees will be affected and the proposed new tree planting in the copses and hedgerows would include a wide range of locally native tree species, to provide resilience to climate change and diseases (in accordance with LDP Part 2 Policy 37, see **Paragraph 9.68 on page 160**).

## VISIBILITY AND VIEWPOINT ANALYSIS

### Visibility Analysis

9.136 The terrain-only zones of theoretical visibility (ZTVs) that have been generated are provided in **Figures 9.4a and 9.4b of ES Volume 3**. These suggest that, based on the screening effects of landform only, the solar PV arrays and the battery storage containers, transformer, substation and control building could be visible as follows:

### *Solar PV Arrays*

9.137 **Figure 9.4a of ES Volume 3** suggests that the solar PV arrays could be visible on the site and surrounding area from Clifton in the north to the outskirts of East Leake in the south, from Brands Hill to the northwest, Gotham Hill to the west, the West Leake Hills to the southwest, from Hotchley, Rough and Bunny Hills to the south and southeast and from the A60 and beyond in the east.

9.138 However, these theoretical areas of visibility are more extensive than the actual areas of visibility for the proposed development would be, as views from much of these zones would be screened by intervening buildings, hedgerows and woodlands. Overtime, further screening would be afforded by the new planting proposed as part of the Outline LBMEP as this establishes and matures.

### *Substation and BESS Infrastructure*

9.139 **Figure 9.4b of ES Volume 3** suggests that the battery storage containers, transformer, substation and control buildings could be visible on the site and immediate environs over a similar area to the solar PV panels.

9.140 However, as for the solar PV panels, these theoretical areas of visibility are more extensive than the actual areas of visibility for these aspects of the proposed development would be, as views from much of these zones would be screened by intervening buildings, hedgerows and woodlands and further screening would be afforded by the new planting proposed as part of the Outline LBMEP as this establishes and matures. The zones of visibility for the taller busbars, which would be slightly higher than the control building and have not been included in this ZTV, would be similar and they would also be screened from much of these zones by intervening buildings, hedgerows and woodlands and, over time, by the new planting.

9.141 The screening effects of the existing and proposed new planting have been taken into account in the viewpoint analysis and the assessments of residual effects.

## Viewpoint Analysis

9.142 Informed by the landscape and visual baselines and the ZTVs, nine viewpoint locations (1 – 9) have been selected in consultation with the Council to illustrate some of the more open views

of the proposed development from the study area. The locations of these viewpoints are shown on **Figures 9.1 – 9.4a/b of ES Volume 3** and the existing and predicted views towards the development from each of these viewpoints are illustrated in **Figures 9.5.1 – 9.5.9. of ES Volume 4**

9.143 This viewpoint analysis has been undertaken in accordance with the method of assessment in **Appendix 9.2** (paras A2.51 - A2.85). For each viewpoint, the overall effects of the construction phase, operational phase (1 – 5 years), operational phase (5 – 40 years) and decommissioning phase on landscape character and views has been assessed.

9.144 For the construction and early years of the operational phase, this analysis takes into account the current degree of screening provided by existing vegetation and buildings on and around the development site. For the operational phase beyond 5 years and for the decommissioning phase, the additional screening effects of the measures proposed in the Outline LBMEP, in particular, the screening effects of the proposed new hedgerow and hedgerow tree planting around the perimeter of the site are taken into account.

9.145 The viewpoint parameters are set out in **Table 9.8** below. In **Table 9.8**, the elevation at each viewpoint is taken from the DTM, the distance of each viewpoint to the site is from the viewpoint location to the perimeter fence and the direction of each viewpoint is from the site centre.

9.146 The viewpoint analysis findings are summarised in **Tables 9.9 and 9.10** at the end of this section. As explained in paras A2.65 and A2.82 (**Appendix 9.2**), where overall effects are predicted to be major/moderate or higher, there are likely to be significant changes in landscape character or views (and these are shaded dark grey in **Tables 9.9 and 9.10**). Overall effects of moderate+ may be significant if these apply to an extended area or location and overall effects of moderate may contribute to significance if combined with greater changes in the same general location. Both of these are taken into account in the assessments of effects on landscape character and visual amenity (**Paragraphs 9.322 to - 9.363**). Moderate/minor+ or lower changes are unlikely to result in significant changes to landscape character or views.



Table 9.8 - Viewpoint Parameters

Viewpoint Data:					Landscape Unit:			Visual Receptors:	
No	Location	Easting Northing	Elevation (mAOD)	Distance/ Direction from Site	RLCA / DPZ	Planning Designations	DPZ Sensitivity	Receptor Types	Location Sensitivity
1	Footpath on northeastern boundary of site	455941 330930	32.8 mAOD	0.01 km / SE	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe	Greenbelt, GI corridor	Medium	Walkers	High/ medium
2	Footpath along Fairham Brook	455470 330580	32.4 mAOD	0.04 km / S	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe	Greenbelt, GI corridor	Medium	Walkers	High/ medium
3	Footpath east of site on Bunny Moor	456579 330339	34.5 mAOD	0.68 km / SE	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe	Greenbelt, GI corridor	Medium	Walkers	High/ medium
4	Footpath off Asher Lane	456379 332130	40.0 mAOD	0.81 km / NE	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe/ SN04: Cotgrave and Tollerton Village Farmlands	Greenbelt, Urban Fringe Enhancement Area, GI corridor	Medium (SN02) Medium (SN04)	Walkers	High/ medium
5	Footpath on edge of Fairham Pasture site	454300 332069	33.0 mAOD	0.91 km / NW	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe	Greenbelt, Urban Fringe Enhancement Area	Medium	Walkers	High/ medium

# FAIR OAKS RENEWABLE ENERGY PARK

Viewpoint Data:					Landscape Unit:			Visual Receptors:	
No	Location	Easting Northing	Elevation (mAOD)	Distance/ Direction from Site	RLCA / DPZ	Planning Designations	DPZ Sensitivity	Receptor Types	Location Sensitivity
6	Footpath east of Gotham	454422 330447	32.3 mAOD	1.10 km / SW	South Nottinghamshire Farmland RLCA / SN02: Ruddington Alluvial Fringe	Greenbelt	Medium	Walkers	High/ medium
7	Round Spinney Nature Reserve on Gotham Hill	453059 330863	82.4 mAOD	2.15 km / WSW	Nottinghamshire Wolds RLCA / NW01: Gotham and West Leake Wooded Hills and Scarps	Greenbelt	High/ Medium	Walkers, cyclists, equestrians	High/ medium
8	Gotham Ride / Bridleway on Court Hill	453504 328712	92.3 mAOD	2.75 km / SW	Nottinghamshire Wolds RLCA / NW01: Gotham and West Leake Wooded Hills and Scarps	Greenbelt	High/ Medium	Walkers, cyclists, equestrians	High/ medium
9	Midshires Way / Restricted Byway on Lantern Lane at field entrance	456177 327903	94.3 mAOD	2.73 km / SSE	Nottinghamshire Wolds RLCA / NW01: Gotham and West Leake Wooded Hills and Scarps	Greenbelt	High/ Medium	Walkers, cyclists, equestrians	High

## *Viewpoint 1: View from footpath on northeastern boundary of site*

- 9.147 Location: this viewpoint is on the footpath alongside the railway line, at a point where it loops westwards to cross over a drainage ditch. It is 13 m (just over 0.01 km) to the site perimeter fence and southeast of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).
- 9.148 Existing view: as illustrated in **Figure 9.5.1 of ES Volume 4**, the foreground is currently an open arable field, bounded by the nearby ditch which forms the northeastern boundary of the site and the lines of pylons that cross the site and to the north of the site are clearly visible. There are also views of the West Leake Hills to the southwest, Gotham Hill with the chimney of the Ratcliffe on Soar Power Station beyond to the west and Brands Hill to the northwest.
- 9.149 Predicted view: as illustrated in **Figure 9.5.1 of ES Volume 4**, the solar PV arrays would be clearly visible just beyond the nearby perimeter fence, occupying approximately 224° of the view. The substation and BESS infrastructure would be largely

screened by the solar PV panels with just the rooves of the substation and control building, the busbars and the tops of the battery storage containers and transformer visible over the panels from this location.

## EFFECTS ON LANDSCAPE CHARACTER

- 9.150 Landscape character area (DPZ): SN02: Ruddington Alluvial Fringe.
- 9.151 Landscape sensitivity: Medium. This is a landscape of local value and moderate susceptibility to this type of development (see **Table 9.4** above).
- 9.152 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:
- During construction phase: substantial/moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements on the site.
  - During operational phase (years 1 - 5): substantial adverse change due to the addition of the perimeter

fence and solar PV panels, and the upper parts of the substation and BESS infrastructure into the nearby landscape, which would partially obscure the long-distance views of the hills.

- After establishment of the measures in the Outline LBMEP (year 5 onwards): substantial/moderate adverse change as the site boundary hedgerows would be establishing and would begin to screen the fence and solar PV panels, and the upper parts of the substation and BESS infrastructure from this location but the mid-ground landscape would not be visible, and the long-distance views of the hills would remain partially obscured which would change the open character of the landscape to the northwest/west/southwest/south.
- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.153 Overall effects on landscape character during construction: Moderate+ adverse effect (medium sensitivity resource and a substantial/moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and significant.

9.154 Overall effects on landscape character during operation (years 1 – 5): Major/moderate adverse effect (medium sensitivity resource and a substantial adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and significant.

9.155 Overall effects on landscape character during operation (year 5 onwards): Moderate+ adverse effect (medium sensitivity resource and a substantial/moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and significant.

9.156 Overall effects on landscape character during decommissioning: Minor adverse effect (medium sensitivity resource and a negligible

adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.157 Visual receptors: walkers.

9.158 Location value: Community (as this is a public footpath used by the local community).

9.159 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.160 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).

9.161 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: substantial/moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements which would be visible on the site.
- During operational phase (years 1 - 5): substantial adverse change due to the addition of the perimeter fence and solar PV panels, and the upper parts of the substation and BESS infrastructure into this view, which would partially obscure the long-distance views of the hills.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): substantial/moderate adverse change as the site boundary hedgerows would be establishing and would begin to screen the fence and solar PV panels, and the upper parts of the substation and BESS infrastructure from this location but the mid-ground landscape would not be visible, and the long-distance views of the hills would be partially

obscured which would change the open views to the northwest/west/southwest/ south.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.162 Overall effects on the view for walkers during construction: Major/moderate adverse effect (high/medium sensitivity receptors and a substantial/moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and significant.

9.163 Overall effects on the view for walkers during operation (years 1 – 5): Major/moderate+ adverse effect (high/medium sensitivity receptors and a substantial adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.

9.164 Overall effects on the view for walkers during operation (year 5 onwards): Major/moderate adverse effect (high/medium sensitivity receptor

and a substantial/moderate adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and significant.

9.165 Overall effects on the view for walkers during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

## *Viewpoint 2: View from footpath along Fairham Brook*

9.166 Location: this viewpoint is on the footpath on the west bank of Fairham Brook, just after the Brook loops northwards to continue along the western boundary of the site. It is 45 m (just over 0.04 km) to the southwest corner of the site perimeter fence and south of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).

9.167 Existing view: as illustrated in **Figure 9.5.2 of ES Volume 4**, the foreground is currently the Brook which forms the western and southern boundaries of

the site, the open arable field beyond and a stand of poplar trees, with the line of pylons that crosses the site clearly visible to the north. Brands Hill is visible to the northwest. Gotham Hill to the west and the West Leake Hills to the southwest and south are outside this 180° view.

9.168 Predicted view: as illustrated in **Figure 9.5.2 of ES Volume 4**, the solar PV arrays would be clearly visible just beyond the perimeter fence on the other side of the Brook, occupying approximately 117° of the view. The substation and BESS infrastructure would be entirely screened by the solar PV panels from this location.

## EFFECTS ON LANDSCAPE CHARACTER

9.169 Landscape character area (DPZ): SN02: Ruddington Alluvial Fringe.

9.170 Landscape sensitivity: Medium. This is a landscape of local value and moderate susceptibility to this type of development (see **Table 9.4** above).

9.171 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:



- During construction phase: substantial/moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements on the site.
- During operational phase (years 1 - 5): substantial adverse change due to the addition of the perimeter fence and solar PV panels into the nearby landscape.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): substantial/moderate adverse change as the woodland in the southwest corner of the site would be establishing and would begin to screen the perimeter fence and solar PV panels in this corner of the site but the mid-ground landscape would not be visible, and the perimeter fence and solar panels further along the western boundary would be visible, which would change the open character of the landscape to the north and northeast.

- During decommissioning: slight change as the decommissioning works in the closest part of the site would be screened by the established woodland but other decommissioning works further along the western boundary of the site would be visible.

9.172 Overall effects on landscape character during construction: Moderate+ adverse effect (medium sensitivity resource and a substantial/moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and significant.

9.173 Overall effects on landscape character during operation (years 1 – 5): Major/moderate adverse effect (medium sensitivity resource and a substantial adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and significant.

9.174 Overall effects on landscape character during operation (year 5 onwards): Moderate+ adverse effect (medium sensitivity resource and a substantial/moderate adverse magnitude of

change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and significant.

9.175 Overall effects on landscape character during decommissioning: Moderate/minor adverse effect (medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.176 Visual receptors: walkers.

9.177 Location value: Community (as this is a public footpath used by the local community).

9.178 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.179 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).

9.180 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: substantial/moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements which would be visible on the site.
- During operational phase (years 1 - 5): substantial adverse change due to the addition of the perimeter fence and solar PV panels into this view.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): substantial/moderate adverse change as the woodland in the southwest corner of the site would be establishing and would begin to screen the perimeter fence and solar PV panels in this corner of the site but

the mid-ground landscape would not be visible, and the perimeter fence and solar panels further along the western boundary would be visible, which would change the open views to the north and northeast.

- During decommissioning: slight change as the decommissioning works in the closest part of the site would be screened by the established woodland but other decommissioning works further along the western boundary of the site would be visible.

9.181 Overall effects on the view for walkers during construction: Major/moderate adverse effect (high/medium sensitivity receptors and a substantial/moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and significant.

9.182 Overall effects on the view for walkers during operation (years 1 – 5): Major/moderate+ adverse effect (high/medium sensitivity receptors and a substantial adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.

9.183 Overall effects on the view for walkers during operation (year 5 onwards): Major/moderate adverse effect (high/medium sensitivity receptor and a substantial/moderate adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and significant.

9.184 Overall effects on the view for walkers during decommissioning: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

## *Viewpoint 3: View from footpath east of site on Bunny Moor*

9.185 Location: this viewpoint is on a grassy track/footpath on Bunny Moor to the east of the railway line, at a point where it turns westwards towards the railway line and the site. It is just over 680 m to the site perimeter fence and southeast of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).

9.186 Existing view: as illustrated in **Figure 9.5.3 of ES Volume 4**, the foreground is currently the grassy track with open arable fields to both sides. Occasional trees and a small wooded copse, located just outside the southeastern corner of the site, form an intermittent line of vegetation along the railway line the middle distance. Gotham Hill with the chimney of the Ratcliffe on Soar Power Station beyond, the line of pylons that cross the site and Brands Hill are visible in the distance. An old bridge over the railway is also visible directly in front of one of the pylons.

9.187 Predicted view: as illustrated in **Figure 9.5.3 of ES Volume 4**, the solar PV arrays would be discernible beyond and partially screened by the old bridge and line of vegetation along the railway line, occupying approximately 44° of the view. The substation and BESS infrastructure would be entirely screened by the old bridge from this location.

#### EFFECTS ON LANDSCAPE CHARACTER

9.188 Landscape character area (DPZ): SN02: Ruddington Alluvial Fringe.

9.189 Landscape sensitivity: Medium. This is a landscape of local value and moderate susceptibility to this type of development (see **Table 9.4** above).

9.190 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements on the site, which would be in the landscape in the middle distance and partially screened by the woodland, trees and old bridge.
- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence and solar PV panels into the landscape in the middle distance, although these would be partially screened by the woodland, trees and old bridge and would be low down in the landscape so would not screen the views of the hills.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight/negligible adverse change as

the site boundary hedgerows would be establishing and would begin to further screen the fence and solar PV panels from this location and would be low down in the landscape so would not screen the views of the hills.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.191 Overall effects on landscape character during construction: Moderate/minor+ adverse effect (medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

9.192 Overall effects on landscape character during operation (years 1 – 5): Moderate adverse effect (medium sensitivity resource and a moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and not significant.

9.193 Overall effects on landscape character during operation (year 5 onwards): Minor+ adverse effect (medium sensitivity resource and a slight/negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.

9.194 Overall effects on landscape character during decommissioning: Minor adverse effect (medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.195 Visual receptors: walkers.

9.196 Location value: Community (as this is a public footpath used by the local community).

9.197 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently

and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.198 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).

9.199 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements on the site, which would be discernible in the middle distance and partially screened by the woodland, trees and old bridge.
- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence and solar PV panels into the middle distance, although these

would be partially screened by the woodland, trees and old bridge and would be low down in the landscape so would not screen the views of the hills.

- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight/negligible adverse change as the site boundary hedgerows would be establishing and would begin to further screen the fence and solar PV panels from this location and would be low down in the landscape so would not screen the views of the hills.
- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.200 Overall effects on the view for walkers during construction: Moderate adverse effect (high/medium sensitivity receptors and a moderate/slight adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and not significant.

- 9.201 Overall effects on the view for walkers during operation (years 1 – 5): Moderate+ adverse effect (high/medium sensitivity receptors and a moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.
- 9.202 Overall effects on the view for walkers during operation (year 5 onwards): Moderate/minor adverse effect (high/medium sensitivity receptor and a slight/negligible adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.
- 9.203 Overall effects on the view for walkers during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

#### *Viewpoint 4: View from footpath off Asher Lane*

- 9.204 Location: this viewpoint is at the entrance to the footpath off Asher Lane immediately west of the Asher Lane bridge over the railway line. Ruddington walk #1 crosses the bridge and follows the public footpath northwards at this point. It is just over 810 m to the site perimeter fence and northeast of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).
- 9.205 Existing view: as illustrated in **Figure 9.5.4 of ES Volume 4**, the foreground is currently an open arable field with the site in middle distance beyond the drainage ditch along which are occasional small trees. The West Leake Hills are to the south, Gotham Hill with the chimney of the Ratcliffe on Soar Power Station beyond is to the southwest and Brands Hill is to the northwest (outside the frame illustrated in **Figure 9.5.4 of ES Volume 4**). The line of pylons that cross the site is visible in the middle distance.
- 9.206 Predicted view: as illustrated in **Figure 9.5.4**, the solar PV arrays would be visible beyond the drainage ditch and occasional trees, occupying approximately 80° of the view. The

substation and BESS infrastructure would also be visible from this location.

#### EFFECTS ON LANDSCAPE CHARACTER

- 9.207 Landscape character area (DPZ): on the boundary between SN02: Ruddington Alluvial Fringe and SN04: Cotgrave and Tollerton Village Farmlands.
- 9.208 Landscape sensitivity: Medium. Both SN02 and SN04 are landscapes of local value and moderate susceptibility to this type of development (see **Tables 9.4 and 9.5** above).
- 9.209 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:
- During construction phase: moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the landscape in the middle distance and with very little to screen the construction works.



<ul style="list-style-type: none"> <li>During operational phase (years 1 - 5): substantial/moderate adverse change due to the addition of the perimeter fence, the solar PV panels and the substation and BESS infrastructure into the landscape in the middle distance, which would not be screened at this stage, but which would be low down in the landscape so would not screen the views of the hills.</li> <li>After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary hedgerows with hedgerow trees would be establishing and would progressively screen the fence, solar PV panels and the substation and BESS infrastructure from this location and would be low down in the landscape so would not screen the views of the hills.</li> <li>During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.</li> </ul>	<p>adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.</p> <p>9.211 Overall effects on landscape character during operation (years 1 – 5): Moderate+ adverse effect (medium sensitivity resource and a substantial/moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and significant.</p> <p>9.212 Overall effects on landscape character during operation (year 5 onwards): Moderate/minor adverse effect (medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.</p> <p>9.213 Overall effects on landscape character during decommissioning: Minor adverse effect (medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.</p>	<h2>EFFECTS ON VIEW</h2> <p>9.214 Visual receptors: walkers.</p> <p>9.215 Location value: Community (as this is a public footpath used by the local community).</p> <p>9.216 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).</p> <p>9.217 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).</p> <p>9.218 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:</p> <ul style="list-style-type: none"> <li>During construction phase: moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports</li> </ul>
<p>9.210 Overall effects on landscape character during construction: Moderate adverse effect (medium sensitivity resource and a moderate</p>		

and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the middle distance and with very little to screen the construction works.

- During operational phase (years 1 – 5): substantial/moderate adverse change due to the addition of the perimeter fence, solar PV panels, substation and BESS infrastructure into the view in the middle distance, which would not be screened at this stage, but which would be low down in the landscape so would not screen the views of the hills.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary hedgerows with hedgerow trees would be establishing and would progressively screen the fence, solar PV panels and the substation and BESS infrastructure from this location and would be low down in the landscape so would not screen the views of the hills.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.219 Overall effects on the view for walkers during construction: Moderate+ adverse effect (high/medium sensitivity receptors and a moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and significant.

9.220 Overall effects on the view for walkers during operation (years 1 – 5): Major/moderate adverse effect (high/medium sensitivity receptors and a substantial/moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.

9.221 Overall effects on the view for walkers during operation (year 5 onwards): Moderate/minor+ adverse effect (high/medium sensitivity receptor and a slight adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.

9.222 Overall effects on the view for walkers during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

#### *Viewpoint 5: View from footpath on edge of Fairham Pasture site*

9.223 Location: this viewpoint is on the footpath from Clifton to Gotham on the southern edge of the Fairham Pasture development site. It is just over 910 m to the site perimeter fence and northwest of the site centre (see **Figures 9.4a and 9.4b of ES Volume 4**).

9.224 Existing view: as illustrated in Figure 9.5.5, the foreground is currently an open field with the site in the middle distance beyond Fairham Brook and the West Leake Hills in the distance to the south. Gotham Hill is to the southwest and Brands Hill is to the northwest (both outside the frame illustrated in Figure 9.5.5). One of the lines of pylons that run to the north of the site crosses this view (the other runs to the rear of this view) and the line of pylons that cross the site are also visible in the middle distance.

9.225 Predicted view: as illustrated in Figure 9.5.5, the solar PV arrays would be visible beyond Fairham Brook, occupying approximately 59° of the view. The substation and BESS infrastructure would be largely screened by the solar PV panels with just the rooves of the substation and control building, and the tops of the battery storage containers and transformer visible over the panels from this location.

## EFFECTS ON LANDSCAPE CHARACTER

9.226 Landscape character area (DPZ): SN02: Ruddington Alluvial Fringe.

9.227 Landscape sensitivity: Medium. This is a landscape of local value and moderate susceptibility to this type of development (see **Table 9.4** above).

9.228 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation

of the solar PV array supports and panels, and construction vehicle movements on the site, which would be in the landscape in the middle distance and with very little to screen the construction works.

- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence and solar PV panels, and the upper parts of the substation and BESS infrastructure into the landscape in the middle distance, which would not be screened at this stage, but which would be low down in the landscape so would not screen the views of the hills.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary hedgerows with hedgerow trees would be establishing and would progressively screen the fence and solar PV panels, and the upper parts of the substation and BESS infrastructure from this location and would be low down in the landscape so would not screen the views of the hills.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.229 Overall effects on landscape character during construction: Moderate/minor+ adverse effect (medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

9.230 Overall effects on landscape character during operation (years 1 – 5): Moderate adverse effect (medium sensitivity resource and a moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and not significant.

9.231 Overall effects on landscape character during operation (year 5 onwards): Moderate/minor adverse effect (medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.

9.232 Overall effects on landscape character during decommissioning: Minor adverse effect (medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

#### EFFECTS ON VIEW

9.233 Visual receptors: walkers.

9.234 Location value: Community (as this is a public footpath used by the local community).

9.235 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.236 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).

9.237 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, and construction vehicle movements on the site, which would be in the middle distance and with very little to screen the construction works.
- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence and solar PV panels, and the upper parts of the substation and BESS infrastructure into the view in the middle distance, which would not be screened at this stage, but which would be low down in the landscape so would not screen the views of the hills.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary

hedgerows with hedgerow trees would be establishing and would progressively screen the fence and solar PV panels, and the upper parts of the substation and BESS infrastructure from this location and would be low down in the landscape so would not screen the views of the hills.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.238 Overall effects on the view for walkers during construction: Moderate adverse effect (high/medium sensitivity receptors and a moderate/slight adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and not significant.

9.239 Overall effects on the view for walkers during operation (years 1 – 5): Moderate+ adverse effect (high/medium sensitivity receptors and a moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.

9.240 Overall effects on the view for walkers during operation (year 5 onwards): Moderate/minor+ adverse effect (high/medium sensitivity receptor and a slight adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.

9.241 Overall effects on the view for walkers during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

## *Viewpoint 6: View from footpath east of Gotham*

9.242 Location: this viewpoint is on the footpath between the village of Gotham and the railway line. It is just over 1.10 km to the site perimeter fence and southwest of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).

9.243 Existing view: as illustrated in **Figure 9.5.6 of ES Volume 4**, the foreground is currently a large arable field surrounded by hedgerows, with

two clumps of woodland to the north and south of the field. The line of poplars near Fairham Brook is visible in the middle distance and there is a wooded and slightly elevated horizon in the distance. The line of pylons that cross the site is visible in the middle distance.

9.244 Predicted view: as illustrated in **Figure 9.5.6 of ES Volume 4**, the solar PV arrays would be in the middle distance, occupying approximately 57° of the view but largely screened by the hedgerows around this field and the woodland to the north. The substation and BESS infrastructure would be largely screened by the solar PV panels with just the rooves of the substation and control building, the busbars and the tops of the battery storage containers and transformer visible over the panels from this location.

## EFFECTS ON LANDSCAPE CHARACTER

9.245 Landscape character area (DPZ): SN02: Ruddington Alluvial Fringe.

9.246 Landscape sensitivity: Medium. This is a landscape of local value and moderate susceptibility to this type of development (see **Table 9.4** above).

9.247 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:

- During construction phase: slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the landscape in the middle distance but largely screened by the intervening hedgerows.
- During operational phase (years 1 - 5): moderate/slight adverse change due to the addition of the perimeter fence, solar PV panels, and the upper parts of the substation and BESS infrastructure into the landscape in the middle distance, which would be largely screened by the intervening hedgerows.



- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight/negligible adverse change as the site boundary hedgerows with hedgerow trees and woodlands along the western boundary would be establishing and would progressively screen the fence, solar PV panels, and the upper parts of the substation and BESS infrastructure from this location and would be low down in the landscape so would not screen the views of the hills.
- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.248 Overall effects on landscape character during construction: Moderate/minor adverse effect (medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

9.249 Overall effects on landscape character during operation (years 1 – 5): Moderate/minor+ adverse effect (medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and not significant.

9.250 Overall effects on landscape character during operation (year 5 onwards): Minor+ adverse effect (medium sensitivity resource and a slight/negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.

9.251 Overall effects on landscape character during decommissioning: Minor adverse effect (medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.252 Visual receptors: walkers.

9.253 Location value: Community (as this is a public footpath used by the local community).

9.254 Receptor susceptibility: Walkers: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.255 Receptor sensitivity: Walkers: High/medium sensitivity (as they would be in a location with local community value and would be susceptible to change).

9.256 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the

perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the middle distance but largely screened by the intervening hedgerows.

- During operational phase (years 1 - 5): moderate/slight adverse change due to the addition of the perimeter fence, solar PV panels, and the upper parts of the substation and BESS infrastructure into the landscape in the middle distance, which would be largely screened by the intervening hedgerows.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight/negligible adverse change as the site boundary hedgerows with hedgerow trees and woodlands along the western boundary would be establishing and would progressively screen the fence, solar PV panels, and the upper parts of the substation and BESS infrastructure from this location

and would be low down in the landscape so would not screen the views of the hills.

- During decommissioning: negligible change due to the decommissioning works being largely screened by the established boundary vegetation.

9.257 Overall effects on the view for walkers during construction: Moderate/minor+ adverse effect (high/medium sensitivity receptors and a slight adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and not significant.

9.258 Overall effects on the view for walkers during operation (years 1 – 5): Moderate adverse effect (high/medium sensitivity receptors and a moderate/slight adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and not significant.

9.259 Overall effects on the view for walkers during operation (year 5 onwards): Moderate/minor adverse effect (high/medium sensitivity receptor and a

slight/negligible adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.

9.260 Overall effects on the view for walkers during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

## *Viewpoint 7: View from Round Spinney Nature Reserve on Gotham Hill*

9.261 Location: this viewpoint is on Gotham Hill, just off the bridleways and footpaths that criss-cross the hill and just off the Gotham Heritage Trail and Gotham Ride, but on a well walked path and representative of locations on all those routes. It is just over 2.15 km to the site perimeter fence and west-southwest of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).

- 9.262 Existing view: as illustrated in **Figure 9.5.7 of ES Volume 4**, this is a relatively elevated view looking out across the village of Gotham with Gotham and Ruddington Moors beyond the village. The foreground is rough grassland and woodland on the southern slopes of the hill, with the extensive woodland on Gotham Hill to the left of the view. The two clumps of woodland to the north and south of Viewpoint 6 are visible, as are the line of poplars at the southern end of the site and there is a wooded and slightly elevated horizon in the distance. The line of pylons that cross the site is visible in the near and middle distance.
- 9.263 Predicted view: as illustrated in **Figure 9.5.7 of ES Volume 4**, the solar PV arrays would be in the middle distance, occupying approximately 37° of the view and, as this is a relatively elevated view, the substation and BESS infrastructure would be visible above and partially screened by the solar PV panels.

#### EFFECTS ON LANDSCAPE CHARACTER

- 9.264 Landscape character area (DPZ): NW01: Gotham and West Leake Wooded Hills and Scarps.

- 9.265 Landscape sensitivity: High/medium. This is a landscape of County value and susceptible to this type of development (see **Table 9.6** above).

- 9.266 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the landscape in the middle distance.
- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence, solar PV panels, substation and BESS infrastructure into the landscape in the middle distance.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): moderate adverse change as, although the site boundary hedgerows with hedgerow trees and woodlands along the western boundary

would be establishing and would progressively screen the perimeter fence and some of the solar PV panels, from this elevated location the majority of the solar PV panels, substation and BESS infrastructure would still be discernible, although they would be low down in the landscape so would not screen the views of the distant hills.

- During decommissioning: slight change due to most of the decommissioning works being discernible above the established boundary vegetation.

- 9.267 Overall effects on landscape character during construction: Moderate+ adverse effect (high/medium sensitivity resource and a moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and significant.

- 9.268 Overall effects on landscape character during operation (years 1 – 5): Moderate+ adverse effect (high/medium sensitivity resource and a moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and significant.

9.269 Overall effects on landscape character during operation (year 5 onwards): Moderate+ adverse effect (high/medium sensitivity resource and a moderate adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and significant.

9.270 Overall effects on landscape character during decommissioning: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.271 Visual receptors: walkers, cyclists, equestrians.

9.272 Location value: Community and Borough (as this is used by the local community and close to two promoted short circular routes).

9.273 Receptor susceptibility: Walkers, cyclists and equestrians: Susceptible (as they would be moving slowly, would be exposed to the change in the

view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.274 Receptor sensitivity: Walkers, cyclists and equestrians: High/medium sensitivity (as they would be in a location with local community and Borough value and would be susceptible to change).

9.275 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the middle distance.

- During operational phase (years 1 - 5): moderate adverse change due to the addition of the perimeter fence, solar PV panels, substation and BESS infrastructure into the view in the middle distance.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): moderate adverse change as, although the site boundary hedgerows with hedgerow trees and woodlands along the western boundary would be establishing and would progressively screen the perimeter fence and some of the solar PV panels, from this elevated location the majority of the solar PV panels, substation and BESS infrastructure would still be discernible, although they would be low down in the landscape so would not screen the views of the distant hills.
- During decommissioning: slight change due to most of the decommissioning works being discernible above the established boundary vegetation.

9.276 Overall effects on the view for walkers during construction: Moderate+ adverse effect (high/medium sensitivity receptors and a moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and significant.

9.277 Overall effects on the view for walkers during operation (years 1 – 5): Moderate+ adverse effect (high/medium sensitivity receptors and a moderate adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and significant.

9.278 Overall effects on the view for walkers during operation (year 5 onwards): Moderate+ adverse effect (high/medium sensitivity receptor and a moderate adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and significant.

9.279 Overall effects on the view for walkers during decommissioning: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change).

These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

### *Viewpoint 8: View from Gotham Ride/bridleway on Court Hill*

9.280 Location: this viewpoint is on Court Hill in the West Leake Hills, on a bridleway that forms part of the Gotham Ride and close to another bridleway that descends the north slope of the hill towards the village of Gotham and is part of the Gotham Heritage Trail. It is just over 2.75 km to the site perimeter fence and southwest of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).

9.281 Existing view: as illustrated in **Figure 9.5.8 of ES Volume 4**, this is a relatively elevated view looking northwards towards the village of Gotham with Gotham and Ruddington Moors beyond and Clifton in the far distance. The foreground is rough grassland on the northern slopes of the hill and woodland to the left (just outside the frame illustrated in **Figure 9.5.8 of ES Volume 4**). The two clumps of woodland to the north and south of Viewpoint 6 are visible, as are

the line of poplars at the southern end of the site and several other wooded copses on the lower ground. The line of pylons that cross the site is visible in the middle distance.

9.282 Predicted view: as illustrated in **Figure 9.5.8 of ES Volume 4**, the solar PV arrays would be in the middle distance, occupying approximately 24° of the view and, as this is a relatively elevated view, the substation and BESS infrastructure would be discernible above and partially screened by the solar PV panels.

### EFFECTS ON LANDSCAPE CHARACTER

9.283 Landscape character area (DPZ): NW01: Gotham and West Leake Wooded Hills and Scarps.

9.284 Landscape sensitivity: High/medium. This is a landscape of County value and susceptible to this type of development (see **Table 9.6** above).

9.285 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works



being undertaken on the site, arising mainly from the installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the landscape in the distance.

- During operational phase (years 1 - 5): moderate/slight adverse change due to the addition of the solar PV panels, substation and BESS infrastructure into the landscape in the distance.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): moderate/slight adverse change as, although the site boundary hedgerows with hedgerow trees and woodlands along the western and southern boundary would be establishing and would progressively screen the perimeter fence and some of the solar PV panels, from this elevated location the majority of the solar PV panels, substation and BESS infrastructure would still be discernible, although they would be low down in the landscape so would not screen the views of the distant hills.

- During decommissioning: slight change due to most of the decommissioning works being discernible above the established boundary vegetation.

9.286 Overall effects on landscape character during construction: Moderate adverse effect (high/medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

9.287 Overall effects on landscape character during operation (years 1 – 5): Moderate adverse effect (high/medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and not significant.

9.288 Overall effects on landscape character during operation (year 5 onwards): Moderate adverse effect (high/medium sensitivity resource and a moderate/slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.

9.289 Overall effects on landscape character during decommissioning: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.290 Visual receptors: walkers, cyclists, equestrians.

9.291 Location value: Community and Borough (as this is used by the local community and close to two promoted short circular routes).

9.292 Receptor susceptibility: Walkers, cyclists and equestrians: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be both in the direction of travel and also across the landscape towards the proposed development).

9.293 Receptor sensitivity: Walkers, cyclists and equestrians: High/medium sensitivity (as they would be in a location with local community and Borough value and would be susceptible to change).

9.294 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: moderate/slight adverse change due to the construction works being undertaken on the site, arising mainly from the installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the distance.
- During operational phase (years 1 - 5): moderate/slight adverse change due to the addition of the solar PV panels, substation and BESS infrastructure into the view in the distance.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): moderate/slight

adverse change as, although the site boundary hedgerows with hedgerow trees and woodlands along the western and southern boundaries would be establishing and would progressively screen the perimeter fence and some of the solar PV panels, from this elevated location the majority of the solar PV panels, substation and BESS infrastructure would still be discernible, although they would be low down in the landscape so would not screen the views of the distant hills.

- During decommissioning: slight change due to most of the decommissioning works being discernible above the established boundary vegetation.

9.295 Overall effects on the view for walkers during construction: Moderate adverse effect (high/medium sensitivity receptors and a moderate/slight adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and not significant.

9.296 Overall effects on the view for walkers during operation (years 1 – 5): Moderate adverse effect (high/medium sensitivity receptors and a moderate/slight adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and not significant.

9.297 Overall effects on the view for walkers during operation (year 5 onwards): Moderate adverse effect (high/medium sensitivity receptor and a moderate/slight adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.

9.298 Overall effects on the view for walkers during decommissioning: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.

### *Viewpoint 9: View from Midshires Way / Restricted Byway on Lantern Lane*

- 9.299 Location: this viewpoint is on Lantern Lane, a restricted byway and part of the Midshires Way. It is between Sharpley Hill and Hotchley Hill (to the left) and Rough Hill (to the right). It is just over 2.73 km to the site perimeter fence and south-southeast of the site centre (see **Figures 9.4a and 9.4b of ES Volume 3**).
- 9.300 Existing view: as illustrated in Figure 9.5.9, this is a relatively elevated view looking northwards towards Gotham and Ruddington Moors, with Clifton and Ruddington in the distance and the short spire of the Church of St Lawrence in Gotham also visible. Another line of pylons (south of Gotham) crosses the view and the line of pylons that cross the site is visible in the middle distance. Lantern Lane is bounded on both sides by hedgerows which would provide greater screening of this view during the summer.
- 9.301 Predicted view: as illustrated in **Figure 9.5.9 of ES Volume 4**, the solar PV arrays would be in the middle

distance, occupying approximately 14° of the view and, as this is a relatively elevated view, the substation and BESS infrastructure would be above and partially screened by the solar PV panels.

#### EFFECTS ON LANDSCAPE CHARACTER

- 9.302 Landscape character area (DPZ): NW01: Gotham and West Leake Wooded Hills and Scarps.
- 9.303 Landscape sensitivity: High/medium. This is a landscape of County value and susceptible to this type of development (see **Table 9.6** above).
- 9.304 Magnitude of change in landscape character that would arise as a consequence of the proposed development would be as follows:
- During construction phase: slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in

the landscape in the middle distance, but occupying a small sector of the view and low down in the landscape so would be partially screened by intervening vegetation in winter and largely screened in summer.

- During operational phase (years 1 - 5): slight adverse change due to the addition of the perimeter fence, solar PV panels, substation and BESS infrastructure into the landscape in the middle distance but occupying a small sector of the view and low down in the landscape so would also be partially screened by intervening vegetation in winter and largely screened in summer.
- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary hedgerows with hedgerow trees and woodlands along the western and southern boundary would be establishing and would progressively screen the perimeter fence and some of the solar PV panels and, although from this elevated location some of the

solar PV panels, substation and BESS infrastructure would still be discernible, they would occupy a small sector of the view and low down in the landscape so would also be partially screened by intervening vegetation in winter and largely screened in summer.

- During decommissioning: negligible change due to the decommissioning works being partially screened by intervening vegetation in winter and largely screened in summer.

9.305 Overall effects on landscape character during construction: Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

9.306 Overall effects on landscape character during operation (years 1 – 5): Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, medium-term/temporary, reversible and not significant.

9.307 Overall effects on landscape character during operation (year 5 onwards): Moderate/minor+ adverse effect (high/medium sensitivity resource and a slight adverse magnitude of change). These adverse effects on landscape character would be direct, individual, long-term/temporary, reversible and not significant.

9.308 Overall effects on landscape character during decommissioning: Minor+ adverse effect (high/medium sensitivity resource and a negligible adverse magnitude of change). These adverse effects on landscape character would be direct, individual, short-term/temporary, reversible and not significant.

## EFFECTS ON VIEW

9.309 Visual receptors: walkers, cyclists, equestrians.

9.310 Location value: National (as this is on a multi-use National Trail).

9.311 Receptor susceptibility: Walkers, cyclists and equestrians: Susceptible (as they would be moving slowly, would be exposed to the change in the view for short periods when travelling along this footpath, could experience the view frequently and where the focus of their view could be in the direction of travel towards the proposed development).

9.312 Receptor sensitivity: Walkers, cyclists and equestrians: High sensitivity (as they would be in a location with National value and would be susceptible to change).

9.313 Magnitude of change in the view for receptors that would arise as a consequence of the proposed development would be as follows:

- During construction phase: slight adverse change due to the construction works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels and the substation and BESS infrastructure, and construction vehicle movements on the site, which would be in the view in the middle distance, but occupying a small sector of the view and low down in the landscape so would be partially screened by intervening vegetation in winter and largely screened in summer.
- During operational phase (years 1 - 5): slight adverse change due to the addition of the perimeter fence, solar PV panels, substation and BESS infrastructure into the view in the middle distance but occupying a small sector of the view and low down

in the landscape so would also be partially screened by intervening vegetation in winter and largely screened in summer.

- After establishment of the measures in the Outline LBMEP (year 5 onwards): slight adverse change as the site boundary hedgerows with hedgerow trees and woodlands along the western and southern boundary would be establishing and would progressively screen the perimeter fence and some of the solar PV panels and, although from this elevated location some of the solar PV panels, substation and BESS infrastructure would still be discernible, they would occupy a small sector of the view and low down in the landscape so would also be partially screened by intervening vegetation in winter and largely screened in summer.
- During decommissioning: negligible change due to the decommissioning works being partially screened by intervening vegetation in winter and largely screened in summer.

9.314 Overall effects on the view for walkers during construction: Moderate adverse effect (high sensitivity receptors and a slight adverse magnitude of change). These adverse effects on the view would be direct, individual, short-term/temporary, reversible and not significant.

9.315 Overall effects on the view for walkers during operation (years 1 – 5): Moderate adverse effect (high sensitivity receptors and a slight adverse magnitude of change). These adverse effects on the view would be direct, individual, medium-term/temporary and not significant.

9.316 Overall effects on the view for walkers during operation (year 5 onwards): Moderate adverse effect (high sensitivity receptor and a slight adverse magnitude of change). These adverse effects on views would be direct, individual, long-term/temporary, reversible and not significant.

9.317 Overall effects on the view for walkers during decommissioning: Moderate/minor adverse effect (high sensitivity resource and a negligible adverse magnitude of change). These adverse effects on views would be direct, individual, short-term/temporary, reversible and not significant.



Table 9.9 - Summary of Viewpoint Analysis - Effects on Landscape Character

Viewpoint Data:				Landscape Unit:		Effects on Landscape Character			
No	Location	Easting Northing	Distance/ Direction from Site	DPZ	Sensitivity	Construction Phase (9 months)	Operational Phase (1 – 5 years)	Operational Phase (5 – 40 years)	Decommissioning Phase (9 months)
1	Footpath on northeastern boundary of site	455941 330930	0.01 km / SE	SN02: Ruddington Alluvial Fringe	Medium	Moderate+ adverse (short-term)	Major/ moderate adverse (medium-term)	Moderate+ adverse (long-term)	Minor adverse (short-term)
2	Footpath along Fairham Brook	455470 330580	0.04 km / S	SN02: Ruddington Alluvial Fringe	Medium	Moderate+ adverse (short-term)	Major/ moderate adverse (medium-term)	Moderate+ adverse (long-term)	Moderate/ minor adverse (short-term)
3	Footpath east of site on Bunny Moor	456579 330339	0.68 km/ SE	SN02: Ruddington Alluvial Fringe	Medium	Moderate/ minor+ adverse (short-term)	Moderate adverse (medium-term)	Minor+ adverse (long-term)	Minor adverse (short-term)
4	Footpath off Asher Lane	456379 332130	0.81 km/ NE	SN02: Ruddington Alluvial Fringe/ SN04: Cotgrave and Tollerton Village Farmlands	Medium Medium	Moderate adverse (short-term)	Moderate+ adverse (medium-term)	Moderate/ minor adverse (long-term)	Minor adverse (short-term)

Viewpoint Data:				Landscape Unit:		Effects on Landscape Character			
No	Location	Easting Northing	Distance/ Direction from Site	DPZ	Sensitivity	Construction Phase (9 months)	Operational Phase (1 – 5 years)	Operational Phase (5 – 40 years)	Decommissioning Phase (9 months)
5	Footpath on edge of Fairham Pasture site	454300 332069	0.91 km / NW	SN02: Ruddington Alluvial Fringe	Medium	Moderate/ minor+ adverse (short-term)	Moderate adverse (medium-term)	Moderate/ minor adverse (long-term)	Minor adverse (short-term)
6	Footpath east of Gotham	454422 330447	1.10 km / SW	SN02: Ruddington Alluvial Fringe	Medium	Moderate/ minor adverse (short-term)	Moderate/ minor+ adverse (medium-term)	Minor+ adverse (long-term)	Minor adverse (short-term)
7	Round Spinney Nature Reserve on Gotham Hill	453059 330863	2.15 km / WSW	NW01: Gotham and West Leake Wooded Hills and Scarps	High/ medium	Moderate+ adverse (short-term)	Moderate+ adverse (medium-term)	Moderate+ adverse (long-term)	Moderate/ minor+ adverse (short-term)
8	Gotham Ride / Bridleway on Court Hill	453504 328712	2.75 km / SW	NW01: Gotham and West Leake Wooded Hills and Scarps	High/ medium	Moderate adverse (short-term)	Moderate adverse (medium-term)	Moderate adverse (long-term)	Moderate/ minor+ adverse (short-term)
9	Midshires Way / Restricted Byway on Lantern Lane at field entrance	456177 327903	2.73 km / SSE	NW01: Gotham and West Leake Wooded Hills and Scarps	High/ medium	Moderate/ minor+ adverse (short-term)	Moderate/ minor+ adverse (medium-term)	Moderate/ minor+ adverse (long-term)	Minor+ adverse (short-term)

Table 9.10 - Summary of Viewpoint Analysis - Effects on Views

Viewpoint Data:				Landscape Unit:		Effects on Landscape Character			
No	Location	Easting Northing	Distance/ Direction to Site	Receptor Types	Sensitivity	Construction Phase (9 months)	Operational Phase (1 – 5 years)	Operational Phase (5 - 40 years)	Decommissioning Phase (9 months)
1	Footpath on northeastern boundary of site	455941 330930	0.01 km / SE	Walkers	High/ medium	Major/ moderate adverse (short-term)	Major/ moderate+ adverse (medium-term)	Major/moderate adverse (long-term)	Minor+ adverse (short-term)
2	Footpath along Fairham Brook	455470 330580	0.04 km / S	Walkers	High/ medium	Major/ moderate adverse (short-term)	Major/ moderate+ adverse (medium-term)	Major/moderate adverse (long-term)	Moderate/minor+ adverse (short-term)
3	Footpath east of site on Bunny Moor	456579 330339	0.68 km/ SE	Walkers	High/ medium	Moderate adverse (short-term)	Moderate+ adverse (medium-term)	Moderate/ minor adverse (long-term)	Minor+ adverse (short-term)
4	Footpath off Asher Lane	456379 332130	0.81 km/ NE	Walkers	High/ medium	Moderate+ adverse (short-term)	Major/ moderate adverse (medium-term)	Moderate/ minor+ adverse (long-term)	Minor+ adverse (short-term)
5	Footpath on edge of Fairham Pasture site	454300 332069	0.91 km / NW	Walkers	High/ medium	Moderate adverse (short-term)	Moderate+ adverse (medium-term)	Moderate/ minor+ adverse (long-term)	Minor+ adverse (short-term)

Viewpoint Data:				Landscape Unit:		Effects on Landscape Character			
No	Location	Easting Northing	Distance/ Direction to Site	Receptor Types	Sensitivity	Construction Phase (9 months)	Operational Phase (1 – 5 years)	Operational Phase (5 - 40 years)	Decommissioning Phase (9 months)
6	Footpath east of Gotham	454422 330447	1.10 km / SW	Walkers	High/ medium	Moderate/ minor+ adverse (short-term)	Moderate adverse (medium-term)	Moderate/ minor adverse (long-term)	Minor+ adverse (short-term)
7	Round Spinney Nature Reserve on Gotham Hill	453059 330863	2.15 km / WSW	Walkers, cyclists, equestrians	High/ medium	Moderate+ adverse (short-term)	Moderate+ adverse (medium-term)	Moderate+ adverse (long-term)	Moderate/minor+ adverse (short-term)
8	Gotham Ride / Bridleway on Court Hill	453504 328712	2.75 km / SW	Walkers, cyclists, equestrians	High/ medium	Moderate adverse (short-term)	Moderate adverse (medium-term)	Moderate adverse (long-term)	oderate/minor+ adverse (short-term)
9	Midshires Way / Restricted Byway on Lantern Lane at field entrance	456177 327903	2.73 km / SSE	Walkers, cyclists, equestrians	High	Moderate adverse (short-term)	Moderate adverse (medium-term)	Moderate adverse (long-term)	Moderate/minor adverse (short-term)

## ASSESSMENT OF EFFECTS ON LANDSCAPE RESOURCES AND VISUAL AMENITY

### Effects on Landscape Fabric

#### *Construction Phase*

- 9.318 The entire footprint of the construction phase would be on land currently used for arable production. No ground vegetation, hedgerows or other important, mature, diverse or distinctive landscape components would be disturbed or lost and so there would not be any adverse effects on landscape fabric as a consequence of the construction phase.

#### *Operational Phase*

- 9.319 During the operational phase, there would also be no disturbance or loss of ground vegetation, hedgerows or other important, mature, diverse or distinctive landscape components and so there would not be any adverse effects on landscape fabric.
- 9.320 The woodlands, hedgerows, hedgerow trees and species-rich

meadow and grassland proposed in the Outline LBMEP and planted at the end of the construction phase, would establish and mature during the operational phase. These would reinstate landscape features which have previously been lost on the site as the result of agricultural operations and would result in a beneficial effect on the landscape fabric of the site.

#### *Decommissioning Phase*

- 9.321 There would be some disturbance of the species-rich meadow and grassland during the decommissioning phase which would be restored at the end of the works, but no disturbance to the woodlands, hedgerows and hedgerow trees which would be well established on the site. No important, mature, diverse or distinctive landscape components would be lost and there would not be any significant adverse effects on landscape fabric as a consequence of the decommissioning phase.

### Effects on Landscape Character

#### *SN01: Clifton Slopes*

- 9.322 As illustrated in the ZTV (**Figures 9.4a and 9.4b of ES Volume 3**), there is a zone of theoretical visibility extending across SN01 as far as the top of Brands Hill. However, SN01 is to the northwest of the double line of pylons to the northwest of the site, and no significant effects arising from the construction, operational and decommissioning phases are predicted at Viewpoint 5 (which is in SN02 but close to the boundary with SN01). Parts of SN01 are more elevated than SN02 but further from the site (2 km+), and there would not be significant effects on landscape character within SN01 during the construction, operational and decommissioning phases of the proposed development.

#### *SN02: Ruddington Alluvial Fringe*

#### CONSTRUCTION PHASE

- 9.323 The site is located within SN02 and, as illustrated in the viewpoint analysis, there would be some short-term



significant adverse effects on the character of the site and surrounding landscape within SN02 during the construction phase due to works being undertaken on the site, arising mainly from the erection of the perimeter fencing, installation of the solar PV array supports and panels, substation and BESS infrastructure and construction vehicle movements on the site.

9.324 However, these significant effects would be very localised, as illustrated by Viewpoint 1 (10 m from the perimeter fence and southeast of the centre of the site) and Viewpoint 2 (40 m from the perimeter fence and south of the centre of the site). These significant effects on landscape character would not extend as far as Viewpoint 3 (680 m from the perimeter fence and southeast of the centre of the site), Viewpoint 4 (810 m from the perimeter fence and northeast of the centre of the site), Viewpoint 5 (910 m from the perimeter fence and northwest of the centre of the site) and Viewpoint 6 (1.10 km from the perimeter fence and southwest of the centre of the site).

9.325 Therefore, significant effects on landscape character within SN02

during the construction phase would not extend beyond the railway line to the east of the site or more than approximately 500 m to the north, west and south of the site.

## OPERATIONAL PHASE

9.326 As illustrated in the viewpoint analysis, there would be some medium-term significant adverse effects on the character of the site and surrounding landscape within SN02 during the operational phase (years 1 – 5) due to the presence of the perimeter fencing, solar PV arrays, substation and BESS infrastructure. These significant effects on landscape character are illustrated at Viewpoints 1, 2 and 4 but would not extend to Viewpoints 3, 5 and 6.

9.327 Therefore, significant effects on landscape character within SN02 during the early years of the operational phase would not extend beyond the railway line to the east of the site, more than approximately 850 m to the north and west or more than 400 m south of the site (due to screening by mature hedgerows along Moor Lane).

9.328 The boundary vegetation proposed as part of the Outline LBMEP will

reinstate landscape features which have previously been lost on the site and will progressively screen the perimeter fencing, solar PV arrays, substation and BESS infrastructure.

9.329 Therefore, significant effects on landscape character within SN02 during the remainder of the operational phase (years 5 onwards) would be confined to the site itself and the immediate surroundings, as illustrated at Viewpoints 1 and 2, but would not extend beyond approximately 50 m from the perimeter vegetation.

## DECOMMISSIONING PHASE

9.330 As illustrated in the viewpoint analysis, there would not be any significant adverse effects on the character of the site and surrounding landscape within SN02 during the decommissioning phase.

### *SN04: Cotgrave and Tollerton Village Farmlands*

9.331 As illustrated in the ZTV (**Figures 9.4a and 9.4b of ES Volume 3**), the zone of theoretical visibility extends only just into SN04 to the north and east of the site. However, as illustrated by Viewpoint 4 which is on the boundary

of SN02 and SN04, there would not be any significant effects on landscape character during the construction phase, the majority of the operational phase or the decommissioning phase and, during years 1 – 5 of the operational phase, the effects would be borderline significant (moderate+) and would not extend far into SN04, so there would not be any significant adverse effects on landscape character within SN04 to the north of the site.

9.332 Within SN04, the other zones of visibility are in the far southeast of the study area, to the east of the A60. However, intervening vegetation will completely screen the site from this part of SN04.

9.333 Therefore, there would not be any significant effects on landscape character within SN04 as a result of the construction, operational and decommissioning phases of the proposed development.

### *NW01: Gotham and West Leake Wooded Hills and Scarps*

9.334 As illustrated in the viewpoint analysis, there would be some significant adverse effects on the character of

the landscape at Viewpoint 7 (2.15 km from the perimeter fence and west-southwest of the site centre) during the construction, early operational and decommissioning phases.

9.335 However, these significant effects on landscape character would occur only in the more open locations on the east facing slopes of Gotham Hill and would be borderline significant (moderate+). Much of the hills in NW01 are wooded, the proposed development would not become a key characteristic of the Gotham and West Leake Hills landscape, and no existing key characteristics would be permanently (or long term temporarily) lost.

## Effects on Visual Amenity

### *Visual Receptor Groups and Locations*

9.336 As described in **Paragraph 9.107 on page 177**, the main visual receptor groups and locations in the study area are:

- Residents – in properties in Ruddington, Clifton, East Leake and the villages of Bradmore,

Bunny, Gotham and Barton in Fabis.

- Residents – in farmsteads on the open farmland, including Fields Farm Cottages, Ruddington Farm, Moorend Farm and Farm Cottages, Moor Farm, Long Manor, Gotham Moor Farm, Fairholme Farm, Glebe Farm, and Top Barn Cottage.
- Visitors – to the visitor and leisure attractions including (A) Rushcliffe Country Park, (B) Nottingham Transport Heritage Centre and Nottingham Heritage Railway, (C) Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington and (D) Rushcliffe Golf Club.
- Cyclists, equestrians and walkers – on Trent Valley Way, Midshires Way, Gotham Heritage Trail, Gotham ride, Ruddington Walks # 1 - 4 and the local rights of way network.
- Motorists – on the A543, Green Street, Nottingham Road and A60.

## RESIDENTS

- 9.337 Residents in some properties along Pasture Lane, Ruddington would have views of construction traffic but this route is already used by HGV and other traffic so the effects would be minor and not significant. As shown in the ZTVs, **Figures 9.4a and 9.4b of ES Volume 3**, the proposed development would be screened by topography from Ruddington, East Leake and Barton in Fabis, and there would not be any effects on views or the visual amenity of residents in properties within East Leake and Barton in Fabis during the construction and decommissioning phases nor within all three settlements during the operational phase.
- 9.338 The ZTVs suggest that the proposed development could be visible from residential areas in Clifton and there would be views from the properties along Summerwood Lane and Manesty Crescent on the southern edge of Clifton, but these properties would screen views from properties further north. Compared with Viewpoint 4 (810 m from the perimeter fence and northeast of the centre of the site) and Viewpoint 5 (910 m from the perimeter fence and northwest of the centre of the site), some of the properties along Summerwood Lane and Manesty Crescent are closer (700 m – 1.2 km from the perimeter fence and north and northeast of the centre of the site).
- 9.339 However, the HFoV occupied by the proposed development would be 25°, so would occupy a much smaller sector of the view than at Viewpoints 4 (80°) or Viewpoint 5 (59°), there is some vegetation along parts of the boundary of this residential area and the proposed development would be seen through and beyond a double line of pylons. Therefore, there would not be any significant adverse effects on views and visual amenity for residents in properties in Clifton during the construction, operational and decommissioning phases.
- 9.340 The villages of Bradmore and Bunny are located alongside the A60, over 2 km east of the railway line and the proposed development. Whilst there would be significant effects on views during the early operational phase at Viewpoint 3 on Bunny Moor (0.68 km east of the perimeter fence), this is located closer to the site and views from these settlements would be screened by intervening field boundary vegetation so there would not be any significant adverse effects on views and the visual amenity of residents in properties in Bradmore and Bunny during the construction, operational and decommissioning phases.
- 9.341 Fields Farm Cottages are located 650 m northeast of the perimeter fence. The front and rear façades of these properties face northwest and southeast but there would be views towards the site from the surrounding garden areas, similar to the view from Viewpoint 4 (810 m from the perimeter fence and northeast of site centre). As illustrated by Viewpoint 4, there would be a significant effect on the view and visual amenity of residents in these properties during the construction and early operational phases, before the boundary vegetation has established, but not during the remainder of the operational phase nor during the decommissioning phase.
- 9.342 Ruddington Farm is located off Asher Lane just east of the railway line. Views from this property would be similar to the view from Viewpoint 4 but filtered by some intervening vegetation and there would be a significant effect on the view and visual amenity of residents in this property during the construction and

early operational phase, before the boundary vegetation has established, but not during the remainder of the operational phase nor during the decommissioning phase.

9.343 Moorend Farm and Farm Cottages, Moor Farm and Long Manor are east of the railway line and 1.0 – 1.6 km east of the site. All have mature vegetation nearby which would filter or screen views westwards towards the proposed development. They are located further from the proposed development than Viewpoint 3 on Bunny Moor (0.68 km from the perimeter fence and southeast of the site centre) and there would not be any significant effects on views and the visual amenity of residents in these properties during the construction, operational and decommissioning phases.

9.344 Gotham Moor Farm is immediately west of the railway line and 700 m south of the perimeter fence. The rear façade faces north-northeast towards the site but the proposed development would be largely screened by the mature hedgerows and trees along Moor Lane between this property and the site, so there would not be

any significant effects on views and the visual amenity of residents in this property during the construction, operational and decommissioning phases.

9.345 Fairholme Farm is located just south of Viewpoint 6, 1.2 km from the perimeter fence. However, there are several intervening field boundary hedgerows between this property and the site which, as illustrated by Viewpoint 6, would largely screen the proposed development, so there would not be any significant effects on views and the visual amenity of residents in this property during the construction, operational and decommissioning phases.

9.346 Glebe Farm is located just north of Viewpoint 6 and east of the allotments on the outskirts of the village of Gotham, 1.1 km from the perimeter fence. Views towards the site would be partially screened by the nearby large farm buildings and intervening hedgerows and there would not be any significant effects on views and the visual amenity of residents in this property during the construction, operational and decommissioning phases.

9.347 Top Barn Cottage is located at the north of a small industrial estate off Barton Lane, 1.9 km from the perimeter fence and northwest of the site centre. Views of the proposed development would be screened by the nearby industrial buildings and there would not be any effects on views and the visual amenity of residents in this property during the construction, operational and decommissioning phases.

## VISITORS

9.348 As shown on the ZTVs, views from Rushcliffe Country Park, Nottingham Transport Heritage Centre and Nottingham Heritage Railway, Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington would be screened by topography and there would not be any effects on views and the visual amenity of visitors to these visitor attractions.

9.349 Rushcliffe Golf Course is located on the north facing lower slopes of the West Leake Hills, 2 km south of the site at elevations of 40 – 60 mAOD. The ZTVs (**Figures 9.4b and 9.4b of ES Volume 3**) suggest that there could be views from parts of the golf course.

However, there is tall and mature vegetation on the course, alongside Leake Road to the immediate north and in the intervening landscape and, although the proposed development may be visible from some more elevated and open locations on the course, at this distance, there would not be any significant effects on views and the visual amenity of golfers on this course during the construction, operational and decommissioning phases.

#### CYCLISTS, EQUESTRIANS AND WALKERS

9.350 Trent Valley Way follows the River Trent in the far northwest of the study area and, as illustrated by the ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**), the intervening topography (Brands Hill) would screen views of the proposed development from this route.

9.351 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) suggest that there could be views of the proposed development from parts of the Midshires Way, such as from Stocking Lane south of Rushcliffe Golf Course and from Gotham Lane to the west of Bunny. However, roadside hedgerows along these routes, plus vegetation

in the intervening landscape would screen views towards the site. There is a view towards the site from Midshires Way on the most elevated section of the restricted byway on Lantern Lane but, as illustrated by Viewpoint 9 (2.73 km south-southeast of the site), there would not be any significant effects on views from this distance. Therefore, there would not be any significant effects on views and the visual amenity of users of this multi-use National Trail during the construction, operational and decommissioning phases.

9.352 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) suggest that there could be views of the proposed development from most of the Gotham Heritage Trail. There would be views from the more elevated and open sections of this route over Gotham Hill (as illustrated by Viewpoint 7) and West Leake Hills (as illustrated by Viewpoint 8) and there would be significant effects on views during the construction and operational phases at Viewpoint 7. However, these effects on views at Viewpoint 7 would be borderline significant (moderate+) and views from much of the route would be screened, such as by built development within Gotham and vegetation on the West Leake

Hills. Therefore, there would not be a significant effect on the visual amenity of users of this route during the construction, operational and decommissioning phases.

9.353 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) suggest that there could be views of the proposed development from Gotham Ride over Gotham Hill and where it follows the bridleway that runs up Wood Lane from Keyworth Road to Court Hill and on to where it meets the Midshires Way on Crow Wood Hill in the West Leake Hills. There would be views from the more elevated and open sections of this route over Gotham Hill (as illustrated by Viewpoint 7) and from the bridleway between Court Hill and Crow Wood Hill (as illustrated by Viewpoint 8) and there would be significant effects on views during the construction and operational phases at Viewpoint 7. However, these effects on views at Viewpoint 7 would be borderline significant (moderate+) and views from much of the route would be screened, such as by built development within Gotham and vegetation on the West Leake Hills. Therefore, there would not



be a significant effect on the visual amenity of users of this route during the construction, operational and decommissioning phases.

- 9.354 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) illustrate that topography would screen views of the proposed development from Ruddington Walk # 1 except where it turns northwards off Asher Lane and follows the footpath alongside the railway line (illustrated by Viewpoint 4 on the footpath off Asher Lane besides the bridge). However, the significant change in the view in the short to medium term would affect the view southwards from just after the bridge only, before walkers turn northwards and away from the site. Therefore, there would not be a significant effect on the visual amenity of users of this route during the construction, operational and decommissioning phases.
- 9.355 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) illustrate that topography would screen views of the proposed development from Ruddington Walks # 2, 3 and 4 and so there would not be any effects on the visual amenity of users of these routes.
- 9.356 Walkers on the footpath alongside the railway line to the immediate east of

the site (Ruddington FP6) would have relatively close and open views of the site, as illustrated by Viewpoint 4 (0.81 km northeast of the site) and Viewpoint 1 (10 m from the perimeter fence), and there would be a significant effect on the visual amenity of walkers on this path during the construction and operational phases, but not during the decommissioning phase when the boundary vegetation would largely screen the site.

- 9.357 Walkers on the footpath from Clifton to Gotham (0.9 km west, Barton in Fabis FP4) would also have views towards the site from the majority of this route and, as illustrated by Viewpoint 5, at this distance, there would be significant effects on views and visual amenity during the early operational phase (moderate+ for a sustained length of the route) but not during the construction phase, the remainder of the operational phase or the decommissioning phase.
- 9.358 Walkers on the footpath from Gotham to the railway line (Gotham FP5) would have views of the site during the construction and operational phases when close to the site (as illustrated by Viewpoint 2) and there would be a significant effect on views and

the visual amenity of walkers along approximately 1 km of this route. However, views of the proposed development from this route further to the west would be screened by intervening hedgerows (as illustrated by Viewpoint 6), and there would not be a significant effect on views and the visual amenity of walkers along the remainder of this route to the west during the construction, operational and decommissioning phases.

- 9.359 There are mature hedgerows along both sides of the footpath along Moor Lane, from Gotham to the railway line 0.3 km south of the site (Gotham FP7) and there would not be any effects on views and the visual amenity of walkers along this footpath during the construction, operational and decommissioning phases.
- 9.360 The ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) suggest that there could be views of the proposed development from footpaths and bridleways to the east of the railway line, including around the periphery of Rushcliffe Country Park and across Bradmore Moor and Bunny Moor. As illustrated by Viewpoint 3 on Bunny Moor, there would be significant effects on views and visual amenity

during the early operational phase but not during the construction phase, the remainder of the operational phase or the decommissioning phase.

## MOTORISTS

9.361 As suggested by the ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**), there would be views of the proposed development from a short section of the A543 and a parallel section of Green Street where these cross the lower slopes of Brands Hill, 1.8 - 2.2 km northwest of the site. Viewpoint 5 is located mid-way between the site and these two routes and there would be significant effects on views at Viewpoint 5 during the early operational phase but not during the construction phase, the remainder of the operational phase and the decommissioning phase. These two roads are more elevated than the footpath, but motorists will be travelling more swiftly, their direction of travel is not towards the site and both routes have vegetation planted alongside which will progressively screen views towards the site. Therefore, there would not be any significant effects on views and the visual amenity of

motorists on the A543 and Green Street.

9.362 The Nottingham Road runs from Clifton to Gotham across Clifton Pastures, 1.3km northeast of the site, and there are open views from this road towards the site. However, as illustrated by Viewpoint 5 (0.91 km northeast of the site), there would not be any significant effects on views and the visual amenity of motorists on Nottingham Road during the construction, operational and decommissioning phases.

9.363 Although the ZTVs (**Figures 9.4a and 9.4b of ES Volume 3**) suggest that there could be views of the proposed development from a 3 km section of the A60 between the villages of Bradmore and Bunny, this is in the far southeast of the study area and intervening vegetation will screen views towards the site, so there would not be any effects on views and the visual amenity of motorists on the A60 during the construction, operational and decommissioning phases.

## ASSESSMENT OF CUMULATIVE EFFECTS

### Likely Future Baseline

9.364 The likely future baseline includes the permitted development in the study area. As described in **Paragraphs 9.110 to 9.112** and **Table 9.7**, this includes the permitted residential and employment development at Fairham Pasture (0.4 km northwest of the site), the permitted Gotham Moor Farm solar array (0.7 km south of the site) and the permitted Sharpley Hill Solar Farm (2.5 km south of the site). The locations of these are shown on **Figure 9.6 of ES Volume 3**.

### *Cumulative Effects with Permitted Fairham Pasture Development*

9.365 The development at Fairham Pasture would be located in SN01: Clifton Slopes. It would occupy and change the character of the landscape within more than a quarter of this DPZ and would screen views of the proposed development from within this part of SN01. The character of the remainder of SN01 (Brands Hill and the lower lying land to the north and west of Gotham Hill) would remain physically unchanged but would be indirectly affected by the presence of the Fairham Pasture development. The proposed development would be

outside this DPZ and would not have any additional cumulative effects on the character of the landscapes within SN01, over and above that predicted for the proposed development (**see paragraph 9.332**).

- 9.366 The Fairham Pasture development would bring residential receptors closer to the northern end of the site than is currently the case (existing properties in Clifton are at least 700 m north of the site). The orientation of the Fairham Pasture residential properties is not currently known but a wide swathe of woodland planting along the southern boundary of the Fairham Pasture development is shown on the Illustrative Development Framework (part of the outline submission) which would progressively screen views southwards towards the proposed development from these new residential properties. Therefore, whilst there may be views of the proposed development from residential properties on Fairham Pasture in the short to medium-term (depending on the orientation of the properties), in the medium to long-term, once the woodland planting has established, the proposed development would not have any effects on the views and

visual amenity of residents in these properties.

## *Cumulative Effects with Permitted Gotham Moor Farm Solar Array*

- 9.367 The permitted Gotham Moor Farm solar array would be located in SN02: Ruddington Alluvial Fringe, the same DPZ as the proposed development. However, it is a very small domestic-scale solar development (a single array covering an area of 150 m<sup>2</sup>), located within the curtilage of the Gotham Moor Farm property and surrounded by substantial hedgerows and other vegetation. It would not change the character of the landscape within SN02 beyond the surrounding hedgerows and the proposed development would not have any additional cumulative effects on the character of the landscapes within SN02, over and above that predicted for the proposed development (see **Paragraphs 9.323 to 9.330**).
- 9.368 The Gotham Moor Farm solar array may be visible from the footpath alongside the railway line for walkers walking northwards from the railway crossing but the proposed development would be screened by the hedgerows and other vegetation

around Gotham Moor Farm from this location.

### *Cumulative Effects with Permitted Sharpley Hill Solar Farm*

- 9.369 The permitted Sharpley Hill Solar Farm would be located in NW01: Gotham and West Leake Wooded Hills and Scarps close to Viewpoint 9. It would occupy a single large field close to the top of Sharpley Hill but the field is bounded by substantial hedgerows and the Sharpley Hill Solar Farm would change the character of only a very small part of the landscape within this DPZ. The proposed development would be outside this DPZ, would not significantly affect the character of the landscapes on and around Sharpley Hill and would not have any additional cumulative effects on the character of the landscapes within NW01, over and above that predicted for the proposed development (see **Paragraphs 9.334 to 9.335**).
- 9.370 Viewpoint 9 is located on Lantern Lane, close to the Sharpley Hill Solar Farm site and the solar arrays on the Sharpley Hill site are likely to be visible from this viewpoint (and elsewhere along this Restricted Byway/section of Midshires Way along Lantern Lane)

except at certain times of the year when the intervening hedgerow (on the left-hand side of the track illustrated in **Figure 9.5.9 of ES Volume 4**) is above eye height (approximately 3 mAGL for equestrians). However, the Sharpley Hill solar arrays would be set back from the lane and the proposed development would not have any additional cumulative effects on views over and above that predicted for the proposed development at this viewpoint (see **paragraphs 9.309 to 9.317**).

### *Possible Future Baseline*

- 9.371 The possible future baseline includes the proposed developments in the study area. As described in **paragraphs 9.110 to 9.113** and **Table 9.7**, this includes the proposed Kingston Solar Farm (2.7 km southwest of the site) and the proposed Highfields Farm Solar Farm (3.4 km southeast of the site), both of which have validated planning applications. The locations of these are shown on **Figure 9.6 of ES Volume 3**.

### *Cumulative Effects with Proposed Kingston Solar Farm*

- 9.372 The proposed Kingston Solar Farm would be located in NW01: Gotham and West Leake Wooded Hills and Scarps close to Viewpoint 8. It would occupy several fields on the top and south facing slopes of the West Leake Hills, surrounded by large blocks of mixed woodland and substantial hedgerows, and would change the character of a small part of the landscape on the top and southern slopes of this DPZ. The proposed development would be outside this DPZ, would not significantly affect the character of the landscapes in the West Leake Hills and would not have any additional cumulative effects on the character of the landscapes within NW01 over and above that predicted for the proposed development (see **Paragraphs 9.334 to 9.335**).
- 9.373 Viewpoint 8 is located next to a bench on the bridleway along the top of the West Leake Hills, which forms part of the Gotham Ride and is close to the Gotham Heritage Trail and the Kingston Solar Farm would not be visible from this location as there is a substantial hedgerow to the rear of the viewpoint, so the proposed development would not have any additional cumulative effects on views at this location over and above that predicted for the

proposed development at Viewpoint 8 (see **Paragraphs 9.290 to 9.298**).

9.374 Viewpoint 7 is located on Gotham Hill, close to the bridleways that form part of the Gotham Ride and Gotham Heritage Trail and the Kingston Solar Farm would not be visible from this location, so the proposed development would not have any additional cumulative effects on views at this location over and above that predicted for the proposed development at Viewpoint 7 (see **Paragraphs 9.271 to 9.279**).

9.375 The Kingston Solar Farm would be a close and visible feature from both of these routes (to the west of Viewpoint 8) in the short to medium term, until the 10 m buffer of woodland and scrub, proposed between this bridleway and the Kingston development establishes. The proposed development would not be visible from this section of these routes due to screening by woodland.

9.376 Consequently, in the short to medium-term, there would be some sequential views of Kingston and Fair Oaks from both of these routes but not any simultaneous views of both proposed developments and, once the 10m buffer has established, only the proposed development would

be visible from these two routes, and in the distance, as illustrated by Viewpoints 7 and 8. Therefore, in the medium to long-term, the proposed development would not have any additional cumulative effects on views from these two routes over and above that predicted for the proposed development at Viewpoint 7 (see **Paragraphs 9.271 to 9.279**) and Viewpoint 8 (see **Paragraphs 9.290 to 9.298**).

### *Cumulative Effects with Proposed Highfields Farm Solar Farm*

9.377 The proposed Highfields Farm Solar Farm would be located in NW01: Gotham and West Leake Wooded Hills and Scarps. It would occupy several fields on the top and south facing slopes of Bunny Hill and would change the character of a small part of the landscape on the top and southern slopes of this DPZ. The proposed development would be outside this DPZ, would not significantly affect the character of the landscapes in the West Leake Hills and would not have any additional cumulative effects on the character of the landscapes within NW01 over and above that predicted

for the proposed development (see **Paragraph 9.334 - 9.335**).

9.378 Deciduous woodland on the north facing scarp slope along the northern boundary of the Highfields Farm Solar Farm site would screen this proposed development in views from the north and there would not be any locations in the surrounding area where both proposed developments would be visible.

9.379 A branch of the Midshires Way traverses up these wooded slopes and exits the woodlands close to the northeast corner of the proposed Highfields Farm Solar Farm and some of the solar arrays on the site may be visible to walkers on the Midshires Way. However, the landscape strategy for the proposed Highfields Farm Solar Farm illustrates the intention to strengthen and infill the existing hedgerow along the eastern boundary of the site, and to maintain the hedgerow at a minimum height of 3 m which would screen the solar arrays from the Midshires Way. Therefore, there would not be any simultaneous views of both proposed developments and, although there may be a couple of sequential views (of the proposed development from Viewpoint 9 and of the proposed Highfields Farm



Solar Farm from immediately east of the site), in the short-term, once the Highfields Farm boundary planting has established, there would not be any views of the proposed Highfields Farm Solar Farm from Midshires Way and the proposed development would not have any additional cumulative effects on views from Midshires Way over and above that predicted for the proposed development at Viewpoint 9 (see **Paragraphs 9.309 to 9.317**).

## CONCLUSIONS

9.380 The entire footprint of the construction phase would be on land currently used for arable production and there would not be any adverse effects on landscape fabric as a consequence of the construction or operational phases. The woodlands, hedgerows, hedgerow trees and species-rich meadow proposed in the Outline LBMEP would establish and mature during the operational phase which would result in long-term beneficial effects on the landscape fabric of the site during the remainder of the operational phase. There would be some disturbance of the species-rich

meadow and grassland as the site is dismantled, but this would be restored at the end of the decommissioning phase.

9.381 The site is located within SN02: Ruddington Alluvial Fringe DPZ and there would be some short-term significant adverse effects on the character of the site and surrounding landscape within SN02 during the construction phase. During the operational phase (years 1 – 5) there would be some medium-term significant adverse effects on the character of the site and surrounding landscape, but these significant effects on landscape character would not extend beyond the railway line to the east of the site, more than approximately 850 m to the north and west or more than 400 m south of the site (to Moor Lane). During the remainder of the operational phase (years 5 onwards) the proposed new boundary vegetation would establish and significant effects on landscape character would be confined to the site and immediate surroundings, extending no more than approximately 50 m from the perimeter vegetation.

9.382 There would not be any significant effects on the landscape character of SN01: Clifton Slopes DPZ (to the west), SN04: Cotgrave and Tollerton Village Farmlands DPZ (to the north and east) or NW01: Gotham and West Leake Wooded Hills and Scarps DPZ (to the west and south) during the construction, operational and decommissioning phases of the proposed development.

9.383 The proposed development would be screened by topography from Ruddington, East Leake and Barton in Fabis, and by intervening field boundary vegetation from Bradmore and Bunny, so there would not be any effects on views or the visual amenity of residents in properties within these five settlements.

9.384 There would be views southwards towards the site from the properties along Summerwood Lane and Manesty Crescent on the southern edge of Clifton. However, the development would be 0.7 – 1.2 km from these properties and would occupy a narrow sector of the view beyond two lines of pylons, and there would not be any significant adverse

effects on views and visual amenity for residents in properties in Clifton.

9.385 There would be a significant effect on the views and visual amenity of residents in Fields Farm Cottages and Ruddington Farm during the construction and early operational phases, before the boundary vegetation has established, but not during the remainder of the operational phase nor during the decommissioning phase as the site would then be screened by the proposed boundary planting. The acceptability of significant effects on residential properties is a planning matter and is addressed in the accompanying Planning Statement.

9.386 Views from other properties in the surrounding area, such as Moorend Farm and Farm Cottages, Moor Farm, Long Manor, Gotham Moor Farm, Fairholme Farm, Glebe Farm and Top Barn Cottage would be largely screened by intervening vegetation and/or buildings and there would not be any significant effects on the views and visual amenity of residents in these properties.

9.387 Views from Rushcliffe Country Park, Nottingham Transport Heritage

Centre and Nottingham Heritage Railway, Ruddington Village Museum, the Framework Knitters' Museum and the human sundial in Ruddington would be screened by topography and there would not be any effects on views and the visual amenity of visitors to these visitor attractions. The proposed development may be visible from some of the more elevated and open locations on the Rushcliffe Golf Course, but these would be distant views and there would not be any significant effects on views and the visual amenity of golfers on this course.

9.388 Views of the proposed development would be screened by topography from the Trent Valley Way and from Ruddington Walks # 2, 3 and 4 and so there would not be any effects on the visual amenity of users of these routes.

9.389 There would be views of the proposed development from Midshires Way on Lantern Lane, and from the Gotham Ride and the Gotham Heritage Trail over Gotham Hill and on Court Hill. However, views from most of these routes would be screened, such as by built development within Gotham and vegetation on the West Leake Hills,

and there would not be a significant effect on the visual amenity of users of these routes.

9.390 Walkers on the footpath alongside the railway line to the immediate east of the site (Ruddington FP6) and on the footpath from Gotham to the railway line (Gotham FP5) within 1km of the site would have relatively close and open views of the site and there would be a significant effect on the visual amenity of walkers on these footpaths during the construction and operational phases.

9.391 For walkers on the footpath from Clifton to Gotham (Barton in Fabis FP4) and on footpaths and bridleways to the east of the railway line, including around the periphery of Rushcliffe Country Park and across Bradmore Moor and Bunny Moor, there would be significant effects on views and visual amenity during the early operational phase but not during the construction phase, the remainder of the operational phase or the decommissioning phase.

9.392 There would be views of the proposed development from a short section of the A543 and a parallel section of Green Street where these cross the

lower slopes of Brands Hill, northwest of the site and from Nottingham Road to the northwest and west of the site. However, motorists will be travelling swiftly, their direction of travel is not towards the site and there would not be any significant effects on views and the visual amenity of motorists on these roads. Intervening vegetation would screen views towards the site from the A60, so there would not be any effects on views and the visual amenity of motorists on the A60.

- 9.393 With regards to cumulative effects, due to the separation distances between the permitted and proposed solar farm developments in the study area, each would affect the character of the landscape and the views and visual amenity of receptors local to each site. Consequently, the proposed development would not result in any significant additional cumulative effects on landscape character or visual amenity in the context of any of these schemes.

## REFERENCES

### Pre-Application Consultations

Rushcliffe Borough Council (21 December 2021) Pre-consultation response from the Council's Design and Landscape Officer agreeing viewpoints, suggesting additional locations, and confirming that The Greater Nottingham LCA was the most relevant assessment.

### Legislation

Department of Communities and Local Government (16 May 2017) The Town and Country Planning (Environmental Impact Assessment) Regulations 2017, SI 2017 No 571, as amended by SI 2018 No 695

Ministry of Housing, Communities and Local Government (6 June 2018) The Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018, SI 2018 No 695

### Policy and Guidance:

Landscape Institute, Institute of Environmental Management & Assessment (April 2013) Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)

Landscape Institute (February 2016) Landscape Character Assessment: Technical Information Note 08/2015 (TIN 08/15)

Landscape Institute (17 September 2019) Visual Representation of Development Proposals: Technical Guidance Note 06/19 (TGN 06/19)

Landscape Institute (May 2021) Assessing Landscape Value Outside National Designations: Technical Guidance Note 02/21 (TGN 02/21)

Ministry of Housing, Communities and Local Government (July 2021) National Planning Policy Framework (NPPF)

Rushcliffe Borough Council (December 2014) Rushcliffe Local Plan Part 1: Core Strategy Adopted December 2014

Rushcliffe Borough Council (October 2019) Rushcliffe Local Plan Part 2: Land and Planning Policies Adopted October 2019

### Environmental Baseline Data:

Google (current) google maps © Google 2022  
<https://www.google.co.uk/maps/>

Microsoft (current) Bing maps © Microsoft 2022

<https://www.bing.com/maps/>

Ordnance Survey Explorer 1:25,000 map sheet nos 246 and 260

TEP (June 2009) The Greater Nottingham Landscape Character Assessment

### Applicant's Development Information:

Ecology Consulting (June 2022) Fair Oaks Renewable Energy Park: Ecological Impact Assessment

HBA Environment (June 2022) Fair Oaks Renewable Energy Park: Landscape and Biodiversity Mitigation, Enhancement and Management Plan (LBMEMP) (Figure 8.3)

Ridge Clean Energy and Engena (October 2021) Fair Oaks Renewable Energy Park: Screening Request

Ridge Clean Energy (2022) Fair Oaks Renewable Energy Park – Site Layout Plan

Ridge Clean Energy (2022) Fair Oaks Renewable Energy Park – Design & Access Statement

Ridge Clean Energy (2022) Fair Oaks Renewable Energy Park – Construction Environmental Management Plan (CEMP)

Ridge Clean Energy – Fair Oaks Renewable Energy Park project website:

<https://ridgecleanenergy.com/fairoaks/>

The background of the page is a photograph of a wooden fence with a horizontal rail and two vertical posts. The fence is made of light-colored wood and is partially covered by green bushes and vines. In the background, there is a green lawn and a line of trees under a clear sky.

# CHAPTER 10 - AVOIDANCE AND MITIGATION

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### AVOIDANCE AND MITIGATION SUMMARY TABLE

- 10.1 The following tables provide a summary of the measures applied to the proposed Fair Oaks Renewable Energy Park to avoid or mitigate identified effects.
- 10.2 For each environmental assessment undertaken within the EIA there is a summary of:

- avoidance measures (**Table 10.1 on page 232**) (with brief commentary additional to the text in the chapter provided for clarity where viewed of assistance in square brackets “[...]”);
- mitigation measures (**Table 10.2 on page 239**); and
- enhancement measures (**Table 10.3 on page 244**).

10.3 **Chapter 11** goes on to summarise the residual effects of the development.

Table 10.1 - *Proposed Avoidance Measures*

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 1 - Introduction			N/A	
Chapter 2 - Development Rationale			N/A	
Chapter 3 - Site Selection and Design	-	Direct impact upon designated assets.	There are no designations in the proposed site area. [Designations within the site have been avoided.]	3.29
	-	Potential impacts to ecological receptors.	The site design has ensured that only lower quality habitats would be affected. Appropriate separation distances have been applied from ecological features such as watercourses and hedgerows contained in and around the site. [Higher quality habitats have been avoided.]	3.35
	-	Flood risk.	Solar panels, BESS modules and associated infrastructure have been sited on Flood Zone 1 areas wherever possible. Additionally, a minimum 9m buffer has been applied along the Fairham Brook flowing through the site and a minimum 5m buffer from all other watercourses/drainage ditches. [Impacts on flood risk have been avoided.]	3.39
	-	Potential for direct impact on designated heritage assets.	There are no designations in the proposed site area. [Impacts on designations within the site have been avoided.]	3.42
	-	Long term impacts on farm land.	Modular units with minimal concrete foundations permit complete removal at the end of the development's life with the site returning to agricultural use. [Long term impacts on farmland have been avoided.]	3.51
	-	Disruption to operation and maintenance of existing infrastructure.	Setbacks were provided from the existing on site electrical infrastructure. [Impacts on operation and maintenance of existing infrastructure have been avoided.]	3.88

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 3 - Site Selection and Design (continued)	3.88	Requirement for new watercourse crossing.	The area to the south of Fairham Brook was re-removed from development.[Requirement for a new crossing has been avoided as have potential impacts on the footpath.]	3.88
Chapter 4 - Existing Conditions	N/A			
Chapter 5 - Environmental Impact Assessment	N/A			
Chapter 6 - Development Proposal		Agricultural soil disturbance	A temporary steel plate track (each plate measuring 2.5 x 3 m) will be laid on top of agricultural land in the field parallel to the existing agricultural track at Pasture Lane.	6.10
	-	Habitat disturbance.	It is proposed that the existing field entrance will be utilised and upgraded, where necessary, to allow access to the solar array, BESS and substation compound. [New hedgebreaks and unnecessary impacts to other agricultural fields are avoided.]	6.12
	-	Landscape and visual impact and ongoing land management.	Cables between solar panels in the same row are hung in ducts fixed along the back of panels to the end of the row.  All connection cables will be run across the site in underground cable trenches. [Visual impacts from cables mounted overhead are avoided.]	6.23  6.25

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 6 - Development Proposal (continued)	-	Landscape and visual impact and potential impact on ecological receptors.	A perimeter fence would be installed to protect the panels from theft. The fence will be stock style fencing with wooden posts and open wire mesh up to 1.8m tall. [Panel, cable and equipment damage and theft is avoided.]  Access points for wildlife will be included in the fence line to ensure permeability across habitat. [Restriction of movement of small mammals is avoided.]	6.26 - 6.27
	-	Landscape and visual impact and potential impact on ecological receptors.	No visible lighting is proposed as part of the Fair Oaks Renewable Energy Park for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye. [Potential for light pollution is avoided.]	6.29
Chapter 7 - Construction, Operation and Decommissioning		Temporary trackway	This will avoid construction traffic being routed along the publicly accessible stretch of Asher Lane	7.10
	-	Increase in traffic during operation	The use of remote monitoring reduces the number of site visits required. [Traffic impacts during operation are avoided.]	7.31
	-	Impacts upon geology and soils	Potential impacts on geology and soils from the construction of the civil works associated with the renewable energy park (the solar panels and frames, inverter/transformer units and other site containers, foundations, and access track) are avoided through considered design of these elements and in the design of the site layout.	7.62



Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 7 - Construction, Operation and Decommissioning (continued)	-	Sourcing and volume of construction materials required	<p>Locally sourced construction materials will be used in construction works as far as possible.</p> <p>The volumes of all footings and foundations are inherently designed to minimise the volumes of stone and concrete required within safe engineering margins.</p> <p>[Both measures avoid importing large volumes of material from a distance.]</p>	<p>7.63</p> <p>7.64</p>
	-	Surface water drainage at the site entrance	<p>A suitable drainage scheme at the site entrance will be designed in discussion with the Local Planning Authority, and incorporated into the CEMP, to avoid the potential for water to leave the construction site and enter the highway. Wheel washing facilities will also be in place to avoid debris exiting site onto the public highway.</p> <p>Guidance published by DEFRA and the Environment Agency (2019) will be adhered to throughout the construction, operation and decommissioning phases of the project. Guidance is provided on polluting substances, the correct use of drains, and appropriately storing materials and wastes. [This avoids pollution events.]</p>	7.66 - 7.67
	-	Degradation of soils	<p>The soils and materials excavated during the construction and decommissioning phases of the proposed development will be stored in accordance with The Site Waste Management Plans Regulations, 2008 (Act of Parliament). [This avoids damage and degradation of stored soils.]</p>	7.68
	-	Construction personnel injury	<p>All site work for the Fair Oaks Renewable Energy Park would comply with the Construction (Design and Management) Regulations 2007, and its associated approved code of practice (HSE, 2007). A transparent reporting process will be in place to monitor on-site safety and potential risks to health. [This avoids injury to construction personnel.]</p>	7.72 - 7.76

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 7 - Construction, Operation and Decommissioning (continued)	-	Potential impact on health and the environment as a result of the use, storage and disposal of hazardous substances.	<p>Any substances classed by regulation as hazardous that are used during the construction, operation (either during normal operations, scheduled maintenance or on the occasion of a major component replacement or repair) and decommissioning phases of the proposed Renewable Energy Park Development will be used and disposed of responsibly off site in accordance with manufacturer's guidance and regulations governing use of the material. Materials with potential to be classified as hazardous are most likely to be coolants, oils, fuels and lubricants.</p> <p>Fuels and oils kept in temporary construction and decommissioning site compounds will be stored in double-walled containers or lined bunds in accordance with Environmental Protection and Control of Pollution regulations.</p> <p>Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance to regulations and manufacturer/supplier's guidelines.</p> <p>No hazardous materials will be stored on site during the operational phase of the proposed development.</p> <p>[These measures avoid pollution events and consequential injury to construction personnel.]</p>	7.77 - 7.80

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 8 - Ecology	8.76 - 8.78	Habitat change and disturbance	<p>Buffers to the development have been applied to avoid the more ecologically sensitive habitats within the site. This included:</p> <ul style="list-style-type: none"> <li>• Minimum 9m buffer along the Fairham Brook flowing through the site.</li> <li>• Minimum 5m buffer from all other watercourses/drainage ditches.</li> <li>• Minimum 5m buffer from all hedgerows, woodland and isolated trees.</li> </ul>	8.79
			The site has also been designed to avoid any loss of hedgerow or trees by using existing breaks and farm tracks, avoid any tree felling/damage, and use existing watercourse crossing (so no new watercourse crossing is required). These measures have been considered as applied in the assessments above.	8.80
Chapter 9 - LVIA			<p>Site location – on arable land and outside any national or local landscape designations, thereby avoiding the more sensitive and valued landscapes.</p> <p>Site access - utilising an existing farm track which would avoid effects on landscape fabric.</p> <p>Protection of existing features – using temporary protective fencing to protect features of ecological, and/or landscape value on the site during the construction phase.</p> <p>Internal access tracks – running a single site track up the centre spine of the site with only two side spurs, thereby minimising the amount of hard surfacing on the site.</p>	9.123

Chapter	Paragraph Reference	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 9 - LVIA (continued)	9.4 - 9.5	<p>“likely significant landscape and visual effects”, i.e. landscape and visual effects</p> <p>“likely significant landscape and visual additional cumulative effects” (i.e. additional cumulative landscape and visual effects).</p>	<p>Solar PV arrays – locating these within the existing field pattern and utilising existing drainage crossing points, thereby avoiding the need to remove any vegetation or undertake any works to the drainage ditches.</p> <p>Battery storage and substation compound – locating this adjacent to the boundary of the site and away from public rights of way and residential properties, keeping the infrastructure to 5m or below, thereby limiting the height and effects of these elements on landscape character and visual amenity.</p> <p>Services – laying all services underground. [This avoids aboveground visual impacts from overhead cables.]</p> <p>Lighting – no permanent external lighting is proposed, with safety lighting in the BESS and connection compound lit only as and when needed, such as to provide lighting for maintenance visits after dark (e.g. on winter afternoons). [This avoids light pollution.]</p> <p>Site restoration – at the end of the construction phase all areas disturbed by the works will be restored which will minimise the footprint of the development and the long-term effects on landscape and visual amenity.</p> <p>Decommissioning – at the end of the operational phase which will restore the site to agricultural use. [This will avoid long terms impacts after the life of the Proposal.]</p>	9.123

Table 10.2 - Proposed Mitigation Measures

Chapter	Paragraph Reference	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 3 - Site Selection and Design	-	Disruption to operation and maintenance of existing infrastructure.	Utilities operators will be re-consulted prior to construction commencing to ensure that the baseline is unchanged.	3.70
Chapter 6 - Development Proposal	-	Landscape and visual impact of site infrastructure e.g. transformers and site containers.	The external finish will be agreed with the Local Planning Authority prior to construction commencing.	6.19, 6.22, 6.45
	-	Landscape and visual impact and potential impact on ecological receptors.	During the construction phase, temporary lighting may be required should deliveries be scheduled for after dusk, and security lighting on a sensor is typically utilised for the construction phase whilst machinery and materials are stored on site. Any lighting on site during the construction phase will be kept to a minimum to avoid disturbance to local residents and ecological species as far as practically possible whilst operating a safe site.	6.30
Chapter 7 - Construction, Operation and Decommissioning	-	Landscape and visual impact.	Where new access tracks are required these will have a running width of 4.5m. As described in <b>Chapter 6 - Development Proposal</b> , the tracks will have the appearance of typical vernacular farm tracks with a crushed stone running surface built up over geotextile placed on top of prepared (scraped and levelled) topsoil at, or just below, existing ground level. The tracks will be allowed to grass over, following completion of the construction phase.	7.11



Chapter	Paragraph Reference	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 7 - Construction, Operation and Decommissioning (continued)	-	Construction impacts.	A Construction Environment Management Plan (CEMP) will be agreed with the Local Planning Authority prior to construction commencing. This will include details of all mitigation measures proposed for the safe and environmentally sensitive construction of the proposed Fair Oaks Renewable Energy Park.	7.60

Chapter	Paragraph Reference	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 8 - Ecology	8.76 - 8.78	Habitat change and disturbance. - Breeding birds.	No species specially protected under Schedule 1 of the Wildlife and Countryside Act from disturbance during breeding were found during the 2022 surveys, but given the habitat present it is possible that species such as barn owl and quail could breed there in the future. It would be important to ensure that no Schedule 1 species are disturbed during the breeding season, particularly during the construction phase of the development. Given the potential to breed within the proposed development, a Breeding Bird Protection Plan (BBPP) will be developed and implemented and secured by way of planning condition. This will include further surveys for Schedule 1 species at fortnightly intervals through the breeding season (March-August) for the construction period to inform the BBPP and ensure compliance with the 1981 Wildlife and Countryside Act.	8.81
			The BBPP will also include measures to ensure the protection of all other nesting birds. Where works affecting habitats that could be used by nesting birds must take place between March and August (inclusive), they will only be carried out following an on-site check for nesting birds by an experienced ecologist, to ensure compliance with the 1981 Wildlife and Countryside Act.	8.82
			It is likely that some breeding birds will be displaced from the site during the operational phase by the presence of the solar panels, particular open ground species such as lapwing, grey partridge and skylark. All these species are NERC Act Species of Principal Importance. Measures to deliver benefit for these species will be delivered as part of the Landscape and Biodiversity Mitigation and Enhancement Plan.	8.83

Chapter	Paragraph Reference	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 8 - Ecology (continued)	8.84 - 8.85	Habitat change and disturbance. - Other protected species.	No other protected species likely to be affected by the development given results from the ecological surveys, but badgers could move into the impact zone, and for which, therefore, check surveys should be undertaken prior to construction (to inform the need for any mitigation measures). Preconstruction surveys for badgers will therefore be undertaken within 30m of the development footprint. If they were found to be present where they could be affected by the construction works, then further consultation would be needed with Natural England to determine the licensing and mitigation requirement.	8.84
			Best practice construction methods will be followed such as clearing all refuse piles daily, covering nightly or providing exit ramps to any excavations and minimising on site noise.	8.85
Chapter 9 - LVIA	-	Visual impact of operation.	Measures are indicative and will be secured by way of a planning condition(s) requiring the submission of a detailed LBMEP and a Landscape and Ecological Management Plan (LEMP). The Outline LBMEP ( <b>Figure 8.3 of ES Volume 3</b> ) includes: <ul style="list-style-type: none"> <li>• Woodland copses of native trees, one in the far north of the site and two along the western boundary.</li> <li>• New hedgerows around the boundary of the site with occasional small native hedgerow trees along the western and northeastern boundaries of the site.</li> <li>• Species-rich meadow across the entire site within the perimeter fencing including beneath the solar PV arrays (but not within the battery storage and substation compound).</li> </ul>	9.127

Chapter	Paragraph Reference	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 9 - LVIA (Continued)	-	Visual impact of operation.	<ul style="list-style-type: none"> <li>Grassland between the perimeter fence and the site boundary.</li> <li>A 1 ha area of lapwing habitat to the south of Fairham Brook which would be left fallow, allowed to vegetate naturally and ploughed once a year to prevent the establishment of tall woody vegetation.</li> <li>There are a few small scrubby trees along the drainage ditches around the site and some hedgerow trees will be incorporated into the new hedgerow planting to provide some wildlife and visual diversity.</li> </ul> <p>The Outline LBMEP would provide a buffer between the surrounding watercourses and the perimeter fence, would conserve and enhance the biodiversity, landscape and recreational value of the watercourse and corridor through good design and includes the long-term landscape and ecological management plan for this buffer</p>	<p>9.127</p> <p>9.129</p> <p>9.133</p>

Table 10.3 - Proposed Enhancement Measures

Reference	Enhancement	Paragraph Reference
Chapter 6 - Development Proposal	<b>Chapter 8 - Ecology</b> and <b>Chapter 9 - LVIA</b> describe the ecological and landscape and visual assessments of the proposed renewable energy park and, where relevant, identify whether mitigation is required or enhancements are suitable.	6.56
Chapter 8 - Ecology	The Outline Landscape and Biodiversity Mitigation and Enhancement Plan will deliver a net gain of 123 habitat units (an increase of 75%) and 25 hedgerow units (there is no hedgerow in this area currently).	8.105
Chapter 9 - LVIA	The measures included within the Outline LBMEP ( <b>Figure 8.3 of ES Volume 3</b> ) are described in <b>Table 10.2</b> (LVIA) above.	9.127



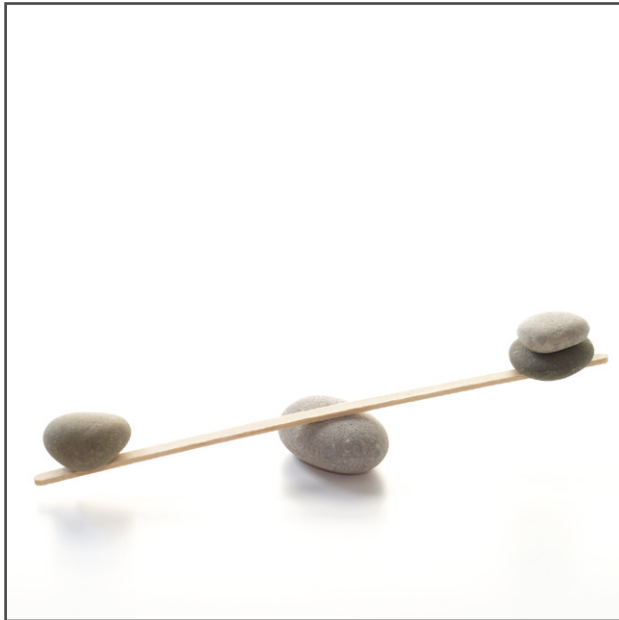
## CHAPTER 11 - RESIDUAL IMPACTS

Residual Impacts

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## RESIDUAL IMPACTS

- 11.1 The following table (**Table 11.1 on page 248**) provides a summary of the residual impacts of the proposed Fair Oaks Renewable Energy Park, for each chapter within the EIA.

Table 11.1 - *Residual Impacts*

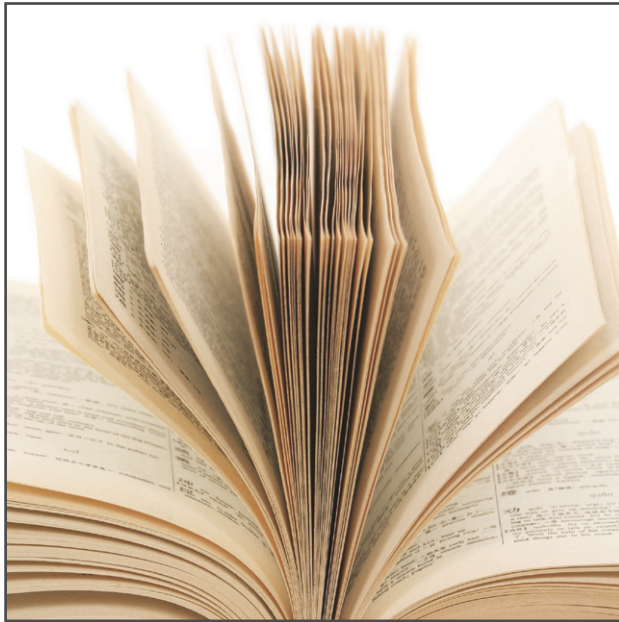
Chapter	Para.	Residual Impact
Chapter 10 - Ecology	8.106	Overall, with the proposed mitigation in place, there would be no significant residual adverse ecological effects from the proposed Fair Oaks Renewable Energy Park.
Chapter 9 - LVIA	9.381	The site is located within SN02: Ruddington Alluvial Fringe DPZ and there would be some short-term significant adverse effects on the character of the site and surrounding landscape within SN02 during the construction phase. During the operational phase (years 1 – 5) there would be some medium-term significant adverse effects on the character of the site and surrounding landscape, but these significant effects on landscape character would not extend beyond the railway line to the east of the site, more than approximately 850 m to the north and west or more than 400 m south of the site (to Moor Lane). During the remainder of the operational phase (years 5 onwards) the proposed new boundary vegetation would establish and significant effects on landscape character would be confined to the site and immediate surroundings, extending no more than approximately 50 m from the perimeter vegetation.
	9.385	There would be a significant effect on the views and visual amenity of residents in Fields Farm Cottages and Ruddington Farm during the construction and early operational phases, before the boundary vegetation has established, but not during the remainder of the operational phase nor during the decommissioning phase as the site would then be screened by the proposed boundary planting. The acceptability of significant effects on residential properties is a planning matter and is addressed in the accompanying Planning Statement.
	9.390	Walkers on the footpath alongside the railway line to the immediate east of the site (Ruddington FP6) and on the footpath from Gotham to the railway line (Gotham FP5) within 1km of the site would have relatively close and open views of the site and there would be a significant effect on the visual amenity of walkers on these footpaths during the construction and operational phases.
	9.391	For walkers on the footpath from Clifton to Gotham (Barton in Fabis FP4) and on footpaths and bridleways to the east of the railway line, including around the periphery of Rushcliffe Country Park and across Bradmore Moor and Bunny Moor, there would be significant effects on views and visual amenity during the early operational phase but not during the construction phase, the remainder of the operational phase or the decommissioning phase.

## CHAPTER 12 - GLOSSARY AND ACRONYMS

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## INTRODUCTION

12.1 This chapter provides a list of common abbreviations and terms used in relation to the environmental assessments undertaken for the proposed development.

## ACRONYMS

<b>AC</b>	Alternating Current
<b>AGLV</b>	Areas of Great Landscape Value
<b>ALC</b>	Agricultural Land Classification
<b>AOD</b>	Above Ordnance Datum
<b>AODN</b>	Above Ordnance Datum Newlyn
<b>AONB</b>	Area of Outstanding Natural Beauty
<b>ATC</b>	Automatic Traffic Count
<b>BAP</b>	Biodiversity Action Plan
<b>BESS</b>	Battery Energy Storage System
<b>BGL</b>	Below Ground Level
<b>BGS</b>	British Geological Survey
<b>BOAT</b>	Byway Open to All Traffic
<b>BOCC</b>	Birds of Conservation Concern
<b>BRE</b>	Building Research Establishment
<b>BTO</b>	British Trust for Ornithology
<b>CBC</b>	Common Bird Census
<b>CCC</b>	Climate Change Committee
<b>CDA</b>	Critical Drainage Area
<b>CIEEM</b>	Chartered Institute of Ecology and Environmental Management
<b>CLVIA</b>	Cumulative Landscape and Visual Impact Assessment

<b>CoP</b>	Conference of the Parties	<b>GSP</b>	Grid Supply Point
<b>CROW</b>	Countryside and Rights of Way	<b>HSI</b>	Habitat Suitability Index
<b>CWS</b>	County Wildlife Site	<b>HMSO</b>	Her Majesty's Stationery Office
<b>DBA</b>	Desk Based Assessment	<b>HLC</b>	Historic Landscape Characteristics
<b>DBEIS</b>	Department for Business Energy and Industrial Strategy	<b>IEMA</b>	Institute of Environmental Management and Assessment
<b>DC</b>	Direct Current	<b>IPCC</b>	International Panel on Climate Change
<b>DECC</b>	Department of Energy and Climate Change	<b>IRZ</b>	Impact Risk Zone
<b>DEFRA</b>	Department for Environment, Food and Rural Affairs	<b>JNCC</b>	Joint Nature Conservation Committee
<b>DfT</b>	Department of Transport	<b>kW</b>	Kilo Watt
<b>DMRB</b>	Design Manual for Roads and Bridges	<b>kWp</b>	Kilo Watt Peak
<b>DNO</b>	Distribution Network Operator	<b>LCT</b>	Landscape Character Types
<b>DPD</b>	Development Plan Document	<b>LDF</b>	Local Development Framework
<b>DTM</b>	Digital Terrain Model	<b>LDN</b>	Local Distribution Network
<b>EIA</b>	Environmental Impact Assessment	<b>LLFA</b>	Lead Local Flood Authority
<b>EOAC</b>	European Ornithological Atlas Committee	<b>LPA</b>	Local Planning Authority
<b>EPS</b>	European Protected Species	<b>LVIA</b>	Landscape and Visual Impact Assessment
<b>ES</b>	Environmental Statement	<b>MAGIC</b>	Multi-Agency Geographical Information for the Countryside
<b>ESA</b>	Environmental Stewardship Agreement	<b>MHCLG</b>	Ministry of Housing, Communities and Local Government
<b>ETSU</b>	Energy Technology Support Unit	<b>MW</b>	Megawatt
<b>FRA</b>	Flood Risk Assessment	<b>NBGR</b>	Nottinghamshire Biological and Geological Record Centre
<b>GLVIA</b>	Guidelines for LVIA	<b>NBN</b>	National Biodiversity Network
<b>GRP</b>	Glass Reinforced Plastic	<b>NCR</b>	National Cycle Route

<b>NERC</b>	Natural Environment Research Council	<b>SPL</b>	Sound Power Level
<b>NHLE</b>	National Heritage List for England	<b>SSSI</b>	Site of Special Scientific Interest
<b>NMR</b>	National Monuments Record	<b>STA</b>	Solar Trade Association
<b>NPPF</b>	National Planning Policy Framework	<b>SuDS Manual</b>	Sustainable Drainage Systems Manual
<b>NPPG</b>	National Planning Practice Guidance	<b>SWDS</b>	Surface Water Drainage Strategy
<b>NPS</b>	National Policy Statement	<b>SWMP</b>	Site Waste Management Plan
<b>NPSE</b>	Noise Policy Statement for England	<b>UNESCO</b>	United Nations Educational Scientific and Cultural Organization
<b>NTS</b>	Non Technical Summary	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>ODPM</b>	Office of the Deputy Prime Minister	<b>UWS</b>	Unconfirmed Wildlife Sites
<b>PEA</b>	Preliminary Ecological Appraisal	<b>VP</b>	View/Vantage Point
<b>PRoW</b>	Public Right of Way	<b>WSI</b>	Written Scheme of Investigation
<b>PV</b>	Photovoltaic	<b>ZTV</b>	Zone of Theoretical Visibility
<b>Ramsar</b>	Convention signed in Iran.		
<b>RPG</b>	Registered Parks and Garden		
<b>SAC</b>	Special Area of Conservation		
<b>SAM</b>	Scheduled Ancient Monument		
<b>SAPs</b>	Species Action Plans		
<b>S.F.</b>	Significant Figures		
<b>SIA</b>	Simple Index Approach		
<b>SMR</b>	Sites and Monuments Record		
<b>SNH</b>	Scottish Natural Heritage		
<b>SPA</b>	Special Protection Area		

## GLOSSARY

Term	Definition
Additional Cumulative Effects	Predicted incremental changes to the landscape and visual baseline as a result of a proposed development(s) in the context of operational, and/or permitted developments.
Ancient Woodlands	These are woodlands that have existed since at least the seventeenth century. They are of biodiversity importance due to their longevity, often giving rise to high species diversity.
Anthropogenic Effect	An effect that is derived from human activities.
Aquifer	An aquifer is an underground layer of water-bearing permeable rock or unconsolidated materials (gravel, sand, silt, or clay).
Aspect Area	In LANDMAP each spatial layer is divided up into discrete geographical units (polygons in GIS) referred to as aspect areas. Each aspect area is distinctly defined by its unique landscape characteristics and qualities.
Baseflow	Baseflow is the portion of streamflow that comes from groundwater and not runoff.
Baseline Conditions	The existing (pre-proposed development) environmental conditions against which any future changes can be measured or predicted.
Biodiversity	The number and variety of organisms found within a specified geographic region.
Biodiversity Action Plan	<p>Biodiversity Action Plans (BAPs) stem from the Convention on Biological Diversity, also known as the 'Earth Summit' (1992), which called for the creation and enforcement of national strategies and action plans to conserve, protect and enhance biological diversity.</p> <p>The BAP system in the UK comprises both Habitat Action Plans (HAPs) and Species Action Plans (SAPs). Species and habitats are chosen according to a number of criteria, including threatened status, decline in range/area and endemism. Biodiversity action planning has been applied at both a national and local (LBAP) level. That a BAP has been prepared should simply reflect the fact that the habitat or species concerned is in a sub-optimal state (and hence that action is required).</p>



Term	Definition
Birds of Conservation Concern	<p>The BTO (2002) lists Birds of Conservation Concern (BoCC), which fall into three categories:</p> <ul style="list-style-type: none"> <li>• Red list (species of high concern);</li> <li>• Amber list (species of medium concern); and</li> <li>• Green list (species of lower concern).</li> </ul> <p>Species are placed on these lists based, among other criteria, on the percentage decline of breeding or wintering populations in the recent past.</p>
Conservation Area	An area of special architectural or historic interest, in which a local authority must pay special attention to the desirability of preserving or enhancing its character or appearance.
Constraints Map	Map showing the location of important resources and receptors that may form constraints to development.
Combined Cumulative Effects	Predicted changes to the landscape and visual baseline as a result of two or more proposed developments, where the effects are the result of more than one of the proposed developments. Effects that arise as a result of one of the proposed developments only would not be cumulative.
Cumulative Landscape and Visual Impact Assessment (CLVIA)	An assessment of likely significant cumulative effects on landscape and visual amenity arising as a result of a development(s) in the context of existing, permitted and/or other proposed developments, undertaken in accordance with the GLVIA and other emerging guidance on CLVIA.
Cumulative Landscape Effects	<p>There is the potential for cumulative landscape effects where two or more developments would result in:</p> <ul style="list-style-type: none"> <li>Changes to the physical fabric of the landscape;</li> <li>Changes to landscape character; and</li> <li>Changes to the character and integrity of designated landscapes.</li> </ul>
Cumulative Visual Effects	<p>There is the potential for cumulative visual effects where two or more developments would be visible:</p> <p>In the same sector of the view at a viewpoint location, i.e. with both developments within a field of view of up to 90 degrees, which would enable an observer to see both developments without moving their head (simultaneous visibility);</p> <p>In different sectors of the view at a viewpoint location, i.e. with the developments &gt; 90 degrees apart, so that an observer has to move their head in order to see both developments (successive visibility); and</p> <p>One at a time at a series of locations along a linear route (sequential visibility).</p>
dB(A)	A measure of the loudness of a sound, given in decibels above the threshold of hearing (i.e. 0dB(A) is the quietest sound heard by the human ear).

Term	Definition
Digital Terrain Model (DTM)	A three dimensional map of the landform of a study area, using digital height data, such as the OS Terrain 50 data (with height data at 50m centres) or OS Terrain 10 data (with height data at 10m intervals). Each height datum provides an easting, a northing and an elevation in mAOD.
Effects	Predicted changes in the environmental baseline as a result of the proposed development. Effects can be direct or indirect, secondary, cumulative, short, medium or long-term, permanent or temporary, positive (beneficial), negative (adverse) or a change that cannot be defined as beneficial or adverse.
Electrical Distribution Network	The electricity distribution system owned by the Distribution Network Operator (such as UKPN) which incorporates both overhead and underground cables. These connect individual properties and areas to the regional grid at a variety of power levels including (in England) 11kV, 33kV and 132kV. The regional grid is distinct from the National Grid, which runs at 275kV and 400kV.
Electrical Transmission Network	The Transmission Network (National Grid) is the highest voltage electricity network in the UK and transmits electricity at 275kV and 400kV (in England) to the grid supply points from where its distributed by the Distribution Network Operator (DNO). The National Grid travels across larger distances than the regional grid.
Electromagnetic Interference (EMI)	Interference with, or the disturbance of, telecommunication systems, including VHF (very high frequency), UHF (ultra high frequency) and microwave systems.
El Niño	El Niño is an oscillation of the ocean-atmosphere system in the tropical Pacific having important consequences for weather around the globe. El Niño is characterized by unusually warm ocean temperatures in the Equatorial Pacific.
La Niña	Global climate La Niña impacts tend to be opposite those of El Niño impacts. La Niña is characterized by unusually cold ocean temperatures in the Equatorial Pacific.
Environmental Impact	A change, brought about in the existing environment, which results in an effect, adverse, beneficial, or both. Within this context the environment may include the population, fauna, flora, soil, water, air, climatic factors, material assets including the architectural and archaeological heritage, and landscape.
Environmental Impact Assessment (EIA)	In this context, the process by which the likely significant environmental impacts of a development are identified and evaluated, and by which mitigation measures and residual impacts are proposed. This process is undertaken in accordance with the EIA Regulations 1999 (amended).
Environmental (landscape and visual) baseline	The existing (pre-proposed development) landscape and visual context of a study area, including landscape fabric, landscape character and existing views.
Environmental Statement (ES)	The environmental information provided in association with a planning application that describes the environmental baseline, methodology and findings of the EIA undertaken on the proposals.
Field Pattern	The pattern of hedges, walls, ditches, etc. that define fields in farmed landscapes. (LI/IEMA 2002).

Term	Definition
Gigatonne (Gt)	Thousand million tonnes.
Hydrogeology	The study of the distribution and movement of water, as well as the impact of human activity on water availability, flows and conditions.
Hydrology	The prediction of rainfall and surface water flows.
Indirect Impacts	Impacts on the environment, which are not a direct result of the development but are often produced away from it or as a result of a complex pathway. Sometimes referred to as secondary impacts. (LI/IEMA 2002).
Intervisibility	Inter-visibility is the visibility between two points. Two points on the ground or two features are described as 'intervisible' when they are visible from each other.
Intra-visibility	Intra-visibility is when two points can be seen/experienced from a third point (in many cases, this is more important than pure intervisibility); e.g. a listed building might be experienced in the same view as a new industrial building by a sensitive visual receptor.
Kilowatt (kW)	A unit of power, equivalent to one thousand Watts.
Kilowatt-hour (kWh)	A Measurement of active energy defined as the amount of energy a Kilowatt source produces in one hour. The kWh is a standard unit of electrical consumption, as metered and shown on electricity bills.
Landcover	The combination of land use and vegetation that cover the land surface.
LANDMAP	LANDMAP is the formally adopted methodology for landscape assessment and is advocated by Planning Policy Wales. LANDMAP is an all-Wales GIS based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. LANDMAP comprises five spatially related datasets known as the Geological Landscape, Landscape Habitats, Visual & Sensory, the Historic Landscape and the Cultural landscape. LANDMAP Information is collected in a structured and rigorous way that is defined by the LANDMAP methodology.
Landscape	<p>Landscape results from the way that different aspects of our environment (physical, social, aesthetic and perceptual) interact together and are perceived by us:</p> <ul style="list-style-type: none"> <li>•Physical elements – e.g. geology, landform, soils, flora and fauna;</li> <li>•Social elements – e.g. land use, enclosure patterns, and the patterns, form and scale of settlements and other built development;</li> <li>•Aesthetic factors – e.g. colour, form, visual texture and pattern, sounds, smells and touch; and</li> <li>•Perceptual factors – e.g. memories, associations, stimuli and preferences.</li> </ul>

Term	Definition
Landscape and Visual Impact Assessment (LVIA)	An assessment of likely significant effects on landscape and visual amenity arising as a result of a development(s), undertaken in accordance with the GLVIA.
Landscape Character	Landscape character arises from a distinct, recognisable and consistent pattern of physical and social elements, aesthetic factors and perceptual aspects in the landscape.
Landscape Character Areas (LCAs)	Single unique areas that are discrete geographical areas containing one or more landscape types.
Landscape Character Types (LCTs)	Generic units of landscape that display a distinct, consistent and recognisable landscape character.
Landscape Elements	Physical components (natural and manmade) of the landscape.
Landscape Fabric	Elements and features that constitute the physical components of the landscape, including ground vegetation, hedgerows, trees, shrubs, walls, fences, and vernacular structures.
Landscape Features	A prominent eye-catching element, eg a wooded hilltop.
Landscape Quality	Is based on judgements about the physical state of the landscape and about its intactness, from visual, functional and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place.
Landscape Resource	The combination of elements that contribute to landscape context, fabric, character and value.
Landscape Units	An umbrella term for LCAs and LCTs.
Landscape Sensitivity	The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Landscape Value	The relative value or importance attached to a landscape, which is often the basis for designation or recognition. A landscape may be valued for many reasons, which could include landscape quality, scenic quality, tranquillity, wilderness value, consensus about its importance whether nationally or locally and other conservation interests and cultural associations.
Listed Building	A building listed by English Heritage as being of significant historical or architectural interest.
Megawatt (MW)	A unit of power, equivalent to one million Watts.
Megawatt-hour (MWh)	A Measurement of active energy defined as the amount of energy a megawatt source produces in one hour.
Mitigation Measure	Measures, including any process, activity or design that seeks to reduce an impact.

Term	Definition
Natural Areas	Natural Areas have been formally defined as 'biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation' (Biodiversity: The UK Steering Group Report, HMSO, 1995).
Overbearing (with regard to landscape assessments)	Where one or more proposed solar developments would be so close and of such a size as to be likely to make the observer uncomfortable and want to move further away.
Overwhelming	Where a proposed development would dominate a view, e.g. the main views from a property, to the extent that the development would be oppressive. This depends on the scale, number and relative elevation of the turbines in the view, the array width and the proportion of the overall view(s) that the turbines will occupy.
Phase 1 Habitat Survey	A Method of ecological surveying recommended by the Joint Nature Conservancy Council. This method usually produces a map showing the habitat structure of a site with habitats classified according to standard notation.
Photomontage	Computer-generated 3D image of a development(s) accurately located and overlaid onto the panoramic photograph of an existing view to illustrate the location and scale of a proposed development in the context of its setting. A photomontage does not illustrate movement and so may not, therefore, illustrate the full effects of a development on a view.
Public Access	<p><i>Land with public access includes:</i></p> <p>Access land – areas of mountain, moor, heath, down, common land and coastal foreshore that have been designated under Section 2 of the Countryside and Rights of Way Act 2000 (CROW Act). The right of access is for walkers only and does not extend to camping, cycling, horse riding or driving a vehicle, nor does the right of access apply to developed land, gardens or cultivated land. Under the CROW Act, there was a process of consultation that allowed the right of appeal for those with a legal interest in the land, and for sensitive ecological and archaeological sites to be excluded. Conclusive maps showing the areas designated as open access land (Registered Common Land and Open Country) are now available from Natural England and the Countryside Council for Wales. Accessible land can also be identified from the Countryside Agency and CCW websites and the Ordnance Survey Explorer (1:25 000) maps. Some areas of access land, such as urban commons, already have higher rights of access, e.g. horse riding, under earlier enactments and, under s15 of the CROW Act, the existing rights of access apply.</p> <p>Definitive rights of way – public footpaths, bridleways, cycle routes, byways open to all traffic (BOATS) and highways. Shown on Definitive Rights of Way maps held by the Local Authority. Most routes are also shown on Ordnance Survey maps.</p> <p>Permissive paths and bridleways – routes where there is public access with the permission of the landowner. Such routes are usually closed at least one day a year to prevent the establishment of a public right of way.</p> <p>Public open space – areas designated for specified public uses, usually in the ownership of the Local Authority. Includes parks and recreation grounds. Shown on Local Development Plans.</p>



Term	Definition
Public Access (continued)	<p>Beaches – the public have permitted access to much of the foreshore (intertidal zone - between high and low tide marks) owned by the Crown Estate (about 50% of the UK coastline), and on land above high water mark owned by the Local Authority. Some beaches above high tide mark are privately owned and some beaches and foreshore have restricted access for military purposes.</p> <p>Permissive access land - land where public access is currently permitted with the permission of landowners. Includes land outlined in purple on the OS Explorer (1:25,000) sheets and with:</p> <p style="padding-left: 40px;">No symbol – land open to public with permission of owners.</p> <p style="padding-left: 40px;">White oak leaf in purple box – National Trust, always open.</p> <p style="padding-left: 40px;">Purple oak leaf in white box – National Trust limited access.</p> <p style="padding-left: 40px;">Tree symbols in purple box – Forestry Commission.</p> <p style="padding-left: 40px;">Single leaf in purple box – Woodland Trust.</p> <p style="padding-left: 40px;">White 'AL' in purple box – other access land.</p> <p>De facto access land – land where there is no definitive or permissive right of way but where the public do actually have access with the knowledge and tolerance (but not legal permission) of the landowner. This includes land in the ownership of the Local Authority and private landowners and is generally not shown on Ordnance Survey maps.</p>
Receptor	A population, fauna, flora, soil, water, air, climatic factors, material assets with the potential to be impacted by the proposal.
Red Data Book Species	The Red Data Book (RDB) system applies standard criteria to define the national conservation status of animal and plant species according to the following categories: Extinct (EX), critically endangered (CR), endangered (EN), vulnerable (VU), near-threatened (NT) and lower concern (LC).
Scoping Report	A document issued to the local authority and statutory consultees by a developer, that includes indicative information necessary for the formulation of a Scoping Opinion.
Sector of a View	The horizontal field of view that can be scanned by the human eyes without moving the head. The human eyes can comfortably scan and focus across a horizontal field of view of about 45 degrees but, taking peripheral vision into account, this can be extended to around 90 degrees. Therefore, for the purposes of this assessment, a sector of a view is taken to be 90 degrees.
Transect	A path along which one records and counts occurrences of the phenomenon of study.
Vantage Point Survey	A bird survey methodology as detailed in SNH, 2005.

Term	Definition
Viewing Distance	The distance that a viewpoint illustration should be held from the eye in order for the illustration to match the scale of the actual view when used in the field to identify the location and scale of the proposed development(s).
Visual Amenity	Arises from a visual receptor's experience of the visual world around them and the value they place on particular views.  Theoretically, it is possible for a development(s) to result in a significant change in the view from a particular location without resulting in a significant effect on visual amenity, if the location is not accessible to receptors or the view is acknowledged as having limited value.
Visual Receptor(s)	An individual observer or group of observers who are capable of experiencing a change in the view, for example resident, road user, or public right of way user.
Visualisation	A computer-generated wireframe, photomontage or other technique used to illustrate the location, scale and/or appearance of a proposed development(s). (See definitions for wireframes and photomontages and also later in this appendix for more details).
Wireframe	A computer generated view of the terrain and proposed development from a specified viewpoint location. As with ZTVs (see below), wireframes are usually based on the bare-ground DTM only and do not show movement or the screening effects of surface features.
Zone of Theoretical Visibility (ZTV)	A computer generated intervisibility map showing the zones within which a proposed development may be visible.  Most ZTVs for solar farms are based on bare-ground digital terrain models (DTMs) and use viewpoint markers at the height of the panels distributed across the site as the targets. ZTVs do not take into account the screening effects of surface features (e.g. walls, trees, buildings, etc.). The intervisibility map may also indicate the proportion of a site that may be visible through varied shading.  Cumulative ZTVs for solar farms are ZTVs as above, but show the zones where one or more solar farms may be visible.

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