# EAST STOUR SOLAR FARM

## Environmental Statement Volume 2A - Written Statement

PREPARED ON BEHALF OF

EDF renewables

APRIL 2022







engena

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# PREFACE

This Written Statement forms the second part of a four volume Environmental Statement which describes the findings of the Environmental Impact Assessment (EIA) of the proposed East Stour Solar Farm. 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 developer, EDF Renewables, has submitted a Planning Statement which summarises the planning policy context of the proposal as well as a supporting Socio Economics and Sustainability Statement.

A complete set of application documents can be viewed in person at Ashford Brough Council Offices at Ashford Borough Council, Civic Centre, Tannery Lane, Ashford, Kent TN23 1PL 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.

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## CHAPTER 1 - INTRODUCTION


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# EAST STOUR SOLAR FARM

## Introduction

1.1 The East Stour Solar Farm proposal is for a fixed solar array, associated access tracks, inverter/transformer units, substation cabinets, welfare and storage cabinets/containers, boundary fencing with inward facing CCTV and ancillary infrastructure. In addition, a range of enhancement measures are proposed as part of the proposed development.

1.2 The site is located on land south of the M20, to the west of Sellindge and north-east of Aldington. The location of the site is illustrated in **Figure 1.1** within **Volume 3** of this Environmental Statement.

1.3 The proposal additionally comprises a below-ground cable route from the northern, southern and eastern area substations to a central substation cabinet west of the Sellindge Converter Station. The grid connection will connect from this cabinet under Church Lane to the adjoining National Grid substation.

1.4 The total solar array would have a capacity of up to 49.9MW. The proposed operational lifetime of the project is 40 years.

1.5 The proposed development is adjacent to the operating Sellindge Solar Farm (10.6 MW).

1.6 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 3.0m, at a tilt of approximately 20$^{O}$ facing south.

## Energy Production

1.7 'PV Syst Photovoltaic Software' Version V6.87 was used by the Applicant to predict that the solar farm will have a potential annual yield of approximately 69 600MWh (to 3 Significant Figures (3 S.F.)).

1.8 In terms of household electricity usage this would be sufficient to offset the equivalent annual energy needs of 16 900 (to 3 S.F.) average Ashford Borough homes' (based on average domestic consumption per household of 4 110kWh (DBEIS, 2021).

## Carbon Offset

1.9 From the displacement of electricity generated from fossil fuels powered generation, the proposed development 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 and international reductions required under the legally binding obligations of the Kyoto Protocol and

the more recent drive to Net Zero through the Climate Change Act 2008. At a more local level, it also assists Ashford Borough Council in reaching its commitment to net zero carbon emissions by 2030.

1.10 As discussed further in **Chapter 15 - Socio Economics and SustainabilityConstruction, Operation and Decommissioning**, on a conservative basis (DBEIS, 2021) the electricity produced by the East Stour Solar Farm will offset the equivalent of 14 800 000 $kgCO_2$ per annum (to 3 S.F.).

1.11 Hosting the East Stour Solar Farm would lead to a significant carbon dioxide emission reduction, helping to meet the National need.

## The Applicant

1.12 East Stour Solar Farm is proposed by EDF Energy Renewables Limited. EDF Renewables is a joint venture between EDF Renewables Group (EDF's global renewable business) and EDF Energy (EDF's UK generation business).

1.13 EDF Energy Renewables (abbreviated to EDF-R in this Environmental Statement) operates in more than 20 countries around the world. The company develop, construct and operate wind farms, solar and battery storage projects, and have more than 25 years' experience in delivering renewable energy generation. In the UK EDF-R has almost 1GW of operational renewable projects and a substantial development portfolio of on and offshore wind, battery and solar projects approaching 2GW.

1.14 The renewable energy projects developed by EDF-R all follow a detailed site selection approach that assesses available landholdings against the constraints to potential solar farm development. Potential developments are considered against both environmental and technical parameters to determine their initial suitability for development.

1.15 The proposed solar farm site layout is shown at **Figure 1.2** and is overlaid on aerial imagery at **Figure 1.3** in **ES Volume 3**. Further information can be found at **Chapter 3 - Site Selection and Design**.

# REFERENCES

Department for Business, Enterprise and Industrial Strategy (DBEIS), 2020, Sub-National Electricity Consumption Statistics, retrieved from: https://www.gov.uk/government/collections/sub-national-electricity-consumption-data [Accessed 03/11/21].

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## INTRODUCTION

2.1 This chapter sets out the wider international, national, regional and local context within which the East Stour Solar Farm 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 7th 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 $CO_2$ and strong reductions in other greenhouse gas emissions are required in order to stabilise human-induced global warming. Five new possible

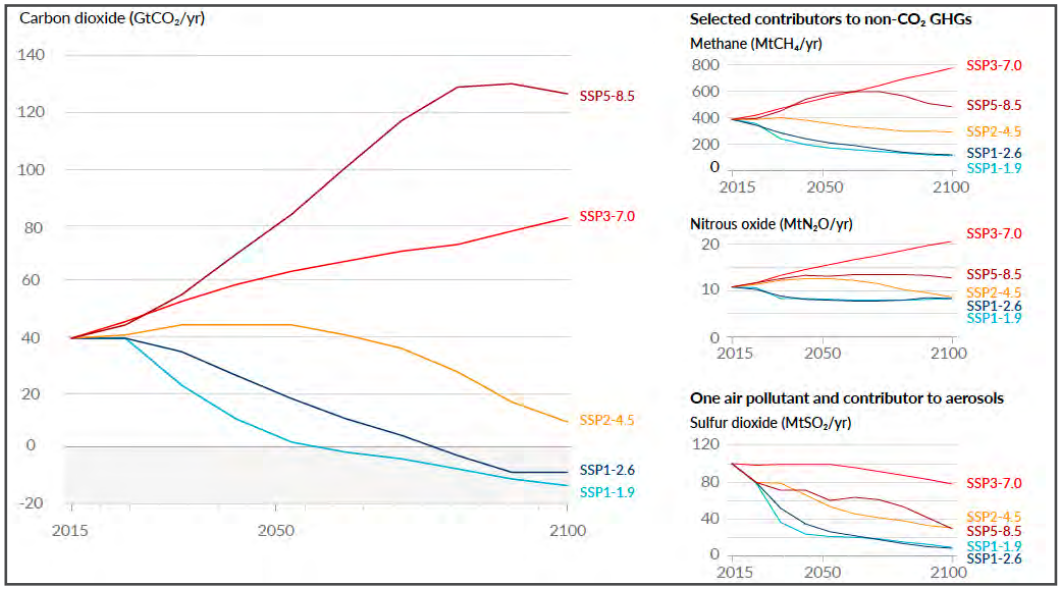
climate future scenarios have been considered across AR6 to explore the broader range of greenhouse gas, land use and air pollutant futures than addressed in AR5. These scenarios are illustrated in **Plate 2.1**.

2.13 SSP1-1.9 and SSP1-2.6 are scenarios that start in 2015 and have very low and low GHG emissions and $CO_2$ emissions declining to net zero around or after 2050, followed by varying levels of net negative $CO_2$ 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).

(a)




(b)

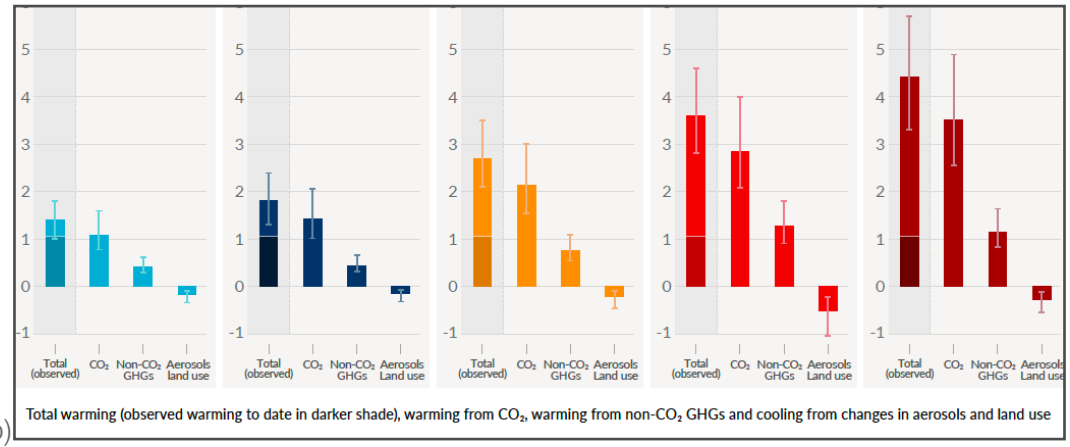



Plate 2.1 - *(a) Future Annual Emissions of $CO_2$ (left) and of a Subset of Key Non-$CO_2$ Drivers (right) across Five Illustrative Scenarios; (b) Contribution to Global Surface Temperature Increase from Different Emissions, with a Dominant Role of $CO_2$ Emissions (IPCC, 2021)*

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 $CO_2$ 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 $CO_2$ emissions as well as reducing non-$CO_2$ 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 $CO_2$ 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.

## Climate Change in the UK

2.38 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.'*

2.39 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.*

2.40 **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.

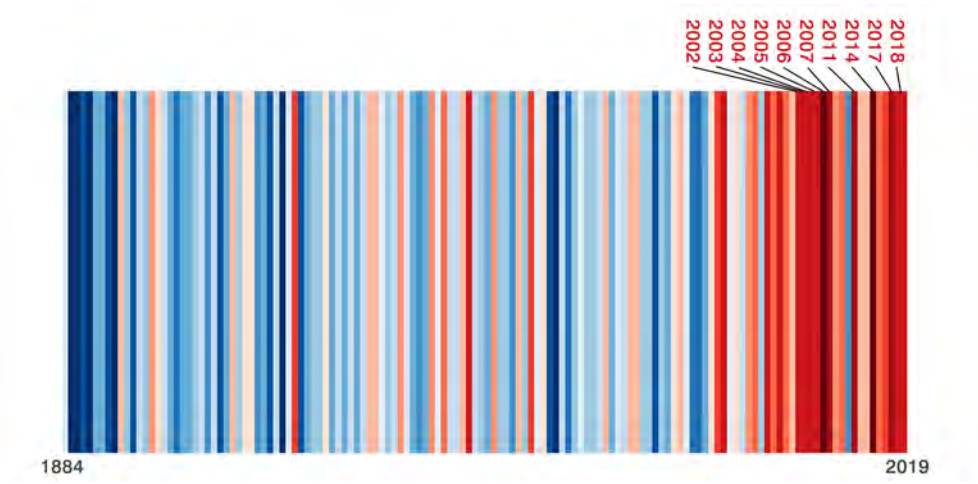



Plate 2.2 - *UK Annual Temperature (Hawkins, 2020)*

## Regional Context

2.41 The East Stour Solar Farm is located within the County of Kent, in the south-east of England.

2.42 A number of climate change studies have been undertaken in the south-east of England, including 'The Climate Change Risk and Impact Assessment for Kent and Medway' (CCRIA), which was produced in 2019.

2.43 The report is based on the Met Office's UK Climate Projections (UKCP) for the south-east, and was developed as a county-level version of the 2017 UK Climate Change Risk Assessment. It describes *'the changes Kent might face, and the potential risks to Kent's society, economy and environment'*.

2.44 The report warns of warmer, wetter winters and hotter, drier summers and predicts that by 2080:

- *'summers are likely to be hotter by around 5°C to 6°C;*
- *winters are likely to be warmer by around 3°C to 4°C;*
- *summer rainfall is likely to decrease by 30% to 50%;*
- *winter rainfall is likely to increase by 20% to 30%; and*
- *sea level rise is likely to increase by 0.8m'.*

2.45 According to the report:

*'The impacts of climate change are likely to be felt acutely in Kent with its long, strategically important coastline, large number of properties at risk of flooding and warm summers compared with the rest of the United Kingdom. It is imperative that the impacts of climate change are considered alongside other drivers of change including economic fluctuations, population growth and demographic shifts.'*

2.46 The CCRIA report describes seven priority climate change risks that are likely to have the most significant impacts within the counties of Kent and Medway. Those are:

- *risks to health, wellbeing, productivity and infrastructure from high temperatures - Kent is the warmest part of the UK;*
- *flooding and coastal change risks to communities, businesses and infrastructure - There are currently*

*88 000 properties in Kent at risk of flooding, and the risk is projected to worsen with increased winter rainfall and increased frequency and severity of intense rainfall events throughout the year;*

- *risk of storm events / intense rainfall and sea level rise impacting productivity and transport infrastructure;*
- *risks of shortages in the public water supply and for agriculture, energy generation and industry - Kent is an area of water stress and has experienced numerous drought events since the 1970s;*
- *overheating, flooding, drought and coastal change risks for natural capital* (including changes to biodiversity, loss of habitat, increased erosion);
- *soil erosion and slope destabilisation as a result of flooding and drought impacting infrastructure, natural environment and productivity;* and
- *risk of new and emerging pests and diseases and invasive non-native species affecting people and biodiversity.*

2.47 Kent County Council's concern for the future and willingness to act are evident, and a *'Kent-wide adaptation programme to build the county's resilience to climate change'* is planned for the next few years.

2.48 Kent County Council and a number of Kent districts (including Swale, Maidstone, Gravesham and Canterbury) declared a Climate Emergency in 2019.

2.49 Ashford Borough Council have not taken that step yet. Instead, they have made a commitment to become carbon neutral by 2030. In May 2021 the Council's cabinet approved the draft Carbon Neutral Action Plan, in which they pledge to achieve carbon neutrality within the council's own estate and operations by 2030. The report acknowledges that achieving carbon neutrality across the borough by 2030 may prove challenging, but the Council remains committed to achieve this as soon as possible.

2.50 *'Increasing local energy generation through renewable energy sources'* is one of the actions identified by Ashford Borough Council as a means to reducing their carbon footprint.

2.51 This is discussed from **Paragraph 2.98 on page 29**.

# 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 $CO_2$ 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 31st 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 12th 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 31st October to 12th November 2021.

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

*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 were 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. At the beginning of Labour's term in Government 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 $CO_2$ 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.

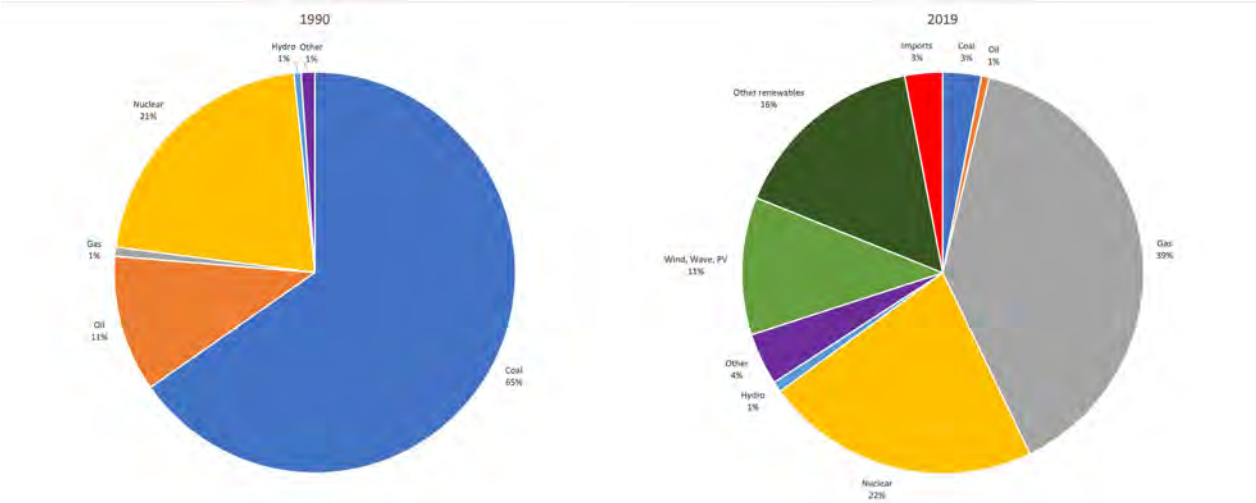



Plate 2.3 - *1990 Electricity Fuel Mix compared to 2019 Electricity Fuel Mix*

(Source: Digest of UK Energy Statistics (DTI, 2000)(BEIS, 2020a)

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 (2019) 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 24% (10% wind, wave and PV; 14% thermal including waste). It also demonstrates an increased reliance on natural gas generation from 1% to 38%.

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 27th 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 24th June 2021, in advance of the UK hosting the 26th 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 $CO_2$ 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 Most recently the Government published their 'Net Zero Strategy: Build Back Greener' (DBEIS, 2021), 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.

## *Renewable Energy Planning Policies*

2.95 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.

2.96 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[54]. 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).

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

## The Ashford Borough Response

2.98 As stated in **Paragraph 2.49 on page 23**, Ashford Borough Council is yet to formally declare a Climate Emergency. However, its strategies and policies do reflect the threat of Climate Change and the need to take action at a local and regional level.

2.99 Ashford Borough Council has pledged to become carbon neutral by 2030 and is currently developing a Carbon Neutral Strategy to set out the actions required to achieve that ambition. The draft 'Ashford to Zero Plan: Our route to net zero carbon emissions' (2021) is currently under consultation.

2.100 The proposed action plan has eight priorities, two of which are directly relevant to renewable energy generation projects:

- *Priority 2 - Ensure the council's decision making processes, including those as the Local Planning Authority, strategic documents, plans and procedures contribute to reducing carbon emissions and increasing local resilience to climate change; and*

- *Priority 3 - Reduce reliance on fossil fuels for energy generation by increasing renewable energy generation and consumption.*

2.101 Expanding on the need for renewable energy, the draft report states that:

*'Decarbonisation of energy production is necessary to meet our carbon neutral ambitions. The demand for energy from renewable and low carbon sources will increase as we use more electricity to heat our homes and power vehicles (...)*

*The majority of the energy we use is supplied from outside the borough, we can increase demand and therefore supply by purchasing energy from suppliers using renewable sources. In addition local renewable energy production reduces reliance on major energy suppliers and creates local income which can benefit local communities.'*

2.102 In order to achieve this, Ashford Borough Council has set out two objectives:

- *increase number of sites suitable for renewable energy generation;* and
- *increase local renewable energy generation.*

2.103 Ashford Borough also falls within the remit of Kent County Council's climate change action. Their Environment Strategy (2016) and accompanying Implementation Action Plan (2017) outline the need for *'additional low carbon and appropriate renewable energy infrastructure'* within the County.

## *Renewable Energy Planning Policies*

2.104 The current Ashford Local Plan was adopted in February 2019. Its most relevant renewable energy policy is **ENV10 - Renewable and Low Carbon Energy**, which states that:

*'Planning applications for proposals to generate energy from renewable and low carbon sources will be permitted provided that:*

*a) The development, either individually or cumulatively does not result in significant adverse impacts on the landscape, natural assets or historic assets, having special regard to nationally recognised designations and their setting, such as AONBs, Conservation Areas and Listed Buildings;*

*b) The development does not generate an unacceptable level of traffic or loss of amenity to nearby residents (visual impact, noise, disturbance, odour);*

*c) Provision is made for the decommissioning of the infrastructure once operation has ceased, including the restoration of the site to its previous use; and*

*d) Evidence is provided to demonstrate effective engagement with the local community and local authority.*

*A statement should be submitted alongside any planning application ilustrating how the proposal complies with the criteria above and any mitigation measures necessary and be informed by a Landscape and Visual Impact Assessment'.*

2.105 Ashford Borough Council has published guidance relating to small and large scale solar energy development. Their Renewable Energy Planning Guidance Note 2 - The Development of Large Scale (>50kW) Solar PV Arrays (2012) sets out the decision-making process followed when determining solar energy applications.

2.106 The report presents the planning application process, outlines the typical elements of solar farms, and discusses the assessments, constraints and mitigation/enhancement strategies to be considered by solar energy developers.

2.107 A complete discussion of the relevant planning policies to the proposed development, at National and Local level, is contained in the Planning Statement submitted alongside this Environmental Statement.

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## CHAPTER 3 - SITE SELECTION AND DESIGN


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## INTRODUCTION AND POLICY BACKGROUND

3.1 This chapter discusses the site selection process undertaken to identify the East Stour Solar Farm 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 and local policies (including the NPPF (MHCLG, 2021a), its associated NPPG (MHCLG, 2021b), National Policy Statements (DECC, 2011a and 2011b) for the development of infrastructure projects and policies and guidance provided by Ashford 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 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).

3.4 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 [reference to wind power footnote removed]. 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.'*

3.5 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 24th June 2021 (MHCLG, 2021b), but the section for renewable and low carbon energy has not been updated since it was first published in 2015. In addition to the NPPF and NPPG, the National Policy Statements (DECC, 2011a & 2011b) are also relevant in determining renewable energy projects.

3.6 Through an iterative considered approach to site design that inherently mitigates potential impacts wherever possible, the proposed development complies with this guidance and adheres to the spirit of EN-3.

## Policy Derived Site Selection and Design Criteria

3.7 As stated in **Paragraph 3.2 on page 37** 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. 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 sites are discussed in the following sections.

### *NPPG*

3.8 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].

3.9 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].

3.10 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 Statement for Renewable Energy Infrastructure (EN-3)*

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 proposed development 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 in the project details should be allowed for in consent* [from Paragraph 2.7.18]; and
- Micrositing:

*'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].

## *Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)*

3.12 A draft update to the National Policy Statement for Renewable Energy Infrastructure was published in September 2021. The consultation on the draft document closed on 30 November 2021.

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

3.14 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.*'

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

- Access tracks: on-site access routes for operation and maintenance activities. 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.

## Ashford Borough Policy and Guidance

3.16 The current Ashford Local Plan 2030 was adopted in February 2019. **Policy ENV10 - Renewable and Low**

**Carbon Energy** provides the most relevant guidance relating to solar energy development and states that:

*'Planning applications for proposals to generate energy from renewable and low carbon sources will be permitted provided that:*

*a) The development, either individually or cumulatively does not result in significant adverse impacts on the landscape, natural assets or historic assets, having special regard to nationally recognised designations and their setting, such as AONBs, Conservation Areas and Listed Buildings;*

*b) The development does not generate an unacceptable level of traffic or loss of amenity to nearby residents (visual impact, noise, disturbance, odour);*

*c) Provision is made for the decommissioning of the infrastructure once operation has ceased, including the restoration of the site to its previous use; and*

*d) Evidence is provided to demonstrate effective engagement with the local community and local authority.*

*A statement should be submitted alongside any planning application ilustrating how the proposal complies with the criteria above and any mitigation measures necessary and be informed by a Landscape and Visual Impact Assessment'.*

3.17 Additionally, Ashford Borough Council has published guidance relating specifically to solar power. The 'Renewable Energy Planning Guidance Note 2 - The Development of Large Scale (>50kW) Solar PV Arrays' (2012) outlines the planning application process and presents the range of assessments, constraints and enhancements/mitigation that need to be considered by solar energy developers.

3.18 A landscape assessment was produced by Jacobs for Ashford Borough Council in 2009. This document does not consider sensitivity to renewable energy development, but is considered further in **Chapter 11 - Landscape and Visual Impact Assessment**.

3.19 Ashford Borough Council is currently developing a Carbon Neutral Strategy. The 'Ashford to Zero Plan: Our route to net zero carbon emissions' (2021) report, which is currently under consultation, sets out the Council's intention to *'reduce reliance on fossil fuels for energy generation by increasing renewable energy generation and consumption'.* In order to achieve this, Ashford Borough Council has set the following objectives:

- *increase number of sites suitable for renewable energy generation;* and
- *increase local renewable energy generation.*

3.20 A complete discussion of the relevant planning policies to the proposed development, at National and Local level, is contained in the **Planning Statement** submitted alongside this Environmental Statement.

# ENVIRONMENTAL CONSIDERATIONS

## Brownfield Availability

3.21 The Ashford Borough Council Brownfield Register records no sites of more than 7.7ha, considerably less than the required land area.

## Designations

3.22 In selecting the potential solar farm 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.

3.23 Data for these designations were obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC) database.

3.24 There are no designations within the proposed site boundary. The following designations can be found within 2km of the site boundary (**Plate 3.1 on page 45**), with the approximate distances given from the site boundary at the closest point:

- Area of Outstanding Natural Beauty (AONB):
  - Kent Downs AONB, approximately 1.3km south and 3.3km northeast of the closest part of the proposed development;
- Local Nature Reserve (LNR):
  - Poulton Wood LNR in Aldington, c. 1.8km south-west;
- Site of Special Scientific Interest (SSSI):
  - Hatch Park SSSI, c. 1.3km north-west;
- Ancient Woodland:
  - there are 23 Ancient and Semi-Natural Woodland and four Ancient Replanted Woodland areas within the study area, of which three are adjacent to the proposed site.
- Registered Parks and Gardens (RPG):
  - Hatch Park RPG, c. 1.2km north-west;
- Scheduled Ancient Monuments:
  - Romano-British building south of Burch's Rough, c. 1.0km south; and
  - Barrow cemetery to the south-west of Barrowhill, c. 1.7km east.
- Listed Buildings, including:
  - Church of St Mary (Grade I), which is situated in Smeeth, c. 650m north-west;
  - Church of St Mary (Grade I), which is situated in Sellindge, c. 1.1km north-east;
  - Church of St Martin (Grade I), c. 1.1km south;
  - Mersham Le Hatch (Grade I), c. 1.9km north-west;
  - Evegate Manor (Grade II*), c. 550m west;
  - Court Lodge Farmhouse (Grade II*), c. 1.1km south;

- Lodge House (Grade II*), c. 1.1km north;
- Ruffyn's Hill Farmhouse and walls projecting (Grade II*), c. 1.4km south;
- Cobb's Hall (Grade II*), c. 1.4km south-west; and
- Bower Farmhouse (Grade II*), c. 1.7km north-west.

3.25 There are no NNR, National Parks, Ramsar sites, SPA, SAC, Registered Battlefields or World Heritage Sites within 2km of the site.

3.26 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 11 - Landscape and Visual Impact Assessment**.

3.27 Designations within the search area are discussed further within **Chapter 4 - Existing Conditions** and full search results are at **Appendix 4.1**.

## Screening

3.28 The existing field boundary vegetation and woodland blocks are important considerations for the site design, as they have the potential to mitigate landscape and visual impacts. It is proposed that as part of the development existing hedgerows will be allowed to grow taller (although still undergoing trimming to encourage thick rather than straggly growth). The section near to the East Stour River crossing will be managed at the existing height to retain existing visibility for road users. New hedgerows will be planted and tree planting will take place to create a new wooded area.

3.29 Mitigation and enhancement elements are discussed further in **Chapter 10 - Ecology** and **Chapter 11 - Landscape and Visual Impact Assessment** and will be required to be agreed with Ashford Borough Council.

## Ecology

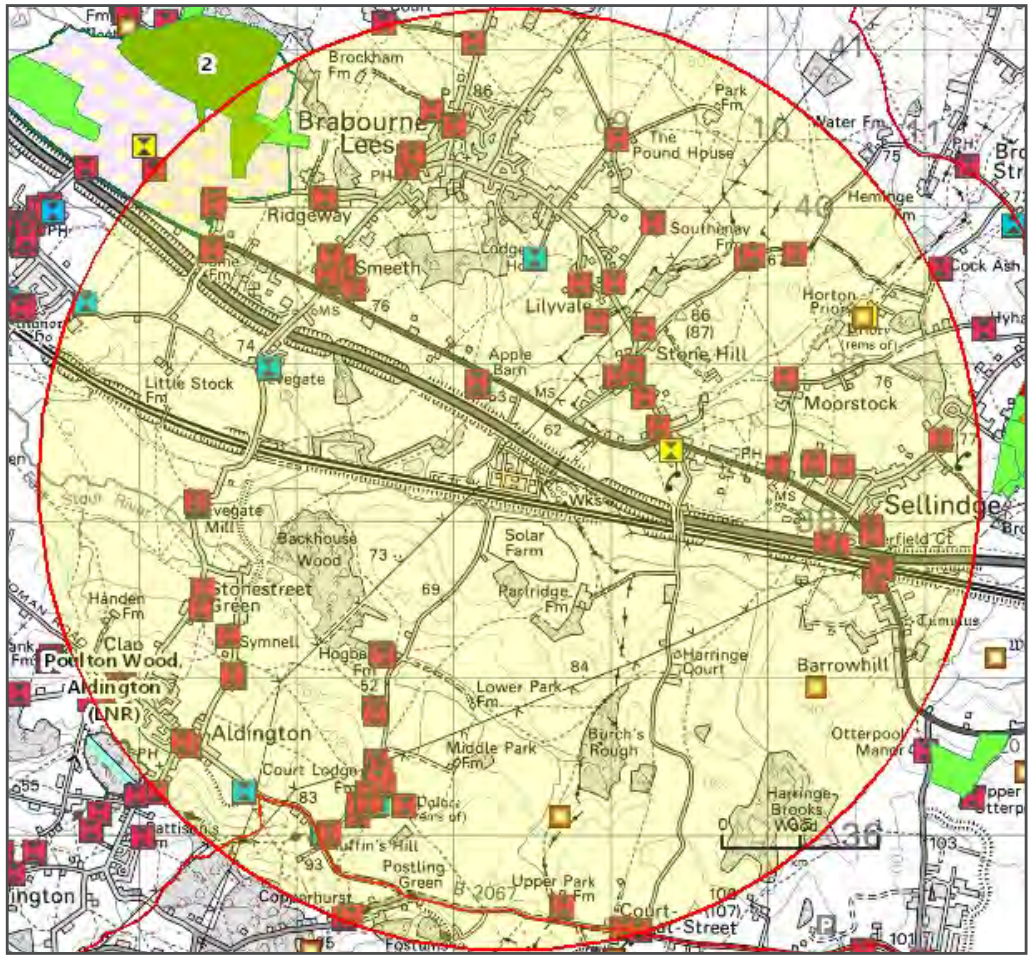
3.30 As discussed from **Paragraph 3.22 on page 43** there are no ecological designations on, or within close proximity of, the site.

3.31 There are a number of broadleaved woodlands surrounding the proposed site, some of which are classified as ancient woodlands. Appropriate separation distances have been applied from ecological features contained in and around the site.

## Flood risk

3.32 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.

3.33 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.




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North

Grade I Listed Building

Grade II* Listed Building

Grade II Listed Building

Site of Special Scientific Interest

Registered Parks and Gardens

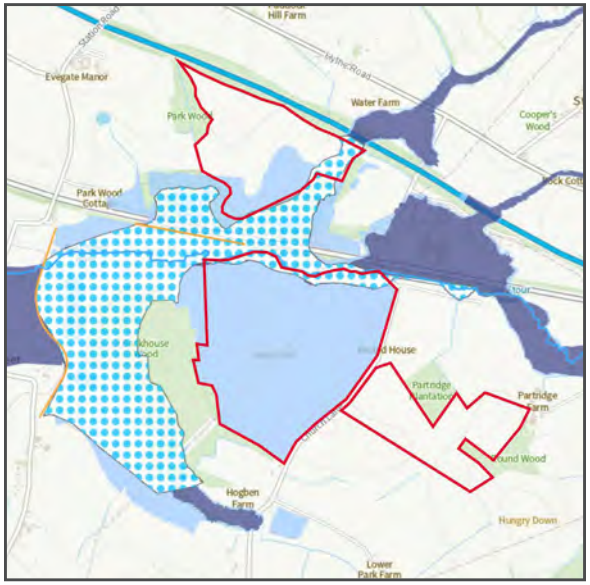
Scheduled Monument

Local Nature Reserve

Plate 3.1 - *Site Selection Stage 1 - Initial Search Area from Sellindge Converter Station*

3.34 As shown at **Plate 3.2**, the eastern section of the site, around Partridge Plantation, is located within Flood Zone 1 (low probability of flooding). The central land parcel on Bested Hill is marked as within Flood Zone 2 (medium probability of flooding), with some flood storage areas along its northern boundary. The development area to the north of the railway lines is primarily in Flood Zone 1, with some Flood Zone 2 and flood storage areas to the south and east.

3.35 A flood risk and surface water drainage assessment has been undertaken for the proposed development as set out in **Chapter 9 - Hydrology and Hydrogeology**.




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Plate 3.2 - *Flood Risk from Rivers or the Sea (Site outlined in red; Flood Zone 1 - unshaded; Flood Zone 2 - shaded light blue; Flood Zone 3 - shaded dark blue; Flood storage area - dotted)*

## Cultural Heritage

3.36 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].

3.37 There are no Scheduled Monuments, World Heritage Sites, Registered Battlefields, or Registered Parks and Gardens within the site or within its immediate vicinity. Similarly, there are no listed buildings within the site area. A detailed heritage assessment considering potential archaeological features and built assets is provided at **Chapter 12 - Archaeology and Cultural Heritage**.

# TECHNICAL CONSIDERATIONS

3.38 The initial suitability of the landholding for a solar farm 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

3.39 Initially, the developer identified areas for further investigation in proximity to the Sellindge Converter Station where grid connection capacity for 49.9MW had been secured by EDF Renewables. 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.

3.40 Discussions and knowledge sharing with the landowners has been instrumental in the development of the solar farm design, largely with respect to ensuring that plant and equipment are positioned so as to relate adequately to existing and future planned agricultural activities.

## Pivot Power Battery Energy Storage System

3.41 Pivot Power, a part of EDF Renewables, is developing a stand alone grid Battery Energy Storage System on land between the northern parcel of land comprising the East Stour Solar Farm and Church Lane, immediately west of the Sellindge Conversion Station (**Plate 3.3** and **Figure 3.1 of ES Volume 3, Figures**).

3.42 The proposal is separate and distinct from the East Stour Solar Farm and will be subject to its own planning application. Each of the schemes stand alone in their own respective rights, however, should both be consented, there is an opportunity to share a connection corridor to the substation at the Sellindge Converter Station and so reduce ancillary infrastructure.

## Agricultural Land Quality

3.43 As noted at **Paragraph 3.10 on page 38**, the NPPG asks Local Authorities to consider the quality of land upon which the solar farm is proposed, as well as how the land can support agricultural use in the future.




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Plate 3.3 - *Pivot Power Battery Energy Storage System Location Edged Blue, East Stour Solar Farm Development Area Edged Red and Potential Shared Grid Connection Corridor Green*

3.44 The recent draft National Policy Statement for Renewable Energy (NPS-EN3)(DBEIS, 2021b) states that;

*'...land type should not be a predominating factor in determining the suitability of the site location'.*

3.45 A full consideration of current Agricultural Land Quality and also of soil quality after the life of the project is provided in **Chapter 4 - Existing Conditions**.

## Temporary Structures

3.46 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.

3.47 This is reflected in the site design, 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

3.48 There is one grass airstrip proximate to the site (approximately 850m east). Other receptors that may be subject to glint/glare effects are residents and users of the nearby highways to the proposed development. As a ground mounted scheme with panels mounted at approximately 20 degrees, the effects are unlikely to be significant. Glint and Glare is considered further at **Chapter 14 - Glint and Glare**.

## Active Solar Arrays

3.49 There may be additional impacts if solar arrays tilt to follow the daily movement of the sun. This proposal is for fixed panels that do not follow the movement of the sun. In this regard the impact is consistent through the day.

## Security

3.50 There will be temporary, sensor controlled, lighting during the construction phase while materials are stored on site. The construction phase is expected to last for up to nine months. No lighting will be erected for the operational phase.

3.51 The site will be bounded by a stock proof fence with wooden posts, to minimise visual impact.

3.52 Inward-facing CCTV will provide security monitoring. The cameras will be mounted on 2m posts independent of the boundary fence. Any CCTV lighting will be infrared and not visible to the naked eye.

## Resource and Panel Row Spacing

3.53 As recognised in the NPPG, the energy generating potential of a solar farm can vary for a number of reasons including, latitude and aspect. As discussed at **Chapter 1 - Introduction**, the Applicant has 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.

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

## Road Access

3.55 Delivery of solar farm components is a relatively straight forward process predominantly involving standard size HGVs. Deliveries would be routed to site from the M20 motorway and the A20 trunk road. Construction traffic would use the northern section of Church Lane from the A20. The anticipated delivery route and construction traffic movements are discussed further in **Chapter 8 - Traffic and Access**.

3.56 There are a number of public footpaths crossing and surrounding the proposed site. Church Lane bisects the site between the southern and eastern portions of the site.

3.57 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. Appropriate separation is considered on an individual basis, taking into account visual amenity, glint and glare, and noise (considered further in **Chapter 11 - Landscape and Visual Impact Assessment, Chapter 14 - Glint and Glare** and **Chapter 13 - Noise**).

## Location of Utilities Infrastructure

3.58 Consultation with utilities operators including National Grid, SGN and UK Power Networks (UKPN) was undertaken by the Applicant during the initial land investigations.

3.59 It was established that:

- a double 400kV overhead electricity transmission line on pylons/towers crosses the central section of the site, heading south-west from the Sellindge Converter Station. An easement distance of 20m around the tower bases has been provided as a constraint within the panel row arrangement with tower access to ensure future maintenance of the electrical network can continue uninterrupted;
- 11kV and 33kV overhead electricity lines on wooden poles cross the central section of the site in an east-west direction; and
- a distribution water mains pipeline operated by South East Water follows the route of Church Lane.

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

## Electricity Network Connection

3.61 The site will export power directly into the nearby substation at the Sellindge Converter Station. This will be through an already secured National Grid connection, with such a secured connection offer being a key feasibility constraint for the progression of a solar farm in England.

3.62 The Environmental Impact Assessment has been based upon five internal substations with four located within northern, central and eastern parcels of land, connected to a central substation near to the Sellindge Converter Station. From the central substation an underground cable will travel alongside internal access tracks and cross Church Lane connecting into the Sellindge Substation. Further details of the grid connection compound are provided in **Chapter 6 - Development Proposal**.

# THE APPLICANT'S SITE SELECTION AND DESIGN APPROACH

3.63 The Applicant 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.

3.64 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 1 051 - 1 100kWh of solar irradiation falls on each square metre of horizontal surface, as shown at **Plate 3.4**.

3.65 The next principal technical constraint is available grid connection as identified. Within Ashford Borough, the Applicant secured a 49.9MW grid connection at the Sellindge Converter Station.

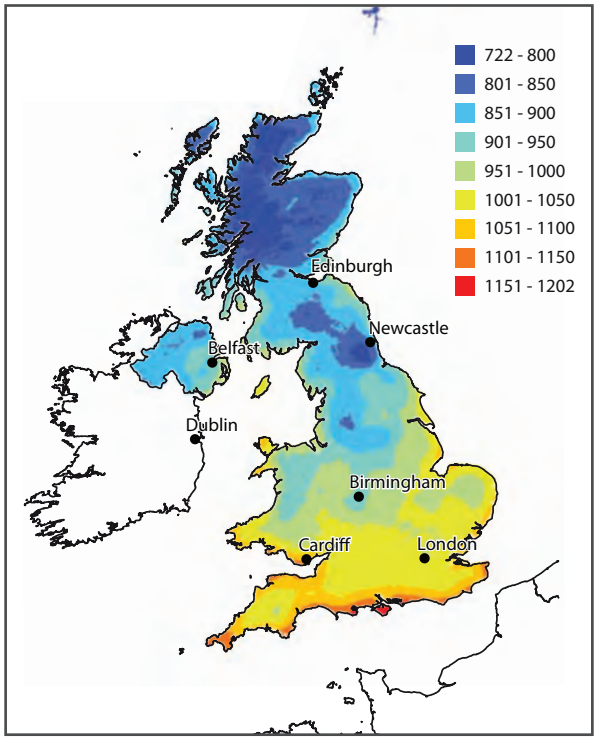



Plate 3.4 - *UK Solar Irradiation Map. Yearly total of global irradiation in kWh/m². Averaging period: 1997-2003. Map data courtesy of the Met Office (BRE, 2014a)*

3.66 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. 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.

3.67 Taking these constraints into account, land was identified to the south and east of Sellindge Converter Station on Bested Hill, fields adjoining Partridge Plantation and land north of the railway lines south of the A20. As discussed further in **Chapter 4 - Existing Conditions,** the land was observed to have an association with energy and other existing infrastructure, including:

- the Sellindge Converter Station and associated overhead electricity lines;
- the operational Sellindge Solar Farm;
- the High Speed 1 (HS1) and South Eastern Mainline railway lines; and

- the M20 motorway and A20 trunk road.

3.68 Landowners in the area were approached and their interest was ascertained. The area taken forward for further appraisal is shown at **Plate 3.5**.

3.69 The M20 was identified as a constraining feature to the proposal with adequate land available to the south to host the land required by the secured 49.9MW solar farm capacity. The land east of Partridge Plantation was discounted again as being beyond that which was required.

3.70 The largest section of contiguous land, east of Church Lane and south of the Sellindge Solar Farm, were identified to have potential to extend visual impacts on the surrounding AONBs and the Aldington Church Conservation Area. As a result, eastern and southern areas were excluded at this early stage and in advance of detailed assessment.




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Plate 3.5 - *Land area taken forward for further appraisal (blue line)*

3.71 Following consideration of the environmental, physical and technical limitations associated with the land taken forward for initial appraisal, three areas of the landholding were progressed for assessment:

- land around Partridge Plantation, south of the Sellindge Solar Farm;
- land around Bested Hill, west of Church Lane and south of the railway lines; and
- land to the west of the Sellindge Converter Station, south of the M20 and north of the railway lines.

3.72 Early consultation was initiated with the Officers of Ashford Borough Council. Formal contact was made for pre-application advice, then for EIA Screening and thirdly via the Scoping process (discussed further in **Chapter 5 - Environmental Impact Assessment**). The development boundary proposed at project Scoping is shown at **Plate 3.6.**

3.73 During the consultation stages with the Council, the Developer undertook pre-application consultations with the local community, including parish councils. Public consultation is discussed further in **Chapter 5** and the feed back received was constructive in shaping the refinement of the development design and mitigations proposals (as discussed further in **paragraph 3.80 on page 53**).




Not to Scale. © Getmapping plc.

Plate 3.6 - *Site Selection Stage 3 - Initial Development boundary considered during pre-application discussions with Ashford Borough Council and formal EIA Screening and Scoping*

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

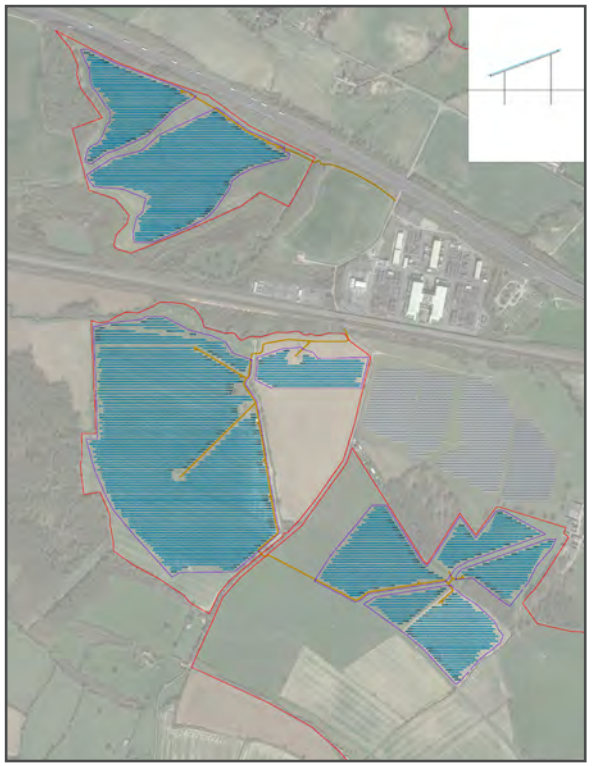
3.75 Discussions with Environment Agency concluded that whilst Bested Hill is identified as being in flood Zone 2, this was as a result of a mapping error. It was agreed that sensitive equipment would be removed from below the 51.3m height contour - this removed an area from along the East Stour river as well as development area within the northern field. A portion of Bested Hill east of the north-south hedgeline was also removed from development to maximise separation from Bested House. This also avoided potential impacts on a number of possible heritage features identified during the geophysics scan of the site.

3.76 To minimise use of Church Lane, a site track to the eastern portion of the site was included within the southern land area with a crossing of Church Lane to access the eastern area.

3.77 Setbacks were provided from footpaths, low voltage overhead lines, the electricity pylons and Backhouse Wood.

3.78 This layout iteration is shown at **Plate 3.7**.

3.79 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.



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Plate 3.7 - *Development Area with Initial Panel Layout*

3.80 The specific site design further evolved through the Environmental Impact Assessment process, whereby any impacts identified by the specialist assessment team, consultees or local community were mitigated for, where possible, through alterations in the site design. Measures taken include:

- removal of panels from an area of some 4.9ha to the far south-east of the site to reduce landscape character impacts when viewed from some rights of way to the south of the site;
- inclusion of tree planting south of the panels on Bested Hill, and hedge planting (both new and improvement of existing hedges) as landscape mitigation and habitat improvement (please see **Figure 11.9** of **ES Volume 3**); and
- inclusion of swales for surface water management.

3.81 The resulting layout assessed as reported in this ES, and progressed for submission is shown at **Plate 3.8 on page 54**, as well as **Figure 1.2** and **Figure 1.3** of the **ES Volume 3 - Figures**.

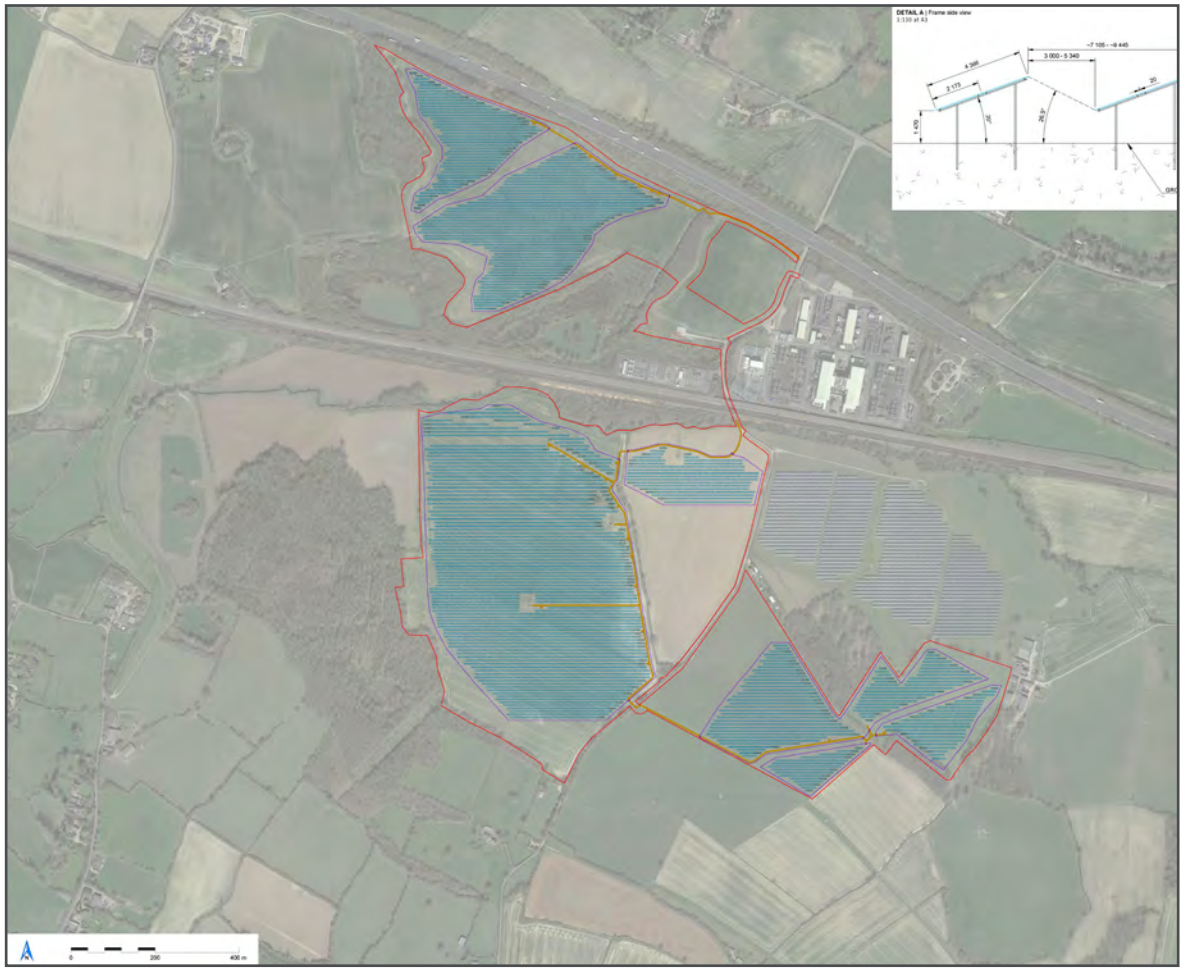
3.82 The East Stour Solar Farm was judged by the Applicant and the EIA assessment team to be a location offering the prospect of a suitable balance of the site-specific features which render a solar development (with its associated environmental benefits) both technically and financially viable, and the need to keep any adverse environmental impact of such a development to an acceptable minimum.

## Industry Guidance

3.83 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).

3.84 Incorporating the guidance, the design aim is to minimise the potential visual and long-term land use impacts of the solar farm whilst supporting renewable energy generation through solar PV and bringing benefits to local communities.



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Plate 3.8 - *Optimised Layout Determined through the EIA*

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## INTRODUCTION

4.1 This chapter sets out the existing physical environment of the development site boundary (as shown at **Figure 1.1**, **Figure 1.2** and **Figure 1.3**, **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 to the west of Sellindge, in Kent. The village of Aldington is approximately 1.3km south-west of the development boundary, and the village of Smeeth is approximately 400m to the north-west.

4.3 The majority of the site is located in Aldington Parish Council, with the northern land parcel falling under Smeeth Parish Council. The location of the site within a wider area is illustrated in **Figure 1.1, Volume 3** of this Environmental Statement. The proposal is entirely within the jurisdiction of Ashford Borough Council.

4.4 Other than the nearest settlements noted in **Paragraph 4.2**, in the wider area around the proposed solar farm site there is Brabourne Lees, Lilyvale, and Mersham.

4.5 Dispersed dwellings and farms are situated alongside the minor roads surrounding the site.

4.6 There are seven 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**.

Table 4.1 - *Dwellings closest to the proposed solar farm boundary*

| | Dwelling | Private or involved-landowner owned | Distance from nearest row of solar panels (to nearest 5m) | Direction to the nearest row of solar panels |
|---|---|---|---|---|
| 1 | Partridge Farm | Involved | 100m | W |
| 2 | Bested House | Private | 150m | N |
| 3 | The Paddock | Private | 150m | N |
| 4 | Apple Barn | Private | 280m | SW |
| 5 | Forehead | Private | 300m | N |
| 6 | Hogben Farm | Private | 330m | N |
| 7 | Unnamed property by Lower Park Farm | Private | 430m | N |
| 8 | Lower Park Farm | Private | 450m | N |
| 9 | Evegate Manor | Private | 550m | E |
| 10 | Forehead Farm | Private | 640m | N |
| 11 | Unnamed property by Forehead Farm | Private | 680m | N |
| 12 | Harringe Court and nearby properties | Private | 670-770m | NW |
| 13 | Woodleas Farm | Private | 770m | E |
| 14 | Unnamed property by Middle Park Farm | Private | 830m | N |
| 15 | Middle Park Farm | Private | 890m | N |
| 16 | Little Goldwell Farm | Private | 850m | NE |
| 17 | Symnell and nearby properties | Private | 890m - 1.01km | NE |

# PAST, PRESENT AND FUTURE LAND USE

## Existing Land Use

4.7 The solar farm is proposed on farmland to the west and south of Sellindge Converter Station and the existing Sellindge Solar Farm. The site itself is primarily used as arable agricultural land. Within the site boundary, the fields range between medium and large scale, and are often bounded by established hedges.

4.8 Land surrounding the proposed East Stour Solar Farm is also mainly utilised for agricultural purposes and comprises mostly arable land. There are several small woodland blocks in the area, including Backhouse Wood, to the west of Bested Hill. In addition, field boundaries are generally well vegetated with established hedgerows and hedgerow trees.

4.9 A range of transport and energy crosses and adjoins the proposed site: Church Lane runs north/south between the southern land parcel at Bested Hill and the eastern land parcel around Partridge Plantation; the HS1

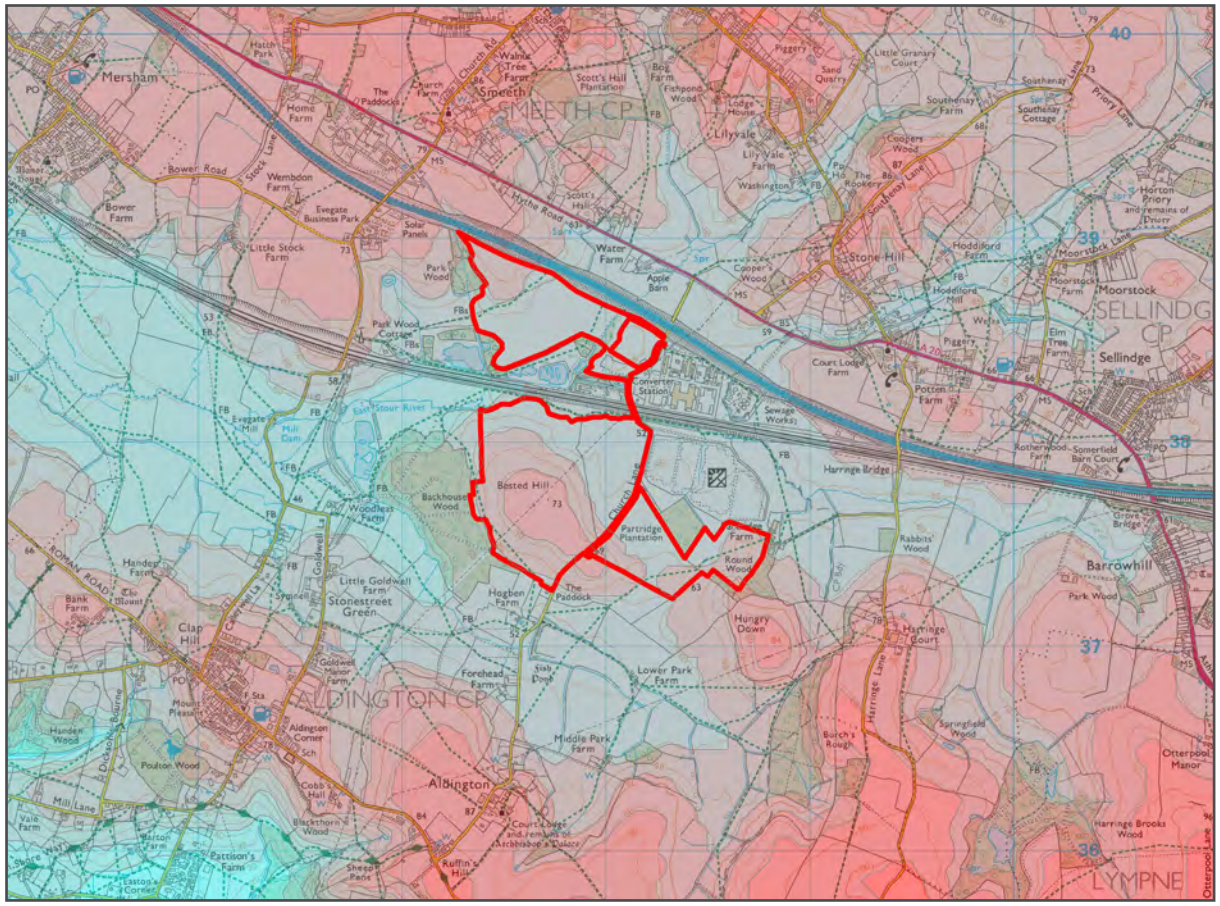
and local railway lines travel east/west across the site separating the northern development area from the rest of the site. The M20 forms the northern boundary of the northern parcels of land.

4.10 The land is also crossed by overhead electricity lines on wooden poles (33kV) and pylons (400kV) connecting to the Sellindge Converter Station. A sewage works is located to the immediate east of the Converter Station. Infrastructure on the site is discussed further from **Paragraph 4.61 on page 71**.

4.11 In the northern land parcel the terrain slopes gently from approximately 70m AOD in the north-western corner to 50m AOD along the southern and eastern areas. The southern section of the site includes Bested Hill, which peaks at approximately 72m AOD and then slopes down, reaching a low of approximately 50m in the north-eastern corner of the land parcel. In the eastern section of the site around Partridge Plantation, the terrain varies between 65m and 55m AOD, with the highest areas located on the south and east.

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

4.13 **Chapter 11 - 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**.




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

1. 
2. 
3. 
4. 
5. 
6. 

1. View south from footpath north of East Stour River south across Bested Hill. 2. View north from Church Lane over Bested Hill towards Converter Station & Sellindge Solar Farm. 3. View north-north-east from the approach to St Martin's Church, Aldington. 4. View north from Public Footpath east from St Martin's Church and Court Lodge Farm. 5. View west from Harringe Lane over Sellindge Solar Farm towards Bested Hill. 6. View south between HS1 Railway and M20 across northern site field towards Aldington.

Plate 4.2 - *Photos of Existing Site Environment*

## Geology and Hydrology

4.14 The site is underlain by three main types of sedimentary bedrock:

- Weald clay formation (mudstone), formed c. 126 to 134 million years ago in the Cretaceous period;
- Atherfield clay formation (mudstone, sandy), formed c. 113 to 126 million years ago in the Cretaceous period; and
- Hythe formation (interbedded sandstone and limestone), formed c. 113 to 126 million years ago in the Cretaceous period (British Geological Survey, 2021).

4.15 An area of Atherfield clay formation along the northern land parcel is covered by superficial Alluvium deposits of clay, silt, sand and gravel. No superficial deposits have been recorded for other parts of the proposed site (British Geological Survey, 2021).

4.16 The proposed site comprises slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils (UKSO, 2021). Further discussion is contained within **Chapter 9 - Hydrology and Flood Risk Assessment** and accompanying appendices.

4.17 As described further in **Chapter 9**, the Environment Agency Flood Map indicates that the development site lies predominately within Flood Zone 1. Some sections of the site boundary extend in to Flood Zone 2.

4.18 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).

4.19 A small section of the site falls under the 'Flood Storage Area' category. This is classed as High Risk, with an annual probability of flooding greater than 3.3%.

## Agricultural Land Classification

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

4.20 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.

4.21 When surveyed in August 2021 agricultural land at the site was in a mix of arable cultivation and pasture grazed by sheep.

4.22 The appraisal of agricultural land quality is consistent with the direction given by the 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.'*

4.23 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'.*

4.24 Accordingly a detailed assessment of the site was undertaken in August 2021 using the Ministry of Agriculture, Fisheries and Food (MAFF) revised guidelines and criteria for Agricultural Land Classification (ALC) published in October 1988.

4.25 Use of the ALC methodology is also supported by Natural England Technical Advice Note 049 (TIN049) revised in 2012.

4.26 To supplement the NPPF the Ministry of Housing, Communities and Local Government also provides an online library of planning practice guidance. Planning Practice Guidance for Renewable and Low Carbon Energy (PPG), Paragraph 013 identifies particular planning considerations that relate to the development of large scale ground mounted solar PV sites. Regarding agricultural land, this paragraph states:

*'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'.*

4.27 Paragraph 013 of the PPG 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 (…)'.*

4.28 Paragraph 013 also references a written ministerial statement of 25th 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'.*

4.29 Local planning policy for Ashford Borough Council is given in the Ashford Local Plan 2030 (adopted in February 2019). The local plan has no policy that makes specific reference to conserving the resource of best and most versatile land. Policy ENV10 – Renewable and Low Carbon Energy seeks to avoid

significant adverse impacts on 'natural assets' but does not provide any examples of such natural assets.

## *Methodology*

4.30 The Ministry of Agriculture, Fisheries and Food (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.

4.31 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

4.32 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 two points within the site were obtained to capture any significant variation in climate factors between the 25m change in elevation across the proposed site. The data is given in **Table 4.2**.

4.33 As can be seen there is little difference between the interpolated data for the two points, with the lower point being slightly warmer.

Table 4.2 - **East Stour Solar Farm Agricultural Land Classification Climate Data**

| Reference Point: | TR 076 377 | TR 076 386 |
|---|---|---|
| Altitude (m) | 70 | 55 |
| Average Annual Rainfall (AAR) (mm) | 759 | 760 |
| Accumulated Temperature AT0 (day degrees) | 1428 | 1445 |
| Moisture Deficit for wheat (mm) | 115 | 116 |
| Moisture Deficit for potatoes (mm) | 110 | 112 |
| Field Capacity Duration (days) | 157 | 158 |

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

4.35 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 is relatively warm and dry, soil droughtiness limitations are enhanced and soil wetness limitations are reduced.

## THE SITE

4.36 The site lies to the west of Sellindge and is broken up into three parcels by the rail line running east west, and south of the rail line, Church Lane running north south.

4.37 Land drains toward the rail line with a water course (East Stour River) running alongside it. Large parts of the site are shown as Flood Zone 2 (the middle category of the three zone system) on the Environment Agency Flood map, with a smaller area around the East Stour River designated a water storage area. Flood risk, including the deliberate storage of water to attenuate flooding downstream, may impose a minor limitation on overall land grade, but is exceeded by other constraints present at the site.

## SOILS AND PARENT MATERIALS

4.38 The British Geological Survey Geology of Britain Viewer shows the site to be underlain the Weald Clay Formation mudstone on the lower lying ground, changing to the Atherfield Formation mudstone and Hythe Formation sandstone and limestone respectively rising upslope to the higher ground. Some superficial cover of Alluvium is present in the East Stour River corridor but any encroachment into the site area is marginal.

4.39 Field survey work found soils consistent with the solid geology of mudstones with interbedded limestone and sandstone on the higher ground. Typical soil profiles are clayey with areas on the upper slopes of calcareous soils incorporating intermittent areas of olive coloured clay loam subsoil similar to that found on a Green Sand geology.

## INTERACTIVE FACTORS

4.40 Two basic soil profiles are found within the site. The most prolific has a heavy textured topsoil and subsoil. Drainage is impeded by the subsoil and the high clay content of the topsoil increases the severity of soil structural damage when disturbed in a wet and plastic consistence, giving rise to a soil wetness and workability limitation to ALC Grade.

4.41 The second soil type has a medium texture with a lower clay content. Drainage is better and the topsoil is less vulnerable to prolonged structural damage when disturbed in a plastic consistence. Soil droughtiness is the dominant limitation to ALC Grade.

## *Agricultural Land Classification of Land at East Stour Solar Farm*

4.42 Detailed ALC survey of the site found agricultural land in ALC Grades 3a and 3b. **Plate 4.3 on page 67** shows the ALC grade distribution within the surveyed area, with area estimates given in **Table 4.3**.

Table 4.3 - *ALC Grade Distribution within Surveyed Area*

| ALC Grade | Area (ha) | % |
|---|---|---|
| 3a | 14.9 | 14.6 |
| 3b | 87.0 | 85.4 |
| Total | 101.9 | 100.0 |

4.43 Grade 3a land is found in two narrow bands running across the hillslope, covering approximately 14.9ha of the surveyed area. Soil profiles have a medium sandy loam to medium clay loam topsoil texture, and a subsoil

that is medium sandy loam to heavy clay loam. Where the heavy clay loam subsoil occurs it is a slowly permeable lower subsoil, restricting drainage. Profiles are rarely wet (wetness class I) or occasionally wet (wetness class III) where the heavy lower subsoil occurs.

4.44 Soil droughtiness is the dominant limiting factor restricting this land to ALC Grade 3a, with isolated pockets of wetness class III land that have a soil wetness limitation to Grade 3a.

4.45 Grade 3b land makes up the majority of the site area, approximately 87.0ha of the surveyed area. Soils comprise a heavy silty clay loam topsoil and subsoil over a clay lower subsoil, with both upper and lower subsoil displaying evidence of regular waterlogging (gley mottles) and an inspection pit confirming a high packing density from the upper subsoil to depth, impeding drainage. As a result the land is in Wetness Class IV (waterlogged for long periods in winter) and limited to ALC Grade 3b by soil wetness.




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Grade 3a Grade 3b

Plate 4.3 - *Agricultural Land Classification Survey Results*

## LAND QUALITY AND THE PROPOSED DEVELOPMENT.

4.46 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 effectively translocated. Agricultural land quality is dependent upon characteristics of the location, not just the soil in isolation.

4.47 Solar PV development differs from built development in that the consent is temporary, is easily reversed and agricultural production can be maintained (though constrained) during the Solar PV consent. At the time of survey a significant part of the assessment area was being used to graze sheep. Sheep could also be seen grazing between and below the solar PV panels on the adjacent solar farm.

4.48 Planning Practice Guidance (MHCLG, 2020) introduces the desirability of maintaining agricultural production and/or enhancing biodiversity on farmland for the duration of any consent for large scale Solar PV. 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 PV development. Such biodiversity effects are however beyond the scope of this assessment.

4.49 When considering a Solar PV development proposal, the conservation of the agricultural land resource and quality is of greater importance than the maintenance of the current agricultural 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 than the proposed solar PV planning consent, Common Agricultural Policy transitioned from direct price support for commodities such as wheat, to area payments for crops 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 to a farm business 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 highly uncertain but speeches by ministers have emphasised the need to maintain a transition towards rewarding land management for environmental services rather than agricultural production.

4.50 Grassland below a solar PV installation should be managed by grazing or cutting to control grass and shrub growth that could shade panels and impede access for maintenance. For the East Stour Solar Farm proposal, the developer intends to manage the grass through grazing with livestock, as per the practice at the existing adjoining solar farm. This livestock grazing will maintain the land in

agricultural production while the solar PV generation is in place.

4.51 Therefore, the development proposed does not result in loss of agricultural land resource and agricultural production, though restricted, can continue through the duration of the solar PV development.

### AGRICULTURAL BENEFITS OF SOLAR PV

4.52 As noted above, the temporary consent for solar PV does not result in the permanent loss of agricultural land resource or the degradation of its ALC grade. The land can remain in agricultural production, grazing sheep, while providing an additional diversified income to the farm business. At the end of the temporary consent, decommissioning returns the land back to its prior agricultural function with no loss of extent or capability.

4.53 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 and permits more rapid infiltration of rainfall.

4.54 Compared to annual arable cropping, perennial crop cover will have time develop a root network that extends further down and through the subsoil, accelerating the drying process that helps aggregate soil into structures that allow improved 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 soil's functional capacity for supporting agricultural production.

## ENVIRONMENTAL STEWARDSHIP

4.55 Land within the proposed site boundary is covered by an Agri-Environmental Scheme. There is an Environmental Stewardship Agreement for Entry Level plus Higher Level Stewardship across the majority of the proposed site. There is no Countryside Stewardship Agreement over the land.

4.56 The Environmental Stewardship Agreement (ESA) covers the central and eastern parts of the proposed site around Bested Hill and Partridge Plantation, as well as additional land in the wider area. However, the land parcel north of the railway line is not covered by the Agri-Environmental Scheme.

4.57 There are many options for land management that can fall within the ESA (Natural England, 2013a). These are:

- maintenance, if land is already in a good condition;
- restoration, if features are present but not in a good condition; and
- creation, where there are opportunities for new habitat creation.

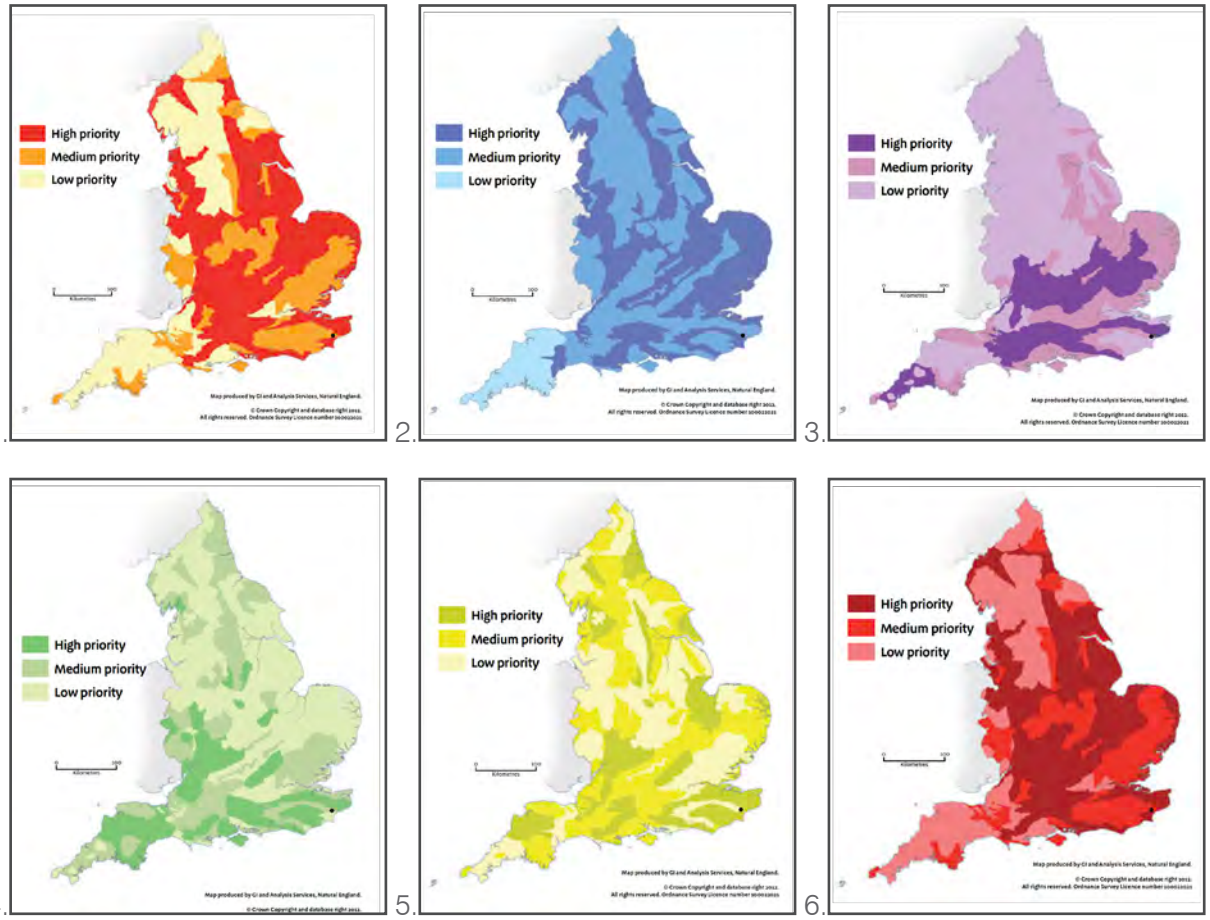
4.58 Measures appropriate for the land are determined through identifying the environmental objectives of the land and then these will be translated into a Farm Environment Plan (FEP). **Plate 4.4 on page 70** shows the priority of

the various environmental objectives at the site.

4.59 At the proposed site there is:

- medium priority for farmland birds;
- high priority for water voles, dragonflies, newts and toads;
- medium priority for arable plants;
- medium priority for bats and dormouse;
- low priority for butterflies, bees and vulnerable grassland; and
- medium priority for brown hare.

4.60 The objectives of the existing Environmental Stewardship Scheme at the proposed site will be incorporated into a Landscape and Environmental Management Plan (LEMP), as introduced at **Chapter 10 - Ecology**.




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1. Priority areas for farmland birds. 2. Priority areas for water vole, dragon flies, newts and toads. 3. Priority areas for arable plants. 4. Priority areas for bats and dormice. 5. Priority areas for butterflies, bees and vulnerable grassland. 6. Priority areas for brown hare.

Plate 4.4 - *Environmental Stewardship Objectives. Approximate site location marked by a black dot*

1. 

2. 

3. 

4. 

**1.** Overhead electricity transmission lines on pylons and distribution lines on wooden poles crossing the site. **2.** Existing Sellindge (Partridge Farm) Solar Array **3.** Church Lane travelling under HS1 and South Eastern railway lines, adjacent to the central section of the proposed site. **4.** Sellindge Converter Station.

Plate 4.5 - *Existing Local Energy and Transport Infrastructure Features*

## CONTEXTUAL INFRASTRUCTURE

4.61 The M20 motorway travels parallel to the northern boundary of the northern section of the proposed site. The A20 is a further 250m to the north of the M20.

4.62 Church Lane provides access to the proposed site, as described in **Chapter 8 - Traffic and Access**, and separates the southern (Bested Hill) and eastern (Partridge Farm) sections of the site. Further local roads in the wider area include Goldwell Lane and Station Road to the west, Roman Road to the south, and Harringe Lane to the east.

4.63 The HS 1 and South Eastern Mainline railway lines runs between the northern and southern land parcels of the proposed site. The nearest train station for South Eastern services is Westenhanger, approximately 4.7km south-east. High speed services travel between Ashford (7.4km north-west of the site along the railway line) and the channel tunnel (14.0km south-east of the site along the railway line) and so trains pass the site at high speed. The line is also used by international freight trains.

4.64 The operating Sellindge Solar Farm (also referred to as Partridge Farm Solar Farm) is located to the east of Church Lane, adjacent to the eastern section of the proposed development. It is an independent installation unrelated to EDF-R. Other cumulative solar energy developments surrounding the proposed site are discussed further from **Paragraph 4.87 on page 76**.

4.65 At present, the site is regularly traversed by agricultural vehicles for the daily farming operations. West of Church Lane, within the northern land parcel, there is an area of hardstanding.

## Past and Future Land Use

4.66 The proposed site has been in agricultural use for many decades. With changing demands on food, feed and energy crop production and movement to more sustainable agriculture, farmers are seeking ways to secure the future of their farms. This is discussed further with respect to carbon reduction and farm diversification at **Chapter 15 - Socio Economics and Sustainability**.

4.67 Further details of the historic environment on and around the site are contained in **Chapter 12 - Archaeology and Cultural Heritage**, with historic mapping for the site area contained at the associated **Appendix 12.1**.

4.68 During the operational phase of the solar farm the use of the land will become a mix of agriculture with biodiversity improvement and renewable energy generation. Wild flower/grass meadow will be sown under, between and around the solar panels. These areas will be available for light sheep grazing (panels are suitably raised above the ground to ensure safe sheep grazing) and invertebrate habitat to continue agricultural production from the land and encourage native bee species.

4.69 Following decommissioning of the solar farm (discussed further in **Chapter 7 - Construction, Operation and Decommissioning**) the land will be fully restored for continued agricultural use, the soils having benefited from resting during the 40 year operational life.

## Public Rights of Way

4.70 There are four Public Rights of Way (PRoW) crossing through the proposed site area. These are:

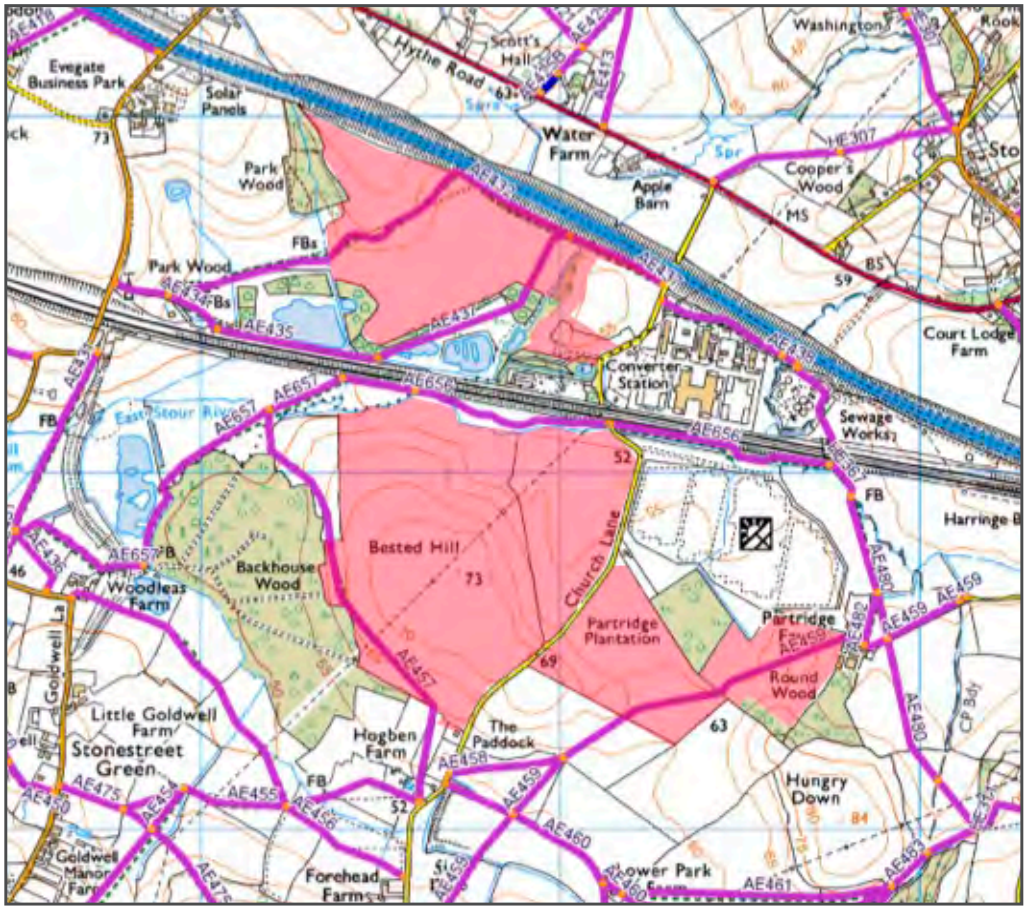
- footpath AE437, travelling west from Church Lane along the northern field boundary of the northern land parcel, then heading south across the site and continuing south-west;
- footpath AE432, which continues west from footpath AE437 along the northern field boundary before crossing the site in a south-westerly direction;
- footpath AE457, which crosses the southern land parcel along the south-western corner of Bested Hill; and
- footpath AE459, which crosses the eastern part of the proposed development, from Partridge Farm across Partridge Plantation.

4.71 Adjacent to the central section of the proposed development, footpaths AE656 and AE657 follow the northern and north-western field boundaries of Bested Hill. In the wider area there is a network of additional public footpaths.

4.72 An annotated copy of Kent Council's Public Rights of Way Map for the area, showing those PRoW listed at **Paragraph 4.70** and additional footpaths surrounding the proposed East Stour Solar Farm, is contained in **Plate 4.6** (and also provided in **Figure 11.7** of **Volume 3 - Figures**).

4.73 There is no Open Access or Common Land within the proposed development area or its surrounds.

4.74 Impacts on users of the Public Rights of Way through and surrounding the site are assessed within **Chapter 11 - LVIA**.




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Plate 4.6 - *Extract from Kent Council's Public Rights of Way Map Viewer (purple lines - public footpaths; red shading - proposed development area)*

# DESIGNATIONS

4.75 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 4.7 on page 75** and listed in full at **Appendix 4.1**.

4.76 There are no designations in the proposed site area. Within 2km of the approximate site boundary there are 118 Listed Buildings. These comprise of four Grade I, six Grade II* and 108 Grade II.

4.77 There is one Area of Outstanding Natural Beauty (AONB), one Local Nature Reserve (LNR), one Site of Special Scientific Interest (SSSI), one Registered Parks and Gardens (RPG), two Scheduled Monuments and 23 parcels of Ancient Woodland within 2km of the proposal.

4.78 There are no 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.

4.79 The ecological, landscape and heritage designations surrounding the proposed site are listed below and discussed in greater detail within **Chapter 10 - Ecology**, **Chapter 11 - LVIA** and **Chapter 12 - Archaeology and Cultural Heritage**, and their accompanying Figures and Appendices.

## *Areas of Outstanding Natural Beauty*

4.80 Kent Downs AONB is approximately 1.3km south of the proposed site.

## *Local Nature Reserves*

4.81 Poulton Wood LNR in Aldington is approximately 1.8km south-west of the site boundary.

## *Sites of Special Scientific Interest*

4.82 Hatch Park SSSI is approximately 1.3km north-west of the proposed site.

## *Ancient Woodlands*

4.83 There are 23 Ancient and Semi-Natural Woodland and four Ancient Replanted Woodland areas within the study area. Three of those are adjacent to the proposed site boundary (IDs. 1484498 - Round Wood, 1484628 and 1484476 - Backhouse Wood).

## *Scheduled Ancient Monuments*

4.84 The following Scheduled Ancient Monuments are within approximately 2km of the site boundary:

- Romano-British building south of Burch's Rough, c. 1.0km south of the proposed site; and
- Barrow cemetery to the south-west of Barrowhill, c. 1.7km east of the site boundary.

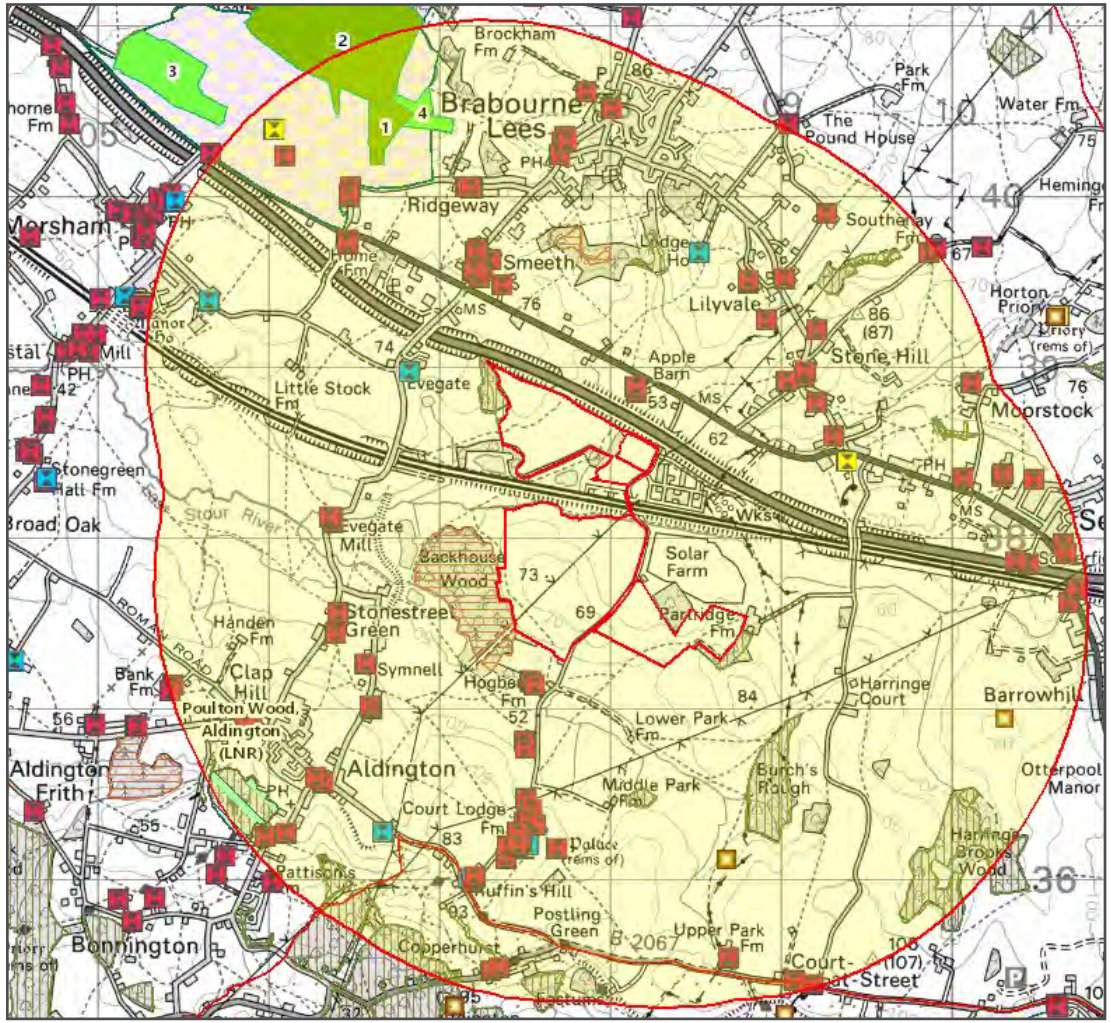
## *Registered Parks and Gardens*

4.85 Hatch Park consists of a mid 18th Century landscape park accompanying a country house by architect Robert Adam. It is situated approximately 1.2km north-west of the proposed site.

## *Listed Buildings*

4.86 The highest graded assets within the 2km search area are:

- Church of St Mary (Grade I) in Smeeth, c. 650m north-west;
- Church of St Mary (Grade I) in Sellindge, c. 1.1km north-east;Church of St Martin (Grade I), c. 1.1km south;
- Mersham Le Hatch (Grade I), c. 1.9km north-west;




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Plate 4.7 - *Designation Search via MAGIC with 2km Buffer Around Site (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.*

- Evegate Manor (Grade II*), c. 550m west;
- Court Lodge Farmhouse (Grade II*), c. 1.1km south;
- Lodge House (Grade II*), c. 1.1km north;
- Ruffyn's Hill Farmhouse and walls projecting (Grade II*), c. 1.4km south;
- Cobb's Hall (Grade II*), c. 1.4km south-west; and
- Bower Farmhouse (Grade II*), c. 1.7km north-west.

## EXISTING AND PROPOSED RENEWABLE ENERGY DEVELOPMENTS

4.87 Inspection of Ordnance Survey mapping, 'renewables-map' and planning records were used to establish the cumulative baseline for the proposed East Stour Solar Farm.

4.88 The 'snapshot' of the cumulative solar schemes around East Stour Solar Farm is set out below, as identified in January 2022.

4.89 A 5km study area has been considered for the purposes of the Landscape and Visual Impact Assessment (**Chapter 11 - LVIA**). A single existing solar energy development has been identified, the location of which is shown at **Plate 4.8 on page 77**.

4.90 Measurements presented in the following section with respect to other solar farms are taken as the crow flies between the nearest boundaries of East Stour Solar Farm and the cumulative development. All measurements are rounded to the nearest 100m (0.1km).

### Operating Commercial Scale Solar Energy Developments

4.91 As noted at **Paragraph 4.7 on page 60**, there is one operating commercial scale solar array adjacent to the proposed East Stour Solar Farm: Sellindge (Partridge Farm) Solar Farm is located south of the Sellindge Converter Station, on land adjacent to the north and east of the proposed development areas on Partridge Plantation and Bested Hill. It is a 10.6MW solar array covering approximately 16ha and was built by Eco Energy Power Solutions in 2016.

4.92 There are no other operational commercial scale solar farms within approximately 5.0km of the proposed site.

### Consented Solar Energy Developments

4.93 A development involving the construction of a solar array, four sound-attenuating bunds and haulage tracks (Ref. Y12/0093/SH) was approved by Folkstone and Hythe District Council in 2012. The proposal is north of Westenhanger Castle, approximately 3.0km east of the East Stour Solar Farm, but has not been constructed to date and is not considered further.

### Proposed Solar Energy Developments

4.94 Screening requests were submitted by Pegasus Planning (Ref. 13/0014, dated 2013) and Hive Energy (Ref. 14/0010 dated 2014) for the erection of a c. 18MW solar farm at Bank Farm, approximately 2.0km west of the proposed site. No further details and/or information differentiating the two proposals is available. Ashford Borough Council determined that

EIA would not be required for these proposals.

4.95 A screening request was also issued for a 1.1MW solar array on land at Park Farm, Brabourne (Ref. 13/0021, dated 2013) approximately 2.7km north of the proposed East Stour Solar Farm. Ashford Borough Council determined that an EIA would not be required for the proposed development.

4.96 Given no applications have been forthcoming and the intervening time, these proposals are not considered any further.

4.97 A proposal for a 165MW solar site to the immediate east of the East Stour proposal was announced in November 2021. As of January 2022, the proposals have yet to enter the planning system although an Inception Meeting is recorded on the Planning Inspectorate wesbsite with Inspectorate reporting that:

*the application is expected to be submitted to the Planning Inspectorate Q4 2022.*

*After receipt of the application, there will be 28 days for the Planning Inspectorate to review the application and decide whether or not to accept it for examination.*




Not to Scale. © Google, 2022.

Plate 4.8 - *Location of operational (blue shading) the proposed East Stour Solar Farm (red shading)*

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# CHAPTER 5 - ENVIRONMENTAL IMPACT ASSESSMENT


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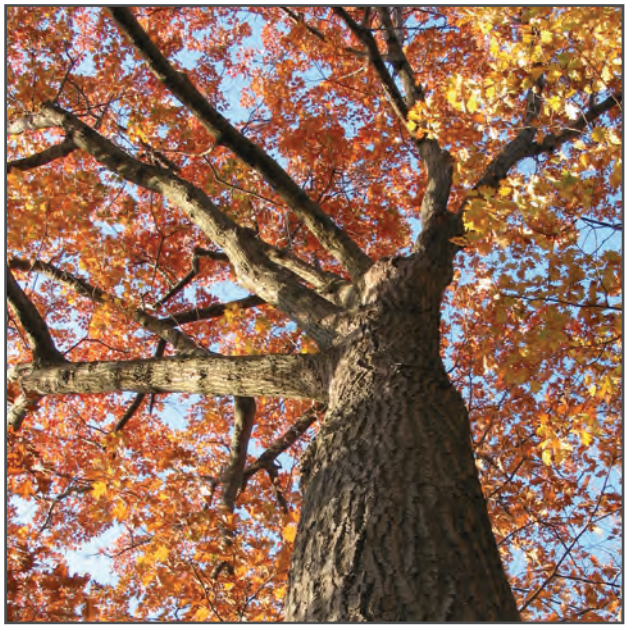
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# THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

## Pre-Application Advice

5.1 The first formal consultation with Ashford Borough Council, as noted in **Chapter 3 - Site Selection and Design**, was seeking pre-application advice on the principle of development at the identified site location and potential requirements for further assessments and statutory bodies to consult.

5.2 A copy of the pre-application correspondence is provided at **Appendix 5.1** (**ES Volume 2b**). The Planning Officer's report (Ref. 21/00183/PRE) states:

*'Having regard to the Development Plan and the NPPF, it is considered that the proposed development is acceptable in principle, subject to compliance with the other relevant Development Plan policies'.*

5.3 In addition, the following pre-application advice was provided:

- the proposed development would be primarily considered against the criteria set out in policy ENV10 of the Local Plan;
- agreement with the proposed scope of assessment in relation to flood risk, Agricultural Land Classification (ALC), ecology and amenity;
- with regards to landscape and visual impacts, the proposal would be policy compliant subject to demonstration that it would have no detrimental impact on the rural setting of the site following appropriate mitigation;
- in accordance with policy ENV10, evidence should be submitted to demonstrate that any mitigation screening and landscaping is in keeping with the character of the landscape and the rural setting;
- the submission of a Construction Management and Maintenance Plan is recommended;
- in accordance with policy ENV10 and the NPPF, the proposal should safeguard features of nature conservation interest and minimise impacts on biodiversity;
- an up to date Phase 1 Ecological Survey should accompany the application, together with subsequent survey work where appropriate; and
- measures should be introduced to achieve net gains in biodiversity and improve the value of the site.

## The need for Environmental Impact Assessment - EIA Screening

5.4 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 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 ES 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.

5.5 Under these regulations the proposed East Stour Solar Farm 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.

5.6 At Schedule 2, Part 3 (a), the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, 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.'*

5.7 A Screening Request was submitted to Ashford Borough Council in July 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.

5.8 The Screening Opinion was provided on 31st August 2021 and stated that an EIA would be required due to potential significant effects on nearby heritage assets (including St Martin's Churchyard and the Aldington Conservation Area) and potential cumulative impacts with the adjacent Sellindge Solar Farm. Landscape and visual impact, heritage impact and impacts upon wildlife habitats and ecology were highlighted as the main issues for consideration.

5.9 The Screening Opinion stated that the *'information to be included in the Environmental Statement can be found at Schedule 4 of the 2017 Regulations'*. No specific reference was made to our proposed scope of works or associated guidance. A copy of the Screening documents is provided at **Appendix 5.2**.

5.10 A Scoping Report was subsequently submitted to the Local Authority. The details of this Scoping Process are provided from **Paragraph 5.12 on page 85**.

5.11 This Environmental Statement has been prepared by a team of professional environmental assessors (see from **Paragraph 5.39 on page 89** for further details), following an Environmental Impact Assessment (EIA) carried out under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

## Scoping the Environmental Impact Assessment

### *Process*

5.12 A formal request for a Scoping Opinion was submitted to Ashford Borough Council on 12th October 2021. The Scoping Report is provided within **Appendix 5.3**.

5.13 The Scoping Report aimed to clearly and concisely identify the key issues to be addressed within the Environmental Impact Assessment and subsequent Environmental Statement for the proposed East Stour Solar Farm.

5.14 The Scoping Report outlined issues arising from the development that were identified as having potential to cause significant effects. It also outlined the works commissioned to date and initial consultations undertaken by the Developer, prior to Environmental Impact Assessment commencing. In summary, the Scoping Report included:

- details of the site and proposal;
- EIA legislation and the scoping process;
- EIA process and the general approach to be taken for East Stour Solar Farm;
- Topics to be assessed within the EIA, including:
  - Pre-application Consultation;
  - Agricultural Land Classification;
  - Traffic and Transport;
  - Hydrology, Hydrogeology and Flood Risk;
  - Ecology and Ornithology;
  - Cultural Heritage and Historic Environment;
  - Landscape and Visual Assessment;
  - Noise;
  - Glint and Glare;
  - Socio-economics;
  - Cumulative Impacts;
  - Planning Policy; and
- proposed format of the Environmental Statement (ES) and planning submission.

### *Scoping Opinion*

5.15 As of January 2022, a Scoping Opinion from Ashford Borough Council is yet to be issued. As such, this Environmental Statement has been prepared following the approach proposed in the Screening and Scoping Reports, and in line with advice received through the Pre-Application and Screening responses.

5.16 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 and the appropriate Development Plan policies, including policy ENV10.

## Other Consultations

5.17 In addition to the formal Pre-Application advice noted from **Paragraph 5.1 on page 83**, pre-application discussions were undertaken with Ashford Borough Council and Kent Downs AONB regarding the selection of viewpoints for detailed analysis within the LVIA. Details of the proposed public consultation activities planned were also provided and comment sought. Copies of correspondence are provided at **Appendix 5.4**. Further details of viewpoint selection are provided in **Chapter 11 - LVIA**.

5.18 Further consultation which has been undertaken with consultees following project screening is summarised within the relevant specialist chapters of this Environmental Statement. This includes but is not limited to:

- Network Rail;
- Kent County Highways Authority; and
- the Environment Agency.

## Public Consultation

5.19 Community Engagement for the East Stour Solar Farm has been coordinated and led by SECNewgate Limited. 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 5.5**.

5.20 EDF Renewables has carried out a full programme of community consultation in support of its proposals for East Stour Solar Farm in line with Ashford Borough Council's Statement of Community Involvement (SCI) and the tenets of the Localism Act 2011. This section explains the public consultation that has been carried out in relation to this application.

5.21 In line with Ashford Borough Council's guidance, as set out in its SCI and its Planning Guidance Note on large scale solar arrays (2013), the Applicant has consulted with the local community and stakeholders across two rounds of public consultation. These public consultations have taken account of the ongoing Covid-19 pandemic and guidance provided by the Government. The first round of consultation during summer 2021 was carried out remotely with a limited number of small, in-person meetings. The second round of consultation in winter 2021 adopted a mix of in-person events and information made available online through a virtual public exhibition.

5.22 To ensure that the public could take part in the consultation, the Applicant wrote to over 2 800 addresses in the area around the proposed Scheme (**Plate 5.1 on page 87**) at the outset of each consultation to provide information on the proposals and to set out how those with an interest can take part in the consultation. Each newsletter directed interested parties to view a virtual exhibition available through the Applicant's website (www.edf-re.uk/renewables/east-stour). A hard copy questionnaire was made available with the newsletter and hard copies of the virtual exhibition and maps were made available on request through a dedicated Freephone information line and Freepost address.

5.23 The Applicant has also met with close site neighbours, local parish councils and councillors during both rounds of

consultation. These discussions have helped to shape the Scheme design as submitted. This has included meetings with Aldington and Bonnington Parish Council, Smeeth and Brabourne parish councils, Sellindge Parish Council and Otterpool Park LLP.

5.24 During the second round of consultation, the Applicant held public exhibition events at Aldington Village Hall and Brabourne and Smeeth Village Hall. These events were attended by over 70 people in total.

5.25 The Applicant received 415 individual pieces of feedback over the two consultations: 254 during the first round of consultation, and 161 during the second. The feedback received has played an important part in shaping the Scheme design, as set out within this document.

5.26 **Table 5.1** sets out the response to the feedback form question "Are you supportive of East Stour Solar Farm?"

| First Consultation Round (August 2021) | |
|---|---|
| Response | Frequency |
| Yes | 127 (50.8%) |
| No | 77 (30.8%) |
| Unsure | 43 (17.2%) |

| Second Consultation Round (November 2021) | |
|---|---|
| Response | Frequency |
| Yes | 93 (59.2%) |
| No | 15 (9.6%) |
| Unsure | 48 (30.6%) |

Table 5.1 - *Response to Question "Are you supportive of East Stour Solar Farm?"*

5.28 The most common themes to emerge through each round of consultation was concern at the potential loss of agricultural land, general support for the proposals, concern for the potential impact of the proposals on wildlife, concern at the Scheme's visual impact and suggestions that other forms of renewable energy would be superior to the proposed Scheme. Full details are provided in **Appendix 5.5**.

5.29 The Applicant will continue to engage with the local community through the planning process.

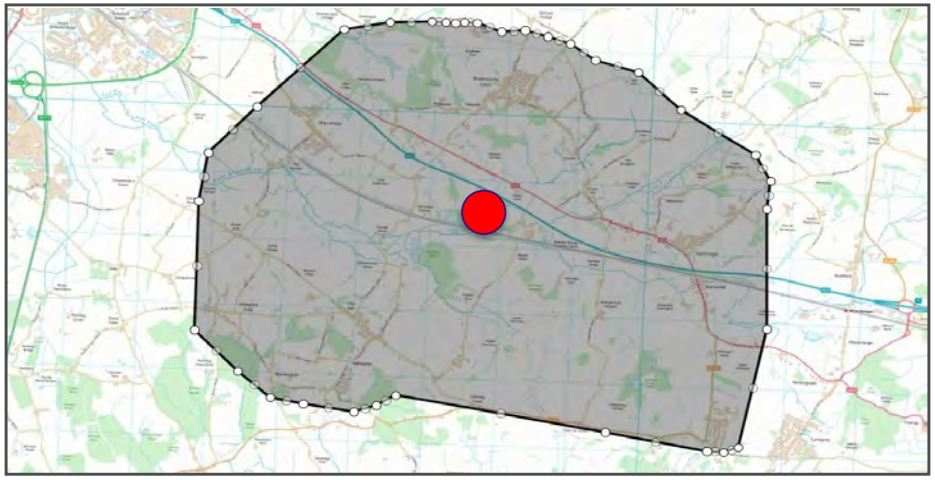



Plate 5.1 - *Public Consultation Zone (extract from **Appendix 5.5**)*

# APPROACH TO ENVIRONMENTAL IMPACT ASSESSMENT

## Purpose

5.30 The purpose of Environmental Impact Assessment (EIA) and requirement for reporting in an Environmental Statement (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.

5.31 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 development proposal.

## Scope of the EIA

### *Issues Not Considered Further in EIA*

5.32 The NPPF (MHCLG, 2021), NPPG (MHCLG, 2020), NPS EN-1 (DECC, 2011a) and EN-3 (DECC, 2011b) are material planning considerations in the determination of planning applications. 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 Scoping Report which was submitted to Ashford Borough Council (as discussed from **Paragraph 5.12 on page 85**).

5.33 Other issues may not require further examination in the Environmental Impact Assessments for individual proposals. These issues are explained in the following paragraphs, but are not necessary to be considered any further within the East Stour Solar Farm Environmental Impact Assessment or this Environmental Statement (ES).

## CONSIDERATION OF ALTERNATIVES

5.34 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 Ashford Borough Council Brownfield Register records no sites of more than 7.7ha, considerably less than the required land area and so greenfield land was progressed. Throughout the Environmental Impact Assessment and site design process consideration was given to alternative panel heights and separations from features within and in proximity to the site boundary, as well as impact avoidance and mitigation.

5.35 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 solar farms 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 which contribute to mitigating the ecological emergency.

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

## CONTAMINATED LAND

5.37 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.

# Environmental Impact Assessment Team

5.38 The Applicant appointed a specialist team to undertake the Environmental Impact Assessment and to produce the subsequent Environmental Statement.

5.39 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.

5.40 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.

5.41 For specific activities, such as landscape and visual and noise 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 solar farm developments.

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

- Wallingford Hydrosolutions (WHS) - Hydrology and Hydrogeology
- Turnstone Ecology Limited - Ecology and Ornithology;
- Viento Environmental Limited - Landscape and Visual Impact Assessment (LVIA);
- Orion Heritage Limited - Archaeology and Cultural Heritage Assessment;
- Ion Acoustic Limited – Noise; and
- Neo Environmental Limited - Glint and Glare.

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

5.44 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;
- sec Newgate - Public Engagement and consultation;
- Traffic Services UK Limited - Automatic Traffic Count; and
- Magnitude Surveys Limited - Geophysical Survey for Archaeological Assessment.

5.45 The relevant qualifications and experience of the development team is provided in **Appendix 5.6**.

## Structure of Environmental Statement

5.46 The findings of the Environmental Impact Assessment are presented within this four-volume 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.

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

5.48 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.

5.49 Electronic copies of the Environmental Statement have been submitted to Ashford Borough Council, where the document will be available for public viewing. Electronic copies of the Environmental Statement are also available on the project website (https://www.edf-re.uk/renewables/east-stour).

## Methodologies and Guidance

5.50 The Environmental Impact Assessment and subsequent Environmental Statement have been produced according to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, following the identified scope set out in the Scoping Report.

5.51 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; and
- Ashford Local Plan 2030.

5.52 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 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 - TRAFFIC AND TRANSPORT

- Department for Transport, Manual for Streets (2007);
- Department for Transport Circular 02/2013;
- Highways England et al. Design Manual for Roads and Bridges (2020); and
- Institute of Environmental Management and Assessment, Guidelines for the Environmental Assessment of Road Traffic, 1993.

CHAPTER 9 - HYDROLOGY AND HYDROGEOLOGY

- CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2018);
- CIRIA SUDS Manual (2015); and
- Environment Agency Flood Risk Assessments (2022).

CHAPTER 10 - ECOLOGY

- BS42020:2013 – Biodiversity Code of practice for planning and development (2013);
- CIEEM Guidelines (2019);
- BTO Common Bird Census Methodology and Breeding Bird Survey Techniques;
- Conservation of Habitats and Species Regulations (2017);
- Countryside and Rights of Way Act (CRoW) (2000);
- IEEM, Guidelines for Ecological Impact Assessment in the United Kingdom (2018);
- JNCC, A Handbook for Phase 1 Habitat Survey, 2nd edition (2016);
- Natural Environment and Rural Communities Act (NERC) (2006);
- The Kent and Medway Biodiversity Action Plan; and
- Wildlife and Countryside Act (1981) (as amended).

CHAPTER 11 - LANDSCAPE AND VISUAL IMPACT ASSESSMENT

- Ashford Borough Council landscape character assessments (2005 and 2009);
- Guidelines for Landscape and Visual Impact Assessment; 3rd Edition; The Institute of Environmental Management and Assessment and the Landscape Institute (2013);
- Kent Downs AONB Landscape Character Assessment (unpublished);
- The Landscape Assessment of Kent (2004);
- 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).

CHAPTER 12 - CULTURAL HERITAGE AND ARCHAEOLOGY

- Ancient Monuments & Archaeological Areas Act (1979);
- Chartered Institute for Archaeologists, Standards and guidance for archaeological geophysical survey (2020);
- English Heritage, Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment (2008);
- English Heritage, Seeing the History in the View: A Method for Assessing Heritage Significance within Views (2011);
- Historic England, Historic Environment Good Practice Advice In Planning, Note 2, Managing Significance in Decision-Taking in the Historic Environment (2015);
- Historic England, Historic Environment Good Practice Advice In Planning Note 3: The Setting of Heritage Assets (2017); and
- Planning (Listed Building and Conservation Areas) Act (1990).

CHAPTER 13 - NOISE

- BS5228 'Code of practice for noise and vibration control on construction and open sites Part 1: Noise +A1:2014 (2014);
- BS4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound (2019);
- Control of Pollution Act (CoPA) (1974);
- Defra, Noise Policy Statement for England (NPSE) (2010);
- Environmental Protection Act (EPA);
- Highways England et al. Design Manual for Roads and Bridges (2020);
- IEMA (Institute of Environmental Management and Assessment) Guidelines for Environmental Noise Impact Assessment (2014); and
- Department of Transport and Welsh Office, Technical Memorandum, Calculation of Road Traffic Noise (CRTN) (1988).

CHAPTER 14 - GLINT AND GLARE

- CAA, Interim CAA Guidance – Solar Photovoltaic Systems (2010);
- CAA, Air Navigation: The Order and Regulations (2015);
- BRE Planning Guidance for the Development of Large Scale Ground Mounted Solar PV Systems (2013); and
- US Federal Aviation Administration (FAA), Technical Guidance for Evaluating Selected Solar Technologies on Airports (2010).

5.53 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 5.50 on page 91** 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.

5.54 The Environmental Statement as a whole follows the same format with a summary of mitigation measures and residual impacts at the end of the document.

## Study Area

5.55 As stated at **Paragraph 5.30 on page 88**, the Environmental Statement should focus upon potential significant effects to the baseline environment. With this is mind the study area was selected in order to allow studies to focus on significant effects.

5.56 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 11**).

5.57 Following the generation of the Zone of Theoretical Visibility (ZTV) for the Scoping Report, it was the professional opinion of the landscape architect, that a 5km radius study area would ensure adequate assessment of significant effects.

5.58 The Hydrology and Hydrogeology assessment (**Chapter 9**) predominantly focuses upon the area within the site boundary. However the impact that the proposal will have on the surrounding area is also considered.

5.59 The Ecological assessment (**Chapter 10**) 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**. Targeted species surveys covered the site area and an appropriate buffer on an individual species basis.

5.60 The assessment of potential impacts on cultural heritage assets (**Chapter 12**) considers all designated heritage assets within a 1.0km study area.

5.61 There is no formal guidance with regard to the maximum distance at which noise or glint and glare should be assessed. Noise modelling of the proposed development at the proposed environment determines the study area to ensure standards are achieved at the nearest dwellings to the proposal. The Glint and Glare assessment, as reported in **Chapter 14**, uses the ZTV as the guide for the study area, which is limited to 1.0km for this discipline, and extended to 30km with respect to aerodromes.

5.62 With respect to other assessments the study area has concentrated on the development site.

# DIFFICULTIES AND LIMITATIONS

## Scoping

5.63 At the point of submission, a Scoping Opinion from Ashford Borough Council was yet to be received. However, the advice provided by the Planning Officer within the Pre-Application and Screening responses has been followed throughout the assessment process and in the preparation of this Environmental Statement as well as the scope as set out in the submitted Scoping Report (October 2021).

# REFERENCES

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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].

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# CHAPTER 6 - DEVELOPMENT PROPOSAL


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## ELEMENTS OF THE EAST STOUR SOLAR FARM

6.1 The elements of the East Stour Solar Farm are described in this chapter. Where these elements may have potential impacts on the environment, reference is made to the Environmental Statement chapter where the impacts are discussed and assessed.

6.2 The proposed development comprises a solar array with the necessary electrical and supporting infrastructure to export the generated electricity to the grid. In addition to the technical equipment, a range of environmental enhancements and social benefits are included with the application. These measures are discussed further from **Paragraph 6.45 on page 105**, while first the technical infrastructure is detailed.

### Solar Array

6.3 An array of ground-mounted solar photovoltaic panels is set out within a fenced area of approximately 65.5 hectares. The export capacity of the array is up to 49.9MW (3 S.F.). A typical solar panel specification is provided at **Plate 6.1**.

6.4 The panels are grouped in blocks (or 'racks') of 64 panels that are arranged in two rows of 32 panels in portrait format. Half 'racks' of 2 rows by 16 columns of panels are used to infill smaller areas.

6.5 Candidate model solar panels have been used for the purpose of the EIA. The final solar panel model choice will be selected prior to construction and will match or better the environmental performance predicted in this ES.

### Panel Frames and Anchors

6.6 The solar panels will be mounted on frames at an angle of approximately 20 degrees, with a maximum height of 3.0m. Frames that support the panels are typically made of aluminium and fixed to the ground with ground anchors. Where less disturbance is required to the subsurface, concrete 'feet' can be used to stabilise the panel frames on the surface. Typical frame and footing details are provided at **Figure 6.1 (ES Volume 3)** and shown at **Plate 6.1** and **Plate 6.2 on page 100**.



Plate 6.1 - *Typical Ground-Mounted Solar Array on Frame with Anchors*

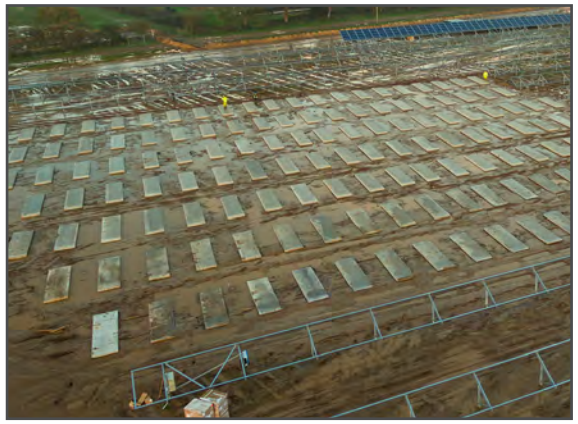


Plate 6.2 - *Typical Ground-Mounted Solar Array Concrete 'Feet' Foundations*

6.7 The lower edge of the panels will be a minimum of 0.8m above the ground to allow for safe sheep grazing.

6.8 Space between frames is provided for maintenance access and to minimise shading from neighbouring panels (**Figure 6.1, ES Volume 3)**.

## Site Access Tracks

6.9 Access within the site is required during construction, through operation, and finally during the decommissioning of the site at the end of the project's operational life.

6.10 It is proposed that existing field entrances will be utilised and upgraded, where necessary, to allow access to individual segments of the solar array with a single new access point to cross Church Lane.

6.11 Three points of access for construction are proposed from the public highway, located off Church Lane (**Figure 6.2, ES Volume 3**). The access points for the northern area and Bested Hill central area will use existing field entrances off Church Lane. A new access point will be required to reach the eastern area with a new crossing of Church Lane.

6.12 An appropriate visibility splay is available in accordance with the Design Manual for Roads and Bridges (Highways Agency, 2020) and Manual for Streets (DfT, 2007) from the entrance off the highway. This is further discussed in **Chapter 8 - Traffic and Access**.

6.13 Where possible, the layout of the proposed access tracks (**Figure 1.2** and **Figure 1.3** in **ES Volume 3)** has followed the route of the existing farm tracks to minimise land loss and impacts on ecological habitat. Where new access tracks are required these have been designed to follow field boundaries and use existing field entrances or hedge gaps, where possible, to minimise the impacts on farming practices.

6.14 Watercourse crossings will be upgraded to accommodate anticipated construction traffic.

6.15 Where sections of new, upgraded or widened access track are required, 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. As illustrated in further detail in **Figure 6.3 (ES Volume 3)**, the running surface (4.0m wide) is laid over a permeable stone sub-surface on a surface-mounted geogrid base (e.g. Cellweb). At some locations, internal access tracks may need temporary widening to accommodate delivery vehicles. The tracks will be reinstated and panels may be placed over these areas as construction concludes.

6.16 Water drainage off the track has also been considered in the track design and layout, and is assessed in **Chapter 9 - Hydrology and Hydrogeology**.

6.17 The on-site access tracks within the solar farm 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*

## Inverter/Transformers

6.18 The solar panels generate Direct Current (DC) electricity, which must be converted to Alternating Current (AC) and the voltage raised to the grid connection voltage before it is exported at the grid connection point within the Sellindge Converter Station, to the north and east of the proposed development areas. The DC to AC and voltage conversion would be undertaken by 20 containerised inverter/transformer units, each up to 6.0m long by 3.0m wide and 3.0m high (**Plate 6.4** and **Figure 6.4, ES Volume 3**). The external finish will be agreed with the Local Planning Authority prior to construction commencing.

6.19 Electrical cables pass along the rear of the panels then underground across site to the inverter/transformer units.

6.20 From the inverter/transformers, export cables pass through the on site substation cabinets then onwards to the Sellindge Converter Station as discussed further from **Paragraph 6.25 on page 102**.



Plate 6.4 - *Typical Inverter/Transformer (image courtesy of SMA Solar Technology AG)*

6.21 Communications cables link the inverter/transformers to the substation from where the site can be monitored remotely.

## Site Cabinets

6.22 Three cabinets located at the northern and one in the central areas of the site (**Figure 1.2** and **Figure 1.3, ES Volume 3**) will contain welfare facilities and 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 at maximum 6.0m long, 3.0m wide and 3.0m high.

6.23 **Plate 6.5** shows a typical container-based cabinet and **Plate 6.6** a typical GRP cabinet. Drawings of typical cabinets are provided as **Figure 6.4**, (**ES Volume 3**). The external finish will be agreed with the Local Planning Authority prior to construction commencing.



Plate 6.5 - *Typical Steel Storage Unit*



Plate 6.6 - *Typical GRP Cabinet*

## Substations and Grid Connection

6.24 Four substations are proposed for the site: three internal substations within each parcel of land, and a central substation (**Figure 1.2** and **Figure 1.3, ES Volume 3**).

6.25 Underground cables will connect from the inverter/transformer units to the respective on-site substations providing protection equipment (e.g. fuses) and isolation switches.

6.26 The substations will be a maximum of 6.0m long, 3.0m wide and up to 3.0m tall and constructed of Glass Reinforced Plastic (GRP) or steel container-based cabinets, finished in a colour to be agreed with the Local Planning Authority. **Figure 6.4 (ES Volume 3)** provides typical details of the on site cabinets.

6.27 From the central on-site substation (located immediately west of the Sellindge Converter Station/ substation) the cables will travel underground adjacent to the hedges, tracks and Church Lane verge to the Sellindge Converter Station/ substation, where the electricity is connected to the National Grid. Where Church Lane passes under the railway bridges, the cable will be buried in the road. The anticipated route of connection between the on-site substations and point of connection is shown at **Plate 6.7**.



© Bluesky International Limited. Not to Scale

Plate 6.7 - *Indicative Grid Connection Route (in blue)*

## Cables and Conduits

6.28 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.

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

6.30 All connection cables will be run across the site in underground cable trenches. The typical detail of the cable trenches are shown on **Figure 6.5 (ES Volume 3)** and are designed to ensure safety and avoid disturbance from agricultural equipment and activities.

## Security

6.31 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 2.15m tall (as shown at **Plate 6.8**). A typical fence and accompanying wire mesh gate detail is shown in **Figure 6.6 (ES Volume 3)**. To secure the site and existing farm entrances, there will be up to twelve gates in the site fencing and one new field gate west off Church Lane south of the East Stour bridge. Two existing field gates will be retained.

6.32 Access points for wildlife will be included in the fence line to ensure permeability across habitat.

6.33 Public rights of way will remain open although some management may be required during construction for health and safety reasons.



Plate 6.8 - *Typical Site Perimeter Fence*

6.34 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, as shown at **Figure 6.7** (**ES Volume 3**).

## Lighting

6.35 No visible lighting is proposed as part of the East Stour Solar Farm for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye.

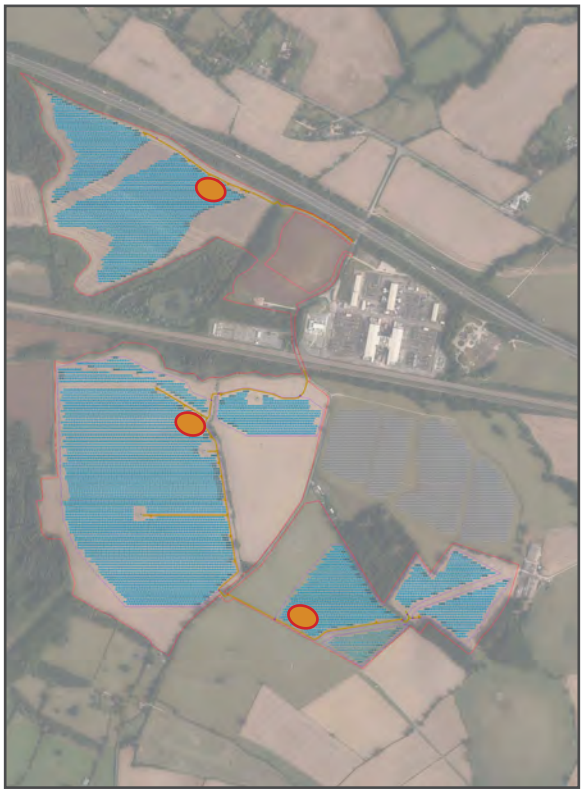
6.36 During the construction phase, temporary lighting may be required should deliveries be scheduled for

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.

## Temporary Construction Compounds

6.37 For the duration of the construction (and decommissioning) periods, temporary compound areas will be required to provide secure storage of equipment and construction materials, welfare facilities and office accommodation for site staff.

6.38 For the proposed development, three separate temporary construction compound areas of varying sizes are required to service the different areas of the site during the construction programme. There will be a main compound at the centre of the site near to the railway line on Bested Hill, and two additional welfare areas serving the northern and eastern land parcels. Temporary welfare facilities will likely move around as the construction team move across the site. The locations of the temporary construction compound areas are shown at **Plate 6.9**.



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Plate 6.9 - *Approximate locations of the Temporary Construction Compound Areas (orange dots)*

6.39 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;
- HGV turning area; and
- vehicle parking spaces.

6.40 The layout of elements within the construction compounds may vary but the overall dimensions will be no more than 5 000m$^2$.

## Operational Period

6.41 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 East Stour Solar Farm is 40 years.

## PROPOSED DEVELOPMENT SUMMARY

6.42 In summary, the elements forming the East Stour Solar Farm are:

- solar photovoltaic panels with a total export capacity of up to 49.9MW;
- panel frames with a combination of ground anchors or concrete feet;
- new access track, up to 4.0m wide;
- 20 inverter/transformer units;
- 3 spare parts stores;
- a welfare unit;
- 4 on-site substations;
- a perimeter fence, up to 2.15m tall with gates as required;
- cables and conduits;
- CCTV cameras on 2m posts; and
- three temporary construction compound areas with welfare, storage and office facilities.

6.43 The arrangement of these elements is shown on **Figure 1.2** and **Figure 1.3 (ES Volume 3**) with the temporary construction compound locations shown on **Plate 6.9** on **page 104**.

6.44 In addition to the technical infrastructure required, a series of ecological and landscape enhancements are proposed. These are discussed further from **Paragraph 6.45 on page 105** and detailed within **Chapter 10 - Ecology** and **Chapter 11 - LVIA**, and shown on **Figure 11.9 (ES Volume 3)**.

## SUMMARY OF ENHANCEMENTS

6.45 Alongside the technical infrastructure required to construct and operate the proposed solar farm, additional measures are proposed as part of the development.

6.46 **Chapter 8** - **Chapter 14** inclusive describe the environmental assessments of the proposed solar farm and, where relevant, identify whether mitigation is required or enhancements are suitable. These measures are summarised at **Chapter 16 - Avoidance and Mitigation**.

6.47 Alongside the elements required to operate the solar farm, the proposal includes a series of environmental additions designed specifically for this site. The measures have been determined through consultation of the BRE National Solar Centre Biodiversity Guidance for Solar Developments (BRE, 2014).

6.48 The biodiversity enhancements will be incorporated with the development of the solar farm and managed over the project life in accordance with a Landscape and Environment Management Plan (LEMP). As shown in **Figure 11.9**, **ES Volume 3**, the measures include:

- local species rich grassland and wild flower meadow between and under the rows of solar panels, providing habitat for birds and invertebrates;
- wide meadow belts between the public footpaths and proposed solar panels in the area east of Park Wood and to the south of Bested Hill;
- establishing a large meadow between Church Lane and Bested Hill;

- hedge and tree planting around the site to:
  - reinstate hedgerows and create new hedgerow lines;
  - strengthen existing hedgerows;
  - continue roadside hedgerows; and
  - plant new low density woodland on the west side of Church Lane at the south of Bested Hill to provide visual screening.
- bat boxes will be positioned on trees around the development site to provide additional bat roosting opportunities;
- birds boxes will be positioned around the site; and
- habitat piles for invertebrates to be introduced in appropriate areas around the site to encourage native bees, amongst other species, to maximise benefits of the wildflower and grassland areas.

6.49 A mix of local native species will be used and will be agreed with Ashford Borough Council through the Landscape and Environment Management Plan (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 maximising screening benefits. The planting has been specifically designed to reflect the wider pattern and scale of woodland and hedging in the area.

6.50 A grass margin will separate woodland from the edge of the solar array, ensuring that the trees do not create shadows over the panels as well as creating habitat for a range of species.

6.51 The environmental management of the site for the life of the project will be detailed within a LEMP. 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.

# CHAPTER 7 - CONSTRUCTION, OPERATION AND DECOMMISSIONING


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## INTRODUCTION

7.1 This chapter describes the construction, operation and decommissioning phases of the proposed East Stour Solar Farm.

7.2 Potential impacts associated with the respective phases of the development are addressed individually within the following ES assessment chapters.

## THE SOLAR FARM CONSTRUCTION PHASE

### Construction Process

7.3 The construction of a solar farm is a relatively straight forward process.

7.4 The principal phases to the construction are:

- site access tracks are built or upgraded and site fencing is erected;
- the combined inverter/transformer units and site cabinets are offloaded in situ;
- 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;
- all electrical connections are made and the site is commissioned; and
- landscape mitigation planting takes place during the autumn.

7.5 It is envisaged that the proposed East Stour Solar Farm will take approximately nine months to construct, with multiple teams working in different areas of the site simultaneously. Most of the construction activity is involved with the track construction during the first six months of construction.

7.6 A typical construction programme for a project of the scale of the East Stour Solar Farm is shown in **Table 7.1 on page 112**.

7.7 **Plate 7.1 on page 113** provides an overview of the construction process as a photographic sequence.

Table 7.1 - *Typical Construction Programme*

| Activity | Programme Month | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Temporary construction compound, including gates, welfare and temporary surfacing, removal at the end of the construction period | ■ | | ■ | | ■ | | | | |
| Security fencing and gates | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| Site tracks (crushed stone over geogrid base) | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| Foundation concrete for inverter/transformer units, customer cabin, welfare unit, store, substation and CCTV posts | ■ | ■ | ■ | ■ | ■ | ■ | | | |
| Frame mounting system and CCTV equipment | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Solar panels | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Cabling and cable trench sand | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Inverter/Transformer units | | | ■ | ■ | ■ | ■ | | | |
| Substation, Store and Welfare containers | | | | ■ | ■ | ■ | ■ | ■ | ■ |
| Ecological works (wildflower/seed mix, hedging and woodland), subject to appropriate time of year | | | | | | | | | ■ |
| Site commissioning, testing and clearing | | | | | | | | | ■ |



Plate 7.1 - *Photographic Sequence of Construction Process*

*Groundworks*

7.8 Works across the site will be staged as the construction teams progress through the various parcels of land comprising the site.

7.9 Two entrance points and one crossing of Church Lane will be used to access the three distinct sections of the proposed site from Church Lane (Unique Street Reference Number (USRN): 1300278 (One.Network, 2021)).

7.10 As described in **Chapter 6 - Development Proposal** and **Chapter 8 - Traffic and Access**, appropriate visibility from the junction is achieved in line with National Policy and Guidance. The solar farm site entrances, including proposed modifications, are shown in Figure 6.2 - Proposed Site Entrances with Visibility Splay (North Entrance - a, Central Entrance - b, Church Lane Crossing - c) **(ES Volume 3)**.

7.11 From the site entrances, access tracks follow field boundaries as far as possible. Access tracks are kept to a minimum to allow access to sub-sections of the site rather than weaving in and out of every row of solar panels. Wherever possible existing farm access tracks have been utilised as the site tracks for the proposed solar farm. Existing field entrances are also used so that no new breaks in hedgerows will be required for access through the proposed site, excepting for the Church Lane crossing point to the south where a defunct section of hedge will be opened.

7.12 Where new access tracks are required these will have a running width of 4m. As described in **Chapter 6 - Development Proposal**, 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 as discussed further in **Chapter 9 - Hydrology and Hydrogeology**.

7.13 Temporary construction compounds will be established. The compounds will provide a secure store for materials and equipment and welfare facilities and will be created following the same construction technique as for the access tracks. Construction of the temporary construction compounds may be staggered as the construction teams progress through the site.

7.14 Stock proof fencing providing security will be installed around the perimeter of each parcel of the site. Fence posts will be driven into the ground wherever ground conditions permit. No concrete or foundations are required for the posts. Wire mesh is then tensioned between the posts.

7.15 Concrete footings are cast for the site cabinets and distributed inverter/transformer units. Concrete will also be used to anchor the posts holding the CCTV cameras.

7.16 Cable trenches will be excavated from the array ‘table’ ends to the inverter/transformer unit pads, and from the inverter/transformer units to the substation and electrical and telecommunication cables installed. The cables will be installed as the trench is excavated, and the trench filled immediately afterwards. The grid connection will be similarly trenched. Works in the highway will be timed to as to minimise traffic disruption.

7.17 Inverter/transformers units are delivered directly on to their pads and installed.

7.18 The installation of the panel frame legs follows a similar approach to fencing installation, these are driven into the ground. Where concrete feet are to be used these are simply set out in place.

7.19 The frames are then assembled. Firstly the edges of the frames are installed at the inclination angle (in this case 20 degrees), 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 transformer/inverter units.

7.22 The approximate number of deliveries and removals associated with the groundworks, solar panel and associated infrastructure delivery throughout the construction process for the East Stour Solar Farm are outlined in **Chapter 8 - Traffic and Access**.

## OPERATIONAL PHASE

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

7.24 The solar panels will be mounted at a fixed angle of approximately 20 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.

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

7.26 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 and fencing are all in good working order.

7.27 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.



Plate 7.2 - *Typical Solar Farm Cleaning Unit*

7.28 Grass and wild flower meadow mix areas will be mown at the appropriate time of year, in accordance with a Landscape and Environment Management Plan, to be agreed with Ashford Borough Council.

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

## Predicted Electricity Generation

7.30 East Stour Solar Farm will connect directly in to the nearby Sellindge Converter Station Substation National Grid Supply Point (GSP). The GSP is where electricity transported from the National Grid is converted to the Distribution Network voltage for supply across the region. Whilst the site is generating it will supply electricity directly into the network and its serviced consumers.

7.31 As stated at **Chapter 1 - Introduction** it is predicted that the solar farm at this site would have a potential annual yield of approximately 69 600MWh.

7.32 In terms of household electricity usage this would be sufficient to offset the equivalent annual energy needs of 16 900 (to 3 S.F) average Ashford Borough homes (as noted in **Chapter 1**).

## Emissions

7.33 It has been predicted that the proposed solar farm will generate an annual average of approximately 69 600 000kWh (net) of electricity (to 3 S.F.).

7.34 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.

7.35 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.

7.36 For carbon dioxide these assumptions range from 860g$CO_2$/kWh (based upon coal generation) to 355g$CO_2$/kWh (based upon gas generation).

7.37 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 7.3 on page 117** (as also discussed in **Chapter 2 - Development Rationale**), electricity is also imported from overseas.

7.38 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 7.3**.

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

7.40 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.

7.41 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.

7.42 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 7.3**) they can be considered conservative as this mix includes for renewable energy sources and renewable energy generation is not used to offset itself.

7.43 The conversion factors for 2020, published in June 2021, provide the most up to date figures as shown in **Table 7.2**.

Table 7.2 - *2021 GHG Conversion Factors (DBEIS, 2021c)*

| | **$kgCO_2e/kWh$** |
|---|---|
| Electricity Generation | 0.21233 |

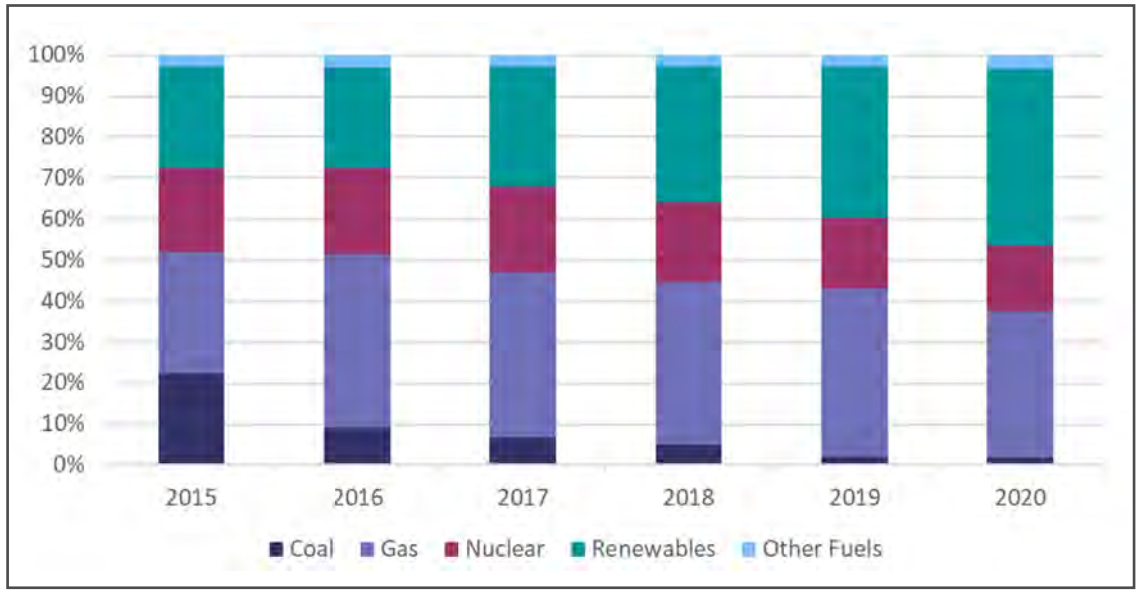



Table 7.3 - *2015 Electricity Fuel Mix Compared to 2020 Electricity Fuel Mix (Source: Digest of UK Energy Statistics (DBEIS, 2021)*

7.44 On this basis the electricity produced by the East Stour Solar Farm will offset approximately **14 800 000$kgCO_2$/ annum or 14 800 tonnes $CO_2$ per annum** (to 3 S.F.). This can be considered a conservative estimate of the carbon offset by the East Stour Solar Farm.

7.45 DBEIS report that the $CO_2$ emissions associated with the average Ashford resident was 1.41 tonnes of $CO_2$ per annum based upon per capita emissions in 2019 (DBEIS, 2021d). The 14 800 tonnes of $CO_2$ offset by the solar array would therefore compare to the total equivalent domestic emissions of some 10 500 (to 3 S.F.) average Ashford Borough residents.

7.46 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. Whilst Ashford Borough elected not to declare a 'Climate

Emergency', the Council has elected to commit to carbon neutrality by 2030.

## DECOMMISSIONING PHASE

7.47 At the end of the operating life of the solar farm, 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.

7.48 If a replacement development is both applied for and consented, then a partial decommissioning will 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.

7.49 If a replacement development is neither applied for nor consented, then the decommissioning of the solar farm would follow the reverse of the construction phase over a shortened time period.

7.50 It is likely that temporary compounds 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. The compounds will be in situ for the duration of the decommissioning process, after which the compound area will be reinstated to agricultural land.

7.51 The solar panels and frames will be removed. The site will be reinstated with electrical connections isolated and made safe and left in situ, below agricultural depth or removed for recycling.

7.52 The inverter/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.

7.53 Fencing and CCTV equipment will be removed.

7.54 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.

7.55 A Waste Management Plan will be agreed with Ashford Borough Council and will include measures for the treatment of waste arising during the decommissioning phase. This plan will maximise re-use and recycling in accordance with the waste management hierarchy.

## PROTECTION MEASURES THROUGH CONSTRUCTION AND DECOMMISSIONING PHASES

7.56 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 East Stour Solar Farm. 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

7.57 Potential impacts on geology and soils from the construction of the civil works associated with the solar farm (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.

7.58 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. The site is well located to receive construction materials from the nearby A-road network as discussed further in **Chapter 8 - Traffic and Access**.

7.59 The volumes of all footings and foundations are inherently designed to minimise the volumes of stone and concrete required within safe engineering margins.

7.60 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.

7.61 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.

7.62 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) 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.'*

7.63 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.

7.64 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 the Site Waste Management Plan.

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

7.66 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.

## Health and Safety

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

7.68 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 solar farm; and contagious diseases (such as SARS-Cov-2).

7.69 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.

7.70 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.

7.71 All site work for the East Stour Solar Farm 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

7.72 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 solar farm 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.

7.73 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.

7.74 Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance to regulations and manufacturer/ supplier's guidelines.

7.75 No hazardous materials will be stored on site during the operational phase of the proposed development.

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# CHAPTER 8 - TRAFFIC AND ACCESS


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## INTRODUCTION

8.1 This chapter considers the impacts of the East Stour Solar Farm on the local roads infrastructure, particularly during the construction process.

8.2 For the purposes of the Environmental Impact Assessment and this Environmental Statement, assessments for impacts of the solar farm have been based upon panel rows with a maximum height of 3.0m, at a tilt of approximately 20$^{O}$ facing south.

8.3 The construction of solar energy projects requires the delivery of a variety of loads, including 'Redimix' concrete, standard HGV to carry the panel frames and solar panels, and a small crane (typically 45T) to offload the inverter/ transformer units.

8.4 The operational phase involves site traffic associated with monthly site visits and annual scheduled servicing, cleaning and ground maintenance.

8.5 The decommissioning phase is a reduced reverse of the construction phase involving the removal of the solar panels, frames and associated infrastructure elements, as described in **Chapter 7 - Construction, Operation and Decommissioning**.

8.6 This assessment has been focused on the construction process. As detailed in **Chapter 7 - Construction, Operation and Decommissioning**, the operation of the development is largely undertaken through remote monitoring, with personnel visiting site approximately once per month. It is therefore considered that traffic volumes associated with the operation of the development will be negligible and, as such, are not considered further in this assessment. The traffic levels associated with the decommissioning of the project are significantly less than those associated with the construction phase.

8.7 The delivery route for the solar farm components is considered. Typical vehicular movements for the construction programme and an assessment of the associated impacts are provided.

8.8 In addition, assessments have been undertaken to determine the requirement for modification to the highway network to facilitate deliveries.

8.9 Finally, following the application of mitigation, residual impacts are identified.

# METHODOLOGY

## Vehicle Movements

8.10 This assessment follows the Guidelines for the Assessment of Road Traffic (IEMA, 1993), published by the Institute of Environmental Management and Assessment (IEMA), to identify and address potential impacts on roads and their users.

8.11 The Guidelines state that the scale and extent of this assessment should include highway links where traffic flows are predicted to increase by more than 30% or where the number of heavy goods vehicles is predicted to increase by more than 30%; and to include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more (such as villages or near schools or hospitals). Increases in traffic flows below 10% are generally considered to be insignificant as this is likely to be within the daily variations in traffic flow. The proposed development is assessed against these thresholds. If exceeded, potential impacts are considered to be significant.

8.12 Much of the advice in the NPPF (MHCLG, 2021) relates to wider transport network planning, assessment of anticipated future transport requirements of a development, and sustainable solutions modes of transport. This is more applicable to other forms of development such as housing and retail, and not specifically relevant to solar farm development as the majority of the transport movements will occur in the construction phase rather than during the life of the project. However, the NPPF at Paragraph 113 requires:

*'All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed.'*

8.13 Further guidance on transport matters is contained in the NPPG (MHCLG, 2014), which includes what information should be contained in a transport assessment (Paragraph Reference ID: 42-015-20140306). Specifically for Renewable and Low Carbon Energy, developers are directed at Paragraph Reference ID: 5-016-20140306 to the Highways Agency/ Department for Transport Circular 02/2013 (DfT, 2013a). Solar Farms are considered specifically at Paragraph Reference ID: 5-013-20150327 of the NPPG (2015), which is considered further for the current proposal in **Chapter 3 - Site Selection and Design**.

## Exceptional Load Delivery Vehicles

8.14 UK Government also provides guidance for dealing with exceptional load deliveries. This guidance (HMSO, 2014) defines an exceptional load as a vehicle with any of the following:

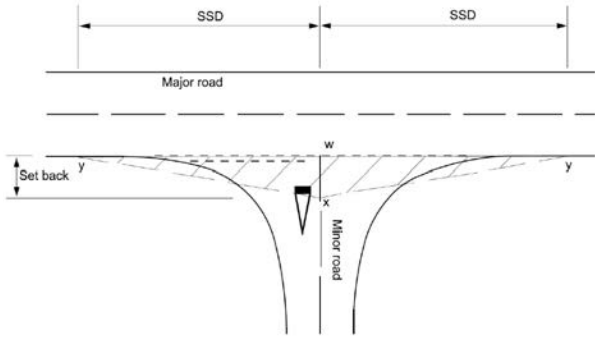
- a weight of more than 44 000 kg (44 Tonnes);
- an axle load of more than 10 000 kg (10 T) for a single non-driving axle and 11 500 kg (11T) for a single driving axle;
- a width of more than 2.9m; or
- a length of more than 18.65m.

8.15 For such vehicles, advance warning to the Police, Highways Authority and structure owners such as Network Rail may be required.

## Visibility Splays at Junctions

8.16 This assessment also considers the requirements for an appropriate site entrance. In this regard, advice on visibility splays is provided in the Design Manual for Roads and Bridges (DMRB) (Highways England et al., 2020). Guidance is also provided in the Department for Transport's Manual for Streets (MfS) (2007). The proposed development is assessed against the requirements of these design guides.

8.17 The required specification for site entrance visibility is shown in **Plate 8.1**. The speed limit on the highway at the site entrance location will be analysed along with recorded vehicle speeds during automated traffic count surveys. The appropriate minimum visibility distance will be established.




The minimum distances used to locate point X and therefore generating the visibility splay shall be: 1) 2 metres for direct accesses; 2) 2.4 metres for simple priority junctions; and 3) 4.5 metres for all other priority junctions.

| **Design Speed of road (kph)** | **120** | **100** | **85** | **70** | **60** | **50** |
|---|---|---|---|---|---|---|
| *DMRB Stopping Sight Distance (SSD) (m)* | | | | | | |
| Desirable minimum | 295 | 215 | 160 | 120 | 90 | 70 |
| One step below desirable minimum | 215 | 160 | 120 | 90 | 70 | 50 |
| *MfS Stopping Sight Distance (SSD) (m)* | | | | | | |
| Desirable minimum | - | - | - | - | 59 | 45 |

Plate 8.1 - *Design Specification for Site Entrances as per the Guidance of the DMRB (2020) and MfS (2007)*

## Road Accident Records

8.18 The Royal Society for the Prevention of Accidents (ROSPA) state that '*Great Britain has one of the best road safety records in Europe and the world*' (2021). Human error is a factor in 95% of all road accidents and the road environment (road and junction design, and road surfaces) a factor in just 12% of accidents (ROSPA, 2017). Human error can be a result of many factors including: alcohol or drugs, inexperience, tiredness or illness, in-car distractions, impatience, stress, carelessness or negligence.

8.19 ROSPA (2020) describe many potential sources of driver distraction, but note that in reality the information required to perform the driving task is prioritised. Many distractions occur within the vehicle, such as conversing with passengers and manipulating audio controls. An American Study found external distractions to occur in over 85% of journeys in the sample (ROSPA, 2020).

8.20 Of the four types of distraction (visual, cognitive, biomechanical and auditory), only visual distraction is potentially relevant for solar farm

developments. The ROSPA factsheet (ROSPA, 2020) states:

*'The way that a driver observes the area around the vehicle depends on how complex it is, and in complex environments, drivers can find it more difficult to identify the main hazards.*

*In undemanding situations, driver's attention tends to wander towards objects or scenery that are not part of the driving task. Estimates of how much time drivers spend doing this varies from between 20% and 50%.'*

8.21 Existing crash records in proximity to the proposed site entrance were reviewed. The number, circumstances and reasons for the crashes were analysed and where similar circumstances may arise as a result of the proposed development significant impacts may be possible. The site layout was designed in accordance with current planning policy and guidance to avoid potential impacts on users of the local highway network.

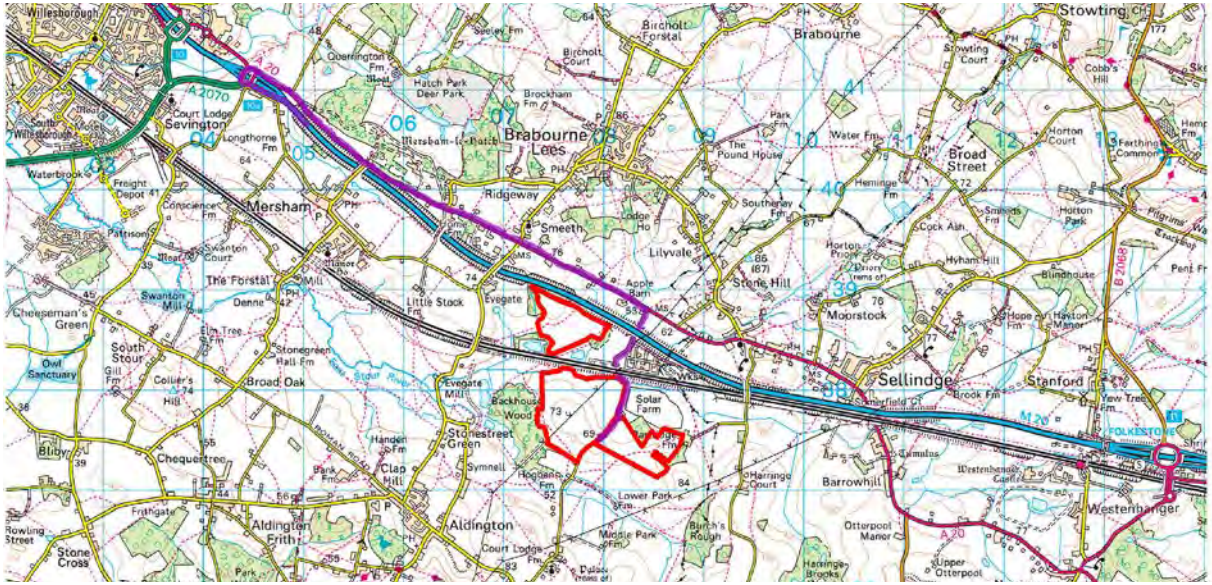
## Transport Route

8.22 An access route for the delivery of the solar farm components (as shown on **Plate 8.2**) was identified through an iterative desktop assessment and site visits.

8.23 Traffic count data are considered in comparison with the anticipated vehicle numbers and transport requirements for delivery of the East Stour Solar Farm components.

8.24 Existing road accident records have been analysed and the site layout designed in accordance with current planning policy and guidance to avoid potential impacts on users of the local highway network.

8.25 Consultation has taken place with the Highway Authority, Kent County Council, to establish the loading capacity of the East Stour bridge on Church Lane.




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Plate 8.2 - *Proposed Delivery Route from M20 Motorway (shown in purple)*

# BASELINE CONDITIONS

## The Local Road Transport Network

8.26 As described in **Chapter 4 - Existing Conditions**, the proposed development is located south of the M20.

8.27 The nearest motorway to the proposed site is the M20, which runs parallel to the northern boundary of the site at a distance of approximately 30m. The nearest trunk road is the A20, which is to the north of the M20 and approximately 300m from the northern site boundary. Church Lane (USRN: 1300278) is a minor road that travels south from the A20 towards Roman Road, Aldington.

8.28 Church Lane will be used to gain access to all three land parcels of the proposed site. The National Speed Limit of 60mph applies along Church Lane, automated traffic counts have been undertaken at two points on Church Lane to establish actual traffic speeds.

8.29 In the wider area, a network of minor roads surround the site serving the local villages and individual farm houses. These include Evegate Mill Lane (USRN: 1301856) and Goldwell Lane (USRN: 1300495) to the west; Roman Road (USRN: 1301012) to the south; and Harringe Lane (USRN: 34503089) to the east.

8.30 There are two site entrances proposed off Church Lane and one crossing. The delivery route and site entrances are discussed further from **Paragraph 8.73 on page 137**.

## Traffic Volumes

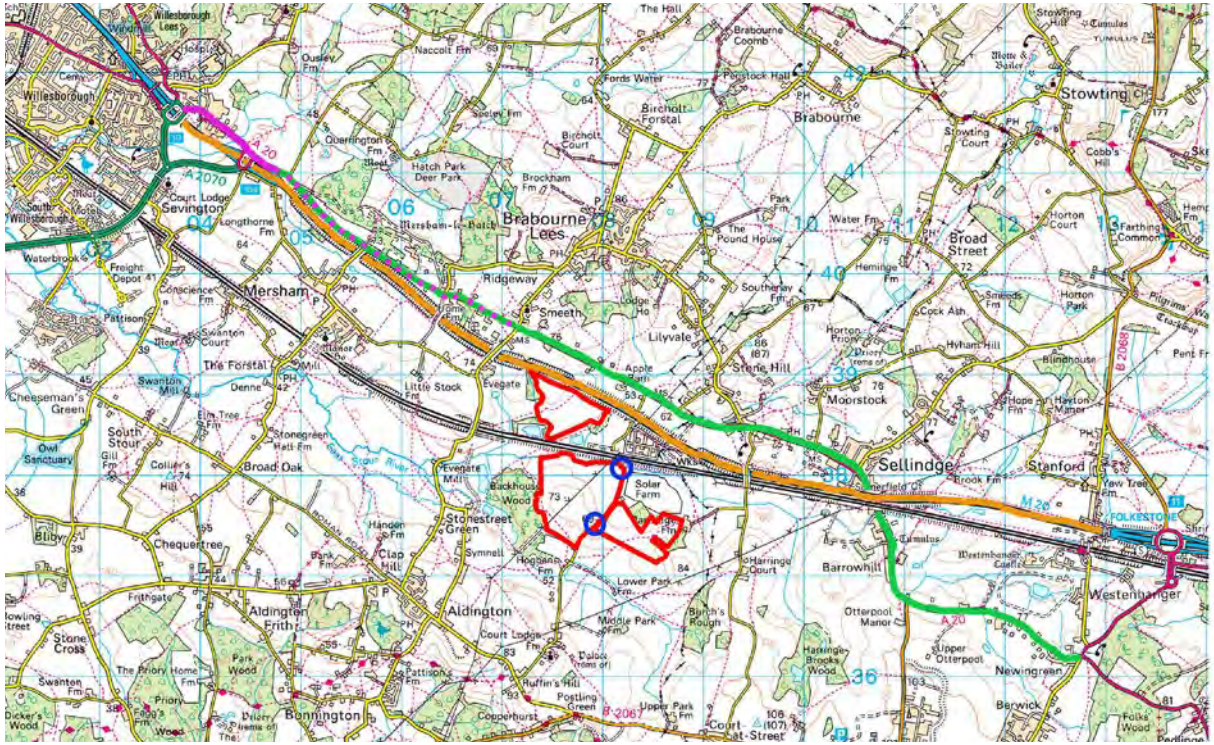
8.31 The Department for Transport (DfT) provides National traffic count data for locations across the UK. Traffic count data provides the number of vehicles that will drive on the particular stretch of road on an average day of the year.

8.32 In Kent there are 787 existing count points. There are no count points in proximity to the proposed site entrance. The closest points to the proposed site are on the M20 (count point 7869), the A20 (count points 36252 and 92060). Traffic counts at Church Lane were undertaken as part of the site assessment, as discussed from **Paragraph 8.50 on page 132**. Traffic count locations are shown at **Plate 8.3 on page 130**.

### *Motorways - M20*

8.33 The count segment for the M20 nearest to the proposed site (count point 7869) covers the area between Junctions 10 and 11, a stretch of approximately 10.9km.

8.34 Traffic count data are available for this location from the year 2000. Over the past 4 years, traffic levels were measured using automatic counters. In 2019, the Annual Average Daily Flow (AADF) was 54 485, of which 8 059 were HGVs. These figures are representative of the previous two yearly counts, which saw approximately 55 000 vehicle movements with approximately 8 200 of these being HGVs. In 2020 traffic levels were considerably reduced as a result of the SARS-CoV-2 restrictions and the transition to new border requirements following UK's departure from the European Union. An AADF of 38 416 was recorded for all vehicles, 7 429 of which were HGVs (DfT, 2021). These numbers account for vehicles travelling in the east and west-bound directions.




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Principal development area

Traffic count segment 7869

Traffic count segment 36252

Traffic count segment 92060

Overlapping segments 36252 and 92060

Project-specific traffic count locations

Plate 8.3 - *Traffic Count Locations*

## *A Roads - A20*

8.47 The most relevant count points along the A20 are located to the north-west of the proposed site. Traffic levels at count point 36252, which starts at the junction with the A2070 and ends at the junction with Church Road covering a distance of approximately 4.1km, were measured from 2000 to 2019. Manual counts were taken in the years 2000, 2003, 2007, 2010 and 2015, whereas the remaining data were estimated using previous year's AADF.

8.48 The 2019 AADF estimate at segment 36252 was 11 416 motor vehicles, 378 of which were estimated to be HGVs. The 2019 figures are representative of previous years, as shown on **Plate 8.4 on page 131**. The monitored segment of the A20 was predominantly used by cars and taxis (c. 82%), and light goods vehicles (LGVs) (c. 12.8%), as shown on **Plate 8.5 on page 131**. HGVs represented approximately 3.3% of the total number of vehicles.

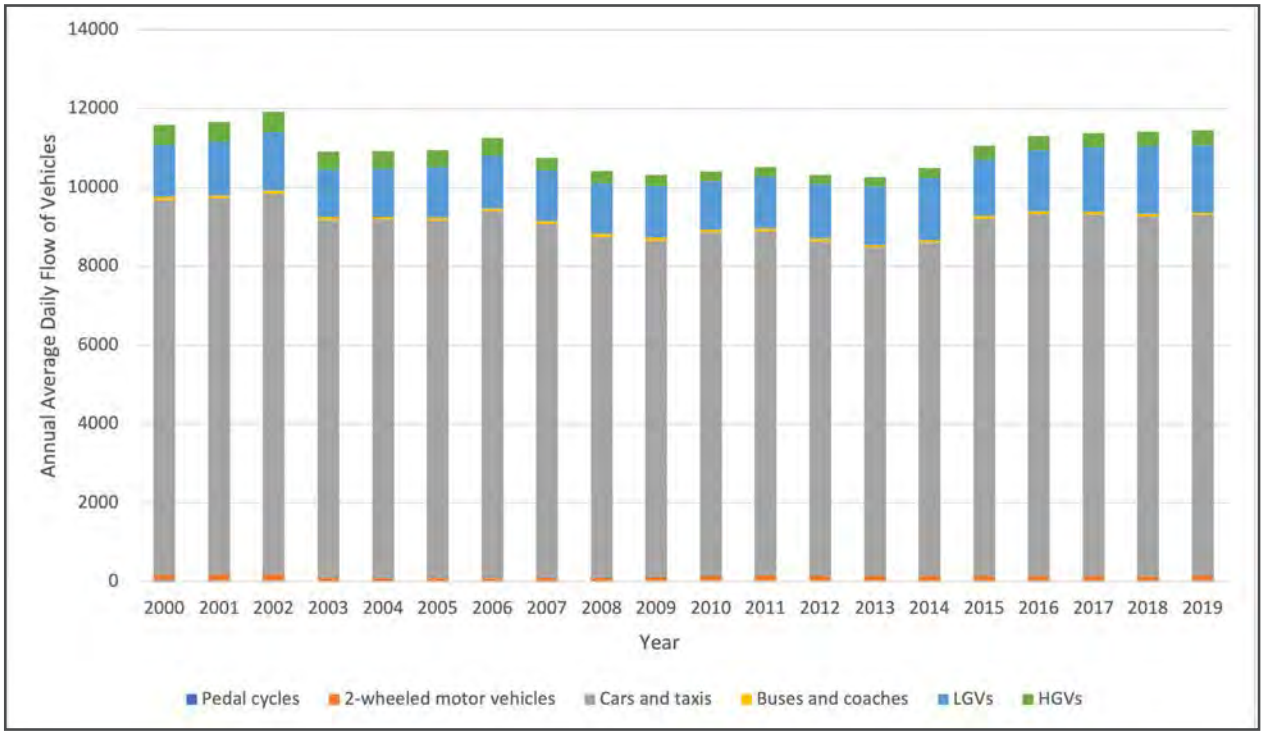



Plate 8.4 - *Annual Average Daily Flow (AADF) at Segment 36252 on the A20 for Different Vehicle Types (2000 - 2019) (Data source: DfT, 2021)*

8.49 In 2020, a manual count was conducted at a nearby segment of the A20 (point count 92060), over a section of approximately 10.2km. AADF for all motor vehicles was 9 396, with 255 (2.7%) of these accounting for HGVs (DfT, 2021). These numbers account for vehicles travelling in the east and west-bound directions.

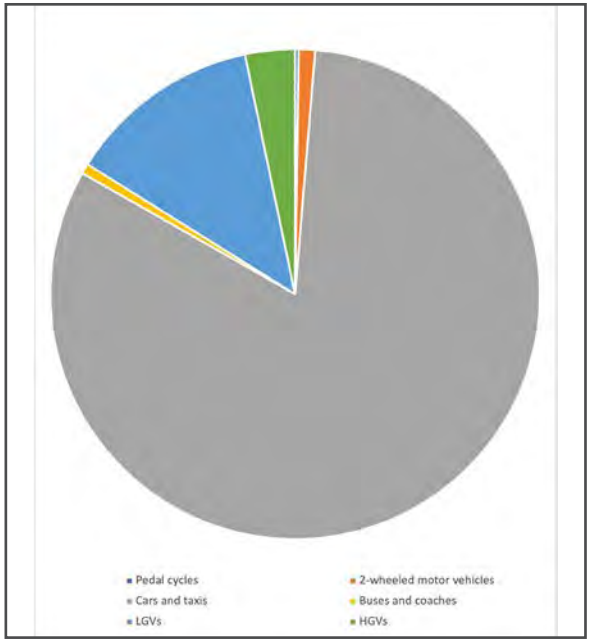



Plate 8.5 - *Average Vehicle Type Composition of AADF at Segment 36252 on the A20 (2000 - 2019) (Data source: DfT, 2021)*

## *Minor Roads - Church Lane*

8.50 Due to the lack of traffic data on the vicinity of the proposed site access points, Traffic Surveys UK Limited were appointed to undertake traffic counts on Church Lane. Two locations were chosen, approximately matching the location of the central access point towards Bested Hill (Church Lane North) and the southern crossing of Church Lane providing the access point towards Partridge Plantation (Church Lane South), as shown in **Plate 8.3 on page 130**.

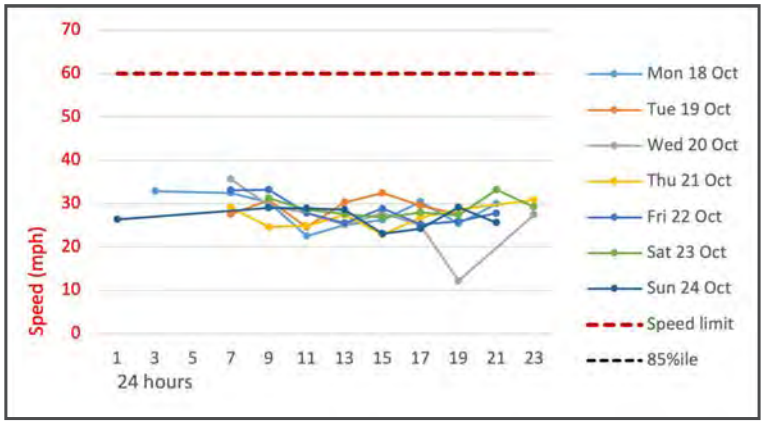
8.51 Automatic traffic counts were undertaken over a period of 7 days, commencing on 18th October 2021. Data were collected in 15 minute periods using a pair of pneumatic tubes installed securely across the carriageway, one metre apart, recording air pulses to determine vehicle speed, class and volume.

8.52 Traffic data gathered are provided in full at **Appendix 8.1**. **Table 8.1** gives a summary of the northbound (N) and southbound (S) data for weekdays (Monday to Friday average), as this is the period in which most construction traffic will occur (weekend deliveries to site will be avoided whenever possible).

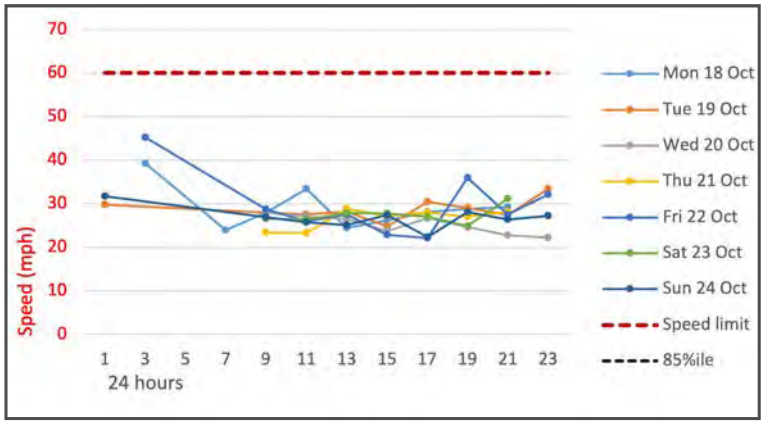
Table 8.1 - *Analysis of Automatic Traffic Count data near proposed site entrances on Church Lane*

| Location | Monday - Friday Average | All Traffic | | | Light Goods Vehicles % of Total (to 3 S.F.) | | Heavy Goods Vehicles % of Total (to 3 S.F.) | |
|---|---|---|---|---|---|---|---|---|
| | | Both directions | N | S | N | S | N | S |
| Church Lane North | Count, 7am-7pm | 743 | 388 | 355 | 36 (9%) | 19 (5%) | 2 (0.5%) | 7 (2%) |
| | Count, all day | 843 | 437 | 406 | 42 (10%) | 28 (7%) | 2 (0.5%) | 7 (2%) |
| | 85th Percentile Speed, 7am-7pm | 31.8 mph | 31.8 mph | 31.7 mph | | | | |
| Church Lane South | Count, 7am-7pm | 660 | 351 | 309 | 30 (9%) | 22 (7%) | 4 (1%) | 8 (3%) |
| | Count, all day | 748 | 394 | 354 | 34 (9%) | 29 (8%) | 4 (1%) | 8 (2%) |
| | 85th Percentile Speed, 7am-7pm | 33.5 mph | 34.1 mph | 32.9 mph | | | | |

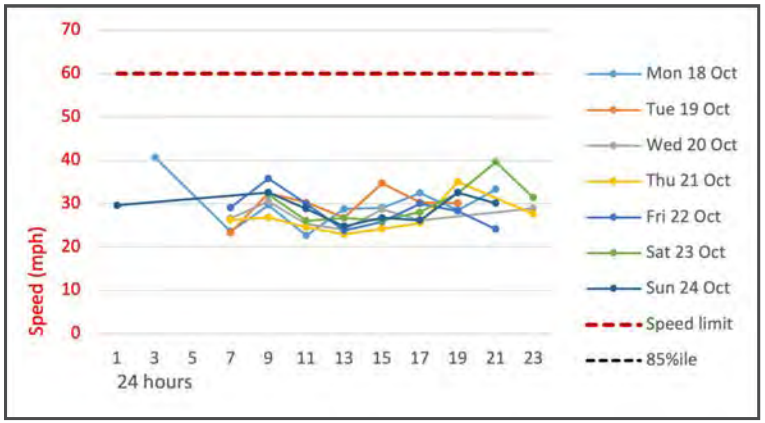
(a)



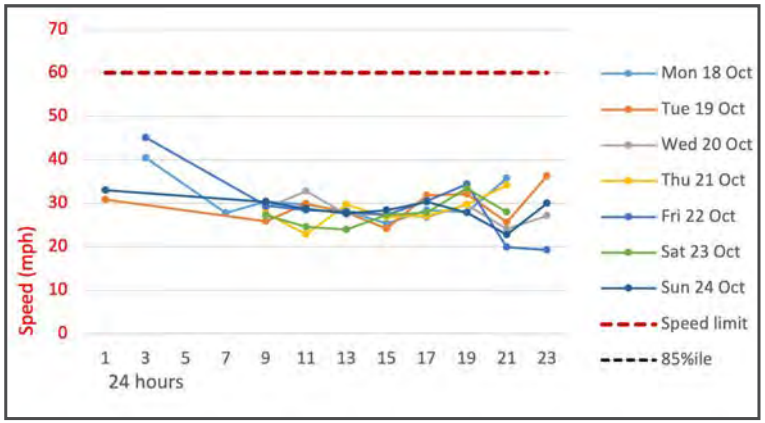

(b)




(c)




(d)




Average daily speeds (solid thin colours) and 85%ile (dashed black) compared against 60mph posted speed limit (dashed red). The 85%ile is the speed at which 85% of all vehicles are observed to travel under free flowing conditions. A minimum of ten vehicles per speed bin is required for this calculation, hence the overnight low-volume 85%ile values may be zero.

Plate 8.6 - *Average Daily Speeds on Church Lane adjacent to East Stour Solar Farm (data collected in October 2021)*

(a) Church Lane North, Northbound, (b) Church Lane North, Southbound (c) Church Lane South, Northbound, (d) Church Lane South, Southbound

8.53 Data showed that in both locations, the majority of vehicles were cars and taxis. The average 85th percentile daily speed was around 32mph on Church Lane North and around 34mph on Church Lane South.

8.54 Further analysis of the speed showed that during weekday daytime hours (7am - 7pm) average vehicle speed was 27.0mph in both directions at Church Lane North and 28.4mph northbound and 28.7mph southbound at Church Lane South, as shown at **Plate 8.6 on page 133**. The highest speeds were recorded in the very early morning, at around 3am.

8.55 In terms of Annual Average Daily Traffic (AADT), the survey determined that 168 vehicles travel along Church Lane North per average day, and 151 vehicles travel along Church Lane South per average day.

## Road Accident Records

8.56 A National accident database map (Crashmap, 2021) was consulted to determine the number and nature of accidents recorded in the vicinity of the proposed solar farm site entrances and highway crossings.

8.57 The records relate only to personal injury accidents on public roads that are reported to the police, and subsequently recorded, using the Department for Transport 'STATS19' accident reporting form. Data for the most recent ten-year period available are analysed.

8.58 In the last 10 years (2011-2020, inclusive), there was one crash in proximity to the proposed site entrances on Church Lane. It involved two vehicles (cars) with one casualty (rider aged 21-25) and the severity was classed as slight. The incident occurred during daytime in wet weather conditions. There were no external factors noted as reason for the crash and the vehicles were proceeding normally along the carriageway, not on a bend. The vehicles impacted offside, possibly when passing each other.

8.59 On the A20, within approximately 500m of the junction with Church Lane, there have been six accidents between 2011-2020. These are predominantly classed as slight crashes although there have been two serious incidents but no fatal crashes.

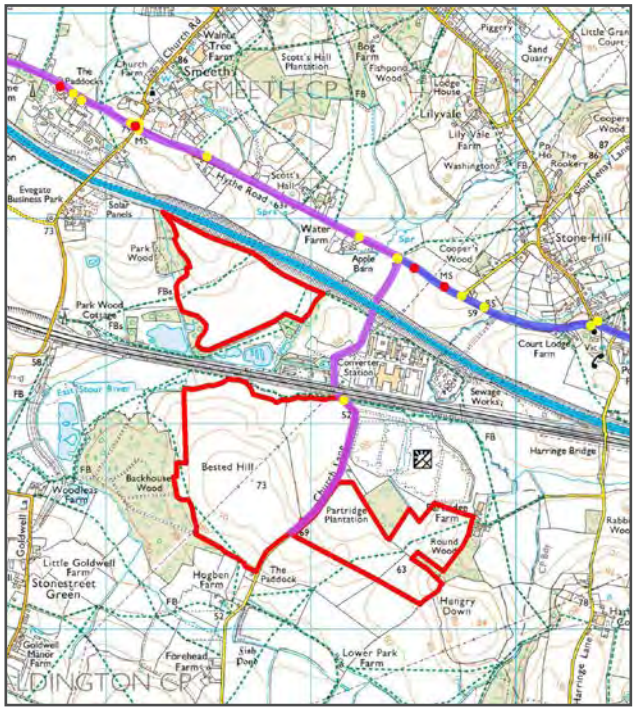
8.60 One of those occurred at the junction of Church Lane with the A20 Hythe Road in 2014. It involved a crash between two vehicles (cars), there were two casualties (rider ages 0-5 and 6-10) and the severity was classed as slight. There were no external factors noted as reason for the crash, and the vehicles were proceeding normally along the carriageway, not on a bend.

8.61 The location of the seven crashes proximate to the proposed site are shown in **Plate 8.7 on page 136**. Further details of the incidents recorded on the A20 are provided in **Table 8.2 on page 135.**

8.62 Further incidents have been reported over the past 10 years along the A20, Hythe Road, and the M20. No further details are provided in this Environmental Statement due to their distance from the proposed site.

Table 8.2 - *Crashes on the A20 between 2011 and 2020 inclusive, proximate to the A20/Church Lane junction. Listed by location, west to east*

| Incident date | Severity | Vehicles/ casualties | Environmental conditions | Further Description | Within 20m of junction? | On Proposed Delivery Route? |
|---|---|---|---|---|---|---|
| 28/05/20145 11:55 pm | Slight | 1 / 1 | Darkness, no street lights. Fine, without high winds. Dry road. | Vehicles (car) proceeding normally along the carriageway, not on a bend. | No | Yes |
| 09/08/2014 10:15 am | Slight | 2 / 2 | Daylight. Fine, without high winds. Dry road. | Both vehicles (cars) were proceeding normally along the carriageway, not on a bend. Vehicle 2 hit a permanent (roadside) object while Vehicle 1 was in the vicinity. | Yes | Yes |
| 02/07/2019 3:30 am | Serious | 2 / 2 | Darkness, no street lights. Fine without high winds. Dry road. | Vehicle 1 (car) is passing another moving vehicle on its offside. Vehicle 2 (car) is proceeding normally along the carriageway, not on a bend. Head on collision. | No | No |
| 17/0/2020 10:45 pm | Serious | 4 / 6 | Darkness, no street lights. Fine without high winds. Dry road. | Vehicle 1 (car) is proceeding normally along the carriageway, not on a bend. Vehicles 2, 3 and 4 (cars) are waiting to proceed normally but are held up. Likely to be a rear end shunt type collision. | No | No |
| 13/01/2016 6:08 pm | Slight | 2 / 2 | Darkness, no street lights. Raining without high winds. Wet or Damp road. | Vehicle 1 (car) is in the act of turning right. Vehicle 2 (car) is proceeding normally along the carriageway, not on a bend. Rear end collision at the junction. | Yes | No |
| 25/05/2020 11:07 pm | Slight | 2 / 1 | Darkness, no street lights. Fine without high winds. Dry road. | Vehicle 1 (car) is passing another moving vehicle on its offside. Vehicle 2 (van) is proceeding normally along the carriageway, not on a bend. Likely Vehicle 1 hit the back of Vehicle 2. | No | No |




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Proposed delivery route from M20 Junction 10a

Crash site, coloured by severity: Slight (yellow) - Serious (red) - Fatal (black)

Plate 8.7 - *Crash Site Locations along A20 and Church Lane (2011-2020, inclusive)*

8.63 Referring to **Table 8.2 on page 135**, over the past 10 years there was one crash along the northern section of Church Lane and a total of six crashes within approximately 500m on either side of the A20/Church Lane junction. The majority of these incidents were classed as 'slight'.

8.64 When reviewing the crash data, it could be inferred that lack of lighting along the A20, and/or greater nighttime driving speeds, played a part in five out of the seven crashes. In terms of weather conditions, wet road surfaces may have been a contributory factor on two of the seven crashes.

8.65 Two of the traffic accidents involved overtaking vehicles: one was a head on collision and the other was likely a rear end collision.

8.66 Two incidents occurred at junctions: one involved the front of one car hitting the back of the turning car, indicating an error in timing; and the other incident involved a collision with a permanent (roadside) object.

8.67 Full Crashmap reports are contained at **Appendix 8.2**.

## Public Rights of Way

8.68 As described in **Chapter 4 - Existing Conditions** and shown on **Plate 4.7**, there are a number of permissive routes and two public footpaths (AE432 and AE437) within the northern land parcel. Both footpaths partially follow the northern field boundary, and then cross the field towards south-west.

8.69 There are three PRoWs (AE656, AE657 and AE457) surrounding the central land parcel that occupies Bested Hill. Footpath AE457 briefly crosses the south-western corner of the field.

8.70 One footpath (AE459) crosses the eastern part of the proposed development, from Partridge Farm across Partridge Plantation.

8.71 The public rights of way will remain open during construction and operation.

8.72 Additional PROWs are located in the wider area. These routes are predominantly footpaths and are not part of any long distance routes (see **Chapter 4 - Existing Conditions**). As these routes are not in proximity to the proposed development area, they are not considered further in this chapter.

## PROPOSED DELIVERY ROUTES AND ASSOCIATED WORKS

8.73 A desktop mapping exercise and driven visual route inspection, where necessary, considered potential routes for construction traffic to the proposed site from the highway network.

8.74 The port identified as likely arrival point of the solar panels and associated components is the Port of Dover, although any port connected to the motorway and trunk road network will be viable. It was determined that the most suitable route from this identified port of delivery for components would use the motorway and A-road network as far as possible. This minimises the potential disruption to local traffic and road users.

8.75 The optimal route identified for construction deliveries to the East Stour Solar Farm is as follows:

- from the Port of Dover, deliveries will follow the A20, which then becomes the M20 at Folkestone;
- the M20 will be followed for approximately 18.5km westbound;
- at the junction with the A2070 (JCT 10a) towards Hastings/ Ashford, vehicles will leave the dual carriageway and at the roundabout take the fourth exit on to the A20 Hythe Road eastbound;
- after approximately 4.5km A20, deliveries will turn right on to Church Lane;
- travelling southbound for approximately 300m and just after passing under the M20 bridge, the site entrance to the northern land parcel will be on the right;
- the route continues southbound along Church Lane, passing under the railway bridges and over a small watercourse. The second entry point towards Bested Hill will be on the right;
- and the final entry point towards Partridge Plantation will be via a crossing Church Lane a further 800m south.

8.76 Construction deliveries will not use the route followed during construction of the existing Sellindge Solar Farm which approached westwards along the A20 towards Church Lane from Junction 11 of the M20.

(a)



(b)

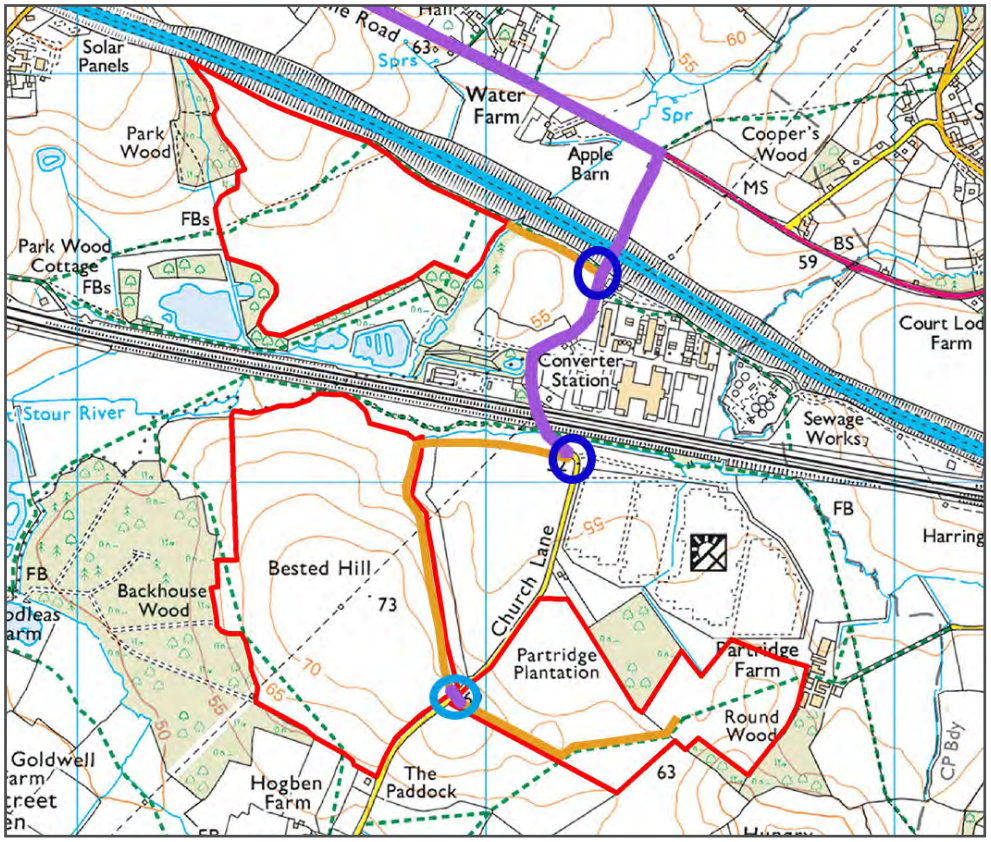


(c)



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Plate 8.8 - *Existing Road Geometry at A20/ Church Lane Junction: (a) looking east on A20, (b) looking south on Church Lane, (c) looking west on A20*




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Principal development area

Preferred delivery route

Proposed site entrance points

Approximate route of internal access track

Church Lane crossing point

Plate 8.9 - *Proposed Delivery Route for Construction Traffic and Site Entrance/crossing Locations*

8.77 The proposed delivery route from the M20 motorway is shown at **Plate 8.2 on page 128**.

8.78 There are two proposed site entrances to reach the three distinct land parcels, and one crossing of Church Lane as shown at **Plate 8.9**. Within the proposed site there are access tracks to reach key elements of the development.

8.79 Construction site entrance and highway crossing drawings are provided at **Figure 6.2**, which demonstrates the swept path analysis and visibility splay achieved in line with current guidance from the Design Manual for Roads and Bridges (Highways England, 2020). No works are required to the highway for the site entrance or crossing points. Kent County Council as Highways Authority will continue to be consulted.

8.80 As described in **Chapter 15 - Socio Economics and Sustainability**, where possible, construction personnel will be contracted from local companies.

# PREDICTED IMPACTS

## Construction Phase

### *Vehicular Movements*

8.81 The construction of a solar farm is straight forward and involves moderate levels of site traffic when compared to many other civil engineering projects.

8.82 The equipment and materials used to construct the development will fit on standard Heavy Goods Vehicles (HGV). No delivery will be classed as an exceptional load.

8.83 As reported in **Chapter 7 - Construction, Operation and Decommissioning**, the principal phases to the construction comprise:

- site access tracks are built or upgraded and site fencing is erected;
- the combined inverter/transformer units and site cabinets are offloaded in situ;
- 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; and
- all electrical connections are made and the site is commissioned.
- landscape mitigation planting takes place during the autumn.

8.84 The typical construction programme for a project of the scale of the East Stour Solar Farm is shown in **Table 8.3 on page 140**.

8.85 As described in **Chapter 7** it is envisaged that the East Stour Solar Farm proposal will take approximately nine months to construct. Most of the construction activity is involved with the track construction during the first six months of construction.

8.86 The approximate number of vehicular movements have been determined in accordance with the estimated construction quantities as proposed at **Chapter 6 - Development Proposal**. These movements were then correlated with the typical construction programme to provide an indication of traffic movements by month. This is illustrated in **Table 8.3 on page 140**. For clarity, 'movement' denotes a single trip to or from site.

8.87 Construction personnel have not been included in this assessment. It is estimated that the peak number of personnel on site at any one time will be approximately 100. Construction personnel will be collected from key points locally and transported to and from site in groups at staggered times.

8.88 Deliveries are spaced throughout the construction period although fewer movements are associated with the end of the construction period. The construction programme starts with a temporary construction compound. Thereafter, a rolling programme will complete areas of the site with the fencing, framing system, panels, electrical system installation and commissioning.

8.89 As noted in **Paragraph 8.78 on page 138** there are two site entrance points and one highway crossing to access the three distinct sections of the proposed solar farm. For the purpose of this assessment it is assumed that the total numbers of vehicles pass across each of the three parts, although in reality more of the vehicles will be held in the northern and central parcels where the main temporary construction compounds will be located and so traffic flows at the second entrance and at the highway crossing to the south will be lower.

8.90 The decommissioning of the solar farm at the end of its life will be a reduced reverse version of the construction process.

Table 8.3 - *Typical construction programme and total monthly vehicular movements*

| Activity | Total Movements | Programme Month | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| Temporary construction compounds, including gates, welfare and temporary surfacing | 70 | 24 | | 23 | | 23 | | | | |
| Security fencing and gates | 38 | 7 | 7 | 6 | 6 | 6 | 6 | | | |
| Site tracks (crushed stone over geogrid base) | 726 | 121 | 121 | 121 | 121 | 121 | 121 | | | |
| Foundation concrete for inverter/transformer units, welfare, store and substation containers and CCTV posts | 24 | 4 | 4 | 4 | 4 | 4 | 4 | | | |
| Frame mounting system and CCTV equipment | 68 | | 8 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Solar Panels | 410 | | 56 | 59 | 59 | 59 | 59 | 59 | 59 | |
| Cabling and cable trench sand | 62 | 6 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | |
| Inverter/Transformer units | 40 | | | 10 | 10 | 10 | 10 | | | |
| Substations, store and welfare containers | 12 | | | | 4 | 2 | 2 | 2 | 2 | 2 |
| Ecological works (wild flower/grass seed mix, hedging and woodland), subject to the appropriate planting season | 28 | | | | | | | | | 28 |
| Site commissioning and clearing | 70 | | | | | | | | | 70 |
| **TOTAL MOVEMENTS** | **1548** | **162** | **204** | **241** | **220** | **243** | **220** | **79** | **79** | **100** |
| **Average movements per day, assuming 24-day working month** | **-** | **8*** | **10*** | **12*** | **10** | **12*** | **10** | **4** | **4** | **6*** |
| **Average movements per hour on working days, assuming off-peak delivery between 9am and 3pm (6 hours)** | **-** | **2** | **2** | **2** | **2** | **2** | **2** | **1** | **1** | **1** |

Note. Total movements are distributed across the construction months and rounded to the nearest whole movement. * Identifies odd numbers of average movements rounded up to account for probable arrival and departure on same day.

*Impact on Roads and Users*

8.91 As stated from **Paragraph 8.10 on page 126**, this assessment considers the approach outlined in the Guidelines for the Assessment of Road Traffic (IEMA, 1993). The Guidelines state that the scale and extent of this assessment should include highways links where traffic flows are predicted to increase by more than 30% or where the number of heavy goods vehicles is predicted to increase by more than 30%; and to include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more. Increases in traffic flows below 10% are generally considered to be insignificant as this is likely to be within the daily variations in traffic flow. Percentage increases in traffic volumes as a result of the East Stour Solar Farm are detailed at **Table 8.4 on page 143**, and described from **Table 8.4 on page 143**.

8.92 For existing road users, impacts may arise through traffic delays caused by construction vehicles, cable laying, or to their visual amenity (which is considered further in **Chapter 11 - LVIA**).

8.93 With respect to road impacts there is the potential to damage road surfaces through the delivery of aggregates and silting of drains through mud deposits on to the highway.

8.94 The road width and junctions in the approach to site are considered to be adequate for the intended use for conventional HGV traffic. Therefore there is low potential for damage to highway verges.

8.95 The site access route has been selected to avoid the villages of Sellindge and Aldington and minimise use of the local road network and potential for local disruption over the construction period. By using internal tracks, traffic along Church Lane has been minimised and limited to immediately south of the railway bridges and the single crossing point which provides access to the south-eastern portion of the site.

8.96 Kent County Highways has been consulted with regard to the load capacity of the Church Lane East Stour river crossing bridge. It was advised the bridge was suitable for all normal road vehicles i.e. up to 40T. The heaviest element comprising the inverter/transformer units is 16T.

8.97 The local services railway tunnel over Church Lane has a height restriction of 3.81m. Whilst this can accommodate typical redimix-concrete vehicles, skip-vehicles etc. typical container HGVs are circa 4m. As such, there is a limit to the specification of vehicles making deliveries to the central and southern portions of the site.

8.98 Whilst the speed limit along Church Lane is a statutory 60mph, the nature of the road is reflected in a markedly reduced driving speed. During weekdays (7am-7pm), the ATC survey evidenced an average speed of 27mph at Church Lane North and 28.3mph at Church Lane South. Considering the 85th Percentile Speed (7am-7pm), this was calculated at 31.8mph and 33.5mph for Church Lane North and Church Lane South, respectively. At the site entrance south of the railway line, a corresponding 51kpm driving speed relates to a derived '*desirable minimum*' DMRB Stopping Sight Distance of 72.2m or a derived '*one step below desirable minimum*' of 52.9m the corresponding 54kpm driving speed at the Church Lane crossing (south) relates to a derived '*desirable minimum*' DMRB Stopping Sight Distance of 78.5m or

a derived '*one step below desirable minimum*' of 57.6m. Whilst the speeds were not surveyed at the northern site entrance, assuming the higher speed of Church Lane, Stopping Sight Distance of 78.5m or a derived '*one step below desirable minimum*' of 57.6m have been assumed. All are readily achieved from a 2.5m highway boundary setback.

8.99 As such, the proposed site entrances and Church Lane crossing point are considered to comply with the Manual for Streets (2007) and DMRB (2020), thereby ensuring appropriate visibility for vehicles entering and exiting the site as well as those travelling along the highway.

8.100 The Construction Traffic Management Plan (CTMP) to be agreed with the Local Planning Authority prior to construction commencing will include details of all traffic management proposals, both on site and leaving site to enter the highway. A draft CTMP is contained at **Appendix 8.3**.

## PEAK AND AVERAGE CONSTRUCTION VOLUMES

8.101 It has been established that the elements of the solar farm creating the maximum traffic volume will be delivery of the solar panels and access track materials. There are approximately four movements anticipated per day for the delivery of the solar panels, which occurs for approximately 28 weeks. The access tracks are constructed in a similar time frame to the solar panels with delivery of these materials requiring approximately six movements per day for around 24 weeks.

8.102 For average construction traffic flows, the peak traffic volume identified is likely to occur in months three and five with 241 and 243 movements respectively within these months. Averaged across the working month (assuming 24 day working month), this would equate to an average of eleven HGV movements per day during each of these months, rounded up to 12. This is more than 30% of the average daily total HGV vehicular movements at both count locations on Church Lane in either direction of travel, so whilst highly localised would be significant as shown in detail in **Table 8.4 on page 143**. When considering this peak number of movements (12 rounded up movements per day), as well as averaged daily movements compared to the existing number of HGV movements on the A20 and M20 highways (which comprise the bulk of the delivery route), these impacts are negligible and not significant.

8.103 Traffic levels associated with the decommissioning of the project are significantly less than those associated with its construction, and decommissioning impacts are considered to be reduced although likely still significant to the affected limited sections of Church Lane. No significant impacts are anticipated in the wider highway network.

Table 8.4 - *Summary of predicted impacts on road users*

| | | | | | Peak Traffic Volumes (movements/day) | Average Traffic Volumes (movements/day) |
|---|---|---|---|---|---|---|
| Estimated Construction Traffic | | | | | 11 | 8 |
| Location of Traffic Count Data | a | All Traffic | Existing % of HGV | c | % of Total Vehicular Movements | |
| | b | Heavy Goods Vehicles | | d | % of HGV Movements | |
| A-Road [1] | | | | | | |
| DfT Count Segment 36252 - A20 (Average all data 2000 - 2019) | a | 10 944 | 3.3% | c | 0.1% | 0.07% |
| | b | 361 | | d | 3% | 2% |
| DfT Count Segment 92060 - A20 (2020 manual count, worst case as less movements than typical due to SARS-CoV-2) | a | 9 396 | 2.7% | c | 0.1% | 0.1% |
| | b | 255 | | d | 4% | 3% |
| Local Roads [2] | | | | | | |
| ATC, Church Lane North (October 2021) | a | 1 113 | 1.0% | c | 1% | 0.7% |
| | b | 11 | | d | 100% | 73% |
| ATC, Church Lane South (October 2021) | a | 1 000 | 1.3% | c | 1% | 0.8% |
| | b | 13 | | d | 85% | 62% |

1 National data (DfT, 2021).

2 Automatic traffic count data, **Appendix 8.1**.

### *Impacts on Public Rights of Way*

8.104 As described from **Paragraph 8.68 on page 136** there are six footpaths that cross the development area and/or travel adjacent to the site boundary.

8.105 Wide buffer strips have been incorporated into the site design to minimise impacts for footpath users.

8.106 During the construction phase of the proposed solar farm the PRoWs crossing the site will remain fully open for use. There may be some minor disruption for users at the conflux of fields where construction traffic may pass. As the PRoWs are located within a working farm users may already experience agricultural activity along the paths. Nonetheless, mitigation measures will be applied to ensure safety and minimise disruption to users of the footpaths.

8.107 There is no alteration to the accessibility of any of the PROW in the wider area around the site.

8.108 No significant impacts on Public Rights of Way are anticipated as a result of the proposed East Stour Solar Farm's construction nor operation.

8.109 Visual amenity impacts for users of the Public Rights of Way are described further in **Chapter 11 - LVIA**.

### *Driver Distraction*

8.110 The East Stour Solar Farm is not located in proximity to major junctions in the existing road network. There are established hedges on some roadsides which will screen some views of the solar farm where it is adjacent to the highway. Prior to mitigation, there will be some open views of the solar panels on the central (Bested Hill) and eastern (Partridge Plantation) sections of the proposed site from Church Lane.

8.111 The potential visibility of the solar farm is considered in the Landscape and Visual Assessment (**Chapter 11**).

8.112 Potential Glint and Glare impacts of the proposed development on motorists are considered in **Chapter 14 - Glint & Glare**.

## Decommissioning Phase

8.113 The equipment used to de-construct the solar farm will be no larger than standard HGVs. The solar farm equipment will be removed from site and sorted for recycling at waste management centres rather than on site.

8.114 The decommissioning process will be a shorter period than the construction phase, and it will typically involve:

- isolating electrical connections and removing from site all electrical equipment (including inverter/transformers and the substation) and cables;
- removing from site all solar panels;
- removing from site the panel frames;
- removing foundation pads; and
- removal of access tracks, where not retained by the landowner.

8.115 Significantly fewer vehicle movements will be required than during the construction phase, principally as aggregate removal will be limited to those tracks not retained by the landowner. Following the Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993), the vehicle movements associated with the construction phase are identified as not significant in the wider motorway and highway network - although short lived and localised significant impacts may affect Church Lane.

## CUMULATIVE

8.116 It is understood Pivot Power, a company linked to EDF Renewables, is soon to submit an application for a Battery Energy Storage System (BESS) immediately west of Church Lane by the Sellindge Converter Station, as shown on **Figure 3.1, Volume 3**. Given the key components of the BESS (namely battery containers, power conversion system containers and control container) are delivered ready assembled in their operational form, the numbers of deliveries are anticipated to be nominal and negligible in the context of the deliveries identified for the East Stour Solar Farm, even should they be constructed concurrently. Construction of the BESS is not anticipated to be likely to add to the significance of impacts identified on the stretch of Church Lane between the A20 and the railway bridges.

## AVOIDANCE AND MITIGATION

8.117 As a key design principle, construction traffic was removed from the highway at the earliest point by using one access point for the northern area and a single site access point from Church Lane immediately south of the railway bridges - moving traffic to on-site tracks and restricting highway disruption any further south to a single crossing point of Church Lane which enables access to the eastern Partridge Plantation parcel of land.

8.118 During construction and decommissioning, deliveries will be restricted, wherever possible, to off-peak weekdays to reduce impacts on local road users. Off-peak is considered to be between 09:00 and 15:00.

8.119 Advance notification of potential delay for road and PRoW users will be provided through appropriate signage and advertisement. The Applicant will liaise with the Highways Authorities and Police prior to the construction phase commencing.

8.120 At the construction site entrances, traffic management measures will be deployed as deemed necessary and appropriate by the Highways Authority (Kent County Council).

8.121 Any vehicle approaching the 3.81m height limit of the local services rail tunnel will be required to register at the northern temporary construction compound before being permitted to proceed through the tunnel. Where a suitable delivery vehicle/load geometry is not available, loads will be broken down within this compound and transported on appropriately sized vehicles.

8.122 To avoid construction traffic travelling through the nearby villages, all construction vehicles will be required to use the access route identified from the A20 and HGVs will be required to approach from the identified route from Junction 10a of the M20. No construction traffic be it HGV, LGV or PSV will be permitted south of the Church Lane highway crossing.

8.123 As well as advance notification and appropriate signage, banksmen will be used on the PRoW to ensure safety and minimise disruption to users of the footpaths during the construction phase.

8.124 A rolling set of traffic lights will be employed during the laying of the verge-side grid connection cable.

8.125 Mitigation planting is proposed to filter and screen views to users of the road network once established.

8.126 It is suggested a scheme for pre-construction and post-construction road condition and road drainage surveys to identify then rectify any damage to the highway, verges and drains caused by construction traffic be produced by the Applicant and agreed with Kent County Council in advance of construction commencing.

8.127 In addition, prior to construction, precautionary mitigation measures are suggested to include:

- a drainage scheme should be devised to ensure that no water enters the highway from the site access or a suitable system is agreed; and
- wheel wash facilities, as appropriate, and sweeping is to be carried out to ensure the road is kept reasonably clear of any deposits from the construction works and the local drains are kept clear.

8.128 Alongside the proposal the Applicant is committing to maintain reduced height hedges in proximity to the Church Lane crossing of the East Stour to maximise highway visibility. This would be agreed with Ashford Borough Council through a Landscape and Environmental Management Plan and controlled by condition.

8.129 Decommissioning mitigation measures would be agreed at that time with Ashford Borough Council, but would be likely to include the same access route, delivery timing, notices, height restriction, PROW, wheel washing and road condition controls outlined above.

## RESIDUAL IMPACTS

8.130 The predicted peak HGV movements are less than 10% of daily movements on the M20 and A20 and as such, no significant impacts are predicted on the wider highway network. Movements along Church Lane to the site entrances, and at the highway crossing point are more than 30% of the average daily HGV total vehicular movements at these locations, and so assessed as potentially significant. However, given the sequential nature of construction across the site over time, not all stretches of Church Lane will be affected for the full nine-months of construction.

8.131 Measures are proposed for the construction period (and similarly for decommissioning) to mitigate potential impacts and disruption to local traffic as far as possible. These impacts are, however, likely to remain significant although limited to Church Lane.

8.132 Following mitigation, minimal non-significant impacts are predicted for users of Public Rights of Way surrounding the proposed development with temporary delays as vehicles cross the rights of way under the control of banksmen.

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# INTRODUCTION

9.1 Wallingford HydroSolutions Ltd (WHS) has been commissioned by the Applicant to complete this geology, hydrology and hydrogeology chapter for a proposed solar farm, on 3 land parcels, near Sellindge, Kent, NGR: TR 07760 37867, TR 07652 38665 and TR 08379 37401. This assessment comprises of a desk-based assessment of the baseline hydrology, geology and hydrogeology environment for the proposed East Stour solar farm along with any potential impacts and mitigation. Residual effects of the proposed solar farm following the implementation of mitigations are also presented together with their significance in EIA terms.

9.2 In summary this chapter details:

- Main legislation and guidance relevant to this chapter;
- Methodology;
- The baseline environment;
- The potential impacts of the proposed solar farm during construction and operation;
- Proposed mitigation measures;
- Best practice construction and operation guidance to minimise potential impacts; and
- Residual effects.

# LEGISLATION, POLICY AND GUIDANCE

## Legislation

9.3 The Water Framework Directive (WFD, 2000/60/EC), has the main objectives of protecting, enhancing and restoring Europe's waters, with the aim of achieving 'good' status, establishing a baseline of no deterioration and encouraging the sustainable use of water resources and the water environment. This directive resulted in the Water Environment (Water Framework Directive) (England and Wales) Regulations 2003, which transposed the WFD into law in England and Wales and provided a timetable for its implementation.

9.4 Where relevant, the assessment takes into account the legislative protection afforded to water resources. The main legal and policy framework is set by the following:

- Water Act 2003, as amended;
- Water Act 2014;
- Land Drainage Act 1991, as amended;

- Water Industry Act 1991;
- Water Resources Act 1991 (as amended 2009);
- Environmental Permitting (England and Wales) Regulations (and Amendments) 2016;
- Control of Pollution (Oil Storage) (England) Regulations 2001;
- Environmental Damage (Prevention & Remediation) Regulations 2009;
- The EC Groundwater "Daughter" Directive (2006/118/EC);
- The EC Nitrates Directive (91/676/EEC);
- The Priority Substances Directive 2013/39/EU;
- The Conservation of Habitats and Species Regulations 2010 (which implement the EC Habitats Directive 92/43/EEC);
- The Flood Risk Regulations 2009 (which implemented the EC Flood Directive 2007/60/EC); and
- Flood and Water Management Act 2010.

### *Water Quality Standards and Objectives*

9.5 The water quality of England's rivers is classified by the Environment Agency (EA), which has developed a classification scheme for surface waters following the requirements of the Water Framework Directive, as part of the river basin management plans (RBMP). This classification scheme assesses the quality of aquatic ecosystems within rivers, lakes, estuaries and coastal waters and the extent to which they have been adversely affected.

9.6 The scheme assesses the condition of each river, lake, estuary and coastal water and assigns it a 'status' from high, good, moderate, poor to bad. If a water body is classified as high or good status, then it has a healthy ecology which deviates only slightly from natural conditions. Such a water body is an important natural heritage asset and can support a wide range of uses such as recreation, fishing and drinking water supply. If a water body is classified as moderate, poor or bad, then the ecology is adversely affected and the range of uses which can be supported is reduced.

9.7 As part of the river basin management plans, waterbody data are published by the EA containing details of the current waterbody classification, current pressures on the waterbody and measures to address these and classification objectives for 2021 and 2027.

## Planning Policy

### *National Planning Policy Framework*

9.8 The National Planning Policy Framework (NPPF) sets out the planning policies for England and describes how these should be applied. The NPPF also sets out the aims for development to contribute towards sustainable development.

9.9 Relevant sections of the NPPF to the water environment include Section 14: 'Meeting the challenge of climate change. This section considers the impact of climate change to flood risk, coastal change and water supply.

9.10 Paragraphs 159 to 169 set out the need to avoid areas at risk of flooding and for developments to be made

safe for its lifetime. Where this cannot be achieved, national policy is clear that new development should not be allowed.

9.11 Section 15 of the NPPF: 'Conserving and enhancing the natural environment' is relevant to water quality and sets out the requirement of:

*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.'*

### *National Planning Practice Guidance*

9.12 The NPPF is supported by the National Planning Practice Guidance (NPPG) (Ministry of Housing, Communities and Local Government, 2019) and provides guidance across a range of topic areas. The section entitled 'Flood Risk and Coastal Change' provides guidance on the 'sequential test' and 'exception test' which must be applied to steer development to areas with the lowest probability of flooding. The document also provides guidance on Flood Risk Assessments (FRA) and sets out flood risk issues from different types of development. Guidance on surface water management including consultation with the Lead Local Flood Authority (LLFA) is also included.

9.13 Guidance on climate change focuses on suitable mitigation and adaptation measures in the planning process. This includes considering availability of water and water infrastructure for the lifetime of a development and designing responses to promote water efficiency and protect water quality.

### Guidance

9.14 The assessment of the effects of the Project on the water environment has been undertaken in accordance with the legislation summarised above and the guidance in the Design Manual for Roads and Bridges (DMRB) LA113 – Road Drainage and the Water Environment . Where appropriate, informed professional judgement has been used, primarily in relation to geomorphology, where there is a lack of published guidance to date.

9.15 Flood risk has been assessed in accordance with the requirements of the NPPF and the accompanying online flood risk guidance.

## ASSESSMENT METHODOLOGY

### Baseline Characterisation

9.16 A comprehensive desk-based study has informed the assessment. A range of publicly available data sources has been used to assess the site's vulnerability by first reviewing the baseline hydrological and hydrogeological environment. This is followed by a review of the potential impacts caused by the development and a summary of recommended mitigation measures to minimise the effect of the development on the baseline environment.

9.17 The following sources of information have been consulted to assess the baseline environment:

- DEFRA 1m LiDAR;
- Environment Agency (EA) designated sites;
- British Geological Survey (BGS) online mapping;

- UK Soils observatory map viewer;
- EA online flood maps;
- River basin management plans; and
- Data request to Kent County Council, the EA, Folkestone and Hythe Borough Council and Ashford Borough Council.

## Assessment of Effects

9.18 The sensitivity of the existing baseline environment has been assessed using the criteria defined in **Table 9.1** below. The criteria for the determination of the sensitivity of receptors has been established based upon available guidance, legislation, statutory designation and/or professional judgement. The study area has generally been based on a 1km buffer from the site boundary. The assessment on surface water management is limited to the site boundary however consideration has been given to flood zones within 1km. It is noted that receptors in the receiving environment only need to meet one of the defined criteria below, to be categorised at that associated level of sensitivity

Table 9.1 - *Receptor sensitivity*

| Receptor Sensitivity | Criteria |
|---|---|
| High | The receptor has low capacity to absorb change without fundamentally altering its present character.<br>• The receptor is of very high environmental value and/or National or International ecological status (i.e. SSSI, SAC).<br>• Environmental equilibrium is precarious and highly sensitive to change.<br>• Designated fishery or used for other freshwater ecological interests.<br>• Active floodplain.<br>• Land use includes essential infrastructure or highly vulnerable or more vulnerable development (as defined in the National Planning Policy Framework (NPPF)).<br>• Abstractions for public water supply; or abstractions for private water supply supplying more than 10 m3/day for human consumption or serves more than 50 persons.<br>• Watercourse widely used for activities relating to water quality (e.g. fisheries, swimming, etc). |
| Medium | The receptor has moderate capacity to absorb change without significantly altering its present character.<br>• The receptor has some environmental importance. Local or Regional ecological status (i.e. Good or Moderate waterbody status or target objective).<br>• Environmental equilibrium is stable and copes well with natural fluctuations.<br>• Contains some flood alleviation features.<br>• Land use includes less vulnerable development (as defined by the NPPF).<br>• Abstractions for private water supplies supplying less than 10 m3/day for human consumption or serves less than 50 persons.<br>• Watercourse is not widely used for activities relating to water quality. |

| | |
|---|---|
| Low | The receptor is tolerant of change without detriment to its character and is of low environmental value.<br>• Low ecological status (i.e. Poor or Bad waterbody status and not subject to higher target objectives).<br>• Environmental equilibrium is stable and resilient to changes greater than natural fluctuations.<br>• Land use includes water compatible development (as defined by the NPPF).<br>• Fish sporadically present or restricted.<br>• Does not contain any flood alleviation features.<br>• No abstractions for private water supply.<br>• Watercourse is not used for activities relating to water quality. |

9.19 The assessment of effects on the surface water and groundwater baseline environment was then conducted using the following process:

- Examination of infrastructure design, construction and operational methodologies.
- Identification of potential impacts using the criteria presented in **Table 9.2**, differentiated between short term construction impacts and long term operational and design impacts for each direct and indirect receptor.
- Identification of potential significant effects using the significance criteria outlined in **Table 9.3**.
- For each potential effect, identification of mitigation measures to avoid, minimise or remedy any adverse impacts and enhance any beneficial impacts.
- Identification of residual effects following the implementation of mitigation measures, differentiating between short term construction impacts and long term operational and design impacts.

Table 9.2 - *Magnitude of Impact*

| Magnitude | Change to Baseline Environment |
|---|---|
| Large | The long-term loss of resource and/or quality; partial loss of or damage to key characteristics, features or elements. |
| Moderate | Long term measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one or more key characteristics, features or elements; or<br>Short term loss of resource and/or quality; partial loss of or damage to key characteristics, features or elements. |
| Small | Long term very minor loss or detrimental alteration to one or more characteristics, features or elements; or<br>Short term measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. |
| Negligible | Short term very minor loss or detrimental alteration to one or more characteristics, features or elements. |
| No Change | No loss or alteration of characteristics, features or elements. |

9.21 The significance of the effects upon the baseline environment is determined by the sensitivity of receptors and the magnitude of change to the baseline conditions, as presented in **Table 9.3**. The significance criteria are based upon the principles of the Chartered Institute of Ecology and Environmental Management's (CIEEM) guidelines for ecology impact assessments in the United Kingdom .

9.22 The impact assessment has been undertaken in accordance with the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended. Moderate or major effects are deemed significant in terms of the EIA regulations. Effects that are of a minor, negligible change or result in No Change are judged to be not significant. Differentiations between categories in the table are based upon professional judgement. A moderate or major effect as a result of an impact would require mitigation, whereas a minor or negligible effect would not require mitigation; although mitigation may be provided as part of standard good practice in construction, operation and decommissioning.

Table 9.3 - *Significance of Effect Criteria*

| Sensitivity of receptor | Magnitude of impact | | | | |
|---|---|---|---|---|---|
| | Large | Moderate | Small | Negligible | No Change |
| High | Major | Moderate/ Major | Minor/ Moderate | Negligible/ Minor | None |
| Medium | Moderate/ Major | Minor/ Moderate | Negligible/ Minor | Negligible | None |
| Low | Minor/ Moderate | Negligible/ Minor | Negligible | None | None |

## Assessment Limitations

9.24 The assessment is undertaken using desk-based information. The assessment is therefore reliant on third party data which are assumed to be correct. The assessment of cumulative effects is based on the information available at the time of writing and assumes that all other development would follow best practice techniques and designed in accordance with national policy and guidance. No further assessment limitations have been identified.

# BASELINE

## Surface Hydrology, Site Drainage and Flood Risk

9.25 The surface hydrology and site drainage has been reviewed using 1m LiDAR data downloaded from the DEFRA website along with OS mapping. The site is split into three sections, separated by the railway line. These are referred to as the Northern, Southern and South-eastern sites. The LiDAR data indicate that the Northern site drains primarily in a south easterly direction towards the railway line and an unnamed brook that flows parallel to the site before joining the East Stour River. A small westward portion drains towards an unnamed ditch network which then joins the East Stour. Just to the south of the Northern site there are lakes present, one of which is used for recreational purposes such as fishing. The Southern site drains in almost all directions due to the summit of the hill being within the site boundary. The site drains to the East Stour River to the north, and to the south it drains towards an unnamed brook that flows north to the East Stour River. The south-eastern site has 3 drainage zones, the southern corner drains south to an unnamed drain, the remaining two drain north to an unnamed drain.

9.26 A review of the EA online flood maps indicates that the Southern site is wholly within Flood Zone 2, however due to the large rise in levels from the river to the summit of the hill (50 to 70mAOD), this indicates an inaccuracy with the flood zone extent for the site. It has been agreed with the EA to use the 51.3m AOD contour as the limit of development for the southern and northern sites. This level reflects the highest level of the water storage area which covers part of

the Southern and Northern sites. The northern edge of this site is also within flood zone 3 and there are surface water flow paths draining to the north.

9.27 The Northern site has areas which are within flood zones 2 and 3, and areas with surface water flood risk adjacent to the unnamed brook. The south-eastern site is not within either flood zone 2 or 3, however there are some small surface water flow routes present.

9.28 No part of the site is at risk from coastal or reservoir flooding.

9.29 Flood risk to the site is considered in more detail in the accompanying Flood Risk Assessment and Outline Drainage Strategy in **Appendix 9.1**.

## Geology, Hydrology and Soils

### *Bedrock Geology*

9.30 The BGS online mapping service has been used to view the composition and coverage of bedrock geology at the site. The 1:50k resolution mapping indicates that the site is underlain by sedimentary bedrocks in the form of interbedded sandstone and limestone, and mudstone and clay formations originating from the Cretaceous period.

### *Overburden Geology and Soils*

9.31 The BGS 1:50k Superficial Deposits map shows the site to have superficial deposits covering a small area of the northern site, these are Alluvium – Clay, Silt, Sand and Gravel. These were formed during the Quaternary period and are fluvial in origin.

9.32 The Cranfield Soil and Agrifood Institute Soilscapes map shows the site to have overlying soil deposits of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, with some freely draining slightly acid but base-rich soils in the north of the northern site.

### *Hydrogeology*

9.33 The hydrogeology of the site was assessed using DEFRA's magic mapping service which provides a range of authoritative geographic information on the natural environment including groundwater and aquifer designations.

9.34 The bedrock aquifer designation map identifies that the southern site is situated over a principal bedrock aquifer. The northern site is partly over principal aquifer and partly over secondary aquifer, the remaining areas and south-eastern site are over an unproductive aquifer. Principal aquifers are defined as layers of rock that have high intergranular fracture permeability, indicating that they usually provide a high level of water storage. The superficial drift Aquifer Designation Map shows the site is not over a superficial aquifer.

9.35 The groundwater vulnerability maps show the vulnerability of groundwater to pollutants discharged into the ground based upon the hydrological, geological and hydrogeological soil properties. Groundwater vulnerability is largely controlled by the thickness and permeability of the subsoil, for example thin, permeable soils would mean that groundwater can become more easily contaminated without appropriate mitigation. The vulnerability classification for part of the northern and southern sites is high. Therefore, appropriate mitigation will be required to ensure the protection of groundwater in those areas.

9.36 Additionally, the BGS borehole scan map shows a borehole at the northern site at NGR: TR 07720 38820 with a depth of approximately 10 m, water

was not identified in this borehole. Borehole records for the southern site are unavailable due to them being confidential.

### *Water Quality and Water Use*

9.37 The site does not lie within a drinking water safeguard zone, or a source protection zone, but does lie within a nitrate vulnerable zone. The Water Framework Directive (WFD) River and Groundwater Body Catchment Cycle 2 dataset has been used to assess the water quality of the East Stour River into which the site drains. The East Stour River is a WFD waterbody with ID GB107040019640, it is not classed as a heavily modified water body.

9.38 The East Stour River has an overall status of moderate, as of 2019, with moderate ecological status and failed chemical status. This is due to a moderate biological class for Macrophytes and Phytobenthos, moderate physico-chemical for Phosphate, and fails chemically for Polybrominated diphenyl ethers (PBDE) and Mercury and its compounds. The watercourse is prevented from reaching good status due to phosphate pollution from water industry wastewater, agricultural and rural land management, industry and urban and transport.

9.39 The surrounding land use is predominantly agricultural with some small isolated urban conurbations. The M20 motorway lies to the north of the site and the Channel Tunnel railway line between the northern and southern sites. It is likely that abstractions are associated with agricultural uses in close proximity to the site or private domestic water supplies. The EA and the borough council were consulted to obtain further information on private domestic water supplies (PWS) that could be impacted by the development. Ashford Borough Council responded that only one PWS was in proximity to the sites, being approximately 1.3km from the site at E 608070 N 140050. Folkestone and Hythe Borough Council of which the boundary is close to the site did not respond within the timeframe of the ES being written. The EA also did not respond within the timeframe of the project.

## Ground Water Dependent Terrestrial Ecosystems (GWDTE)

9.40 The EA's GWDTE dataset indicates that there are no GWDTE in the vicinity of the site which could be impacted by the development due to the large distance to the nearest sites. The nearest is Gibbins Brook which is a tributary of the East Stour River that is upstream of the site, and as such is not hydraulically connected to the site.

## Baseline Sensitivity

9.41 The sensitivity of the baseline receptors has been assessed as follows based on the criteria outlined in **Table 9.4**.

Table 9.4 - *Baseline Sensitivity*

| Receptor | Sensitivity |
|---|---|
| Surface Water quality | Medium |
| Groundwater (quality and quantity) | High |
| Private water supplies | High |
| Soil | Medium |
| Superficial and bedrock geology | Low |

## Future Baseline

9.43 Under a future baseline scenario the environment is likely to respond to a change in climate and a change in land use. Although the effects of climate change are unknown it is likely that UK winters will become milder and wetter and the intensity and frequency of storms will increase. To incorporate this uncertainty we have included a climate change allowance of 40% to the rainfall estimate which is used to inform the storage volume within the outline drainage strategy. The 40% allowance for climate change is the upper end potential change for the 2080's, as prescribed by the EA . Given the 40yr design life of the scheme, this is considered to be a conservative allowance.

# POTENTIAL IMPACTS

9.44 The proposed solar farm may induce a series of potential adverse impacts upon the baseline hydrology, hydrogeology and geological environment within the vicinity of the proposed works. Impacts may arise during the construction/ decommissioning and operational phases.

9.45 In order to assess the potential impacts of the proposed scheme the proposed infrastructure must be reviewed relative to the baseline environment. The following infrastructure is proposed:

- Construction of a maintenance/ access track;
- Perimeter stock proof post and wire fencing;
- Trenching, ducting and installation of underground DC Cable;
- 1 Spare building;
- 1 Store building;
- 1 Welfare block;
- Installation of panel frames and ground anchors;
- 20 x Inverter units; and
- Landscape planting.

## Construction & Decommissioning

### *Potential Impacts on Soil, Geology*

9.46 Potential impacts from decommissioning would be similar to those considered for construction, although reduced where tracks are left in situ.

9.47 There is a risk of soil compaction across the whole of the site through operation of machinery and plant to install the panel arrays. However, the access tracks to be constructed will be the most heavily trafficked areas, these tracks will be constructed from permeable materials, therefore, a small impact on soil in these areas is foreseen. There will likely be a minor increase in run-off due to this soil compaction and the development of impermeable building areas. If the soils become compact, the soakaway potential decreases, leading to increased surface water runoff, this potentially increases the flashiness of the catchment during high rainfall events and potentially reduces groundwater recharge temporarily.

9.48 Excavation of the topsoil will likely be required to lay the proposed access tracks. This can often have a direct impact on the exposed subsoil or rock due to increased risk of erosion. This poses a risk during high rainfall events due to increased siltation of runoff and potentially the surrounding watercourses. Furthermore, excavations during the installation of the underground DC cables could potentially result in erosion

of the subsoil and siltation of runoff. However, given the shallow depth of excavations, the predicted impacts are expected to be small.

9.49 The potential impact on soils of medium sensitivity could be up to small magnitude. This would result in a potential negligible effect which is not considered to be significant. The potential impact on geology of low sensitivity could be small. This would result in a potential effect of negligible (not significant).

### *Potential Impacts on Surface and Groundwater Quality*

9.50 The primary short-term construction impacts include the potential for reductions in water quality through siltation of the surrounding watercourses due to soil erosion and accidental release of pollutants leading to changes in in-stream hydrochemistry.

9.51 The construction work across the site that will expose surface soils, such as soil stockpiles, could occur adjacent to the natural land drainage ditches of the site. There is the potential for sediment loaded run-off to enter these ditches directly, which could increase siltation in the East Stour River.

9.52 There is a low risk of chemical spillages/ leakages from the proposed development and any cabling associated with the substation. However, if this were to occur, it would have the potential to soak through the subsoil and into the groundwater, or alternatively be entrained with surface water runoff into the watercourses surrounding the site.

9.53 There is also the risk of contamination from any fuel spillages from construction vehicles. This risk is considered low, providing that refuelling occurs off site and appropriate emergency plans are put in place to deal with potential spill events.

9.54 The depth of groundwater at one location at the site (>10m) indicates groundwater is deep, however this is not considered to be reliably representative of the entire site. Due to there being a principal aquifer underlying parts of the southern and northern sites, these would be considered a high sensitivity receptor and there is the potential for contamination from chemical pollutants to these aquifers.

9.55 The PWS in proximity to the site lies in a different surface water catchment to the site and therefore the site is very unlikely to be in the zone of groundwater contribution to the PWS. There is considered to be no possible mechanism where pollution at the site could impact the PWS.

9.56 The potential impact on surface water receptors of medium sensitivity could be up to small. This would result in a potential negligible effect. The potential impact on groundwater receptors of high sensitivity could be up to large. This would result in a potential effect of major and significant. The potential impact on private water supply receptors of high sensitivity would be no change. This would result in a potential effect of none (no change).

### *Potential Impacts on Drainage and Flood Risk*

9.57 The impact from construction will be limited for flood risk in terms of the short time scale of this phase, however there are temporary impacts that could arise. If temporary units or stockpiles are located in surface water preferential flow routes then blocking

these routes could cause an increase in flood risk. If they are located in the fluvial flood plain (the Aldington flood storage area) then flood storage volume would be effectively removed temporarily. At the latter stages of construction when impermeable areas have been built, this could cause an increase in flood risk, resulting from greater runoff rates.

9.58 The flood risk receptors for the site are residential housing up and downstream of the site, Church Lane and the Sellindge electrical stations. The potential impact on these receptors of high sensitivity could be up to moderate. This would result in a potential effect of moderate significance.

## Operation

### *Potential Impacts on Soil and Geology*

9.59 Lack of infiltration over a longer time scale through the introduction of impermeable infrastructure, could lower the aquifer recharge rate in the area, part of the southern and northern sites are overlying a principal bedrock aquifer. Due to the small area of the permanent infrastructure, and given retained vegetation surrounding the panels, this is assumed to be a small impact. There is potential for soil erosion from surface water runoff if vegetation cover is not maintained across the site. We consider that there will be no impacts to geology as this receptor will not be exposed during this phase.

9.60 The potential impact on the soil receptors of medium sensitivity could be up to small. This would result in a potential effect of minor (not significant).

### *Potential Impacts on Surface and Groundwater Quality*

9.61 There is potential for improvement of surface water quality resulting from the change of land use away from agriculture, which is currently a contributing factor to the moderate WFD status of the East Stour River. This is especially important given the site lies in a Nitrate Vulnerable Zone.

9.62 During operation there is a risk of spillage of chemicals from maintenance vehicles which could infiltrate into the soil or be entrained with surface water runoff into the local watercourses. There is also a risk of increased siltation if vegetation cover is not maintained surrounding the panel array. Due to there being a principal aquifer underlying parts of the southern and northern sites, these would be considered a high sensitivity receptor and there is the potential for contamination from chemical pollutants to these aquifers from maintenance vehicles, although this is predicted to be lower risk than during the construction phase.

9.63 The potential impact on surface water receptors of medium sensitivity could be up to small. This would result in a potential effect of negligible. The potential impact on groundwater receptors of high sensitivity could be up to small. This would result in a potential effect of minor. The potential impact on private water supply receptors of high sensitivity would be none (no change). This would result in a potential effect of none (no change).

9.64 No significant impacts are predicted overall.

### *Potential Impacts on Drainage and Flood Risk*

9.65 The proposed development would result in the increase of impermeable areas through the construction of inverter, welfare and store blocks. The access track is to be constructed from permeable materials. An increase in impermeable area on site, leads to a reduction in infiltration and an increase in surface water runoff. This means rainwater can reach rivers faster, carrying a larger volume of water, subsequently increasing downstream flood risk.

9.66 The proposed solar panels themselves are thought to have a limited impact on the surface water runoff regime of the site as, due to the tilt of the panels that are raised above ground, rainwater can still reach the existing vegetation underneath.

9.67 The potential impact on the flood risk receptors of high sensitivity for the site (noted in Section 5.1) without mitigation could be up to moderate. This would result in a potential effect of moderate. This is significant.

## MITIGATION MEASURES

### *Mitigation Measures for Soils, Geology*

9.68 When constructing the access track, the lengths of open excavations would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion/siltation. These would be constructed on existing tracks that are already compacted, where possible. Gravel material will be used as opposed to tarmac to allow a level of infiltration through permeable tracks, better representing the baseline soil conditions. If scour or siltation could occur on steeper sections of the site, silt traps, soil bunds and grass filter strips will be used to capture any sediment, preventing this from entering any watercourses draining the site.

9.69 Underground cabling should be designed and installed to ensure a low risk of pollution from this activity. Excavations required for cable installation will be undertaken in a manner as to minimise time which subsoil layers are exposed. Soil stockpiles would be managed to contain sediment to that locality, preventing input to watercourses. The ground will be restored as quickly as possible following construction and existing vegetation replanted.

9.70 The layout of the panels would be designed to minimise the risk of local scour problems. For example, the panels would be angled with approximately a 20° tilt to allow water to drip from the panels along the length of each row. This will prevent high velocity flow of rainwater from scouring the soil below the panels.

9.71 Maintaining vegetation under and around panels will be undertaken, which will work to reverse the compaction of soil over time. Additionally, a traffic management plan would be adopted to minimise the concentration of soil compaction. The reduction of soil compaction through these methods would minimise any loss of groundwater recharge.

### *Mitigation Measures for Surface and Groundwater Quality*

9.72 All fuel, lubricants and chemicals would be stored within bund containment areas, with the capacity

to store at least 10% more volume than the maximum storage volume required. Furthermore, any filling points will be within the bunded area or have secondary containment provided.

9.73 Refuelling, cleaning and routine maintenance of vehicles will be carried out off-site. Drip trays or absorbent mats will be placed under standing plant. Spill kits and other necessary equipment will be provided to contain and clean up any spills of fuel, lubricants or other chemicals.

9.74 All solid and liquid waste materials would be properly disposed of in controlled landfill sites away from the site. Welfare facilities would be provided on site and any effluent contained within a sealed unit which would be appropriately disposed of offsite.

9.75 The aforementioned mitigation measures for soils are also relevant for ensuring minimal impacts upon water quality from increased siltation. The proposed soil mitigation measures will help to prevent increased siltation of surface water runoff reaching the local watercourses.

## Mitigation measures for Drainage and Flood risk

9.76 The impact of the solar panels on the existing drainage is expected to be minimal due to their design. However due to the small increase in impermeable area on site from the associated operational infrastructure, a conservative approach to drainage will be adopted utilising extensive planting and targeted SuDS to control and increase the quality of surface water runoff.

9.77 The proposed built infrastructure, where surface water flow would be impeded, are located outside of the areas indicated to be at risk of surface water flooding to ensure existing surface water drainage routes are not impeded. Due to the design of the panel ground anchors, we would not expect them to impede the surface water drainage routes. The additional surface water run-off resulting from impermeable surfaces on the site will be attenuated by extensive planting and captured at strategic locations using cut-off swales (**Figure 9.1, ES Volume 3, Figures**). These will be designed to provide long term storage for runoff resulting from the rainfall events on the site. There will be the possibility of infiltration into the soil or evaporation of water whilst stored. It will be necessary that vegetation is maintained under and around the solar panels to attenuate runoff.

9.78 All of the infrastructure of the site will be placed outside of the flood exclusion zone, defined in the FRA and Drainage strategy (**Appendix 9.1**) from the embankment level of the Aldington Flood Storage Area. This will ensure that no storage volume is displaced, and flood flows will not be impeded.

9.79 See the associated Flood Risk Assessment and Outline Drainage strategy (**Appendix 9.1**) for further details on the proposed surface water management.

## RESIDUAL EFFECTS

9.80 Residual effects have been assessed by reviewing the proposed mitigation measures against the potential effects outlined above. It is considered that all of the potential impacts can be managed appropriately through mitigation measures, good practice

construction methods and sustainable design. **Table 9.5** and **Table 9.6** outline how the proposed mitigation results in no significant effects for each of the potential impacts from construction, decommissioning and operation of the site respectively. It can be concluded from this that there will be no significant effects on the drainage, flood risk, geology, soils, water quality and hydrogeology receptors associated with the site when all mitigation is employed.

## CUMULATIVE EFFECTS

9.81 A proposed battery energy storage facility has been proposed by EDF Renewables and is located within the southern extent of the northern site (Figure 3.1). If construction of the proposed battery storage facility would take place at the same time as the proposed solar farm there could be increased construction activity which could mobilise sediment and increase the risk of pollution of watercourses. Similarly, there would be an increased risk of spillage of construction materials/fuels. Considering the low level and unintrusive nature of construction activities related to the proposed solar farm, as well as the proposed battery storage facility, it is not likely significant cumulative effects would occur. During operation it is likely both developments would only have a negligible effect in terms of changes in water quality and as such no significant effects are likely during operation.

9.82 In terms of flood risk, the proposed battery storage facility would result in an additional impermeable area within the site boundary. It is assumed that the design and construction techniques of the proposed battery storage facility will take this into account and will provide appropriate attenuation or SuDS as required, in line with national policy and guidance. Therefore no significant cumulative effect in relation to flood risk during construction or operation is likely to occur.

Table 9.5 - *Residual Risk – Construction and Decommissioning*

| Potential Effect | Proposed Mitigation | Residual Effect |
|---|---|---|
| Soil – negligible | Reducing exposure time and extent. | Negligible – soil erosion will be reduced; however, some soil will have to be displaced for construction. Not significant effect. |
| Geology – negligible | Reducing exposure time and extent. | Negligible – erosion of geology will be reduced, but not eliminated. Not significant effect. |
| Groundwater quantity – negligible | Traffic management plan. | None – Mitigation will reduce compaction of soil on site, thereby mitigating impact upon recharge, Not significant effect. |
| Surface water quality – negligible | The below mitigation for groundwater quality all applies to surface water quality. Additionally, minimising extent and time subsoil exposed, silt traps, soil bunds, grass buffer strips. | None – mitigations will reduce siltation and prevent chemical pollution of surface water, impact reduced to negligible resulting in no effect. Not significant effect. |
| Groundwater quality - major | Vehicle refuelling offsite, spill kits carried, welfare facilities with sealed tanks, waste materials disposed of correctly off site, bunded chemical storage areas. | Negligible – chemical spillage risk is greatly reduced following mitigation methods, impact reduced to negligible. Not significant effect. |
| Private water supply - none | None proposed (no mechanism for impact to source of supply). | None – no effect possible. |
| Flood risk up/ downstream – moderate | Building infrastructure out of fluvial flood risk zones.<br>Construction of swales within outline drainage strategy. Using permeable track design. Wildflower grass seeding across site, replacing current arable land use. Introduction of hedgerows and grass buffer strips. Building infrastructure (excluding panel arrays) out of pluvial flood risk zones. Sustainable design of panels with adequate spacing. | Negligible – Impact reduced to negligible. Not significant effect. |

Table 9.6 - *Residual Risk - Operation*

| Potential Effect | Proposed Mitigation | Residual Effect |
|---|---|---|
| Soil - minor | Vegetation is maintained across the site and depressions along drip lines will attenuate runoff. | Negligible – soil erosion risk greatly reduced with mitigation. Impact reduced to small. Not significant effect. |
| Groundwater quantity – minor | Traffic management plan, maintenance of vegetation around panels. | Negligible – Compaction reduced through mitigation. Impact reduced to negligible. Not significant effect. |
| Surface water quality – negligible | The below mitigation for groundwater quality all applies to surface water quality. Maintenance of grass buffer strips. | None – mitigations will reduce siltation and prevent chemical pollution of surface water, impact reduced to negligible. Not significant effect. |
| Groundwater quality - minor | Spill kits carried, welfare facilities with sealed tanks, waste materials disposed of correctly off site. | Negligible – chemical spillage risk is greatly reduced following mitigation methods, impact reduced to negligible. Not significant effect. |
| Private water supply - none | None proposed (no mechanism for impact to source of supply). | None – no effect possible. Not significant effect. |
| Flood risk up/ downstream - moderate | Correct maintenance of swales, hedgerows and grass buffer strips. | Negligible – Mitigation will ensure site drainage retains greenfield runoff rates, Impact reduced to negligible. Not significant effect. |

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# INTRODUCTION

10.1 This chapter has been completed in connection with a proposal to construct and operate a solar power plant within agricultural fields west of Sellindge, Kent (approximate Grid Reference TR 071 387). The location of the proposed development sites is shown in **Figure 1.1** of ES Volume 3 and the proposed development plans are fully detailed in **Chapter 6** of this ES, The Development Proposal and the accompanying figures.

10.2 A Preliminary Ecological Appraisal of the site was carried out on 7th April 2021 and consisted of a Phase 1 Habitat Survey and a Protected Fauna Survey which included a Habitat Suitability Index (HSI) survey of off-site ponds. eDNA surveys were completed in April 2021 and Breeding Bird Surveys were also completed in April, May and June 2021. All surveys were completed by Turnstone Ecology Limited – a Statement of Competence is provided within **Chapter 5** of the ES, EIA.

10.3 This chapter details survey and assessment methodology along with the results of a desk-based study and on-site surveys. It also provides an assessment of potential impacts and appropriate mitigation to offset any impacts associated with the proposal and to satisfy national and local planning policies. Significance in EIA terms is attributed to the residual effects.

## Ecological Context

10.4 The proposed development site is located within agricultural fields to the west of Sellindge, Kent. The proposed site comprises three areas of solar arrays (**Plate 10.2**) consisting of:

- Northern Array which is sandwiched between the M20 to the north and the high-speed London – Paris railway to the south. A block of semi-mature broad-leaved woodland is beyond the western boundary and the eastern boundary is demarked by a narrow, fast flowing brook, with an area of plantation woodland to the east of the brook. The Northern Array is within a single, large arable field. Access to the Northern Array will be along an existing hard-standing track leading off Church Lane to the east. The track runs parallel to the M20, crosses the brook and enters the field in which the solar panels will be constructed. An existing bridge over the brook will be upgraded as part of the proposals.
- Southern Array is to the south of the high-speed railway and encompasses two arable fields. To the west of the Southern Array is a large block of semi-mature broad-leaved woodland known as Backhouse Wood. The Southern Array is within two, large arable fields which are separated by a defunct hedgerow. Immediately

north of the Southern Array is the East Stour River and associated river corridor. Access to the southern Array will be off Church Lane through an existing gap in the hedgerow which runs parallel to Church Lane.

- Eastern Array is to the east of Church Lane and within two improved sheep grazed fields. Access to the Eastern Array will be from the Southern array, crossing Church Lane, through an existing field gate entrance. There are two groups of panels within the Eastern Array, and these are separated by a hedgerow between two blocks of broad-leaved woodland; Partridge Plantation and Round Wood. Access through the hedgerow between these two woodland blocks will utilise an existing gap through the hedge.

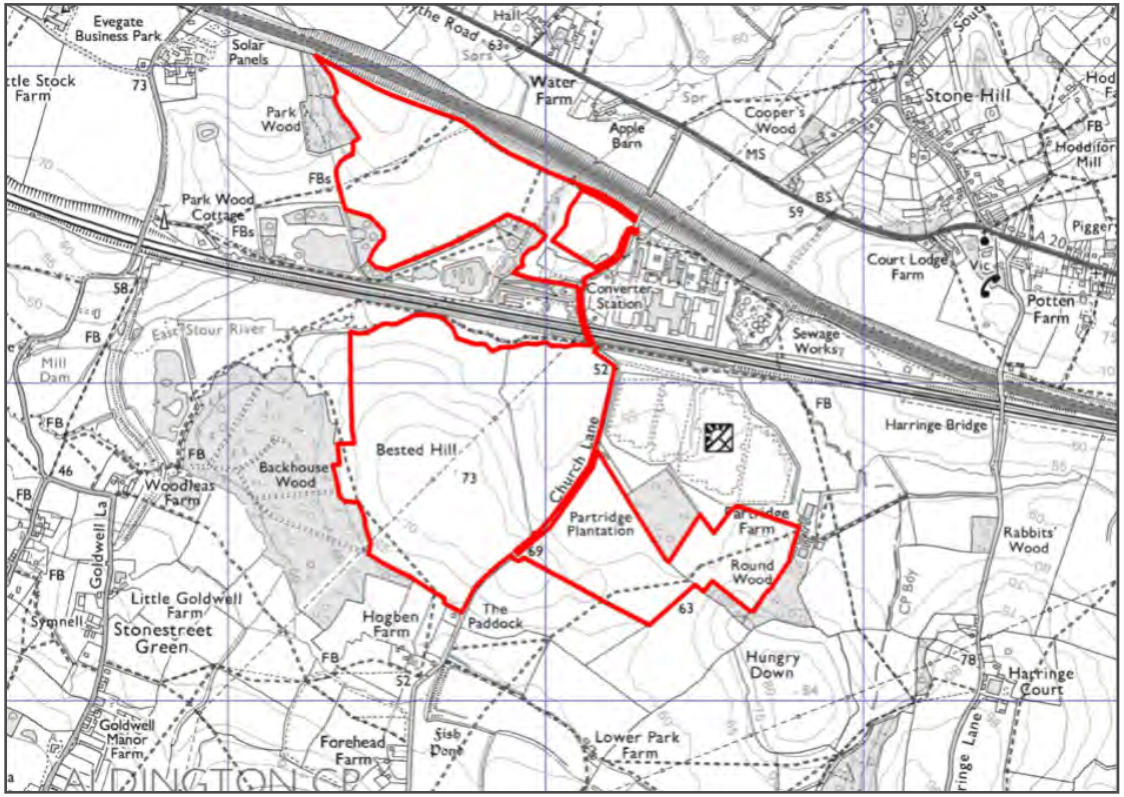



Plate 10.1 - *Location of proposed development (application site)*

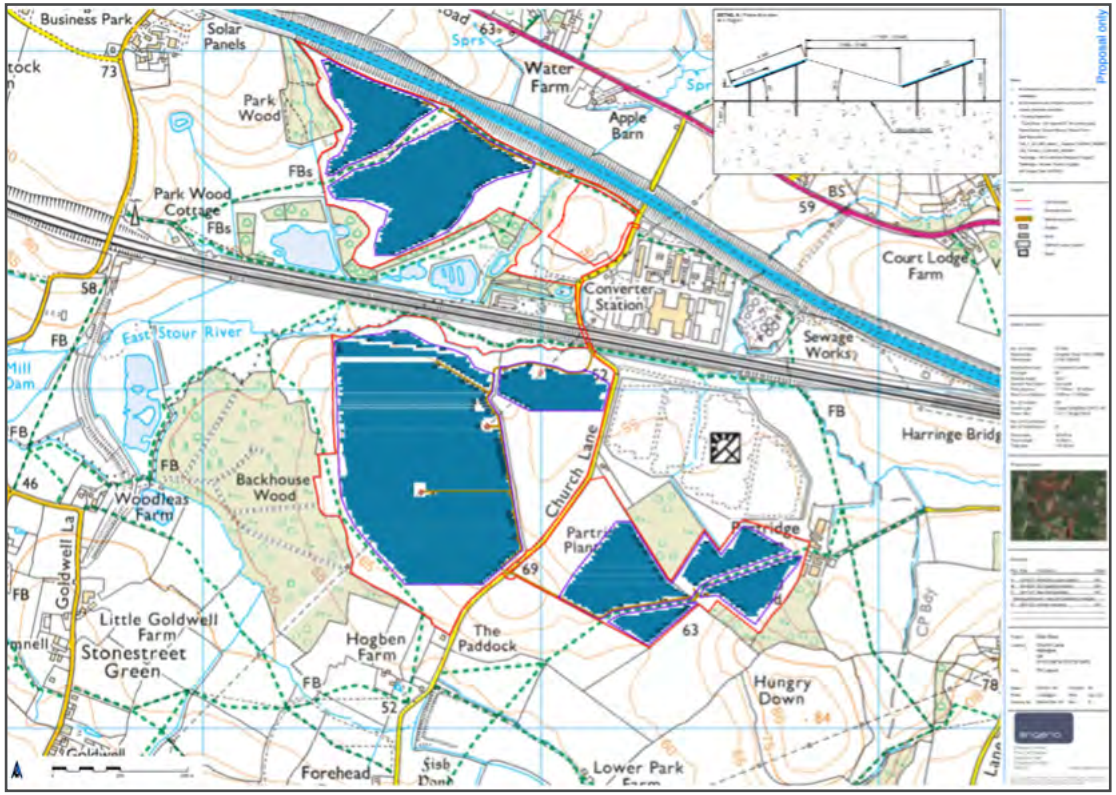



Plate 10.2 - *Location of the Solar Arrays*

10.5 The proposal involves the construction and operation of a solar farm and associated infrastructure, which will cover approximately 65.49 hectares (ha) of farmland. The total area of the application site covers 103.9ha.

10.6 The application site is dominated by arable fields or sheep grazed improved grassland. Broad-leaved woodland blocks are present to the west of the Northern and Southern Arrays however these are outside of the application site. To the north of the Northern Array is an area of linear plantation woodland associated with the M20. To the east of the Northern Array is a tree lined brook which flows south to an area of fishing lakes which have been created in an area of broad-leaved woodland which wraps around the southern boundary of the Northern Array, beyond which is the high-speed London to Paris railway.

10.7 The northern boundary of the Southern Array is within the arable field with the East Stour River and associated riparian corridor beyond the field's northern boundary and the western and southern boundaries are also within the arable field with woodland further to the west and the

hedge lined Church Lane to the south and east. The eastern boundary of the larger part of the Southern Array is within the arable field with a defunct hedgerow beyond. The boundaries of the smaller part of the Southern Array are entirely within the arable field.

10.8 The boundaries of the Eastern Array are entirely within the sheep-grazed grassland.

10.9 A number of ponds are present outside of the application site boundary, within 500m, including a balancing pond adjacent to Church Lane and ponds within the woodland associated with the brook and the fishing lake to the south of the Northern Array. There are no ponds within the redline application boundary.

10.10 The wider landscape is dominated by arable and pasture fields with scattered woodlands and villages as well as extensive areas of the build environment associated with Ashford the centre of which is approximately 7.4 km north-west of the site and Hythe, the centre of which is approximately 7.6 km south-east of the site.

# METHODS FOR ECOLOGICAL SURVEY

## Desk-based Study

10.11 Information relating to locally designated sites and records of protected species within 5 km of the proposed development site (from TR 07890 37872) has been obtained from the Kent and Medway Biological Records Centre (KMBRC).

10.12 Information relating to designated sites, sites where European Protected Species (EPS) Licences have been granted between 2009 and 2019 (the most recent update of the database) and historic records of protected species within 2.5 km of the centre of the site obtained from Magic (www.magic.gov.uk) and other freely available information on the internet, such as planning portals.

10.13 Any species-specific historic records are detailed within the relevant species accounts in the Results section.

## Phase 1 Habitat Survey

10.14 The survey methods were based on the Phase 1 Habitat Survey approach (Joint Nature Conservation Committee 2003), which is a standardised method to survey main habitat types. Plant nomenclature in this report follows Rose (Revised Edition 2006) for native, naturalised and garden varieties of vascular plant. Introduced species and garden varieties are not always identified.

## Protected Fauna Surveys and Assessment

10.15 The habitats on site were assessed for suitability for protected fauna that occur in the region and obvious signs and incidental sightings of protected species were noted where present. Taking into consideration the geographical region and habitat types on and adjacent to site, the protected species and species groups that could be encountered are listed below:

- Badger;
- Bats;
- Dormouse;

- Otter;
- Water Vole;
- Nesting birds;
- Great Crested Newt; and
- Reptiles.

10.16 Details of initial survey methods for each relevant species are given below.

## *Badger*

10.17 Where access allowed a comprehensive assessment was carried out to identify areas that are used by Badgers (Meles meles) for foraging and sett digging. Signs of Badgers including setts, foraging signs, paths and latrines, would have been recorded if they had been encountered.

## *Bats*

10.18 Any buildings and trees on or adjacent to the site were visually surveyed to assess them for their potential to support roosting bats, although a thorough inspection of all potential roosting features would not be undertaken as part of the Phase 1 survey.

10.19 Habitats were assessed for their suitability for use by foraging or commuting bats. Areas of particular interest vary between species, but generally include sheltered areas and those habitats with good numbers of insects, such as woodland, scrub, hedges, watercourses, ponds, lakes and more species-rich or rough grassland.

## *Dormouse*

10.20 Habitats were assessed for their suitability for use by Dormouse (Muscardinus avellanarius), which generally use areas of dense woody vegetation cover. Dormice are most likely to be found where there is a wide diversity of woody species contributing to three-dimensional habitat complexity, a number of food sources, plants suitable for nest-building material and good connectivity to other areas of suitable habitat.

## *Otter*

10.21 Watercourses and areas of wetland and adjacent habitat were assessed for their suitability for use by Otter (Lutra lutra). This included an assessment of water depth, water quality, vegetation and cover.

10.22 Field signs would have been recorded if they had been encountered, including spraint (droppings), footprints, slides, paths, feeding evidence, holts (underground resting places) or couches (temporary resting places).

## *Water Vole*

10.23 Initial surveys centre on an assessment of habitat suitability. Most watercourses, waterbodies and other areas where there is surface water for the majority of the year (including marshland, rush-pasture, wetland, mires, ponds and other waterbodies) have some potential to support Water Voles (Arvicola amphibius). The following factors were taken into consideration: water quality, water-level regime, channel dimensions, bank type and material, vegetation for cover and food sources, shading, predation and competition and habitat management.

10.24 Field signs and direct evidence of the species (including feeding signs, latrines, burrows, footprints, runways, food piles and actual sightings) would have been recorded if they had been encountered.

## *Birds*

10.25 Specific breeding bird surveys were undertaken between April and June 2021 and the objectives of these surveys were to:

- identify the distribution of breeding birds across the site;
- locate the presence of birds protected under Schedule 1 of The Wildlife and Countryside Act 1981(as amended);
- locate the presence of species of conservation concern; and
- identify any species which may require special mitigation during construction and throughout the life of the development.

## *Methodology*

10.26 The survey methodology is based on a combination of the Common Bird Census methodology, devised by the British Trust for Ornithology (BTO), and national Breeding Bird Survey techniques, jointly devised by the BTO, Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservation Committee (JNCC).

10.27 The survey was undertaken by a single ornithologist walking a transect route that covered the entirety of the site so that all habitat possibly used by breeding birds was included. The transect routes started at slightly different points on each visit so that all areas were recorded at different times during the survey to reflect possible changes in bird activity through the morning. All birds seen or heard during each visit were recorded on to maps using BTO standardised codes and symbols representing each species present and activity. Attention was given to identifying the presence of specially protected and nationally declining bird species. Birds recorded from areas of adjacent habitat were also noted on to the fieldmaps including within areas of adjacent woodland, and the riparian corridors associated with the brook and the East Stour River.

10.28 Full details of the survey visits are provided in **Table 10.1**.

Table 10.1 - *Details of breeding bird survey visits.*

| Visit | Date | Start Time | End Time | Weather (Wind = Beaufort scale, Cloud = Octas) |
|---|---|---|---|---|
| Visit 1 | 08/04/2021 | 05:30 | 10:00 | 7/8, 1.50C, BF 1, dry and cloudy |
| Visit 2 | 06/05/2021 | 05:15 | 09:30 | 3/8, 0.50C, BF1, cold and part cloudy |
| Visit 3 | 11/06/2021 | 05:15 | 09:30 | 8/8, 160C, BF1, dry and foggy to start, clearing during survey |

## *Criteria for Evaluation of the Breeding Bird Survey Results*

10.29 A number of criteria are available to determine the conservation status of those bird species recorded as well as attributing a value to the overall breeding bird assemblage. The most appropriate of these are;

- Schedule 1 of the Wildlife and Countryside Act – The Wildlife and Countryside Act affords greater protection to certain breeding species that are considered appropriately at risk nationally and are as such listed as specially protected under Schedule 1.
- Birds of Conservation Concern 5 (Eaton et al. 2021) – Under this approach, UK bird populations are assessed using quantitative criteria, to determine the population status of each species and then placed on one of three lists; Red, Amber or Green.
  - Red list species are of high conservation concern, being either globally threatened, having historical UK population declines between 1800 and 1995 or a rapid population decline or breeding range contraction by 50% or more in the last 25 years.
  - Amber list species are of medium conservation concern due to a number of factors, for example having suffered between 25% and 49% contraction of UK breeding range or a 25-49% reduction in breeding or non-breeding populations over the last 25 years. Species which have a five year mean of 1-300 breeding pairs (bp) in the UK or an unfavourable European conservation status or for which the breeding population in the UK represents 20% or more of the European breeding populations are also listed on the Amber list.
  - Green list species have a favourable conservation status.
- Species of Principal Importance included under Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006 as well as those for which specific Local Biodiversity Action Plans have been prepared.

10.30 The results of the survey as well as conservation status of the species recorded are broadly assessed against these selection criteria to assist in the valuation of the combined breeding bird assemblage.

## *Interpretation of the Breeding Bird Survey Results*

10.31 The data is compiled into a summary table (**Appendix 10.2**) giving information on species recorded, conservation status and breeding status. Conservation status is defined with special emphasis on species on Schedule 1, Birds of Conservation Concern, species included in Section 41 of the NERC Act 2006 and Local BAP species. Breeding status is defined using criteria devised by the European Ornithological Atlas Committee (EOAC) and is presented below.

CONFIRMED BREEDING (C)

- Distraction-display or injury feigning;
- Used nest or eggshells found (occupied or laid within period of survey);

- Recently fledged young (nidicolous species) or downy young (nidifugous species);
- Adults entering or leaving nest-site in circumstances indicating occupied nest (including high nest or nest-holes, the contents of which cannot be seen) or adult seen incubating;
- Adult carrying faecal sac or food for young;
- Nest containing eggs; or
- Nest with young seen or heard.

PROBABLE BREEDING (PR)

- Pair observed in suitable nesting habitat in breeding season;
- Permanent territory presumed through registration of territorial behaviour (song, etc.) on at least two different days a week or more apart at the same place;
- Courtship and display;
- Visiting a probable nest site;
- Agitated behaviour or anxiety calls from adults;
- Brood patch on adult examined in the hand; or
- Nest building or excavating nest-hole.

POSSIBLE BREEDING (PO)

- Species observed in breeding season in possible nesting habitat.
- Singing male(s) present (or breeding calls heard) in breeding season.

NON-BREEDING (NB)

- A species present during the survey but considered to be not breeding within the survey area. Recorded simply as a bird flying over the site or are present on site but considered to be a non-breeding species due to a lack of suitable breeding habitat or lack of behaviour characteristic of breeding.

## *Great Crested Newt*

10.32 The suitability of any aquatic and terrestrial habitat on the site, and in the immediate vicinity, was assessed for suitability for use by Great Crested Newts (Triturus cristatus). Great Crested Newts are known to travel up to 500m between breeding ponds and suitable terrestrial habitat, so a desk-based search was undertaken for any ponds up to 500m from the site using OS maps and aerial imagery. The terrestrial habitat between the site and these ponds, and therefore connectivity to the site, was also considered.

HABITAT SUITABILITY INDEX ASSESSMENT

10.33 Waterbodies were assessed to determine whether they were suitable for Great Crested Newt using the Habitat Suitability Index (HSI) assessment developed by Oldham et al. (2000), which is a derived from systems developed by the US Fish and Wildlife Service. It is a numerical index, between 0 and 1, where 0 indicates unsuitable habitat and 1 represents optimal habitat. The HSI for the Great Crested Newt uses ten factors (suitability indices (SI) 1 to 10) which are thought to affect Great Crested Newts, as follows:

- geographic location (SI 1);
- surface area (SI 2);
- hydrology (drying) (SI 3);
- water quality (SI 4);

- shade (SI 5);
- presence of water fowl (SI 6);
- presence of fish (SI 7);
- number of adjacent water features (SI 8);
- terrestrial habitat (SI 9); and
- macrophyte cover (SI 10).

10.34 Each factor is scored using field andesk-based survey. These ten scores are then converted to SI scores using a scale from 0.01 to 1 from graphs given in Oldham et al. (2000) and an HSI result is calculated using the following formula:

- *HSI = (SI1 x SI2 x SI3 x SI4 x SI5 x SI6 x SI7 x SI8 x SI9 x SI10)1/10*

10.35 Further research by Brady (unpublished) has developed a system for using HSI scores to define pond suitability for Great Crested Newts according to the following categories:

- HSI <0.5 = poor;
- HSI 0.5 – 0.59 = below average;
- HSI 0.6 – 0.69 = average;
- HSI 0.7 – 0.79 = good; and
- HSI > 0.8 = excellent.

10.36 HSI cannot guarantee the presence or absence of Great Crested Newts however, there is a positive correlation between HSI scores and presence and abundance. Generally, ponds with high HSI scores are likely to support larger populations. The relationship is however not sufficiently precise to conclude that any pond with a high HSI will support newts in high populations, or that any pond with a low score will support low numbers of newts or no newts at all.

ENVIRONMENTAL DNA (EDNA)

10.37 Four ponds, numbered and shown on the Phase 1 map (**Figure 10.1** of ES Volume 3 - Figures), were subject to eDNA surveys completed on the 15th April 2021. The surveys were undertaken by Mark Gash of Turnstone Ecology. Mark holds a licence to survey for Great Crested Newts in all counties of England (Licence number 2015-19057-CLS-CLS).

10.38 The fishing ponds immediately north of the railway line were scoped out from survey based on their current use (sports fishing) and lack of suitable habitat for Great Crested Newts. In addition further ponds are present to the west of the southern cluster (west of Backhouse Wood) however these ponds are approximately 500m west of the site and were also scoped out as they are large sports fishing lakes and appeared to support no suitable habitat for Great Crested Newts.

10.39 The survey samples were analysed by Surescreen Scientifics for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5' (Biggs et al. 2014).

## *Reptiles*

10.40 The site was assessed for suitability for use by widespread species of reptiles, with particular attention paid to those features that could be used as basking areas (e.g. south-facing slopes), hibernation sites (e.g. banks, walls, piles of hardcore) and opportunities for foraging (e.g. rough grassland and scrub). The site was assessed for its suitability for the commoner reptile species which have broadly similar habitat requirements, but more specific requirements include the following (Beebee & Griffiths 2000):

- Common Lizards (Zootoca vivipara) use a variety of habitats from woodland glades to walls and pastures, although one habitat they use is brownfield sites;
- Slow-worms (Anguis fragilis) use similar habitats to Common Lizards, and are often found in rank grassland, gardens and derelict land;
- Grass Snakes (Natrix natrix) have broadly similar requirements to Common Lizards but with a greater reliance on ponds and wetlands, where they prey on amphibians; and
- Adder (Vipera berus) use a range of fairly open habitats with some cover but are most often found in dry heath.

## Constraints

10.41 April is not an optimal month to undertake Phase 1 Habitat surveys, as many plants are not visible and identifiable, however the site is dominated by arable or pasture fields and therefore taking this into consideration as well as the range of other habitats on the site and nature of the proposals this is not considered to be a significant constraint. Surveys were also completed later in the year so all parts of the site were walked over at ideal times of the year.

## Criteria for Assessment

10.42 The scientific value of habitats for nature conservation is assessed according to widely accepted criteria of which the most important are naturalness, extent, rarity, and diversity.

10.43 The assessment of impacts is based on the principles within Chartered Institute of Ecology and Environmental Management (CIEEM) Environmental Impact Assessment (EIA) Guidance (2019) which assesses the impacts of the proposal on ecological receptors taking in to consideration extent, duration, reversibility, timing, frequency and certainty.

10.44 Mitigation is designed to reduce the level of impact upon receptors. Ecological enhancements, in line with best practice, have also been suggested in order to meet current legislation and planning policy. The information below has therefore been considered during assessment.

- Criteria that have been developed to assist in the identification of statutory Sites of Special Scientific Interest (SSSIs) (JNCC 2013);
- Habitats and species of Principal Importance included under Section 41 (England) and Section 42 (Wales) of the Natural Environment and Rural Communities (NERC) Act 2006;
- The legal status of habitats and species according to The Conservation of Habitats and Species Regulations 2017 (as amended);
- CIEEM Guidelines (2019) for assessing the value of ecological receptors within a defined geographical context using the following categories: international (i.e. Europe); UK and national (England); regional; county; Unitary Authority; local or parish; and zone of influence. Receptors are identified as 'important' at these levels, or as 'not important';
- Species protected by the Wildlife and Countryside Act 1981 (as amended);

- Other species listed as scarce or notable in literature issued by conservation organisations or learned societies e.g. vascular plant species listed in Stewart et al. (1994) and Red and Amber List Birds of Conservation Concern (Eaton et al. 2015);
- Local Wildlife Site selection criteria;
- National Policy Planning Framework (NPPF), 2021;
- BS42020:2013 – Biodiversity Code of practice for planning and development;
- Protected species handbooks and best practice guidelines; and
- The Kent and Medway Biodiversity Action Plan (BAP), identifies and prioritises local habitats and species of conservation importance. These habitats and species are stated as
  - Habitats: Lowland Beech and Yew Woodland, Lowland Mixed Broadleaved Woodland, Chalk Grassland, Lowland Meadow, Lowland Dry Acid Grassland / Lowland Heathland, Hedgerows, Brownfield, Traditional Orchard, Rivers, Chalk Streams, Ponds, Coastal Floodplain Grazing Marsh, Intertidal Mudflats and Coastal Saltmarsh, Wet Woodland, and Vegetated Shingle.
  - Species: A total of 387 UK Priority Species have been recorded in Kent and of these Action Plans have been written for the following species: Shrill Carder Bee (Bombus sylvarum), Turtle Dove (Streptopelia turtur), Nightingale (Luscinia megarhynchos), Swift (Apus apus), Adder (Vipera berus), Adonis Blue (Lysandra bellargus), Heath Fritillary (Melitaea athalia), Dwarf or Kentish Milkwort (Polygala amarella), European Eel (Anguilla anguilla), Lapwing (Vanellus vanellus), Sandwich Tern (Sterna sandvicensis), Water Vole (Arvicola amphibius) and True Fox-sedge (Carex vulpina).

# RESULTS

## Desk Study

### *Designated Sites*

10.45 There are four statutory designated sites within 5 km of the proposed solar farm as well as one area of Outstanding Natural Beauty (AONB). These are:

10.46 Kent Downs AONB, which wraps around the wider countryside to the north, south and east of the application site. The AONB is at its closest point approximately 1.5 km south-west of the application site (Southern Array).

10.47 Lympne Escarpment SSSI is approximately 3.4 km south-east of the Eastern Array. The site consists of a steep escarpment of Kentish ragstone formed by the Hythe Beds of the Lower Greensand. Ragstone is a hard sandy limestone which produces calcareous soils. The grassland and woodland of this site are among the best remaining examples of semi-natural habitats on ragstone in Kent. Wet ash-maple is the predominant woodland type with a small area of

calcareous ash-wych elm wood. Many plants usually associated with chalk soils occur in the grassland, including Early-purple Orchid (Orchis mascula).

10.48 Otterpool Quarry SSSI is approximately 2.4 km south-east of the Eastern Array and is designated due to its geological importance.

10.49 Gibbens Brook SSSI is approximately 3.4 km east of the Northern Array. The SSSI consists of an area of marshy grassland on peaty soils that has developed from an acidic valley bog and still retains many features characteristic of a bog. The site is also notable for its invertebrates, particularly moths including the White-barred Clearwing (Synanthedon spheciformis) and the Silver Hook (Eustrotia uncula). Another important feature of the site is the alder carr which supports a number of fen plants, including Opposite-leaved Golden Saxifrage (Chrysosplenium oppositifolium), Marsh Marigold (Caltha palustris) and Yellow Flag (Iris pseudacorus).

10.50 Hatch Park SSSI is approximately 2.3 km north-west of the Northern Array. The SSSI is of special interest for its unimproved acidic grassland, a scarce habitat in Kent, and its ancient pollard woodlands, the latter supporting the richest epiphytic lichen community in the county. The acidic grassland is the remnant of a formerly much more extensive deerpark, and the turf here is believed to have remained unbroken for the last 500 years. This continuity has resulted in a relatively species-rich sward dominated by Common Bent-grass (Agrostis capillaris) and Sheep's Fescue (Festuca ovina), but also containing such species as field Wood-rush (Luzula campestris), Sheep's Sorrel (Rumex acetosella), Heath Bedstraw (Galium saxatile), Bird's-foot (Ornithopus perpusillus), and Upright Chickweed (Moenchia erecta), the latter two species being scarce in Kent. The site is also of importance for the mature timber habitat supporting beetles (Coleoptera) and hole-nesting birds such as Nuthatch (Sitta europaea), Stock Dove (Columba oenas) and 3 species of woodpecker.

10.51 In addition to the above statutory designated sites the site is within 5 km of 14 non-statutory sites including 13 Local Wildlife Sites (LWS) and one Roadside Nature Reserve. None of these sites are within the application redline boundary, although Backhouse Wood LWS is immediately west of the western boundary of the Southern Array.

## *Protected Species Mitigation Licences*

10.52 Two Protected Species Mitigation Licences (formerly European Protected Species Licences) have been issued for projects within 2.5 km from the centre of the site; these are:

10.53 EPSM-2013-6123 which was issued for the destruction of a resting place of Common Pipistrelle (Pipistrellus pipistrellus) at a site approximately 2.2 km south-west of the centre of the proposed development site.

10.54 2014-852-EPS-MIT was issued for the destruction of suitable terrestrial habitat for Great Crested Newt (Triturus cristatus) at a site approximately 1.9 km south-west of the centre of the proposed development site.

## *Preliminary Ecological Survey*

10.55 Phase 1 habitat types were recorded within and immediately adjacent to the proposed development sites are listed below and shown in **Plate 10.3** and **Figure 10.1** of ES Volume 3 - Figures:

- Arable;
- Field Margins;
- Improved grassland;
- Hedgerows;
- Ditches;
- Brook;
- Ponds;
- East Stour River Corridor; and
- Woodland.




Plate 10.3 - *Habitats present within the survey area*

10.56 The site or immediately adjacent areas contain habitat suitable for the protected species and species groups listed below.

- Badger
- Bats
- Dormouse
- Otter
- Water Vole
- Nesting birds
- Great Crested Newt
- Reptiles

## Phase 1 Habitat Survey

### *Arable*

10.57 The sites comprises three large arable fields (as well as two sheep grazed pasture fields, described below), which at the time of the survey were either bare or had been recently sown with Wheat. During the course of the breeding bird surveys the crops matured so that all of the fields were well-vegetated by the middle of the year. The arable fields are of low ecological value.



Plate 10.4 - *Arable field – Northern Array looking north-west towards Park Wood and the M20*



Plate 10.5 - *Bare earth field (eastern part of the Southern Array, looking south)*



Plate 10.6 - *Arable field (Bested Hill, Southern Array, looking north-east)*

### *Field Margins*

10.58 Field margins are largely absent from the arable fields as cropping abuts areas of adjacent habitat, however a 4m margin is present along the northern edge of the Northern Array and a similar sized buffer is present along the northern edge of the Southern Array, adjacent to the East Stour River corridor. These margins consist of improved grassland which are well-used public footpaths which keeps the sward short. Common grass species including Cocks-foot (Dactylis glomerata), Perennial Rye

Grass (Lolium perenne) and False Oat-grass (Arrhenatherum elatius) were noted along with forb species including Spear Thistle (Cirsium vulgare), Creeping Thistle (Cirsium arvense), Ragwort (Jacobaea vulgaris), Dandelion (Taraxacum sp.), Creeping Buttercup (Ranunculus repens), Broad-leaved Dock (Rumex obtusifolius), Curled Dock (Rumex crispus), White Clover (Trifolium repens), Daisy (Bellis perennis), Common Hogweed (Heracleum sphondylium), Daisy (Bellis perenis), Bristly Oxtongue (Helminthotheca echioides) and Germander Speedwell (Veronica chamaedrys). Along the field margin of the Southern Array, adjacent to the East Stour River, Great Celandine (Chelidonium majus) was present along with Willowherb sp, (Epilobium sp.), Horsetail Equisetum arvense), Common Nettle (Urtica dioica) and White Dead-nettle (Lamium album).

10.59 Field margins are not present on the western, southern, or eastern sides of the Northern Array as the boundaries of the solar array are within the arable field.

10.60 Field margins are not present on the eastern, southern, or western boundaries of the Southern Array as the boundaries of the solar array are within the arable field. Field boundaries are not present on the Eastern Array as the boundaries of the site are within areas of improved sheep grazed grassland and the fields are contiguous to the field boundaries.

## *Improved Grassland*

10.61 The two fields comprising the Eastern Array are both sheep grazed grassland and are dominated by short sward improved grassland and comprise of common plant species with occasional White Clover and Creeping Thistle.

## *Hedges and Trees*

10.62 There is a central hedge aligned north to south between the two areas of the Southern Array (hedgerow 1 in **Plate 10.3** and **Plate 10.7**). This hedgerow is gappy and defunct and is in poor condition. The edges of the arable field are cropped to within 1m either side of the hedge and as such margins are poor and consist of common grass, forb and ruderal species including Common Nettle, Bramble (Rubus fruticosus), Cleavers (Galium aparine), Willowherb and occasional Lords and Ladies (Arum alpinum) and Greater Celandine. A dry ditch is present adjacent between the two fields. Tree species within the hedge include Hawthorn (Crataegus monogyna) with occasional Blackthorn (Prunus spinosa), Willow (Salix sp.), Elder (Sambucus nigra), Ash (Fraxinus excelsior) and Oak (Quercus sp.). There are larger trees scattered within the hedge; including one Ash which has a large vertical split along the main trunk.



Plate 10.7 - *Central Hedge within the Southern Array (looking south)*

10.63 There are two areas of woodland associated with the Eastern Array and these are connected by a Hawthorn dominated hedgerow (hedgerow 2 in **Plate 10.3**) which is gappy at its base, which is also heavily poached and grazed by sheep and as such ground flora along the hedge is very limited. There is a public footpath that crosses through this hedge, at a field gate, and this existing breach will be used to access the north-eastern part of the Eastern Array. Hawthorn dominated hedges are also present around, and within, the sheep-grazed improved grassland and these are generally in poor condition with ground flora limited to occasional Common Nettle, Docks and Bramble. There is a field gate through the hedge leading off Church Lane and this existing breach will be used to access the Eastern Array.

## *Ditches*

10.64 A dry ditch is present along the central hedge within the Southern Array (**Plate 10.7**). Wetter ditches are present immediately beyond the southern boundary of the Northern Array (**Plate 10.8**). The ditches consist of semi-improved grassland which support a variety of common grass species including Perennial ryegrass, Common Couch (Elymus repens), Annual Meadow-grass (Poa annua) and Cock's-foot. Forb species present included Cow parsley (Anthriscus sylvestris), Curled Dock, Broad-leaved Dock, Cleavers, Common Nettle, White Dead-nettle, Red Dead-nettle (Lamium purpureum), Dandelion (Taraxacum sp.), Common Hogweed, Black Medic (Medicago lupulina), Lords and Ladies (Arum maculatum) and species of Willowherb (Epilobium sp.). Where water is present stands of Soft Rush (Juncus effusus), Brooklime (Veronica beccabunga), Greater Celandine and Water Mint (Mentha aquatica) were recorded.



Plate 10.8 - *Ditch beyond the southern boundary of the Northern Array*

## *Brook*

10.65 A brook is present to the east of the Northern Array. The brook flows north to south beyond the eastern boundary of the array and is crossed by an existing bridge allowing access to fishing lakes to the south of the Northern Array. The brook flows into this lake system. The brook is approximately 1 to 1.5m wide, fast flowing, muddy-bottomed and shallow. The water is clear however aquatic vegetation is limited to filamentous algae, likely indicating a degree of eutrophication from agricultural run-off. To the west of the brook is a made-up hardcore track leading to the fishing lakes and to the east is a linear mixed woodland which connects to a larger area of woodland that encompasses the lake and wraps around the southern edge of the Northern Array. The banks of the brook consist of ruderal dominated grassland or the herb layer of the woodland.



Plate 10.9 - *Brook adjacent to the eastern boundary of the Northern Array*

## *Ponds*

10.66 There are multiple waterbodies adjacent to the application site including a complex of three large fishing lakes to the south of the Northern Array. The fishing lakes were scoped out from further survey due to being heavily stocked with fish and having limited emergent vegetation for egg-laying amphibians.

10.67 Four ponds adjacent to the application site were subject to eDNA surveys for Great Crested Newts. Pond descriptions along with the results of the eDNA surveys are given from **paragraph 10.83 on page 189**.

## *East Stour River Corridor*

10.68 The East Stour River flows from east to west beyond the northern boundary of the Southern Array (**Plate 10.10**). The river is approximately 2 – 2.5m wide and up to 1m deep, although generally about 50 – 60cm deep along most of its length. There is no emergent or ephemeral vegetation present and occasional stands of thick filamentous algae, again indicative of eutrophication from agricultural run-off. Large stands of Willow and Alder (Alnus glutinosa) are present along the northern edge of the river as well as a dense scrubby complex between the river and the high-speed railway.



Plate 10.10 - *East Stour River Corridor*

## *Woodlands*

10.69 There is no woodland habitat within the application site however there are a number of woodland blocks immediately adjacent to all of the arrays.

10.70 Backhouse Wood Local Wildlife Site is immediately west of the Southern Array and consists of semi-natural broad-leaved ancient woodland which supports large stands of Hazel (Corylus avellana) coppice along with Ash and Oak. Ground flora within the woodland includes Bluebell (Hyacinthoides non-scripta), Wood Anemone (Anemone nemorosa), Greater Celandine, Lords and Ladies and dense stands of Dogs Mercury (Mercurialis perennis) along with previous described ruderal and scrub species. This site is also known to support Common Spotted Orchid (Dactylorhiza fuchsia), Common Twayblade (Neottia ovata) and Greater Butterfly Orchid (Platanthera chlorantha) (KMBRC, 2021).

10.71 Park Wood is a small area of semi-natural ancient woodland to the west of the Northern Array. This woodland is similar in composition to Backhouse Wood.

10.72 Partridge Plantation and Round Wood are associated with the Eastern Array. These woodlands are broad-leaved plantation woodlands with limited ground flora. A hedgerow (as described in 3.3.4) connects these two areas of plantation woodland.

10.73 A mixed plantation woodland is present along the track leading from the brook crossing to the fishing lakes. The plantation woodland in on the east side of the brook.

## Protected Fauna

### *Dormouse*

10.74 The woodlands adjacent to the Northern and Southern Arrays are suitable for Dormouse as they support areas of suitable habitat for this species and this species has been previously recorded in Backhouse Wood (KMBRC, 2021). The woodlands adjacent to the Eastern Array are unlikely to support Dormouse due to poor woodland structure, absence of food plants and lack of connectivity to other woodlands.

10.75 The central hedge is not suitable for Dormouse due to its current poor state and it is not connected to areas of more suitable habitat. The hedgerows within the Eastern Array as well as those adjacent to Church Lane are also not suitable for this species as they are poor quality hedgerows, do not support suitable food plants and are also poorly connected to areas of optimal habitat (e.g. Backhouse Wood).

### *Bats*

10.76 There are no buildings or trees within the proposed application site that will be affected by the proposals. A single tree within the central hedgerow has a large crack within the main trunk and is suitable for roosting bats. The woodlands adjacent to the site are all suitable foraging and commuting habitats and are likely to support roosting bats. The brook and the East Stour River corridor are also optimal habitats for foraging and commuting bats. Data returned from KMBRC indicate that the following bat species have previously been recorded within 5 km of the project site:

- Serotine (Eptesicus serotinus);
- Noctule (Nyctalus noctule);
- Daubenton's Bat (Myotis daubentonii);
- Common Pipistrelle;
- Soprano Pipistrelle (Pipistrellus pygmaeus); and
- Brown Long-eared Bat (Plecotus auritus).

10.77 It is likely that other common species of Myotis bats occur in the area of the project.

10.78 The arable fields and improved grasslands within the application site are unlikely to be important for foraging bats.

### *Badgers*

10.79 Badgers have been assessed within a confidential badger appendix provided to Ashford Borough Council.

### *Otter*

10.80 No evidence of Otter was found during a search along the brook or the East Stour River corridor including footprints, scats or evidence of holts. The brook and river are adjacent to the application site and whilst water quality in both appeared to be poor it is likely that they support populations of fish and as such are suitable foraginghabitats and are suitable corridors for Otters to commute through. The large fishing lakes to

the south of the Northern Array are also likely to be used by Otters as a foraging habitat and the brook and river corridor are likely to be used by commuting Otters. No local records of this species was included in the data search.

### *Water Vole*

10.81 No evidence of Water Vole was found during a search along the brook or the East Stour River Corridor and both watercourses are considered to be sub-optimal for this species due to the lack of available food plants. The banks of both watercourse are however suitable for burrows to be excavated, although no burrows are present. The closest known populations of this species (KMBRC, 2021) are from Aldington which is approximately 2.1 km south-west of the Southern Array. It is considered certain that Water Vole are not present within the watercourses adjacent to the application site.

### *Birds*

10.82 Specific breeding bird surveys were undertaken between April and June 2021, the results of which are included from **paragraph 10.88** of this Chapter.

### *Great Crested Newt*

10.83 The nearest historic record of Great Crested Newt is approximately 2.0 km south-west of the site (www.magic.com).

10.84 There are four ponds adjacent to the application site that were subject to eDNA surveys. Information on these ponds is presented in **Table 10.2**. The location of the ponds is shown on **Plate 10.3** and **Figure 10.1** of ES Volume 3 - Figures. The fishing lakes to the south of the Northern Array were scoped out from the surveys due to high densities of stocked fish, presence of waterfowl and absence of suitable egg-laying plants within the ponds.

Table 10.2 - *Ponds Subject to eDNA Survey Results of the Habitat Suitability Surveys*

| Pond Number | Habitat Description | HSI Score | Result of eDNA |
|---|---|---|---|
| Pond 1 | Small ephemeral waterbody to the south-west of the Northern Array. Pond is within an area of woodland and is adjacent to a larger reed-lined pool. Pond 1 is 100% shaded and supports dense stands of Common Reed and Common Reedmace. Water quality is poor and water levels are low. | Poor | Negative |
| Pond 2 | Linear waterbody north of the Northern Array, adjacent to the M20. Waterbody is choked with dense stands of Common Reedmace and water quality is poor with evidence of pollution. | Poor | Negative |
| Pond 3 | A woodland pond to the south-east of the Northern Array. Pond is within an area of plantation woodland and is 100% shaded. Dense stands of Common Reedmace are present with occasional Willowherb sp. and Watermint also present. No eggs found during egg search. Waterfowl present and water quality is poor. | Poor | Negative |
| Pond 4 | Pond adjacent to Church Lane and is dominated by Common Reedmace / reed swamp. Poor water quality and pond is shaded by adjacent trees. | Poor | Negative |

10.85 The hedgerow network as well as the areas of off-site woodland are suitable for terrestrial phase Great Crested Newts, including foraging, commuting and hibernation.

### *Reptiles*

10.86 Records of Adder, Slow Worm, Common Lizard and Grass Snake were returned from KMBRC. Terrestrial habitats within the application site consist of arable and improved grass fields which are sub-optimal for reptiles. Areas of adjacent woodland as well as the wider hedgerow network are optimal habitats for foraging, commuting and hibernating reptiles.

### *Other Species*

10.87 Brown Hare (Lepus europaeus) or deer species were not recorded during the surveys, although it is likely that deer are present in the woodlands adjacent to the application site as the habitats are more than suitable for them. Surveys included multiple visits to the site during the spring and if present it would be expected that Brown Hare would have been recorded and is therefore considered to be absent. It is also possible that Hedgehog (Erinaceus europaeus) also occurs in habitats adjacent to the application site, although this species was not recorded during the surveys and the project site is considered to be unsuitable for this species.

## BREEDING BIRD SURVEY

### General

10.88 A total of forty-five bird species were recorded over the course of the three survey visits. Of these, seven were confirmed to be breeding, thirty were probable breeding species, five were possible breeding species and the remaining three are considered to not have bred within the survey area. Detailed results of the survey including breeding and conservation status of the species recorded are presented in **Appendix 10.2** and a summary is presented below.

10.89 In general, bird activity was consistent across all survey visits with limited bird activity recorded within the application site. The highest density and diversity of breeding species occurred in habitats adjacent to the application site including the adjacent woodlands, fishing lakes and associated habitats and the East Stour River corridor.

### Schedule 1 Species

10.90 Cetti's Warbler was recorded on all visits with adults seen and heard from the habitats adjacent to the fishing lakes as well as at the southern end of Park Wood. It is likely that one or two pairs bred within the habitats between the Northern Array and the high-speed railway.

### Red List Birds of Conservation Concern

10.91 Seven Red Listed Birds of Conservation Concern (BoCC) species were recorded and, with the exception of Nightingale, all are also NERC priority species. These were Lapwing (probable), Herring Gull (non-breeding), Skylark (confirmed breeding), Starling (non-breeding), Nightingale (possible breeding, but likely), Linnet (probable breeding) and Yellowhammer (probable breeding).

10.92 Two pairs of Lapwing were recorded in the arable fields of the Northern Array in April and May. Both pairs were very agitated on the May survey indicating likely presence of young within the arable crop.

10.93 Herring Gull were recorded on all three visits on the bare arable field in the eastern part of the Southern Array. This species was also recorded foraging in the sheep-grazed improved grass fields of the Eastern Array.

10.94 Activity of Skylark was low on all survey visits with breeding confirmed within the large arable fields of the Southern Array (Bested Hill). It is likely, based on registrations of displaying male Skylark, that the site supports between 2 and 3 breeding pairs of Skylarks, all of which are within the Southern Array. This species was not recorded within the Northern or Eastern Arrays.

10.95 Starling was recorded on all survey visits and it is considered likely that this species nests in adjacent farm buildings, residential areas or mature woodland and uses the site for foraging.

10.96 Nightingale were only recorded on the May survey with two singing males recorded; one within the scrubby / ruderal habitats north of the East Stour River and one from within the habitats adjacent to the fishing lakes. Nightingale were not recorded on the June survey which may be indicative of successful nesting as this species reduces the amount it sings if paired or has a nest with eggs / young.

10.97 Linnet were recorded on all survey visits and based on the registrations of this species it is considered that between 2 and 5 pairs are present in the edge habitats adjacent to the application site.

10.98 Yellowhammer were recorded on all survey visits in habitats adjacent to the Southern Array only. It is likely that the adjacent habitats support between 2 and 4 breeding pairs.

## Amber List Birds of Conservation Concern

10.99 Ten Amber List Birds of Conservation Concern were recorded, of which, two are also NERC priority species (Dunnock and Reed Bunting). Of the Amber list species recorded, only Lesser Black-backed Gull is considered to be non-breeding species.

10.100 Mallard were recorded flying over the site on all survey visits with activity centred on the fishing lakes and associated habitats. A female Mallard with a brood of ducking's was recorded in Pond 4 when undertaking the eDNA surveys.

10.101 Wood Pigeon were recorded on all site visits and this species is likely to have bred in all wooded habitats adjacent to the application site.

10.102 Moorhen were recorded on all visits calling from wetland habitats associated with the fishing lake as well as in the habitat complex between the East Stour River and the high-speed railway line.

10.103 A single Tawny Owl was heard calling from Backhouse Wood on the April breeding bird surveys. It is possible that this species breeds in this off-site woodland, and it is possible that this species hunts on site, although field margin and hedgerow margin habitats are ecological poor quality habitats and are therefore unlikely to support significant populations of mice and voles.

10.104 Wren were recorded on all visits and likely bred in wooded habitats adjacent to the application site.

10.105 Song Thrush were recorded on all surveys singing from adjacent areas of woodland. It is likely that this species breeds in Park Wood, Backhouse Wood and the wooded areas around the fishing lakes and along the brook and East Stour River corridor.

10.106 Dunnock were recorded on all surveys and it is considered that this species probably bred within the off-site woodlands.

10.107 Three Bullfinch were recorded along the linear habitat feature between the northern edge of the Northern Array and the M20. This species possibly bred within areas of wooded habitat adjacent to the application site.

10.108 Reed Bunting were recorded on all of the survey visits within the dense boundary hedgerows as well as around the central areas of the site around the ditch network. It is likely that the site supports up four breeding pairs of this species.

## Species of Principal Importance (NERC Act 2006)

10.109 Nine species of Principal Importance (as listed on the NERC Act 2006) were recorded during the course of the breeding bird surveys. These were Lapwing, Herring Gull, Skylark, Starling, Song Thrush, Dunnock, Linnet, Yellowhammer and Reed Bunting and these have been discussed above.

## Local Biodiversity Action Plan Species

10.110 Nightingale was the only species recorded during the breeding bird survey for which a Kent Species Action Plan has been written and this species is discussed above.

# IMPACT ASSESSMENT

## Methodology

10.111 The Ecological Impact Assessment (EcIA) broadly follows the UK Chartered Institute of Ecology and Environmental Management (CIEEM) 'Guidelines for Ecological Impact Assessment in the UK and Ireland' 2019. The guidelines are endorsed by statutory consultees in EIA and other concerned organisations including Natural England, The Environment Agency, Environment and Heritage Service, Association of Local Government Ecologists (ALGE), Institute of Environmental Management and Assessment (IEMA) and the Wildlife Trusts. The CIEEM Guidelines are also recommended in the planning guidance 'Planning for Biodiversity and Geological Conservation: A Guide to Good Practice' (ODPM 2006) as the recommended procedure for the ecological component of an EIA.

10.112 The impact assessment also includes a metric-based calculation of impact significance in order that the assessment of ecological impact is consistent with other parts of the EIA.

10.113 The EcIA involved the following key stages:

- identifying the zone of influence arising from the whole lifespan of the project;
- identifying ecological features (e.g. habitats, species, ecosystems and their functions/processes, previously known as ecological receptors) through field surveys and the background data search;
- Determination of the ecological sensitivity / importance of the ecological features in order to indicate which features require detailed impact assessment (**Table 10.3** on **page 196**).
- Identification of the potential impacts and assessment of effects

on the integrity or conservation status of the ecological features in terms of their extent, magnitude, duration, reversibility, timing, and frequency;

- Identify significant effects of impacts in the absence of any mitigation (**Table 10.4** on **page 198**);
- Incorporation of the mitigation heiracy in order to avoid, reduce or mitigate impacts and where necessary to provide compensation measures to balance any unavoidable significant effects, and enhancement to provide net benefits for biodiversity over and above requirements for avoidance, mitigation and compensation;
- Assessment of the significance of any residual ecological effects remaining after the implementation of mitigation and compensation measures (also follows **Table 10.4**); and
- Identify cumulative impacts.

## Impact Characteristics

10.114 An 'impact' is any change to a resource or receptor caused by the presence of a project component or by a project related activity. Impacts can be negative or positive and are described in terms of their characteristics, including the impact's type and the impact's spatial and temporal features (namely extent, duration, scale and frequency). Impact characteristics are defined below.

### *Type of Impact*

- Direct: applies to an impact which can be clearly and directly attributed to a particular environmental or social parameter (e.g. dust generation directly affects air quality).
- Indirect: applies to impacts which may be associated with or subsequent to a particular impact on a certain environmental or social parameter (e.g. high levels of dust could entail nuisance and health effects to workers on site).
- Induced: applies to impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project.
- Cumulative: applies to impacts that arise as a result of an impact and effect from the Project interacting with those from another activity to create an additional impact and effect.

### *Duration of Impact*

- Temporary - applies to impacts whose effects are limited to a period of less than 3 years, or only associated with Project pre-construction or construction phases.
- Short-term: applies to impacts whose effects are limited to a five-year period.
- Long-term: applies to impacts whose effects last longer than a period of five years, but limited to within the project lifetime.
- Permanent: applies to impacts whose effects last longer than the life of project – i.e. irreversible.

### *Extent of Impact*

- On-site: impacts that are limited to the Project site.
- Local: impacts that are limited to the Project site and adjacent properties.
- Regional: impacts that are experienced at a regional scale.
- National: impacts that are experienced at a national scale.

### *Scale of Impacts*

10.115 The scale of an impact is a quantitative measure, such as the size of the area damaged / impacted or the fraction of a resource that is lost / affected, etc. It is generally described using numerical values and units rather than assigned fixed designations.

### *Frequency of Impacts*

10.116 The frequency of an impact the measure of the constancy or periodicity of an impact, described using numerical values or a qualitative description.

### *Likelihood*

10.117 Likelihood is a measure of the degree to which the unplanned event (e.g. incidents, spills) is expected to occur. The likelihood of an unplanned event occurring is determined qualitatively, or when data is available, semi quantitatively. Definitions of likelihood as applied in the ESIA are provided as follows:

- Unlikely: The event is unlikely but may occur at some time during normal operating conditions.
- Possible: The event is likely to occur at some time during normal operating conditions.
- Likely: The event will occur during normal operating conditions (i.e. it is essentially inevitable).

## Assessment of Impact Significance

10.118 In order to determine the significance of each impact, two overall factors are considered:

- magnitude and nature of impacts; and
- the importance and/or sensitivity of the environmental and social receiving parameter, as determined.

### *Magnitude of Impact*

10.119 Once impacts are characterised (see section above) they are assigned a ‘magnitude’. Magnitude is typically a function of some combination (depending on the resource / receptor in question) of the following impact characteristics:

- extent;
- duration;
- scale; and
- frequency.

10.120 Magnitude (from small to large) is a continuum. Evaluation along the continuum requires professional

judgement and experience. Each impact is evaluated on a case-by-case basis and the rationale for each determination is noted. Magnitude designations for negative effects are: negligible, small, medium and large. The magnitude designations themselves are universally consistent, but the definition for the designations varies by issue. In the case of a positive impact, a magnitude designation is also assigned.

### *Sensitivity of Ecological Receptor*

10.121 In addition to characterising the magnitude of impact, the other principal step necessary to assign significance for a given impact is to define the sensitivity of the receptor. There are a range of factors to be taken into account when defining the sensitivity of the receptor, which may be physical, biological, cultural or human. As in the case of magnitude, the sensitivity designations themselves are universally consistent, but the definitions for these designations will vary on a resource/receptor basis.

10.122 For ecological impacts, sensitivity is assigned as negligible, low, medium, high or very high based on the conservation importance of habitats and species. A subjective assessment of the sensitivity of habitats and species is made and is based on the information presented in **Table 10.3** on **page 196**.

Table 10.3 - *Receptor Sensitivity*

| Importance | Descriptor |
|---|---|
| Very High (international / European) | An internationally designated site or candidate/proposed site (Special Protection Area (SPA), potential SPA, special area of conservation (SAC), candidate SAC and/or Ramsar Site. A suitable area of habitat listed in Annex 1 of the Habitats Directive or smaller areas of such habitat which are essential to maintain the viability of the larger whole. Sustainable population of an internationally important species or site supporting such a species), i.e.:<br>• IUCN Red List species that is listed as critically endangered, endangered or vulnerable; or<br>• Species listed in Annex IV of the Habitats Directive; or<br>• Site that supports 1% or more of the biogeographic population of a species; or<br>• The species is at a critical phase of its life. |
| High (National) | A nationally designated site (Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), or a discrete area which meets the selection criteria for national designation. An area previously identified by Defra as a Nature Improvement Area. A sustainable area of a priority habitat identified in the UK BAP or smaller areas of such habitat, which are essential to maintain the viability of the whole. Sustainable population are they nationally important species or site supporting such a species (or supplying a critical element of their habitat requirement), i.e.:<br>• Species listed of Schedule 5 or 8 of the WCA (1981);<br>• UK Red Data Book species;<br>• Other species occurring in 15 or fewer 10km squares in the UK; and<br>• Sites supporting 1% or more of the national population. |
| Medium – High (Regional) | Sites/populations which exceed the County-level designations but fall short of SSSI selection guidelines including the following:<br>• sustainable areas of key habitat identified in the Regional BAP or smaller areas of such habitat, which are essential to maintain the viability of the whole;<br>• Population of a species listed as being nationally scarce which occurs in 16-100 10km squares in the UK;<br>• population of a species listed in a Regional BAP or relevant Natural Area on account of its regional rarity or localization; or<br>• Sites supporting 1% or more of the regional population. |

| Importance | Descriptor |
|---|---|
| Medium (County) | Some designated sites (including County Wildlife Sites, Local Wildlife Site). A viable area of habitat identified in the County BAP. Sustainable populations of the following species, i.e.:<br>• Species listed in a County/Metropolitan 'red data book' or BAP on account of its rarity/localisation in a county context; or<br>• Sites supporting 1% or more of a county population. |
| Low – Medium (Unitary Authority, i.e. Borough) | Some designated sites (including non-statutory designated Sites of Importance for Nature Conservation, Sites of Borough Importance). Viable areas of habitat identified in a District / Borough BAP. Sites/features That are scarce within the District / Borough all that appreciable enrich the District / Borough habitat resource. Sustainable Populations of the following species, i.e.:<br>• Species listed in a District / Borough BAP on account of its rarity / localisation in a district context; or<br>• Sites supporting 1% or more of a District / Borough population. |
| Low (Local Neighbourhood or Parish) | Sites/populations, which appreciably enrich the Parish/Neighbourhood habitat resource (for example hedgerows of medium richness). |
| Negligible (i.e Zone of Influence only) | No significant ecological value. |

## Assessing the Significance of Impacts

10.123 In order to assess the significance of an impact, the sensitivity of the ecological receptor is considered in association with the magnitude of the impact, according to the matrix shown in the **Table 10.4** below.

10.124 While the matrix in **Table 10.4** provides a framework for the determination of significance and enables comparison across environmental parameters, a degree of professional judgement must be used and some parameter-specific factors considered in making a determination of impact significance.

## Summary of Impacts

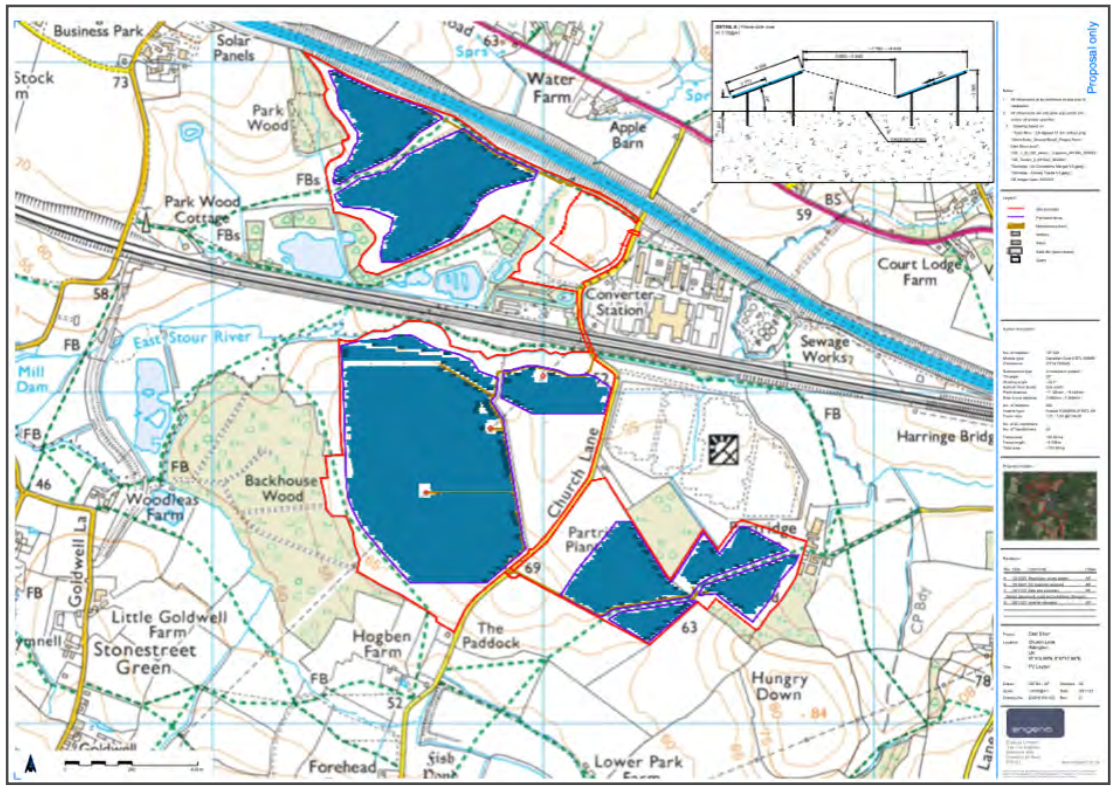
10.125 The proposed development involves the construction of a solar energy farm and associated access tracks and fencing within arable fields and improved grassland (**Plate 10.11**). Edge and adjacent habitats including the brook, East Stour River Corridor, Park Wood, Backhouse Wood, Partridge Plantation and Round Wood will not be directly affected by the proposals. Direct and indirect impacts associated within the construction and operation of the solar farm are discussed below.

10.126 Decommissioning impacts are anticipated to be closely equivalent to those associated with construction, although the duration of decommissioning is likely to be slightly less than that for construction.

Table 10.4 - *Determination of Impact Significance*

| Magnitude of Impact | Sensitivity of Receiving Receptor | | |
|---|---|---|---|
| | Low | Medium | High |
| Negligible | Negligible | Negligible | Negligible |
| Low | Negligible | Minor | Moderate |
| Medium | Minor | Moderate | Major |
| High | Moderate | Major | Major |
| Very High | Major | Major | Major |

Plate 10.11 - *Proposed Development Plan*




10.127 The Kent and Medway BAP lists Habitat Action Plans but none of these habitats will be directly affected by the proposals. Indirect impacts on adjacent habitats including woodland and rivers are discussed below. The Kent and Medway BAP also includes Species Action Plans and one species for which an action plan has been written, Nightingale, was recorded in habitats adjacent to the application site. Direct impacts on the habitats where Nightingale were recorded are not predicted however measures to avoid indirect impacts are included below.

10.128 Ecological enhancements are also recommended to ensure the proposals result in a positive ecological gain which is in accordance with the National Planning Policy Framework.

## Designated Sites

10.129 There are four statutory designated sites as well as a single AONB with ecological interest within 5 km of the proposed development site however there are no direct links between the habitats on site and habitats within these sites and due to the type and scale of the proposals and

distances from the designated sites, it is considered that there will be no impact on the designated sites as a result of the proposed development.

10.130 Backhouse Wood which is a Local Wildlife Site is immediately west of the Southern Array. The proposed scheme will not directly impact on this habitat unit and measures detailed below will ensure no direct impacts on this woodland habitat. The landscaping plan includes additional woodland planting which will link to Backhouse Wood and hedgerow planting will also create linkage habitats.

## Habitats

### *General*

10.131 The proposed solar farm development will result in the direct loss of approximately 65.49 ha of arable land and sheep-grazed improved grassland. Neither habitat is of significant ecological value and the impact of habitat loss is considered to be negligible.

10.132 Access for the Northern Array will be along an existing access track off Church Lane, with additional tracks within the array being created within the arable field. The track will cross the brook at the site of the existing crossing which will be upgraded to be able to support machinery required for the construction of the solar panels and associated fencing. Access into the Southern Array will be created off Church Lane and will run through areas of arable land. Access into the Eastern Array will be through the Southern Array and across Church Lane at a new crossing where an existing field gate exists. The access track will travel through the improved grassland. Access to the north-eastern part of the Eastern Array will be through an existing field gate. Direct impacts associated with the creation of access tracks on habitats of ecological value are not anticipated.

10.133 All areas of adjacent habitats including the brook, the East Stour River corridor and all areas of adjacent semi-natural Ancient Woodland will not be directly affected by the proposals.

10.134 To protect areas of adjacent habitat from indirect impacts during construction of the scheme as well as maintaining and increasing the biodiversity of the site and adjacent habitats, the following mitigation measures and safe working methods will be incorporated into the proposals.

10.135 Operational impacts on areas of adjacent habitat, including areas of semi-natural ancient woodland, the Brook and the East Stour River are not anticipated. All works traffic and site maintenance operations will be within the fenced site.

### *Mitigation and Enhancement*

10.136 Construction activities will be within areas of existing ecologically poor arable farmland and improved grassland with access to, and across the site, making use of existing hardstanding field gate entrances, farm tracks or areas where no hedgerows are present, and mitigation is not required for these impacts. Working areas will be clearly marked to ensure areas of habitat adjacent to the solar park are not impacted by the scheme.

10.137 The entire part of the project site under the panels (65.49ha) will be enhanced with native grassland and wildflower mixes. In addition to this a total of 13.6 ha of lowland wildflower meadow will be sown on Bested Hill (Southern

Array) between the perimeter fencing and Church Lane. Grasslands will also be created between the north-eastern part of the Eastern Array and adjacent woodland. All areas of grassland will be managed as wildflower meadow which, once established, will ultimately be subject to an annual hay cut, between September and October. All cuttings will be removed from the site, after which the areas of grassland within the fenced solar farm (e.g. under the panels) will be subject to low-intensity mop-up grazing between September and March. There will be no mowing or grazing of the grassland areas between March and July / August which will allow the meadow flowers and grasses to flower and set seed. The management regime will also ensure that any ground nesting birds are not impacted by the management of the grassland habitat. Wildflower mixes will be determined as part of the management plan and will be dependent on soil type. Seed mixes should favour locally sourced seed where possible and will reflect the location of the meadows being created (e.g. riparian meadows along the northern edge of the Southern Array which borders the East Stour River corridor).

10.138 A total of 2.2 km of hedgerow will be planted and this include new hedges:

- On the north-western edge of the Northern Array;
- On the south-western and southern edges of the Southern Array; and
- On the north-western, western and southern edges of the Eastern Array.

10.139 In addition to the above new hedges, the existing Hedgerow 1, hedges along Church Lane and the hedge on the south-eastern edge of the Eastern Array will be improved through planting up of existing gaps resulting in a total of 1.5 km of improved hedgerows across the application site. This work will create vital habitat links between the woodlands adjacent to the Southern and Eastern Arrays which will ultimately provide habitats for a range of breeding birds, as well as improving foraging and commuting habitats for small mammals, including Dormice, [redacted] and bats. The planted hedgerows will consist of:

- Hawthorn – 30%;
- Blackthorn – 30%;
- Hazel - (15%); and
- The remaining 25% of tree species planted will consist of the following
  - Dog Rose
  - Guelder Rose (Viburnum opulus)
  - Holly
  - Honeysuckle (Lonicera periclymenum)

10.140 A small area (1.1ha) of low-density woodland will be planted at the southern end of the Southern Array. Tree species planted will include Oak, Ash, Hazel, Small-leaved Lime (Tilia cordata), Hornbeam (Carpinus betulus) and Holly.

10.141 All newly planted trees will be guarded in a biodegradable tree guard and bark mulch will be used to supress weed growth as well as aid in water retention. All planted trees will need to be regularly watered once they have been planted and weed killers should not be used. Tree guards should be removed by at least Year 5 (if they have not naturally degraded)

and surveys will be completed in Year 3 and Year 5 and any losses will be replaced. Long term hedgerows will be managed through sympathetic cutting using cutting blades. Flail heads should be avoided as these damage hedgerow trees. Cutting should only be completed in January / February (the later the better) so as to give wintering birds the opportunity to eat berries and fruits. Cutting should not be undertaken at other times of the year, especially during the breeding bird season (March to August inclusive).

10.142 The enhancements to the existing hedgerows will result in a transition from poor quality, low ecologically valuable hedgerows with some (limited) habitat connectivity to hedgerows that are species rich, thick and tall offering nesting opportunities for bird species, and improved habitat connectivity to extend mammal corridors on site. Newly planted hedgerows along with the creation of a small area of low-density tree planting will result in habitats with moderate to high ecological value and improved habitat connectivity for wildlife.

10.143 The brook and the East Stour River corridor will be unaffected by the works and impacts will be avoided through the implementation of a minimum of a 15m stand-off distance from the sites' perimeter fencing and the East Stour River. Riparian meadow will be created along the northern boundary of the Southern Array which will ultimately enhance the East Stour River corridor and associated habitats.

10.144 Indirect impacts to watercourses will be prevented (avoided) during construction by implementing standard pollution control measures outlined below.

10.145 The following measures will be employed during the construction phase of the project to prevent indirect impacts to the adjacent watercourses:

- No construction works to be undertaken within at least 10m of the watercourses, apart from the upgrade of the bridge across the brook and access track laying;
- Edges of the solar farm adjacent to watercourses will be fenced with silt barrier fencing to prevent any surface water run-off into the watercourse during construction. The construction areas around the brook crossing will be fenced prevent run-off into the adjacent watercourse;
- Spill kits will be stored within the site compound during and post construction and all spills will be cleaned up accordingly and if necessary reported;
- All chemical substances and hazardous materials will be stored in accordance EA guidelines with all diesel fuel and other lubricants will be stored in appropriate containers and within a double bunded storage areas;
- Any washing of concreting vehicles will be done well away from any watercourses and/or drainage systems;
- Any re-fuelling and re-lubrication will only be completed in an approved area in which a spill kit is available; and
- No dirty water associated with the proposed development to be discharged into the watercourse.

### *Landscape Environmental Management Plan (LEMP) and Monitoring*

10.146 It is recommended that a LEMP is written which will detail all of the mitigation and enhancement included in this section for both habitats and fauna. The LEMP will include details on habitat management works that will be completed throughout the operational phase of the project. Monitoring requirements will also be included within the LEMP along with an adaptive management strategy setting out additional measures to be completed depending on the outcome of the operational monitoring.

10.147 It is recommended that habitat condition surveys are completed in Years 3 and 5 after construction to monitor the rate of grassland establishment as well as to assess the rate of establishment of any trees that have been planted. Additional habitat creation or remedial works may be required depending on the results of these surveys and this could include additional seeding or tree planting, and this will be detailed in the LEMP which should be included as a Planning Condition.

10.148 The location of the ecological enhancement is shown on **Figure 10.2** of ES Volume 3 - Figures.

### *Impact Assessment – Habitats*

10.149 **Table 10.5** on **page 204** summarises the predicted direct and indirect construction and operational impacts on habitats.

Table 10.5 - *Impact Assessment Summary – Habitats*

| Ecological Receptor | Sensitivity | Construction/ Decommissioning | Operation | Avoidance/ Mitigation | Enhancement | Residual Impact |
|---|---|---|---|---|---|---|
| Arable / Improved Grassland | Negligible | Permanent, long-term irreversible loss of habitats of negligible ecological value.<br>Significance of impact: Negligible. | Habitats will not be impacted during operation of the solar park.<br>Management will be completed for the lifetime of the scheme to maintain created habitats. | N/A | Creation of wildflower meadow under all panels and additional 13.6 ha grassland in Southern Array (previously bare earth field). | Long-term, permanent major positive increase in grassland / wildflower habitat across the application site. |
| Hedgerows / Woodland | Low (high for woodland) | No construction related direct or indirect impacts predicted. Access to Eastern Array will be through existing field gate entrances. Access to Southern Array is through existing gap in hedgerow network and access to Northern Array is via existing hedgerow breaches. | Habitats will not be impacted during operation of the solar park.<br>Management will be completed for the lifetime of the scheme to maintain created habitats and will result in increased amount and functionality of hedgerow network around the site. | N/A | 2.2 km new hedge<br>1.5 km enhanced hedge<br>1.1 ha of woodland planting | Long-term, permanent, major positive impact to hedgerow network and habitat connectivity. |
| Waterbodies – East Stour, brook and off-site ponds / fishing lakes | Low to medium | No direct or indirect impacts predicted. Mitigation measures will ensure no impact. | No direct or indirect impacts predicted. Buffer zones maintained throughout operation of the solar park. Creation of riparian meadows adjacent to the East Stour River. | Buffer zones and preventative construction methods. | Creation of riparian meadows. | Neutral to minor positive.<br>Reduction in fertilisers and pesticides on the arable land likely to have a minor positive impact on the brook and East Stour River. |

## Protected Fauna

### *General*

10.150 [redacted] There are records of Dormouse within Backhouse Wood however this habitat unit will remain unaffected by the proposals and there will be no impact to the hedgerow network within the application site. Access to the Northern and Eastern Arrays will utilise existing field gate entrances. Otter could potentially be present along the East Stour River corridor however no evidence of this species was recorded during the surveys. Water Vole and Great Crested Newt are considered to be absent from the application site. Reptiles could potentially be present within the application site however the habitat areas that will be directly affected by the proposals are largely unsuitable for reptiles and edge habitats will remain unaffected.

### *Dormouse*

10.151 No woodland habitat will be directly or indirectly affected by the proposals and access into the arrays will be through existing field gate entrances in hedges that are unlikely to support this species. The roadside hedge along Church Lane is not suitable for Dormouse and is not directly connected to known populations of this species in Backhouse Wood. The hedgerow between Partridge Plantation and Round Wood (access to the north-eastern part of the Eastern Array) is also unsuitable for Dormouse and the two woodland blocks are also considered unsuitable for this species due to poor woodland structure and lack of suitable food plants. It is therefore certain that there will be no impact on this species and as such mitigation specific for Dormouse is not recommended.

10.152 The landscaping plan will significantly increase the amount of hedgerows around the site and these will be managed specifically for wildlife. The planting scheme includes suitable food plants for this species (e.g. Hazel, Honeysuckle). The newly created hedgerows will link to Backhouse Wood and into the wider hedgerow network, including existing hedgerows which will be enhanced through additional tree planting. The scheme is therefore likely to result in a minor positive impact on this species.

### *Bats*

10.153 No features suitable for roosting bats will be affected by the proposals and the open arable land and improved grassland directly lost to construction works is unlikely to be of importance for foraging bats. Edge habitats including the brook and East Stour River corridor as well as off-site woodlands will remain unaffected by the works. The proposed hedgerow enhancement, creation, and planting of an area of low-density woodland and arable / improved grassland to wildflower grassland will significantly increase foraging and commuting habitats across the site. The lack of use of pesticides across the site should also increase invertebrate availability further enhancing the site for foraging bats.

10.154 The site will not be lit during operation of the solar farm and as such there will be no operational impacts on foraging

and commuting bats. Should lighting be required during construction a lighting plan showing the location and specification for any proposed lights on the site will need to be produced and this plan should reflect the Bat Conservation Trust Bats and Lighting in the UK guidance (2018). This will include directing lighting away from all retained trees and hedgerows around the boundaries of site other edge habitats to ensure that suitable foraging and commuting habitats remain unlit. Any lighting required during the operation of the solar park will be activated by PIR units and timed to go off after a period of five minutes. All installed lighting will be hooded so as not to illuminate edge habitats.

10.155 Enhancements for bats will be provided through the provision of 15 bat boxes which will be installed within the application boundary. This will comprise of five large pole-mounted bat boxes suitable for maternity or hibernation colonies and 10 smaller multi-purpose woodcrete bat boxes, suitable for summer roosts (**Figure 10.2** of ES Volume 3 - Figures).

## *Badgers*

10.156 Badgers have been assessed within a confidential badger appendix provided to Ashford Borough Council.

## *Otter*

10.157 No evidence of Otter was in habitat areas adjacent to the application site however the brook and East Stour River corridor are suitable habitats for this species. These habitat units will remain unaffected by direct or indirect impacts associated with the construction or operation of the solar farm and as such impacts on this species are not predicted and specific mitigation or enhancements are therefore not required.

## *Water Vole*

10.158 No evidence of Water Vole was recorded during any of the surveys completed on the site and it is considered that this species is absent from the application site. It is therefore certain that this species will not be impacted by the proposals and as such mitigation or enhancements for this species are not required.

## *Birds*

10.159 Specific surveys for breeding birds were completed between April and June 2021 and these surveys recorded a fairly typical assemblage of lowland farmland birds including species listed as being of Conservation Concern. The proposal will result in the loss of approximately 65.5ha of arable and improved grassland. The only species recorded breeding within the application site were Lapwing and Skylark. It is predicted that the loss of habitat within the solar park will therefore result in loss of breeding habitat for two pairs of Lapwing and between two and three pairs of Skylark. Similar habitats to those being lost are present in the wider area and the two areas of wildflower meadow being created outside of the solar farm will be suitable for both species. It is therefore likely that the residual impacts of habitat loss on Lapwing and Skylark will be neutral.

10.160 Habitat that is supporting Nightingale, a Kent Priority Species, will remain unaffected by the proposals.

10.161 Site clearance works as part of the construction programme will be

completed outside of the breeding bird season (March to August inclusive). If this is not possible the fields should be left un-cropped and if vegetation starts to grow up it should be regularly cut and kept short. If crops are planted and or 'fallow' vegetation is higher than 10cm it is possible that ground nesting species could breed on the fields and works will need to be delayed until the end of the breeding bird season.

10.162 Direct impacts on areas of adjacent habitat are not predicted and indirect impacts on the breeding bird assemblage in areas of adjacent habitat as a result of construction related impacts will be short-term (one breeding season) and reversible.

10.163 Direct or indirect impacts during operation of the solar park are not predicted.

10.164 The proposed landscaping plan which includes the conversion of arable land and improved grassland into wildflower grassland as well as the proposed hedge and low-density woodland will significantly improve opportunities for breeding birds across the site.

10.165 Any increases in invertebrates across the site as a result of no longer applying pesticides across the site will obviously benefit breeding birds.

10.166 The site will be further enhanced through the installation of 10 bird boxes which will be erected on trees within the application boundary. This will include 3 larger-hole hole nesting boxes suitable for Starling and 5 smaller-hole hole nesting boxes suitable for a range of common woodland birds (e.g. tits, Nuthatch). Two open-fronted nesting boxes will be installed as well as two large nesting boxes suitable for Tawny Owl or Kestrel (Falco tinnunculus) (**Figure 10.2** of ES Volume 3 - Figures).

## *Great Crested Newt*

10.167 Habitats that will be directly impacted by the works are of sub-optimal suitability for use by Great Crested Newts. The four ponds adjacent to the application site were subject to eDNA surveys returned negative results for presence of Great Crested Newt. The closest known record of this species is approximately 2.0 km south of the site.

10.168 Great Crested Newts are therefore considered to be absent from the site and as such no mitigation for this species is required.

## *Reptiles*

10.169 Common reptiles are known to occur within 5 km of the site however the habitats that will be directly affected by the proposals are of limited suitability for reptiles. It is recommended that habitat clearance works are completed during the reptile active season (March to October – but subject to breeding bird mitigation proposals) or the fields are left bare over the winter and that safe working methods are put in place to ensure no reptiles are harmed. During construction, any storage of piles of materials and excavated earth on the site should be kept to a minimum and away from the boundaries to deter reptiles from using them for temporary cover.

10.170 Taking in to account suggested mitigation it is predicted that residual impacts on reptiles during the construction phase will be negligible.

10.171 Habitat creation works will ensure that the scheme has a long-term positive impact on reptiles.

### *Other Species*

10.172 Deer are likely to be present in the off-site woodlands however direct impacts are not anticipated during the construction phase of the works. Indirect impacts are possible as a result of noise and disturbance however are both short-term and reversible. Operational impacts are not anticipated as all suitable off-site habitats will remain unaffected.

10.173 Brown Hare and Hedgehog are considered absent or are unlikely to occur in the project area and as such impacts during construction are not predicted. Operational impacts are likely to be neutral to minor positive as a result of the suggested habitat creation including grassland, hedgerow and woodland habtiats.

### *Summary of Residual Impacts on Ecological Receptors and Mitigation Plan*

10.174 A summary of the likely ecological impacts of the scheme on receptors of conservation importance during construction and operation along with residual impacts is shown in **Table 10.6** on **page 209**.

10.175 An assessment of the biodiversity net gain is provided within **Appendix 10.3**.

Table 10.6 - *Impact Assessment Summary – Species*

| Ecological Receptor | Sensitivity | Construction/ Decommissioning | Operation | Avoidance/Mitigation | Enhancement | Residual Impact |
|---|---|---|---|---|---|---|
| Dormouse | Medium | No construction related impacts predicted as works will not affect habitats suitable for this species. | No impacts predicted. | Clearly defined working zones to ensure works outside of the application boundary in woodland / hedgerow habitats are avoided. | Landscaping plan will result in 2.2 km of new hedge and 1.5 km of enhanced hedge as well as 1.1ha of woodland. New habitats link to Backhouse Wood. Significant increase in available habitat. | Negligible to minor positive. |
| Bats | Medium | No impacts predicted as works will not affect habitats suitable for this species. | Impacts on bats are not predicted. | Clearly defined working zones to ensure works outside of the application boundary in woodland / hedgerow habitats are avoided.<br>Lighting plan will be developed. Lighting will not be directed on to areas of habitat outside of the fenced area and lighting will be triggered by PIR units and timed to go off after 5 minutes. | Landscaping plan will result in 2.2 km of new hedge and 1.5 km of enhanced hedge as well as 1.1ha of woodland. New habitats link to existing woodland areas / hedgerow network. Significant increase in foraging and commuting habitats.<br>Provision of bat boxes will provide additional roosting opportunities. | Negligible to minor positive. |

| Ecological Receptor | Sensitivity | Construction/ Decommissioning | Operation | Avoidance/Mitigation | Enhancement | Residual Impact |
|---|---|---|---|---|---|---|
| Otters and Water Vole | Medium | No direct predicted as works will not affect the brook or East Stour River. Indirect impacts as result of pollution possible. | No impacts predicted. | Standard pollution control measures to be implemented during construction, including installation of silt trap fencing. | N/A | No impact / neutral.<br>Reduction in fertilisers and pesticides on the arable land likely to have a minor positive impact on the brook and East Stour River and species it supports. |
| Breeding Birds | Medium, presence of BAP and BoCC species | Habitat loss will likely result in the loss of two pairs of breeding Lapwing and up to three pairs of Skylarks from arable fields in the Northern and Southern Arrays. No additional habitat loss (e.g. woodland, hedgerows) is predicted. | No operational impacts are predicted. | Habitat removal will be completed outside of the breeding bird season and the arable fields will be left bare / uncropped / ploughed in the preceding spring to prevent birds from breeding within the working areas. | Creation of wildflower meadows across the site including 13.6ha of meadow without solar panels will provide alternative nesting habitat for ground nesting birds.<br>Planting of 2.2 km of new and enhancement of a further 1.5 km of existing hedgerow as well as will 1.1ha of woodland will ultimately provide additional nesting and foraging habitat for a range of breeding bird.<br>Bird boxes to be erected across the site. | Minor positive. |

| Ecological Receptor | Sensitivity | Construction/ Decommissioning | Operation | Avoidance/Mitigation | Enhancement | Residual Impact |
|---|---|---|---|---|---|---|
| Great Crested Newt | N/A – Absent | Not present – no impacts predicted | - | N/A | Absent – n/a | - |
| Reptiles | Low | Habitats being lost to the scheme are not suitable for reptiles and impacts are not predicted. | No impacts predicted. | Standard measures to include storage of materials away from suitable edge habitats. | Creation of wildflower meadows, new and enhanced hedgerows and area of woodland will increase suitable habitat across the site. | Negligible to minor positive. |

## CUMULATIVE IMPACTS

### *Construction & Decommissioning*

10.176 Whilst all individual projects or actions affect their environment, the combined or cumulative effects of multiple projects or actions can be greater than the sum of their individual parts. This is especially pertinent where these individual projects are similar, and any resultant impact will affect similar ecological receptors.

10.177 One PV development is already operational adjacent to the eastern site boundary. This is a small site (approximately 16ha). A Battery Energy Storage System application is anticipated to the immediate west of Church Lane by the Sellindge Converter Station.

10.178 Given the information available for Cumulative Schemes and the nature of the development, this does not indicate any significant impacts. The predicted impacts within the Environmental Statement conclude no significant impact on any receptor, and it is unlikely that it would cause a significant cumulative impact to biodiversity at any geographical level.

### *Operation*

10.179 The information available for Cumulative Schemes does not indicate any significant impacts. The predicted impacts of this development are not significant and it is unlikely that it would cause a significant cumulative impact to biodiversity at any geographical level.

## LEGAL PROTECTION

10.180 This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation but summarises the salient points.

### Badger

10.181 Badger is protected in Britain under the Protection of Badgers Act 1992 and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).

10.182 The legislation affords protection to Badgers and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or to attempt to do so;
- interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

### Dormouse

10.183 The Dormouse is on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. This species is also listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 which gives them full protection under Regulation 42. Protection was extended by the Countryside and Rights of Way Act 2000 (the CRoW Act).

10.184 Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;

- possess any part of such species either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

10.185 Dormouse is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP) and also as a species of principal importance for the conservation of biological diversity in England under Section 74 of the CroW Act.

## Bats

10.186 All species of British bat are protected by The Wildlife and Countryside Act 1981 (as amended) extended by the Countryside and Rights of Way Act 2000. This legislation makes it an offence to:

- intentionally kill, injure or take a bat;
- possess or control a bat;
- intentionally or recklessly damage, destroy or obstruct access to a bat roost; and
- intentionally or recklessly disturb a bat whilst is occupies a bat roost.

10.187 Bats are also European Protected Species listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats in such a way as to be likely to (a) impair their ability to: (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or b), to affect significantly the local distribution or abundance of the species to which they belong; and
- damage or destroy a breeding site or resting place of a bat; and
- possess, control, transport, sell, exchange a bat, or offer a bat for sale or exchange.

10.188 All bat roosting sites receive legal protection even when bats are not present.

10.189 Where it is necessary to carry out an action that could result in an offence under the Conservation of Habitats and Species Regulations 2017 it is possible to apply for a Protected Species Mitigation (formerly European Protected Species) licence from Natural England (NE) or Natural Resources Wales (NRW) to allow works to proceed lawfully.

## Otter

10.190 Otter is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. Protection was extended by the Countryside and Rights of Way Act 2000 (the CroW Act). Otter is also included as a Priority Species in the UK Biodiversity Action Plan (Anon, 2007).

10.191 Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;

- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

10.192 Otters are European Protected Species listed on of the Conservation of Habitats and Species Regulations 2017 (as amended). This legislation makes it an offence to:

- deliberately capture, injure or kill an Otter;
- deliberately disturb Otters in such a way as to be likely to (a) impair their ability to: (i) to survive, to breed or reproduce, or to rear or nurture their young, or (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or b), to affect significantly the local distribution or abundance of the species to which they belong; and
- damage or destroy a breeding site or resting place of an Otter; and
- possess, control, transport, sell, exchange an Otter, or offer an Otter for sale or exchange.

## Water Vole

10.193 Water Vole is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receives full protection under Section 9. Protection was extended by the Countryside and Rights of Way Act 2000 (the CroW Act). Water Vole is also included as a Priority Species in the UK Biodiversity Action Plan (Anon, 2007).

10.194 Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

## Birds

10.195 All species of bird are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended). The protection was extended by the CroW Act.

10.196 The legislation makes it an offence to intentionally:

- kill, injure or take any wild bird;
- take, damage or destroy the nest of any wild bird while that nest is in use or being built; or
- take or destroy an egg of any wild bird.

10.197 Certain species of bird are listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and receive protection under Sections 1(4) and 1(5) of the Act. The protection was extended by the CroW Act. The legislation confers special penalties where the above-mentioned offences are committed for any such bird and

also make it an offence to intentionally or recklessly:

- disturb any such bird, whilst building its nest or it is in or near a nest containing dependant young; or
- disturb the dependant young of such a bird.

## Great Crested Newt

10.198 Great Crested Newt is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and receive full protection under Section 9. Protection was extended by the Countryside and Rights of Way Act 2000 (the CroW Act).

10.199 Great Crested Newts are also listed on Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended) and receive full protection, where they are found to be present. Works which will result in damage to suitable habitat or where killing and injury to Great Crested Newts is possible a Protected Species Mitigation (formerly European Protected Species) licence will need to be applied for and granted prior to works commencing.

10.200 Under the above legislation it is an offence to:

- kill, injure or take an individual of such a species;
- possess any part of such species either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by such species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb such a species whilst using any place of shelter or protection; or
- sell or attempt to sell any such species.

10.201 The Great Crested Newt is included as a Priority Species in the UK Biodiversity Action Plan (UKBAP) and also as a species of principal importance for the conservation of biological diversity in England under Section 74 of the CroW Act.

## Reptiles

10.202 The common reptile species, such as Common Lizard, Grass Snake, Slow-worm and Adder, are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). This protection was extended by the CroW Act.

10.203 Under the above legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of such a species; or
- sell or attempt to sell any part of the species alive or dead.

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# INTRODUCTION

11.1 This chapter presents the findings of a landscape and visual impact assessment that has been undertaken to identify the likely effects of the proposed East Stour Solar Farm on the landscape character and visual amenity of the locality.

11.2 Following consultation with Ashford Borough Council (the "Council"), the assessment has concentrated on a 5.0km radius study area (from the site centre) which is considered sufficient to identify all likely significant effects on landscape and visual amenity (see **Figures 11.1 – 11.6 of ES Volume 3**). However, some viewpoints were requested by consultees beyond the study area and these have been included within the assessment.

11.3 The assessment is illustrated by **Figures 11.1 – 11.9** and by V**iewpoints 1 - 12 (ES Volume 4)** and supporting information is provided in **Appendices 11.1 – 11.3 (ES Volume 2b)**. All references are listed at the end of this chapter.

# METHOD OF ASSESSMENT

## Assessment Approach

11.4 The assessment has examined the effects of the proposed solar farm in the context of the existing landscape and visual baseline which currently contains one operational solar farm within a 5.0km radius, Sellindge Solar Farm. The location of this operational development is shown on **Figure 11.8** for reference and has been considered within the baseline of the assessment. No consented or proposed solar developments within the planning process are located within the study area.

## Good Practice Guidance and Data

11.5 The assessment process has been based on the current published good practice Guidelines for Landscape and Visual Impact Assessment (LI/IEMA, 2013) and technical guidance for the Visual Representation of Development Proposals (LI, TGN 06/19). The assessment has drawn on information provided within the local development plans and landscape character assessments that cover the study area as well as other relevant guidance documents (see list of references).

## Assessment Process

11.6 The assessment has involved information review, fieldwork observations and photography, and computer-based data processing and analysis, and has been undertaken in several stages, as presented in the following sections of this chapter:

- Predicted effects and mitigation – a review of the visual characteristics of the proposed development to identify the aspects with the potential to give rise to landscape and/or visual effects and a description of the measures that have been incorporated into the design to mitigate these effects during the design phase.
- Landscape and visual context – a review of the existing landscape and visual baseline of the study area, to identify landscape character, landscape designations and visual receptors in the study area as well as any operational solar schemes within the baseline.
- Visual analysis – visibility analysis using computer-generated zones of theoretical visibility (ZTVs) to identify the locations in the study area from where the East Stour Solar Farm could in theory be visible (based on topography only) as well as a cumulative ZTV to identify potential combined visibility with Sellindge Solar Farm, and a viewpoint analysis to predict the changes to views as a result of the proposed development from a selection of viewpoints that represent the main visual receptors in the study area, including potential cumulative impacts.
- Landscape assessment – an assessment of the potential effects of the proposed solar farm on landscape fabric, landscape character and landscape designations in the landscape study area in combination with other operational solar schemes within the study area.
- Visual assessment – an assessment of the potential effects of the proposed development on the visual amenity of receptors in the visual study area in combination with other operational solar schemes within the study area.
- Conclusions – a summary of the findings of the landscape and visual assessments.

## Prediction Methodologies

11.7 The prediction methodologies for the viewpoint analysis, landscape assessment and visual assessment are provided at the beginning of these sections, with a more detailed methodology provided in **Appendix 11.2**.

# PREDICTED EFFECTS AND MITIGATION

11.8 A detailed description of the proposed development and information on the installation of the various components of this proposed development are provided in the Chapters of this ES as well as the accompanying Design and Access Statement.

11.9 From the point of view of landscape and visual assessment, there are two aspects of the proposal that have the potential to cause an effect on landscape character and visual amenity. These are the activities and elements of the proposal that would affect the fabric of the site landscape, and the activities and visual characteristics of the elements that would be visible from the surrounding locality. The nature of solar farm developments is such that these activities and elements would occur in three distinct phases: a short-term construction phase, a long-term operational phase and a short-term decommissioning phase.

## Construction Phase

11.10 The construction phase would be approximately 9 months, and the activities and temporary features which would be visible on the site would include:

- Erection of approximately 9,040m of stock style fencing with wooden posts and open wire mesh, CCTV/ infra-red camera and up to twelve internal security gates around the development and one new field gate.
- Creation of three temporary construction compounds.
- Temporary lighting – sensor activated and kept to a practicable minimum, with no night time construction activities.
- Installation of the mounting systems and solar arrays.
- Delivery and construction of 20 combined inverter/transformer units.
- Delivery and construction of four substation units (three internal substations, one within each parcel of land and a further central substation).
- Construction of site cabinets (two store cabins, one spare parts container and one welfare cabin).
- Creation of approximately 3,000m of new access tracks within the site. Tracks would be 4.0m wide.
- Upgrade of existing tracks and crossing points to 4.0m wide.
- Excavation of cable trenches including trenches for the connection of the central on site substation to the national grid at Sellindge Converter Station (See **Chapter 6** and the accompanying Figures for details).
- The presence of the HGV deliveries to site and movement of vehicles on-site. Details of the number of deliveries and removals associated with the groundworks during the construction period are contained within **Chapter 8 – Traffic and Transport**.
- Reinstatement works around areas disturbed by the construction activities and all habitat restoration and enhancement measures.

11.11 Many activities will occur in parallel as construction activities move across the site with the anticipated programme described further in **Chapter 7 – Construction, Operation and Decommissioning** and **Chapter 8 – Traffic and Transport**.

11.12 The visual effects of the various aspects of the construction phase would be temporary, intermittent and short-term with each aspect lasting only part of the 9 month construction programme.

11.13 As the site fields are a mixture of arable and pasture, there would be limited loss of ground vegetation as a result of the temporary site compound, new tracks, inverter/ transformer units, store buildings and cable trenches. Ground disturbance would be minimised by good site management with full reinstatement over all temporarily disturbed and excavated areas.

11.14 All the site tracks within the layout would utilise existing field entrances and gaps in field boundaries thereby minimising any potential loss of landscape fabric (excepting the small loss of boundary ‘scrub’ on the western side of the Church Lane at the crossing point to the south). The likely effects of the construction phase on

the existing landscape fabric of the site are considered in the Landscape Assessment below.

## Operational Phase

11.15 The main elements that would be visible over the 40-year operational life of the proposed solar farm would be:

- Solar arrays – comprising rows of panels; the face of each panel would be approximately 4.4m deep and mounted at an approximate angle of 200. These would be fixed into the ground on galvanised frames so that the total height above ground of the highest part of the panels would be approximately 3.0m. The panels would be positioned in regular rows facing south with a spacing of approximately 3m to 5.34m between rows (depending on terrain).
- Transformer/ inverter units – 20 in number, rectangular in form, constructed of steel, approximately 6.0m by 3.0m and 3.0m high, and of a colour to be agreed in consultation with the Council, although a green colour is suggested. Details provided in **Chapter 6 – Development Proposal** and accompanying figures (ES Volume 3).
- Store and spares – 3 cabinets in number, rectangular in form, of GRP construction and approximately 6.0m by 3.0m and 3.0m high and of a colour to be agreed in consultation with the Council, although a green colour is suggested. Details provided in **Chapter 6 – Development Proposal** and accompanying figures (ES Volume 3).
- Welfare cabin – 1 in number, rectangular in form, of GRP construction and approximately 6.0m by 3.0m and 3.0m high and of a colour to be agreed in consultation with the Council, although a green colour is suggested. Details provided in **Chapter 6 – Development Proposal** and accompanying figures (ES Volume 3).
- Site substations – 4 in number, rectangular in form, of GRP construction and approximately 6.0m by 3.0m and 3.0m high and of a colour to be agreed in consultation with the Council, although a green colour is suggested. Details provided in **Chapter 6 – Development Proposal** and accompanying figures (ES Volume 3).
- Fencing – around the perimeter of the solar array. Main fence panels would be stock style fencing with wooden posts and open wire mesh up to 2m in height. Final style and colour to be agreed in consultation with the Council.
- CCTV - a system of CCTV and/ or infra red cameras set at approximately 50m intervals along the deer fencing and set upon poles of a height up to 2m;
- Gates – up to 12 sets, within the fencing and made of welded hot dipped self-coloured galvanised steel. Gates would be double in design, totalling approximately 4m in width and 2m in height. Details provided in accompanying figures (ES Volume 3).
- Internal access tracks – sections of track extending into the site from existing roads and upgraded tracks, approximately 4.0m wide and approximately 3 000m in length in total.

- Seeding between solar panels with native grasses also wild flower seeding. A comprehensive mitigation scheme is also proposed including tree planting, new hedgerows and hedgerow management. See Figure 11.9 for details.
- Periodical visits to the site for operational and grounds maintenance purposes (management of grassed areas and mitigation planting), involving a light van or four-wheel drive vehicle.

11.16 From a landscape and visual perspective, the number of visual elements present over the anticipated 40 year operational phase has been minimised by siting the proposal close to existing infrastructure in the form of an existing solar farm, pylon lines, High Speed 1 (HS1) and local services railway lines, M20 motorway, Sellindge Substation and Converter Station. In addition, some of the solar arrays have been positioned adjacent to existing mature vegetation and woodland. Furthermore, light stock grazing would be able to occur in between the solar panels, tracks etc, thereby minimising the area of land taken out of agricultural use.

11.17 The proposed mitigation scheme will take several years to establish and provide additional screening of the proposed development, although year on year this screening will gradually improve. Therefore, the aspects of the operational phase that are likely to initially give rise to significant effects on landscape character and visual amenity during the operational life are the solar arrays, site tracks, stock style fencing, CCTV, inverter/transformer units, substations, spare parts and storage cabinets and welfare cabin, and these are considered in the Landscape and Visual Assessments below. The proposed development has also then been assessed at a stage ten years after completion of construction when the landscaping proposals are expected to be established, providing some further screening of the proposed development from parts of the study area, and contributing beneficially to the landscape character and landscape fabric of the local area. It should be noted that beyond this ten year period the landscaping proposals would continue to mature and integrate within the locality.

## Decommissioning Phase

11.18 The decommissioning phase would be undertaken over a period of less than the 9 month construction period, and the activities and temporary features which would be visible on the site would include:

- The presence of HGV deliveries collecting materials and components from the site and the movement of vehicles on-site.
- Dismantling and removal of the solar array, fencing, inverter/ transformer units, substations, CCTV, and storage/spares/ welfare cabinets. Excavation and removal of associated hardstanding areas/ plinths (where applicable). Access tracks and ancillary infrastructure may remain in place following decommissioning for use by the landowner if required.
- Reinstatement works over the other areas disturbed by the works.

11.19 The effects on landscape and visual amenity during the decommissioning phase would be minimised by the limited duration of the works, by removing all above ground structures

and materials, by leaving all deep below-ground structures in place and by restoring the ground disturbed by the works. All planting proposals associated with this application would remain in place.

11.20 The likely effects of the decommissioning phase on the landscape fabric of the site are considered in the Landscape Assessment below.

# LANDSCAPE AND VISUAL CONTEXT

11.21 It is worthwhile noting at this stage that a proposal for a Battery Energy Storage System (BESS) is due to come forward into the planning system within 6 – 12 months within part of the application area for the East Stour site. The location of the Pivot Power BESS is shown on Figure 3.1 along with an indicative layout. This future proposal would be located adjacent to existing infrastructure including Sellindge Converter Station and other electrical infrastructure as well as the nearby rail line. Whilst a detailed layout is not yet available, indications are that the majority of elements within the proposal would be no more than 3.0m in height. Given that this is not currently a submitted application with a finalised layout, and given the low lying location of the site, its position adjacent to several existing developments of greater mass and height as well as adjacent mature woodland, the potential for this development has been noted, but has not been considered further within this assessment.

## General Description

11.22 The proposed solar farm development would be situated within a series of agricultural fields to the southeast of Ashford, southwest of Sellindge and north of Aldington, near the M20 motorway. The site is formed by three separate parcels of land; the northern parcel is between the M20 and the HS1 rail line, the western parcel is across Bested Hill and the eastern parcel is to the east of Church Lane on fields adjacent to Partridge Plantation and Round Wood. The field pattern is irregular where the fields are bound by woodlands and hedgerows in some places, but fenced in other areas. The East Stour River is located immediately north of the western land parcel and is generally flanked by mature trees and shrubs on both sides.

11.23 A pylon line crosses through the western land parcel and across Bested Hill to link into the Sellindge Converter Station/ substation which is positioned between the M20 and the HS1 rail line and close to the northern and western land parcels of the site. The converter station contains a number of large buildings as well as electrical infrastructure. A sewage works is located immediately east of the converter station.

11.24 The landform of the site varies across the three site land parcels. The northern parcel gently slopes down to the southeast towards the HS1 rail line, the western parcel rises gently from the rail line to a high point on Bested Hill and then gently slopes down again to the south and to Church Lane in the northeast, and the eastern land parcel gently slopes down to the northeast from its southern boundary.

11.25 A number of public rights of way travel through the site and nearby landscape. Within the northern land parcel of the site Footpath AE432 travels through the solar arrays, with Footpath AE437 travelling to the east

of the solar arrays. Footpaths AE656 and AE657 are located close to the northern boundary of the western site land parcel, and meet Footpath AE457 which then travels through the site between the solar array and Backhouse Wood on the southwestern side of Bested Hill. Within the eastern land parcel of the site Footpath AE459 travels between the solar arrays and between Partridge Plantation and Round Wood. These public rights of way are shown on **Figure 11.7**.

11.26 Two public highways bound the proposed site. The M20 motorway bounds the northern boundary of the northern site land parcel, although at this point the motorway is on an embankment surrounded by trees and access would not be available to the site. The northern land parcel would be accessed via an existing gated access point onto Church Lane to the east. The western and eastern site land parcels would also be accessed from Church Lane with a new highway crossing of Church Lane from the western land portion to the eastern land portion.

11.27 Overall, the 5.0km radius study area is broadly an undulating landform, varying in height between approximately 2m and 150m AOD. The lowest part of the study area is within the far south, across the coastal plain, where the landform then rises in a distinct ridge. Centrally within the study area the landform undulates, rising further to form a second distinct ridge just on the northern edge of the study area at the North Downs.

## Landscape Fabric

11.28 The proposed solar farm development would be located across five arable and pasture fields. The fields are bounded by a mixture of post and wire fencing, hedgerows and woodland blocks where the landscape elements within the site itself are the hedgerows forming some field boundaries within the site boundary as well as one mature tree within the Bested Hill site field positioned within the field away from field boundaries.

## Landscape Character

11.29 At a national level, Natural England has divided England into 159 National Character Areas (NCAs). The study area falls within four NCAs: NCA 120: Wealden Greensand, NCA 119: North Downs, NCA121: Low Weald and NCA 123: Romney Marshes, as illustrated on **Figure 11.2**. NCA 120 covers the site itself and the full NCA description for this area is included within **Appendix 11.1**, with the key characteristics for each of the four NCAs set out below.

### *NCA120 – Wealden Greensand*

- A long, narrow belt of Greensand, typified by scarp-and-dip slope topography, including outcrops of Upper Greensand, Gault Clay and Lower Greensand. The Greensand forms escarpments separated by a clay vale: the overall undulating and organic landform – particularly in the west – gives a sense of intimacy to the landscape. Leith Hill in Surrey is the highest point in south-east England.
- There are extensive areas of ancient mixed woodland of hazel, oak and birch, with some areas having been converted to sweet chestnut coppice in past centuries. These areas reflect the diverse geology, including the distinctive chalk grassland elements within the East Hampshire Hangers Special Area of Conservation (SAC), the wooded commons

('charts') of East Surrey and West Kent, and conifer plantations.

- Semi-natural habitats include: remnant lowland heathland, mostly concentrated in West Sussex, Hampshire and West Surrey; the wetlands associated with the River Arun in West Sussex; and unimproved acid grasslands found in commons, parklands, heathland and other areas of unimproved pasture.
- Fields are predominantly small or medium, in irregular patterns derived from medieval enclosure. Boundaries are formed by hedgerows and shaws, with character and species reflecting the underlying soils. On the clay, hedgerows are dense and species-rich, with occasional standard oaks. On more acidic soils they generally consist of hawthorn and blackthorn, also with occasional oak trees, and often trimmed low.
- Agricultural land comprises a mosaic of mixed farming, with pasture and arable land set within a wooded framework. There is a fruit-growing orchard belt in Kent and also around Selborne in Hampshire.
- The rural settlement pattern is a mixture of dispersed farmsteads, hamlets and some nucleated villages. Large houses set within extensive parks and gardens are found throughout the area.
- In the east of Kent, the Wealden Greensand has a gentler and more open aspect than in the wooded west. This part of the area is also more marked by development, with the presence of major towns and communication corridors such as the M26, M25 and M20 motorways and railway lines including the Channel Tunnel Rail Link (High Speed 1).
- The local built vernacular includes the use of Greensand, ragstone and, in the west, malmstone, bargate stone, plus dark carrstone patterned in the mortar between stones ('galleting') in Surrey, as well as timber-framing and weatherboarding.
- There are a range of historic landscape features, including field monuments, old military defences, prehistoric tumuli, iron-age hill forts, Roman forts, the Royal Military Canal, small quarries and relics of the iron industry (including hammer ponds). Sunken lanes cut into the sandstone are a historic and characteristic feature, as are older deer parks and more recent 18th-century parklands.
- Surface water is an important feature across the Greensand, with many streams and rivers passing through the NCA: the Western Rother, Wey, Arun, Medway and the Great and East Stour.
- The Greensand ridge meets the coast of Kent between Folkestone Warren and Hythe. While most of the coastal strip is now built up and protected by sea defences, the undeveloped sea cliffs at Copt Point provide important geological exposures, are designated for their nature conservation interest and fall within the Dover–Folkestone Heritage Coast.

### *NCA119 – North Downs*

- Cretaceous Chalk forms the backbone of the North Downs. A distinctive chalk downland ridge rises up from the surrounding land, with a steep scarp slope to the south providing extensive views across Kent, Surrey and Sussex and across the Channel seascape to France.

- The broad dip slope gradually drops towards the Thames and the English Channel, affording extensive views across London and the Thames Estuary. The carved topography provides a series of dry valleys, ridges and plateaux.
- Chalk soils are predominant across the NCA but the upper part of the dip slope is capped by extensive clay-with-flint deposits. Patches of clay and sandy soils also occur with coombe deposits common in dry valleys.
- The North Downs end at the dramatic White Cliffs of Dover, one of the country's most distinctive and famous landmarks. Most of the coast between Kingsdown and Folkestone is unprotected, allowing for natural processes. The cliffs are home to internationally important maritime cliff-top and cliff-ledge vegetation.
- The area is cut by the deep valleys of the Stour, Medway, Darent, Wey and Mole. The river valleys cut through the chalk ridge, providing distinctive local landscapes which contrast with the steep scarp slope.
- The south-facing scarp is incised by a number of short, bowl-shaped dry valleys, cut by periglacial streams and often referred to as combes. The undulating topography of the dip slope has also been etched by streams and rivers, today forming dry valleys, some of which carry winterbournes that occasionally flow in the dip slope, depending on the level of the chalk aquifer.
- The footslope of the escarpment supports arable cropping, the dominant land use within the NCA. In the east, the richer, loamy soils of the lower dip slope support large tracts of mixed arable and horticultural production.
- Woodland is found primarily on the steeper slopes of the scarp, valley sides and areas of the dip slope capped with clay-with-flints. Wellwooded hedgerows and shaws are an important component of the field boundaries, contributing to a strongly wooded character. Much of the woodland is ancient.
- Tracts of species-rich chalk grassland and patches of chalk heath are important downland habitats and of international importance.
- Ancient paths, drove roads and trackways, often sunken, cross the landscape and are a distinctive feature of the dip slope. Defensive structures such as castles, hill forts and Second World War installations, and historic parks, buildings and monuments are found throughout.
- Small, nucleated villages and scattered farmsteads including oasts and barns form the settlement pattern, with local flint, chalk and Wealden brick the vernacular materials.
- In the western part of the area, around and to the west of Sevenoaks and into Surrey, there is increased urban development.

### *NCA121 – Low Weald*

- Broad, low-lying, gently undulating clay vales with outcrops of limestone or sandstone providing local variation.
- The underlying geology has provided materials for industries including iron working, brick and glass making, leaving pits, lime

kilns and quarries. Many of the resulting exposures are critical to our understanding of the Wealden environment.

- A generally pastoral landscape with arable farming associated with lighter soils on higher ground and areas of fruit cultivation in Kent. Land use is predominantly agricultural but with urban influences, particularly around Gatwick, Horley and Crawley.
- Field boundaries of hedgerows and shaws (remnant strips of cleared woodland) enclosing small, irregular fields and linking into small and scattered linear settlements along roadsides or centred on greens or commons. Rural lanes and tracks with wide grass verges and ditches.
- Small towns and villages are scattered among areas of woodland, permanent grassland and hedgerows on the heavy clay soils where larger 20th-century villages have grown around major transport routes.
- Frequent north–south routeways and lanes, many originating as drove roads, along which livestock were moved to downland grazing or to forests to feed on acorns.
- Small areas of heathland particularly associated with commons such as Ditchling and Chailey. Also significant historic houses often in parkland or other designed landscapes.
- The Low Weald boasts an intricate mix of woodlands, much of it ancient, including extensive broadleaved oak over hazel and hornbeam coppice, shaws, small field copses and tree groups, and lines of riparian trees along watercourses. Veteran trees are a feature of hedgerows and in fields.
- Many small rivers, streams and watercourses with associated watermeadows and wet woodland.
- Abundance of ponds, some from brick making and quarrying, and hammer and furnace ponds, legacies of the Wealden iron industry.
- Traditional rural vernacular of local brick, weatherboard and tile-hung buildings plus local use of distinctive Horsham slabs as a roofing material. Weatherboard barns are a feature. Oast houses occur in the east and use of flint is notable in the south towards the South Downs.

### *NCA123 – Romney Marshes*

- Romney Marshes is a flat, open and agricultural landscape, with distinctive drainage dykes, marshes and open skies. The treeless, low lying, reclaimed marshland is now maintained by manmade sea walls, drainage and river flood plain improvements.
- The majority of the land area is below high tide level, with the beach ridge, concrete sea walls and tidal embankments forming the main barriers to flooding by the sea.
- Internationally important for its geological and geomorphological features, the geology is dominated by coastal deposits of shingle. Dungeness and Rye Harbour comprise the largest cuspate foreland in Europe.
- Wind-blown sand has formed sand dunes and, behind the shingle

beach, alluvial deposits have developed, giving rise to highly productive loamy and clayey soils with high groundwater.

- The diverse coastal landscape and hinterland host a number of habitats, including sand and shingle beaches, sand dunes, intertidal mud and sand, saline lagoons, natural freshwater pits and ditches, salt marsh, grazing marsh and reedbeds.
- Former sea cliffs, mainly of sandstone, mark the post-glacial shoreline and form a notable feature overlooking Romney Marshes at Lympne, Rye, Winchelsea, Hythe and Pett.
- The river valleys of the Rother and Brede are notable in the west, separated by sandstone ridges. The rivers Tillingham and Brede join the Rother Estuary at Rye.
- The irregular small- and medium-sized fields are almost entirely bounded by a complex ditch network, which is critical for providing drainage and irrigation for the marsh as well as supporting a range of species.
- Low woodland cover features throughout, with clumps of trees and patches of woodland found on the higher ground and around settlements. The agricultural land of arable fields and the pasture land, predominantly grazed by sheep, are of high quality. Although much reduced in extent, some traditional wet grazing marsh is still present.
- The area is home to several nationally scarce and rare species such as water voles, the medicinal leech, the hairy dragonfly and England's only remaining population of the Sussex emerald moth.
- Narrow, straight roads and winding lanes link the widely dispersed settlements, with their distinctive churches. The overall open character provides a sense of remoteness.
- Heritage assets include defensive structures such as the Royal Military Canal, Martello towers and more recent Second World War structures. Other historic features include old sea walls, medieval settlement sites and churches, including a high number of lost church sites. The ancient towns of Lydd, New Romney, Rye and Winchelsea have a rich heritage.
- Settlement predominantly consists of dispersed farmsteads, with a few small villages and hamlets. Larger settlements are present at Rye, New Romney and Lydd. There is some nucleated settlement on higher ground, including the Isle of Oxney and the raised area around Appledore.
- Brick is the predominant walling material across the area, and roofs are commonly plain clay tile. There are also some timber-framed buildings, with the framing clad in white-painted weatherboarding or hung tile.
- The 20th and 21st-century coastal developments include Dungeness Power Station, Little Cheyne Court Wind Farm and associated recreation amenities such as caravan sites, holiday parks and golf courses.

11.30 The study area is characterised by a series of more detailed studies. The Landscape Assessment of Kent (KCC

2004) was undertaken by Jacobs Babtie in 2004 and covers the whole 5.0km radius study area, as illustrated by **Figure 11.2**. The landscape falls mainly within 11 landscape character areas (LCAs) within the study area with the site itself located predominantly within the Upper Stour Valley LCA. The main characteristics of each of the LCAs are set out below along with the sensitivity rating given by the study. This study rates sensitivity as very high, high, moderate, low or very low.

UPPER STOUR VALLEY LCA [SITE IS LOCATED WITHIN THIS LCA]

**Characteristic features:**

- *Flat, open valley landscape enclosed by outliers of Greensand;*
- *Mixed farming including a high percentage of arable; and*
- *Historic mills on river.*

**Sensitivity: Low.**

ALDINGTON RIDGE LCA

**Characteristic features***:*

- *Raised landscape with steep slopes down to neighbouring character areas.*
- *Good quality loam soils;*
- *Mixed, generally open farmland;*
- *Landslips in association with the underlying clays; and*
- *Dramatic views to the Low Weald, Romney Marsh and the Downs.*

**Sensitivity: High***.*

ALDINGTON:LYMPNE LCA

**Characteristic features:**

- *Rounded slopes;*
- *Deciduous woodland dominates the scarp;*
- *Gentle lower slopes with arable cultivation; and*
- *Large properties with views over the marsh.*

**Sensitivity: High.**

This LCA is not discussed further within this assessment as this LCA overlaps with the Lympne Greensand Escarpment LCA of the Kent Downs AONB Landscape Character Assessment (see **paragraph 11.34 on page 237**) and discussion of landscape character is made in reference to the Lympne Greensand Escarpment LCA.

BRABOURNE LEES MIXED FARMLAND LCA

**Characteristic features:**

- *Gentle undulating landscape with fine loamy soils locally subjected to waterlogging;*
- *Medium-sized woodlands locally important;*
- *Mixed farmlands; and*
- *Remnant heathy habitats such as valley bogs, acid grassland and woodlands.*

**Sensitivity: Moderate.**

BRABOURNE VALE LCA

**Characteristic features:**

- *Gentle sloping landform with poor quality soils subject to waterlogging;*
- *Mixed farmland including a large percentage of grassland; and*
- *Small copses and larger woodlands locally, of high nature conservation value.*

**Sensitivity: Moderate.**

## HYTHE ESCARPMENT: LYMPNE LCA

**Characteristic features:**

- *Sandstone scarp with rough grassland;*
- *Remnant hedgerows;*
- *Unimproved agricultural grasslands; and*
- *Scrub at base of slopes.*

**Sensitivity: Very high.**

This LCA is not discussed further within this assessment as this LCA overlaps with the Lympne Greensand Escarpment LCA of the Kent Downs AONB Landscape Character Assessment (see **paragraph 11.33 on page 221**) and discussion of landscape character is made in reference to the Lympne Greensand Escarpment LCA.

## MERSHAM FARMLANDS LCA

**Characteristic features:**

- *Undulating landscape with good quality soils;*
- *Mixed farmland with small-scale pastoral farming and more open arable fields; and*
- *Small copses and gappy hedgerows.*

**Sensitivity: Moderate.**

This LCA is not discussed further within this assessment as this LCA is covered by the Ashford Borough Landscape Character Assessments (see **paragraph 11.32 on page 233**) and discussion of landscape character is made in reference to the LCAs within Ashford Borough.

## OLD ROMNEY SHORELINE WOODED FARMLANDS LCA

**Characteristic features:**

- *Flat, or gently undulating with distinctive ridges and valleys dropping down to Romney Marsh;*
- *Large broadleaf or mixed woodlands;*
- *Small-scale pattern of pastoral fields;*
- *Scattered settlement;*
- *Historic churches along the Old Romney Shoreline; and*
- *Remote feel.*

**Sensitivity: Moderate**.

This LCA is not discussed further within this assessment as this LCA is covered by the Ashford Borough Landscape Character Assessments (see **paragraph 11.32 on page 233**) and discussion of landscape character is made in reference to the LCAs within Ashford Borough.

## ROMNEY MARSH: LYMPNE LCA

**Characteristic features:**

- *Drainage ditches and canal. Reed vegetation;*
- *Flat and remote;*
- *Rich arable and pasture; and*
- *Scrubby, wind blown trees around settlements.*

**Sensitivity: Moderate.**

SELLINDGE PLATEAU FARMLANDS LCA

**Characteristic features:**

- *Flat to undulating plateau farmlands on good quality soils;*
- *Open arable landscape with pasture locally important on more undulating ground; and*
- *Small copses and gappy hedgerows on undulating ground.*

**Sensitivity: Moderate.**

STOWTING: POSTLING VALE LCA

**Characteristic features:**

- *Relatively open;*
- *Intensively farmed, grass-scarp slopes and wooded hilltops; and*
- *Motorway and ribbon development at foot of scarp on edge of area.*

**Sensitivity: Very high.**

This LCA is not discussed further within this assessment as this LCA overlaps with the Postling Scarp and Vale LCA of the Kent Downs AONB Landscape Character Assessment (see **paragraph 11.33 on page 222**) and discussion of landscape character is made in reference to the Postling Scarp and Vale LCA.

11.31 No landscape character assessment has been published within Folkestone and Hythe District. However, Ashford Borough Council has published two landscape character assessments pertinent to this assessment. In 2005 Studio Engleback published a landscape character assessment on behalf of the council covering parts of the 'urban fringe' of the borough. From this study, six LCAs are located within the study area, although none cover the site itself (see **Figure 11.3** for details). Each LCA is then split down further into smaller District Landscape Types (DLTs), although only the LCAs are considered further within this assessment as they cover a similar scale and level of detail as the other landscape character assessments within the study area. A brief description of each of the LCAs are set out below along with the sensitivity rating given by the study. This study rates sensitivity as high, moderate or low through its policy recommendations.

ALDINGTON RIDGE LCA

- *Part of the Wealden Greensand Ridge affording panoramic views over Romney Marsh to Dungeness.*

**Sensitivity: Moderate/ high.**

BRABOURNE VALE LCA

- *Located to the north of Hinxhill extending from Naccolt on the edge of the Great Stour Floodplain.*

**Sensitivity: Moderate/ high.**

BRABOURNE LEES MIXED FARMLANDS LCA

- *Undulating farmed landscape with scattered woodlands and a distinctive pattern of linear tree cover and copses.*

**Sensitivity: High.**

MERSHAM FARMLANDS LCA

- *Open, undulating farmed landscape of predominantly large arable fields that have lost hedges, but with some smaller scale pasture and intact hedges around Mersham.*

**Sensitivity: Low to High.**

OLD ROMNEY SHORELINE WOODLAND FARMLANDS LCA

- *Undulating mixed farmland with generally strong hedgerows interspersed with old coppiced woodlands.*

**Sensitivity: Moderate/high.**

UPPER STOUR VALLEY LCA

- *An extensive open valley floor landscape of predominantly arable farming where hedgerows have been removed during the conversion to unimproved pasture and riparian vegetation lost as cultivation extends close to the river banks.*

**Sensitivity: Low to High.**

11.32 The second landscape character assessment within Ashford Borough was undertaken in 2009 by Jacobs and covers the 'rural fringes' of the borough, including the site itself. Nine LCAs are identified, as indicated on **Figure 11.3** and the site is located partly within Evegate Mixed Farmlands LCA and partly within East Stour Valley LCA. The main characteristics of each of the LCAs are set out below along with the sensitivity rating given by the study. This study rates sensitivity as high, moderate or low.

EAST STOUR VALLEY LCA [SITE IS PARTLY LOCATED WITHIN THIS LCA]

**Key characteristics***:*

- *Well vegetated East Stour River cuts through valley with land rising to Bested Hill in the north;*
- *Mosaic like pastoral field pattern;*
- *Mixed and broadleaf woodland blocks;*
- *Mature isolated oak trees within pasture;*
- *Narrow lanes follow the undulations of the landscape, often hedgerow and ditch lined;*
- *Some recent individual housing sporadically located along the lanes; and*
- *Scattered farmsteads set back from the lanes.*

**Sensitivity: High***.*

EVEGATE MIXED FARMLANDS LCA [SITE IS PARTLY LOCATED WITHIN THIS LCA]

**Key characteristics:**

- *Undulating topography;*
- *Intensively farmed landscape with small pockets of pasture;*
- *Comprehensive network of tree cover provided by highway planting, hedgerows and a block of broadleaf ancient woodland;*
- *Ponds and vegetation lined water courses;*
- *Fragmentation caused by major infrastructure routes;*
- *Large electricity sub station; and*
- *Converted oast houses at Evegate Business Park.*

**Sensitivity: Low.**

BRABOURNE FARMLANDS LCA

**Key characteristics:**

- *Gently undulating landform which forms part of the immediate foreground to the Kent Downs AONB;*
- *Series of narrow streams run perpendicular to the Downs;*
- *Mature pollard ash trees mark woodland boundaries;*
- *Isolated oak trees set within arable fields;*
- *Series of parallel narrow lanes run perpendicular to the Downs;*
- *Clusters of vernacular style buildings; and*
- Traditional and more recent residential development is strewn along the lanes.

**Sensitivity: High.**

## BRABOURNE ARABLE FARMLANDS LCA

**Key characteristics:**

- *Intensive arable land;*
- *Large, open, extensive fields;*
- *Extensive hedgerow loss and limited tree cover;*
- *Dramatic panoramic views of the Kent Downs AONB;*
- *Narrow water courses originating from a series of springs along the foot of the Downs; and*
- *Isolated farms.*

**Sensitivity: Moderate.**

## BRABOURNE LEES HILLY FARMLANDS LCA

**Key characteristics:**

- *Hilly topography;*
- *Strong sense of enclosure provided by woodland blocks, hedgerows, landform and settlement;*
- *Pasture for horses and livestock;*
- *Chestnut coppice and evergreen woodland blocks;*
- *Recent development within Brabourne Lees; and*
- *Large, historic farm houses to the south amid a parkland landscape of pasture and isolated trees.*

**Sensitivity: Moderate.**

## ALDINGTON RIDGELINE LCA

**Key characteristics:**

- *High ridgeline topography;*
- *North Downs frame the views to the north;*
- *Mixed farmland with enclosed pasture immediately surrounding settled areas;*
- *Loss of historic field pattern where land is intensively farmed;*
- *Small woodland copses, tree belts and native hedgerows;*
- *Very distinctive ragstone church and remains of Archbishops Palace isolated from main settlement of Aldington;*
- *Strong use of ragstone and locally distinctive chequered brick;*
- *Farm building conversions; and*
- *Recent development within Aldington situated along a Roman road.*

**Sensitivity: High.**

## BONNINGTON WOODED FARMLANDS LCA

**Key characteristics:**

- *Undulating landform which forms part of the immediate foreground to the Kent Downs AONB which rises to the east;*
- *Mixed farmland with small fields;*
- *Deciduous and evergreen enclosing woodland blocks;*
- *Native hedgerows with large standard oak trees;*
- *Isolated oaks trees set within pasture;*
- *Strong sense of enclosure;*
- *Equestrian grazing and land use;*
- *Narrow and hedge lined roads;*
- *The non nucleic settlement of Bonnington with traditional houses and stone farm buildings; and*
- *Recent housing development arranged around closes.*

**Sensitivity: Moderate.**

OLD ROMNEY SHORELINE SETTLEMENTS LCA

**Key characteristics:**

- *Undulating landform slopes southwards towards Romney Marsh;*
- *Open views out of the area across the Romney Marsh to the south;*
- *Mixed land use;*
- *Higher wooded ground to the west, which would have been an island prior to reclamation of the surrounding marshes;*
- *Numerous small settlements along the former shoreline; and*
- *Distinctive stone churches are prominent landmark features.*

**Sensitivity: High.**

ROYAL MILITARY MARSHLANDS LCA

**Key characteristics:**

- *Flat, low lying marshland which forms part of the immediate foreground to the Kent Downs AONB which rise to the east;*
- *Rising Downs to the east, and higher ground to the north provide enclosure to the marsh;*
- *Large irregularly shaped arable fields, divided by a network of reed filled drainage ditches;*
- *Sporadic clumps of scrubby vegetation;*
- *Open and unvegetated Royal Military Canal;*
- *Recent, large scale agricultural buildings at Bridge Farm;*
- *Narrow, unenclosed lane skirts the edge of the marsh to the east; and*
- *Transmission towers.*

**Sensitivity: High**.

11.33 A landscape character assessment has also been undertaken across the Kent Downs Area of Outstanding Natural Beauty (AONB). As yet this report is unpublished but it is understood that publication is imminent and the AONB kindly provided the relevant information as their preferred update to the 1995 published character assessment of the AONB. **Figure 11.4** illustrates that there are two main LCAs from this study that fall within the 5.0km radius study area and the key characteristics identified within the character assessment are set out below. No specific sensitivity ratings are given within the study.

POSTLING SCARP AND VALE LCA

**Key characteristics:**

- *Underlying geology comprises layers of Cretaceous chalk forming the scarp, with mudstone in the vale, and sandstone in the south around Sandling. Vale has areas of deposited sand, gravel, clay and alluvial material;*
- *Soils on the chalk scarp are thin and dry. Those in the vale are more fertile and often sticky;*
- *Landform comprises a strongly-crenelated and steep south-facing scarp, with an undulating landscape to the south. Isolated conical hills are distinctive features. Springs and ponds occur at the base of the scarp;*
- *Woodland blocks and shaws throughout the vale, and a distinctive band of trees and shrubs at the base of the scarp slope. Large numbers of ash trees;*
- *Land use predominantly agricultural, with arable and pastoral fields. Also pockets of woodland, parkland, recreation and transport uses;*

- *Extensive semi-natural habitats including chalk grassland, scrub and woodland;*
- *Archaeological sites concentrated on scarp and hill tops. Strong estate influences in the south of the LCA;*
- *LCA is adjacent to urban areas, but within the LCA, settlement limited to scattered farms, and small historic springline villages with a dispersed pattern. Vernacular buildings constructed of red brick, tile, ragstone and flint;*
- *Network of historic lanes and tracks, with east-west motorway and rail corridor superimposed;*
- *Contrasting textures between the smooth outlines of the scarp and the wooded farmland at the base. Distinctive landforms of hills add to sense of place;*
- *Outstanding views from the scarp and hill tops across the patchwork of fields and woodlands in the vale to the south;*
- *Popular for recreation and walking, with the North Downs Way, Saxon Shore Way and Elham Valley Way crossing the LCA; and*
- *Sense of tranquillity away from large settlements and transport infrastructure.*

## LYMPNE GREENSAND ESCARPMENT LCA

**Key characteristics:**

- *Underlying geology of the escarpment is Greensand, with layers of clay causing it to slump. Soils on the escarpment are generally pitted and unstable;*
- *Landform dominated by a sloping south-facing escarpment (a former cliff line), with undulating land above, and the flat, artificially drained land of Romney Marsh below;*
- *Spring-fed streams flow down the escarpment into the Royal Military Canal at the base. This constructed watercourse and the associated Canal Cutting help to drain Romney Marsh;*
- *Woodland and scrub on the escarpment, with denser woodlands to the west, and strong lines of trees (including pollards) following the Royal Military Canal and other watercourses;*
- *A range of land uses, including pastoral and arable agriculture, nature conservation and recreation. Fields generally irregular in shape, and bounded by hedgerows on the scarp, and by ditches on Romney Marsh;*
- *Semi-natural habitats include extensive grassland (The Roughs) and woodland blocks (mainly in the west). Also watercourses, scrub and hedgerows;*
- *Rich archaeological and cultural heritage, particularly related to coastal defence, including Lemanis Roman fort, Lympne Castle, Royal Military Canal and sound mirror;*
- *Roman road along top of escarpment, and winding lanes on Romney Marsh;*
- *A strongly patterned and textured landscape, showing variations in different parts of the LCA;*
- *Popular for recreation, with Royal Miltary Canal Path providing easy*

*access from Hythe. Port Lympne is a popular visitor attraction; and*

- *Spectacular views across Romney Marsh from the top of the escarpment. The escarpment forms the backdrop to views inland from Romney Marsh.*

## Landscape Designations

### *National Landscape Designations*

11.34 There is one national landscape designation located within the study area. This is the Kent Downs Area of Outstanding Natural Beauty (AONB) and its boundary is shown on **Figure 11.5**. At its closest point, this designation is located approximately 1.3km south and 3.3km northeast of the closest part of the proposed development.

11.35 Under Section 87 of the National Parks and Access to the Countryside Act 1949, as amended by the Environment Act 1995, and then by the Countryside and Rights of Way Act (2000) (CROW Act), Natural England protects an AONB so as to conserve and enhance its natural beauty. AONBs differ from National Parks in that AONBs are not designated for the purpose of promoting opportunities for public enjoyment and understanding of their special qualities by the public, that is, there is not a recreational purpose. This is discussed in more detail later within the assessment.

### *Local Landscape Designations*

11.36 Policy ENV3a and 3b of the Ashford Local Plan 2030 (ABC, 2019) is a boroughwide policy. Policy ENV3a (Landscape Character and Design) sets out a series of landscape characteristics that development proposals within the borough must have regard to.

11.37 Policy ENV3b (Landscape Character and Design in the AONBs) broadly seeks to preserve and enhance the natural beauty of the AONBs within the borough in relation to development proposals within these national designations, but also lists a set of circumstances under which proposals affecting the setting of AONBs within the borough would be permitted.

11.38 Policy ENV3 is discussed in more detail later within this report.

## Visual Receptors

11.39 The visual receptor locations within the study area are illustrated on **Figure 11.6** and include:

- Settlements – the villages and hamlets of Aldington, Smeeth, Stone Hill, Sellindge, Brabourne Lees, Mersham, Brabourne, Barrowhill, Lympne, Bonnington, and Aldington Firth;
- Individual residential properties – scattered cottages and farmsteads;
- Visitor attractions – attractions open to the public are limited within the area mainly to a few fishing lakes, Hatch Park deer park and Port Lympne Wildlife Park. Sawton Mill can be accessed by public rights of way but does not seem to be open to the public;
- Long distance recreational routes – The North Downs Way National Trail, Saxon Shore Way and Royal Military Canal Path long distance routes and Sustrans route 2;
- Local public rights of way – footpaths, bridleways and byways open to all traffic (BOATs);

- Public highways – including the M20, A20, B2067, and a network of minor roads; and
- Passenger rail routes – HS1 running centrally through the study area between the Channel Tunnel and Central London.

11.40 The Countryside and Rights of Way (CRoW) Access Lands Maps on the Natural England website have been checked and there are three very small areas of access land within 5km of the site. The first area is at Gibbins Brook, approximately 2.6km east of the site at its closest point. The other two areas are north of the site around Brabourne Downs at a distance of approximately 4.2km from the proposed site. These three areas are indicated on **Figure 11.6**.

# VISUAL ANALYSIS

## Theoretical Visibility Analysis

11.41 The East Stour Zone of Theoretical Visibility (ZTV) has been generated using a computer-based intervisibility package, the Ordnance Survey Digital Terrain Model (DTM) with height data at 5m intervals and a model of the proposed East Stour Solar Farm. This ZTV is shown within **Figure 11.1**. However, it should be noted that this ZTV is based on bare terrain topographical data only. It does not take into account the screening effects of minor topographic features, vegetation such as woodland and hedgerows and built structures and therefore tends to over-emphasise the extent of visibility in this type of undulating landscape, providing a worst case scenario.

11.42 There is one operational solar farm within a 5.0km radius, with no permitted or proposed solar farms identified within the study area at the current time by this assessment (January 2022). This operational scheme (Sellindge Solar Farm) has been included within the baseline of the assessment and its location is shown on **Figure 11.8**, located approximately 50m east of the proposed development at its closest point.

11.43 **Figure 11.1** illustrates the potential visibility of the proposed East Stour solar panels only, using the tops of the solar panels as the targets and so illustrates the locations in the study area where topography would permit views of at least these portions of the solar farm. This ZTV suggests that the potential visibility of the proposed solar farm would mainly be contained within approximately 2.5km of the site centre, with further intermittent potential visibility extending out across limited further parts of the 5.0km radius study area. The deeper blue tone denotes that a greater proportion of the solar panels would potentially be visible. From the vast majority of the study area the proposed development would be entirely screened by intervening topography, indicated where no blue tone is visible.

11.44 However, in reality, as is illustrated on the ground by the existing operational Sellindge Solar Farm, surface features, such as woodland, tree belts, built form etc, would fragment and reduce the extent of most of these zones of theoretical visibility, and may also reduce the amount of the proposed solar farm visible from any given location, particularly given the limited height of the proposal and the existing woodlands adjacent to the site, where existing vegetation can be a very effective screening element.

11.45 The ZTV does not illustrate the decrease in the scale of the proposal with increased distance from the development which is better illustrated by the viewpoint analysis (see section below and **Appendix 11.2**).

11.46 A cumulative ZTV has been produced to illustrate the potential visibility of the operational Sellindge Solar Farm in conjunction with the East Stour proposal, as illustrated by **Figure 11.8** and the locations of these two solar schemes are shown on the CZTV. This CZTV indicates the very limited potential visibility of the operational Sellindge Solar Farm within the study area suggesting scattered potential combined visibility of the operational scheme in combination with the proposal. It should be noted that in reality the actual visibility of the operational Sellindge scheme is far more contained and limited than suggested by the ZTV due to the screening effects of surrounding elements such as vegetation and the railway embankment, and it is expected that the combined visibility of both schemes would also be far more limited than the CZTV suggests as well.

## Viewpoint Analysis

### *Viewpoint Locations*

11.47 The viewpoints were selected through consultation with officers of the Council and the Kent Downs AONB. These viewpoints were selected to represent the most open views of the proposed solar farm from a range of distances, directions and viewpoint receptor locations, as well as to illustrate a few locations which are outside of the study area requested by the AONB officer. The viewpoints are listed in **Table 11.1** below and the locations of these viewpoints are shown on the figures (**Figures 11.1 – 11.8**).

11.48 A detailed description of the viewpoint panoramas and the potential changes that would occur to each through the introduction of the proposed development are contained within **Appendix 11.2**. These findings are summarised below in **Table 11.2**. The findings in **Table 11.2** take into account the screening effects of intervening topography, existing vegetation and built form and assume excellent visibility conditions, and have been directly assessed through field visits to each viewpoint by the landscape assessor. Those landscape and visual effects that may potentially be significant in accordance with the methodology set out within **Appendix 11.2** are highlighted in grey in **Table 11.2** below. Overall effects of major/moderate and above are considered significant and are shaded dark grey in **Table 11.2** below. Overall effects of moderate+ may be significant if experienced over a sustained length of a route or over most of a zone, area or location, and overall effects of moderate may contribute to significance if combined with greater changes at the same general location, whereas moderate/minor+ or lower changes are unlikely to result in significant changes to views or landscape character.

11.49 A detailed description of how the viewpoint graphics were produced is contained in **Appendix 11.3**.

Table 11.1 - *Viewpoint Locations*

| Vp No | Location | Easting | Northing | Elevation (approx) | Distance (km) | Bearing (approx) to site | Landscape Character Type | Landscape Designations | Recreational and Transport Routes | Visual receptors |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Footpath AE432 near Park Wood | 607769 | 138808 | 59m AOD | 0.02 | S | Evegate Mixed Farmlands | None | Public Right of Way | Walkers |
| 2 | Footpath AE457 near The Paddock | 607658 | 137343 | 58m AOD | 0.09 | N | East Stour Valley | None | Public Right of Way | Walkers |
| 3 | Church Lane near Bested House | 608131 | 137737 | 57m AOD | 0.16 | W & SE | East Stour Valley | None | Local road | Motorists, nearby residents |
| 4 | Junction of footpaths AE459 and AE460 near Lower Park Farm | 607875 | 137055 | 53m AOD | 0.38 | NE | East Stour Valley | None | Public Right of Way | Walkers |
| 5 | Harringe Lane by Harringe Bridge | 609425 | 137904 | 68m AOD | 0.77 | W | Upper Stour Valley | None | Local road over HS1 | Motorists and rail passengers |
| 6 | Footpath AE477 near Grove Cottage, Aldington | 607625 | 136220 | 79m AOD | 1.2 | N | Aldington Ridgeline | None | Public Right of Way | Walkers, nearby residents |
| 7 | Footpath AE474 west of Aldington | 607222 | 136331 | 85m AOD | 1.16 | N | Aldington Ridgeline | None | Public Right of Way | Walkers |

| Vp No | Location | Easting | Northing | Elevation (approx) | Distance (km) | Bearing (approx) to site | Landscape Character Type | Landscape Designations | Recreational and Transport Routes | Visual receptors |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Footpath AE485 Saxon Shore Way by Roman Road near Postling Green | 607294 | 135743 | 96m AOD | 1.7 | N | Aldington Ridgeline | Kent Downs AONB | Local road, long distance footpath | Motorists and walkers |
| 9 | PRoW AE299 North Downs Way by Kingsmill Down | 610011 | 142777 | 178m AOD | 4.58 | SW | Stowting: Postling Vale/ Postling Scarp & Vale | Kent Downs AONB | National Trail, local road | Walkers and motorists |
| 10 | PRoW AE299 North Downs Way by Brabourne Lane | 611063 | 142176 | 172m AOD | 4.69 | SW | Stowting: Postling Vale/ Postling Scarp & Vale | Kent Downs AONB | National Trail | Walkers |
| 11 | Car park by PRoW HE356 North Downs Way at Farthing Common | 613620 | 140350 | 179m AOD | 5.6 | SW | Stowting: Postling Vale/ Postling Scarp & Vale | Kent Downs AONB | National Trail, main road | Walkers and motorists |
| 12 | PRoW AE143 North Downs Way through Wye Downs Nature Reserve | 607914 | 145165 | 174m AOD | 6.2 | S | Wye: Stour Valley/ Stour Valley | Kent Downs AONB | National Trail | Walkers |

Table 11.2 - *Landscape and Visual Assessment*

| Viewpoint Information | | | | Landscape Assessment | | | Visual Assessment | | |
|---|---|---|---|---|---|---|---|---|---|
| **No** | **Location** | **NGR** | **Distance/ direction to site** | **LCA (sensitivity)** | **Magnitude of change** | **Effects on Landscape Character** | **Receptors (sensitivity)** | **Magnitude of change** | **Effects on Visual Amenity** |
| 1 | Footpath AE432 near Park Wood | 607769 138808 | 0.02km/ S | Evegate Mixed Farmlands (Medium/low) | Substantial adverse | Moderate+ adverse | Walkers (High/ medium) | Substantial | Major/ moderate+ |
| 2 | Footpath AE457 near The Paddock | 607658 137343 | 0.09km/ N | East Stour Valley (High/ medium) | Substantial adverse | Major/ moderate+ adverse | Walkers (High/medium) | Substantial | Major/ moderate+ |
| Viewpoint 2: 10 years post construction | | | | East Stour Valley (High/ medium) | None | No effect | Walkers (High/ medium) | None | No effect |
| 3 | Church Lane near Bested House | 608131 137737 | 0.16km/ W & SE | East Stour Valley (High/ medium) | Very substantial/ substantial adverse | Major adverse | Nearby residents (High) | Very substantial/ substantial adverse | Major+ |
| | | | | | | | Motorists (Medium) | | Major/ moderate+ |
| Viewpoint 3: 10 years post construction | | | | East Stour Valley (High/ medium) | Substantial/ moderate adverse | Major/ moderate adverse | Nearby residents (High) | Substantial/ moderate | Major/ moderate+ |
| | | | | | | | Motorists (Medium) | | Moderate+ |
| 4 | Junction of footpaths AE459 and AE460 near Lower Park Farm | 607875 137055 | 0.38km/ NE | East Stour Valley (High/ medium) | Slight adverse | Moderate/ minor+ adverse | Walkers (High/ medium) | Slight | Moderate/ minor+ |
| Viewpoint 4: 10 years post construction | | | | East Stour Valley (High/ medium) | None | No effect | Walkers (High/ medium) | None | No effect |

| Viewpoint Information | | | | Landscape Assessment | | | Visual Assessment | | |
|---|---|---|---|---|---|---|---|---|---|
| No | Location | NGR | Distance/ direction to site | LCA (sensitivity) | Magnitude of change | Effects on Landscape Character | Receptors (sensitivity) | Magnitude of change | Effects on Visual Amenity |
| 5 | Harringe Lane by Harringe Bridge | 609425 137904 | 0.77km/ W | Upper Stour Valley (Medium/ low) | Moderate/ slight adverse | Moderate/ minor adverse | Motorists (Medium) | Moderate/ slight | Moderate/ minor+ |
| | | | | | | | Rail passengers (Low) | | Minor+ |
| Viewpoint 5: 10 years post construction | | | | Upper Stour Valley (Medium/ low) | Moderate/ slight adverse | Moderate/ minor adverse | Motorists (Medium) | Moderate/ slight | Moderate/ minor+ |
| | | | | | | | Rail passengers (Low) | | Minor+ |
| 6 | Footpath AE477 near Grove Cottage, Aldington | 607625 136220 | 1.2km/ N | Aldington Ridgeline (High/ medium) | Moderate/ slight adverse | Moderate adverse | Walkers (High/ medium) | Moderate/ slight | Moderate |
| | | | | | | | Nearby residents (High) | | Moderate+ |
| Viewpoint 6: 10 years post construction | | | | Aldington Ridgeline (High/ medium) | Slight adverse | Moderate/ minor+ | Walkers (High/ medium) | Slight | Moderate/ minor+ |
| | | | | | | | Nearby residents (High) | | Moderate |
| 7 | Footpath AE474 west of Aldington | 607222 136331 | 1.2km/ N | Aldington Ridgeline (High/ medium) | Moderate/ slight adverse | Moderate adverse | Walkers (High/ medium) | Moderate/ slight | Moderate |
| Viewpoint 7: 10 years post construction | | | | Aldington Ridgeline (High/medium) | Slight adverse | Moderate/ minor+ adverse | Walkers (High/ medium) | Slight | Moderate/ minor+ |

| Viewpoint Information | | | | Landscape Assessment | | | Visual Assessment | | |
|---|---|---|---|---|---|---|---|---|---|
| No | Location | NGR | Distance/ direction to site | LCA (sensitivity) | Magnitude of change | Effects on Landscape Character | Receptors (sensitivity) | Magnitude of change | Effects on Visual Amenity |
| 8 | Footpath AE485 Saxon Shore Way by Roman Road near Postling Green | 607294 135743 | 1.7km/ N | Aldington Ridgeline (High/medium) | Negligible adverse | Minor+ adverse | Motorists (Medium) | Negligible | Minor |
| | | | | | | | Walkers (High/ medium) | | Minor+ |
| 9 | PRoW AE299 North Downs Way by Kingsmill Down | 610011 142777 | 4.6km/ SW | Stowting : Postling Vale/ Postling Scarp & Vale (High) | Slight/ negligible adverse | Moderate/ minor+ adverse | Walkers (High) | Slight/ negligible | Moderate/ minor+ |
| | | | | | | | Motorists (Medium) | | Minor+ |
| 10 | PRoW AE299 North Downs Way by Brabourne Lane | 611063 142176 | 4.7km/ SW | Stowting : Postling Vale/ Postling Scarp & Vale (High) | Slight/ negligible adverse | Moderate/ minor+ adverse | Walkers (High) | Slight/ negligible | Moderate/ minor+ |
| 11 | Car park by PRoW HE356 North Downs Way at Farthing Common | 613620 140350 | 5.6km/ SW | Stowting : Postling Vale/ Postling Scarp & Vale (High) | Slight/ negligible adverse | Moderate/ minor+ adverse | Walkers (High) | Slight/ negligible | Moderate/ minor+ |
| | | | | | | | Motorists (Medium) | | Minor+ |
| 12 | PRoW AE143 North Downs Way through Wye Downs Nature Reserve | 607914 145165 | 6.2km/ S | Wye : Stour Valley/ Stour Valley (High) | Negligible adverse | Moderate/ minor | Walkers (High) | Negligible | Moderate/ minor |

*Findings of Visual Analysis*

11.50 In general terms the visibility of the proposed solar farm would be confined to an area local to the proposed site, much in the same way as the existing Sellindge Solar Farm. This is due to the limited height of solar infrastructure, the undulating nature of the local topography and the good levels of vegetation across the landscape, which combine to serve as useful containment and screening tools in combination with the screening provided by the HS1 rail embankment and the M20 motorway embankment and associated mature vegetation. In cumulative terms the viewpoints illustrate clearly that, in most cases, the operational solar farm would not be visible from the same locations as the proposal.

11.51 The viewpoint analysis has considered the operational solar farm within the baseline, as well as other nearby larger scale development such as the converter station. The ZTV and the viewpoints indicate that there is a core area proximate to the proposal within which the proposed development could be visible. This is an area of very limited extent (approximately 0.05km from the site boundary to the north, 0.7km to the east, 1.2km to the south and 0.3km to the west), and beyond this the proposal would generally be screened from the majority of the study area, with only a few small pockets of visibility from more distant higher ground to the north at distances of over 4.5km away.

11.52 Taking into account the visual analysis (ZTVs), fieldwork observations and the viewpoint analysis, these findings suggest that the introduction of the proposed East Stour Solar Farm to the baseline would result in a significant change in the view for high sensitivity receptors (e.g. some residents and users of national trails) within approximately 0.75km of the proposed solar farm, high/ medium sensitivity receptors (e.g. equestrians, cyclists and walkers on local PRoW network and long distance routes) within approximately 0.35km of the proposed solar farm, and medium sensitivity receptors (e.g. motorists) within approximately 0.2km of the proposed solar farm. The viewpoint analysis also suggests that a significant effect on landscape character would be limited to within approximately 0.3 – 0.4km of the proposal.

11.53 Over time the mitigation planting proposals would establish and begin screening parts of the proposal. In many cases, this vegetation would reduce the overall visibility of the proposal, the magnitude of change in the view and the overall effects of the development.

11.54 It is also worth noting that there are locations where the proposed development would be largely or entirely screened by topography, built form or intervening vegetation for some receptors such that views from within these zones would be intermittent in places. The zones of visibility would be much more fragmented than suggested by the ZTV in **Figure 11.1** and the proportion of the proposal that would be visible would be reduced in some locations. In these instances the magnitude of change in the view and resulting overall effects are also likely to be reduced.

11.55 A more detailed discussion of the likely effects on the visual amenity of receptors in settlements and residential properties, at visitor attractions, on recreational routes and on public highways is provided in the Visual Assessment below.

# LANDSCAPE ASSESSMENT

11.56 This assessment draws on the review of the predicted effects of the development, the landscape fabric of the site, the key characteristics of the LCAs, the purposes/objectives of the landscape designations, the visibility analysis, the viewpoint analysis and fieldwork observations, and discusses the significance of the predicted effects on:

- Landscape fabric of the site;
- Landscape character; and
- Purposes of the landscape designations.

## Effects on Landscape Fabric

### *Prediction Methodology*

11.57 Landscape fabric is composed of the physical components of the landscape (e.g. landform, land cover and landscape elements and features). Developments can bring about both direct and indirect effects on landscape fabric. Direct effects occur where changes to the fabric of the landscape arise as the result of physical disturbance, for example, the loss of landscape elements such as hedgerows, walls and trees. Indirect effects are consequential changes that are separated from the source of the change in a temporal or spatial manner, for example changes in vegetation downstream as the result of modifications to surface water patterns upstream in a catchment area.

11.58 This assessment of effects on landscape fabric considers the existing landscape fabric of the site and the predicted effects of the development, and makes a judgement as to whether there are likely to be any significant beneficial or adverse changes to landscape fabric (as well as the range in between) based on the following two definitions:

- Significant beneficial effects on landscape fabric - could occur where important/mature/diverse/distinctive components, which had previously been lost or degraded as the result of agricultural operations or other development, would be added, reinstated or improved.
- Significant adverse effects on landscape fabric - could occur where existing important/mature/diverse/distinctive components would be permanently lost (or long term temporarily lost) and the effects cannot be adequately mitigated.

### *Construction Phase*

11.59 There would be no significant adverse effects on landscape fabric during the construction phase as there would be no removal of hedgerows at key entrance points and no other loss of important, mature, diverse or distinctive landscape components. It is envisaged that the site entrances from the highway network into the fields containing the proposed development would utilise existing field access points and gaps in hedgerows.

11.60 As the fields are used for arable crops and pasture, there would be minimal loss of ground vegetation as a result of the temporary site compound, new tracks, inverter/transformer units, substations, store/spare/welfare cabinets and cable trenches. Beneath the solar arrays each field would be

pasture and so the site fields would all convert to pastureland. Therefore, overall there would not be any significant (adverse or beneficial) effects on landscape fabric as a result of the construction phase.

### *Operational Phase*

11.61 Once the construction phase has been completed, the proposed mitigation measures would be implemented. These measures are illustrated on **Figure 11.9** and include some sizeable areas of tree and hedgerow planting, hedgerow management to maintain and grow the height of some existing site hedgerows and hedgerow enhancement to gap up and improve some existing site hedgerows. In addition, some areas of wildflower/ riparian/ grassland have been accommodated within the layout to encourage biodiversity. There would be a beneficial effect on landscape fabric as a result of these measures which would last throughout the operational phase of the proposed development and would be maintained and replaced where necessary through an operational planting management plan.

### *Decommissioning Phase*

11.62 There would be minimal disturbance of landscape features during this phase as underground structures below approximately 1.0m depth (e.g. lower parts of the building foundations and cables) would be left in situ and there would be reinstatement of the ground over all ground disturbed by the works. All the new tree and hedgerow planting measures as part of the application would remain in place. Therefore, there would be a negligible effect on landscape fabric during the decommissioning phase.

## Effects on Landscape Character

### *Prediction Methodology*

11.63 Landscape character is composed of physical, biological and social components, combined with aesthetic and perceptual factors. This assessment of effects on landscape character considers the existing landscape character of the site and study area by using the information collected during fieldwork and within the local landscape character assessments and sensitivity assessments. It considers the predicted effects of the development, and assesses the area within which there is likely to be a significant change to landscape character (as well as the range in between), based on the following two definitions:

- Significant beneficial effects on landscape character - are likely to occur where the proposed development would materially enhance the quality (condition) of the landscape, would complement the existing character and/or where particularly valued characteristics, previously lost or degraded, would be reinstated.
- Significant adverse effects on landscape character - are likely to occur where the proposed development would become a key or one of the defining characteristics of the landscape, would contrast with the existing character, and/or where existing key characteristics would be permanently lost or changed.

11.64 The long-term addition of a renewable energy development into an area of landscape that is not currently characterised by built form or

renewable energy development will usually have an appreciable effect on the character of at least a localised area within that landscape.

11.65 Whether such effects would be significant depends on the sensitivity (susceptibility and value) of the landscape resource and the scale or magnitude of landscape effects, as indicated by fieldwork and the viewpoint analysis. Therefore, fieldwork observations are examined together with the findings of the viewpoint analysis so as to determine the degree and extent of likely significant effects of the proposed development on landscape character within the various landscape character units in the study area.

11.66 Landscape units are often relatively large geographical areas and the screening effects of topography and vegetation will vary across each unit, so that the predicted extent of significant effects on landscape character will almost always be intermittent. However, with increasing distance from the proposed site, the proposed development will have a decreasing effect on landscape character and there will come a point where there are few or no further significant landscape effects. This is defined as the extent of the significant effects on landscape character.

## *Effects on Character of the Site Landscape*

11.67 There would be some short-term effects on the character of the site as a result of the construction phase. Overall, the construction phase would be short-term, with the various activities lasting for only small parts of the overall timescale. The presence of construction machinery and activities would be transient (temporary, short-term and reversible) and ground and vegetation disturbance would be limited. Therefore, the effects of the construction phase would not result in a significant beneficial or adverse effect on the landscape character of the site.

11.68 The main effects on the landscape character of the site would occur during the operational phase as a result of the presence of the solar panels and associated infrastructure. All these parts of the proposed development would be located within the Evegate Mixed Farmlands LCA and the East Stour Valley LCA.

11.69 The elements of the proposal most likely to be visible across the surrounding area during the initial stages of the operational phase would be the solar panels forming the solar array, new tracks, the transformer/ inverter units, substations, store/spares/ welfare containers, stores, stock style fencing and CCTV, all of which would become key characteristics of the site landscape and, although no existing key characteristics would be lost or changed, they would contrast with the existing character such that these elements of the proposal would result in a significant adverse effect on the character of the site landscape.

11.70 Over time these significant changes to landscape character would diminish to a degree as the mitigation proposals establish and reach maturity. However, across the site itself, these significant changes would still be evident.

11.71 The decommissioning phase would be very short-term, ground disturbance would be very limited in extent and there would be the removal of the built form and the reinstatement of the ground on completion of the

works, which should return much of the site to its current character, albeit with additional hedgerow and tree planting as well as some slight changes to the heights of hedgerows within the site. Therefore, the decommissioning phase would result in a significant beneficial effect on the landscape character of the site relative to the operational phase. Overall, the change occurring as a result of the introduction of the tree planting and new hedgerows would be beneficial and in keeping with the existing character of the local area. Therefore, the change in character upon decommissioning relative to the current landscape character of the site would be beneficial, but not significant.

11.72 Therefore, there would be a significant adverse long-term but temporary change in the character of the site landscape for the duration of the operational phase but by the end of the decommissioning phase the site character would have been enhanced for the long-term by the planting proposals.

11.73 However, it would be impossible to site a solar array of this scale in the UK without significantly affecting the character of at least the site and immediate surroundings. The key issue is how far this change in landscape character would extend and whether this change would be acceptable.

11.74 As noted in **paragraph 11.17 on page 223**, the aspects of the development that are likely to give rise to significant effects on landscape character (and visual amenity) during the operational phase are the solar array, new tracks, transformers/inverter units, store/spares/welfare cabinets, substations, stock style fencing and CCTV, and the effects of the presence of these features on the character of the wider landscape are considered below.

## *Effects on Character of Wider Landscape*

11.75 The viewpoint analysis suggests that there would be no significant adverse effects on the character of the landscape further than approximately 0.3 – 0.4km from the proposed development. Therefore, this indicates that potential significant effects on landscape character would be limited to parts of the Evegate Mixed Farmlands LCA, the East Stour Valley LCA and the Upper Stour Valley LCA within the locality of the site. It has already been acknowledged above that the character of the site landscape itself would be significantly affected by the proposal.

### EVEGATE MIXED FARMLANDS LCA

11.76 The key characteristics of this LCA are set out within **paragraph 11.32 on page 233**, and a more detailed description of this LCA is provided in the extract in **Appendix 11.1**. The area is described within the character assessment (extract): 'there is a comprehensive network of tree cover….the pattern of the landscape is much influenced and fragmented by major infrastructure routes. The M20 and A20 run parallel, bisecting the area and leaving a narrow strip of land which is used mostly for arable production and pasture.'

11.77 This is a small LCA covering a central section of the study area and it derives its character primarily from its key characteristics and internal features and only partly from views out of the LCA to neighbouring landscapes.

11.78 The overall evaluation of the sensitivity of this LCA within the published assessment is low, with only three levels of high, moderate and low used within the published assessment. Our assessment considers the sensitivity of the LCA to solar development using a five point scale and has determined the sensitivity as medium/ low. This is a landscape with mainly local value with features of local value, that could have a slight susceptibility to the type, scale and location of development proposed.

11.79 Within the viewpoint analysis, only Viewpoint 1 is located within this LCA, in close proximity to the proposal where the viewpoint suggests that a moderate+ adverse effect on landscape character would occur from the viewpoint, indicating a significant adverse effect on landscape character may occur if experienced over a greater local area. However, in reality this viewpoint is located within the solar farm site itself, which, as already acknowledged above, would experience a significant effect on landscape character as a result of the proposal. This portion of the solar farm is situated in between woodland blocks which form natural screens to more distant views of the proposal. As a result, beyond these woodland blocks within the LCA the proposal would not be visible and would not result in significant effects to the remainder of this LCA.

11.80 In cumulative terms, whilst the CZTV in **Figure 11.8** suggests that the Sellindge Solar Farm could be visible from some parts of this LCA, the screening effects of the embankment for the HS1 rail line and the associated mature vegetation entirely screen this existing development from view.

11.81 Therefore, these significant effects (contained section of the LCA through the site itself and immediately surrounding the site, enclosed by surrounding woodland) would be adverse, direct, individual (rather than cumulative), long-term, temporary and reversible once the proposed development is decommissioned.

## EAST STOUR VALLEY LCA

11.82 The key characteristics of this LCA are set out within **paragraph 11.32 on page 233**, and a more detailed description of this LCA is provided in the extract in **Appendix 11.1**. The area is described within the character assessment as (extract) 'a mosaic like pastoral field pattern is concentrated around the East Stour River, with field shape often dictated by the non linear route of water courses. Woodland blocks are scattered throughout the landscape. Roads comprise narrow lanes, following the undulations across the landscape. Hedgerows often line the lanes, at times containing hedgerow trees, becoming more significant tree belts in places.' This LCA covers a small area centrally within the study area and derives its character mainly from its key characteristics and internal features but also in part from its views out to other LCAs.

11.83 The overall evaluation of the sensitivity of this LCA within the published assessment is high, based on a three point scale. This assessment has determined the sensitivity of the LCA to solar development as high/medium based on a five point scale. This is a landscape with mainly local value with features and special qualities of local value, that could be susceptible to the type, scale and location of development proposed.

11.84 Within the viewpoint analysis Viewpoints 2 – 4 are located within this LCA at distances of between 0.09km and 0.38km from the proposed development, respectively. The viewpoints suggest that in close proximity to the site a very substantial/substantial or substantial adverse magnitude of change could occur, which would result in major or major/ moderate adverse effects on landscape character, which would be significant. These types of effect would be expected from parts of the landscape directly adjacent to the proposal and where the proposal can be viewed in several directions, such as Viewpoint 3. However, Viewpoint 4 illustrates the natural screening provided within this landscape by both undulating topography and high levels of woodland where at a distance of 0.38km from the proposal, a slight adverse magnitude of change and no significant adverse effect would occur initially. Furthermore, mitigation proposals would reduce visibility of the proposal even further so that no adverse effects on landscape character are expected at Year 10 from this Viewpoint.

11.85 Mitigation proposals have been carefully designed to improve and enhance existing local landscape fabric such as site boundary hedgerows, and these measures will assist in limiting the adverse effects of the proposal on local landscape character. In turn, the natural screening provided by existing woodland and tree belts within the LCA and also by the rail embankment would also contain these potential adverse landscape character effects.

11.86 In cumulative terms, Sellindge Solar Farm is also located within this LCA but is broadly visually contained within the northeast edge of the LCA by boundary vegetation. The significant adverse effects on parts of this LCA resulting from the proposed development would be significant due to the size and proximity of the proposal and not due to the very limited cumulative visibility with the smaller operational development.

11.87 Therefore, these significant effects (contained section of the LCA through the site itself and immediately surrounding the site) would be adverse, direct, individual (although limited cumulative effects would occur), long-term, temporary and reversible once the proposed development is decommissioned.

## UPPER STOUR VALLEY LCA

11.88 The ZTV suggests another LCA within the study area with potential visibility of the proposal would be the Upper Stour Valley LCA. The key characteristics and a description of this LCA are set out within **paragraphs 11.30 on page 229** and **11.31 on page 232**, and a more detailed description of this LCA is provided in the extract in **Appendix 11.1**. The area is described within the Ashford character assessment as (extract) 'an extensive open valley floor landscape of predominantly arable farming where hedgerows have been removed during the conversion to unimproved pasture and riparian vegetation lost as cultivation extends close to the river banks.'' This is an average sized LCA within the central and western part of the study area that derives its character partly from its key characteristics and internal features and also in part from its views out to other LCAs in neighbouring landscapes.

11.89 The evaluation of the sensitivity of this LCA within the published assessment ranges between high and low. This assessment has determined the sensitivity of the LCA to solar development as medium based on a five point scale. This is a landscape with mainly local value with features and special qualities of local value, that could be moderately susceptible to the type, scale and location of development proposed.

11.90 None of the viewpoints within the viewpoint analysis are located within this LCA, where the LCA is located directly bordering the proposed development at its closest point. Fieldwork has found that the proposal may be partially visible from some limited areas of the LCA within approximately 0.3-0.4km of the proposal, immediately to its west, but beyond this distance, the low elevation of the LCA and the screening effects of Backhouse Wood and vegetation along East Stour River would screen the proposal entirely from view. The field boundary hedgerow along the northwestern side of Bested Hill would partially screen the proposal from view so that typically within 0.3-0.4km of the site a moderate adverse or lower magnitude of change and no significant adverse effect on landscape character would be expected.

11.91 In cumulative terms the CZTV in **Figure 11.8** indicates that the low elevation of this LCA means that no cumulative visibility with the Sellindge Solar Farm would be available.

11.92 These limited effects would be adverse but not significant, direct, individual (rather than cumulative), long-term, temporary and reversible once the proposed development is decommissioned.

## OTHER LCAS

11.93 The viewpoints have illustrated that beyond the immediate landscape, visibility of the proposal would be partial and intermittent. In terms of neighbouring LCAs within the study area, fieldwork found some limited potential visibility of the proposal would be available from some parts of the Aldington Ridgeline LCA where intervening vegetation allows (and as illustrated by Viewpoints 6 – 8 at distances of between 1.2km and 1.7km from the proposal. The viewpoints illustrate at worst a moderate/slight adverse magnitude of change is predicted initially, which would result in a moderate adverse effect on landscape character (not significant) in this high/ medium sensitivity LCA. Over time mitigation planting would reduce this magnitude of change down to slight adverse (by Year 10) and a moderate/ minor+ adverse effect, which would not be significant. Viewpoint 8 notes the Aldington Ridgeline LCA at this location as the viewpoint sits on the boundary of the AONB, but even with the high sensitivity Lympne Greensand Escarpment LCA within the AONB, the effects on landscape character would be moderate/ minor adverse and not significant.

11.94 Fieldwork was unable to find any clear views of the proposal from Brabourne Farmlands, Brabourne Arable Farmlands, Brabourne Lees Hilly Farmlands, Brabourne Vale or Brabourne Lees Mixed Farmlands, Mersham Farmlands and Sellindge Plateau Farmlands LCAs. The layering effects of mature vegetation in the intervening landscape and the gently undulating landform of these areas means that views of a low elevation development such as

a solar farm would generally not be possible. This has been illustrated by the complete lack of visibility of the operational Sellindge Solar Farm from these LCAs. Therefore, no significant adverse effects on the character of these LCAs would occur as a result of the proposal.

11.95 The ZTV in **Figures 11.2** and **11.3** has also clearly identified that topography would entirely screen any potential visibility of the proposal from Old Romney Shoreland Woodland, Bonnington Wooded Farmlands, Old Romney Shoreline Settlements and Royal Military Marshlands and Romney Marsh: Lympne LCAs.

11.96 Very limited parts of the proposal would potentially be visible from distant higher land within the AONB and it is acknowledged that in landscape character terms these LCAs are of high sensitivity. It is worthwhile noting that the solar panels would be south facing and viewed from the AONB LCAs from the north so that no potential glint from the panels would be possible. In addition, as the backs of the panels are in shade, they would be dark toned, seen against an immediate context of woodland (Backhouse Wood, Partridge Plantation and Round Wood) and from distances of over 4.6km away where their dark tone would blend with the woodland context within which they would be seen. As such, at worst a slight/ negligible adverse magnitude of change and a moderate/ minor+ adverse effect on visual amenity is expected, which would not be significant.

## Effects on Landscape Designations

11.97 There is one national landscape designation within the study area; this is the Kent Downs AONB.

### KENT DOWNS AONB

11.98 At its closest point, this designation is located approximately 1.3km south and 3.3km northeast of the closest part of the proposed development (see **Figure 11.5**). This figure indicates that the proposal would be almost entirely screened from the southern section of the AONB except for a few limited areas of potential visibility along the AONBs northern boundary close to Aldington. Viewpoint 8 illustrates a typical view from this part of the AONB at a distance of 1.7km from the proposed development, showing that in reality extremely limited potential visibility of the proposal would be available and a negligible adverse magnitude of change is expected, resulting in no significant effects on landscape character at this point.

11.99 Further afield, the eastern parts of the AONB are located beyond the 5.0km radius study area boundary and **Figure 11.5** indicates that the proposal is extremely unlikely to be visible from this section of the designation. However, a distinct scarp slope rises in the distance to the north and it is this section of the AONB where some potential visibility of the proposal is expected. From the lower parts of the scarp slope, within approximately 3.3km and 4.4km of the proposal the elevation of the landform is unlikely to allow any visibility of the proposal. However, from the top of the scarp slope, limited visibility of the proposed development would be possible at distances of over 4.6km away where intervening vegetation allows. Viewpoints 9 – 12 illustrate these potential views, seen as part of detailed and panoramic views where the proposal would be a barely discernible element of these views and

a moderate/ minor+ or lower adverse effect on landscape character is anticipated. These effects would not be significant.

11.100 Therefore, the proposed development would have no significant effect on the purpose of the AONB, that is, the ability of the designation "to conserve and enhance the natural beauty".

## LOCAL LANDSCAPE DESIGNATIONS

11.101 Policy ENV3a & 3b is a borough-wide policy. Policy ENV3a (Landscape Character and Design) sets out a series of landscape characteristics that development proposals within the borough must have regard to:

a) Landform, topography and natural patterns of drainage;

b) The pattern and composition of trees and woodlands;

c) The type and composition of wildlife habitats;

d) The pattern and composition of field boundaries;

e) The pattern and distribution of settlements, roads and footpaths;

f) The presence and pattern of historic landscape features;

g) The setting, scale, layout, design and detailing of vernacular buildings and other traditional man made features;

h) Any relevant guidance given in the Landscape Character SPD;

i) Existing features that are important to and contribute to the definition of the local landscape character shall be retained and incorporated into the proposed development; and,

j) Any non-designated, locally-identified, significant landscape features justified in a Parish Plan or equivalent document.

11.102 Given that there would be no removal of landscape fabric elements such as trees or hedgerows and no loss of important, mature, diverse or distinctive landscape components as a result of the proposal, it is considered that the proposed development complies with Policy ENV3a. In addition, the proposed mitigation measures associated with the application seek to reinforce and strengthen the existing landscape fabric and landscape components within the site.

11.103 Policy ENV3b (Landscape Character and Design in the AONBs) broadly seeks to conserve and enhance the natural beauty of the AONBs within the borough in relation to development proposals within these national designations, but also lists a set of circumstances under which proposals affecting the setting of AONBs within the borough would be permitted:

- The location, form, scale, materials and design would conserve and where appropriate enhance or restore the character of the landscape;
- The development would enhance the special qualities, distinctive character and tranquillity of the AONB;
- The development has regard to the relevant AONB management plan and any associated guidance; and
- The development demonstrates particular regard to those characteristics outlined in Policy ENV3a, proportionate to the high landscape significance of the AONB.

11.104 As set out above regarding potential effects on the AONB, the proposal would have no significant effect on the

purpose of the AONB and would be a barely discernible element within a very limited number of views from the AONB.

# VISUAL ASSESSMENT

## Prediction Methodology

11.105 Visual amenity arises from a visual receptor's experience of the visual world around them and the value they place on a particular view or views. It is possible for a development to result in a significant change in the view from a particular location without resulting in a significant effect on the visual amenity of any receptors if, for example, the location is not accessible to receptors or if the view is acknowledged as having limited value. An important differentiation to make at this stage is between visual amenity and residential amenity. Impacts on residential amenity include the assessment of acoustic impacts and impacts on TV reception combined with the impacts on the visual amenity of residents. The impacts on the visual amenity of residents within settlement areas are broadly discussed below.

11.106 For the purposes of this assessment, the predicted changes in views have been examined and significant effects on visual amenity have been identified where the proposed solar farm would result in a significant effect on the primary view(s) at a location or along a route and the view(s) is/are valued and can be appreciated by receptors who are at that location for purposes that include the appreciation of the view(s).

11.107 Significant effects on visual amenity can be perceived as beneficial, adverse or neutral and this depends largely on the perceptions and opinions of the individual receptors and, to a certain extent, on the type of development proposed. The polarisation of public opinion on renewable energy is such that it is difficult to define significant changes in a view as having a definitely beneficial or definitely adverse effect on visual amenity for all members of the public who may experience that view.

11.108 Accordingly, the assessment identifies whether the predicted effects on visual amenity would be significant or not significant and, whilst it is expected that these significant effects would be considered to be adverse, it is important that the broad range of public opinions on such effects is also taken into account in the decision making process.

11.109 This assessment draws on the predicted effects of the development, the viewpoint analysis and fieldwork observations, and discusses the significance of the predicted effects on the visual amenity of receptors at a range of visual receptor locations within the study area. Within this study area these include settlements, individual residential properties, long distance recreational routes, visitor attractions, the local public rights of way network, public highways and passenger rail routes.

## Settlements

11.110 The visual analysis suggests that there could be significant changes in the view for high sensitivity receptors, such as residents in their properties, within approximately 0.75km of the proposal as a result of the introduction of the proposed solar farm into the current baseline landscape. The villages and hamlets of Aldington, Stone Hill, Sellindge, Brabourne Lees,

Mersham, Brabourne, Barrowhill, Lympne, Bonnington, and Aldington Frith are all more than 0.75km from the proposed development. The ZTV indicates no potential visibility of the proposal would be available from Lympne, Bonnington, and Aldington Frith, but does suggest some potential visibility of the proposal may be available from the remaining settlements. However, fieldwork has found that the layering of mature vegetation within the landscape and the additional screening provided by the HS1 and M20 embankments would result in Aldington being the only settlement where visibility of the proposed development would be available for some residents.

11.111 Aldington is split into two settlements; the modern settlement based around Roman Road and the older settlement based around the church and Church Lane. Both are located on high points of land south of the proposed development and Viewpoints 6 - 8 illustrate some of the most open views of the proposal from within and close to Aldington (the older settlement section around Church Lane) at distances of between 1.2km and 1.7km from the proposed solar farm. These views illustrate that the northern portion of the site, beyond the HS1 rail line would be screened from view, with an intervening ridge of land south of Partridge Plantation also screening large parts of the eastern portion of the proposal in combination with mature woodland adjacent to this part of the site. The western portion of the proposal over Bested Hill would be the main visible part of the proposal from some northern parts of Aldington (the older settlement section around Church Lane), mainly from those properties adjacent to and north of Viewpoint 6. As the viewpoint indicates, initially a moderate/ slight magnitude of change and a moderate+ effect on the visual amenity of residents would occur, reducing down over time to a moderate effect as mitigation measures establish and provide some further screening to the proposal. Beyond Viewpoint 6 the landform tends to form a plateau around the church and parts of the village to the south of Viewpoint 6 where built form often obscures the view to the north and in turn any views of the proposed development from within the settlement. Therefore, due to the orientation of properties within the settlement and along Church Lane, only a handful would gain open views to the north, such as is illustrated by Viewpoint 6, where partial visibility of the proposal would be expected and no significant effect on the visual amenity of these residents would occur.

11.112 The more modern Aldington settlement has some areas of mature woodland immediately north of the settlement which limit views out towards the site, as well as the intervening Backhouse Wood which is a significant area of woodland immediately southwest of Bested Hill. As a result, views of the proposal from this part of Aldington are expected to be extremely limited and resulting in a slight/ negligible or lower magnitude of change, which would not result in a significant effect on the visual amenity of these residents.

11.113 In cumulative terms **Figure 11.8** suggests that the operational Sellindge Solar Farm would potentially be visible from parts of Aldington. However, as Viewpoints 6 – 8 all illustrated, this solar farm is entirely screened from view, and so cumulative impacts on residential amenity are not anticipated to occur.

11.114 As noted above, significant effects on visual amenity can be perceived as beneficial, adverse or neutral and this depends largely on the perceptions and opinions of the individual receptors and, to a certain extent, on the type of development proposed. Therefore, these predicted significant effects on visual amenity could be perceived as positive or negative by these residents depending on their personal opinion of renewable energy developments.

## Individual Residential Properties

11.115 There are a limited number of residents within farmsteads and individual properties local to the proposed development who may gain near and open views of the proposal. The three closest residential properties are Partridge Farm (approximately 100m east of the proposal), Bested House (approximately 150m from the proposal) and The Paddock (approximately 150m south of the proposal). Partridge Farm is a landowner property situated on the east side of the farmyard with a series of large agricultural barns located immediately adjacent to the property that would entirely screen any views of the proposal from the property.

### *Bested House*

11.116 Bested House is located adjacent to Church Lane. This two storey property is broadly orientated in a southwest/ northeast position, with a number of single storey outbuildings and a garage (with office space located above) positioned to the north and east of the main property. Parking is located to the north of the main property and a long garden area extends to the southeast all the way to meet Partridge Plantation. A number of structures are located within the garden area including a covered pool, sheds, polytunnels and a summerhouse. A mature hedgerow forms the boundary of the property along the roadside to Church Lane and is over 2m in height and of good quality. Mature vegetation forms the northern boundary of the property and adjacent to this tree planting associated with Sellindge Solar Farm was planted approximately 5 years ago to provide a screen along the southern boundary of the development. A further hedgerow forms the southern boundary to the property but this is gappy in some places and of varying height.

11.117 The property was visited as part of fieldwork and this visit confirmed that ground floor views of the proposed development from the property itself would be limited due to the existing vegetation along the boundaries of the property. The proposal has been set back from Bested House to the south so that even in winter months when the hedgerow along the southern boundary is not in leaf, the proposal would be oblique to the main ground floor views. The main views of the proposal from this property would be from south facing parts of the upper storey, used as bedrooms, a bathroom and office space. A south facing flat roof space is also available which has open views to the southwest, south and southeast and is apparently used by the owners as an open space. From here, open and panoramic views of the proposal would be available, similar to those illustrated by Viewpoint 3, where a significant effect on the visual amenity of these residents would occur.

11.118 Through discussion with these residents, it is proposed to create a new hedgerow within the site boundary along the boundary with Bested House. This hedgerow would

be of good sized plant stock to ensure that the hedgerow would reach maturity within approximately 5 years. This aims to reduce the visibility of the proposal from garden areas due to the gappy nature of the existing garden hedgerow.

11.119 Overall, as set out above, the main visibility of the proposal would be from south facing upper storey areas of the property, with some further partial visibility of the eastern portion of the proposal available from some garden areas where intervening vegetation allows. This garden visibility would initially result in a moderate magnitude of change in winter months, and a major/ moderate effect on visual amenity. However, once the new boundary hedgerow has established, these views would be screened and no effect on the visual amenity of these residents is expected. Ground floor views from the property are much more limited, as described above, and a slight or lower magnitude of change and a moderate effect would be expected initially, reducing down to no effects once the hedgerow has established and would screen any views of the proposal entirely. In cumulative terms, no ground floor or garden views of Sellindge Solar Farm are available due to the screening effects of outbuildings and mature vegetation. However, some limited upper storey views of the existing development are available from some north facing windows where the intervening outbuildings do not intervene, seen in the context of the HS1 rail line and converter station behind. The orientation of the property means that these views are entirely separate to the views of the proposed development.

### *The Paddock*

11.120 The Paddock is a single storey property located approximately 150m south of the western portion of the proposal by Bested Hill. The property is orientated broadly southwest/ northeast with parking located to the immediate east of the property and garden areas located to the west and south. The northern boundary hedgerow of the property curtilage is located almost immediately north of the property and it is this façade of the property that faces towards the proposed development. Two windows and a sunroom are located on this northern façade and the landform rises north from the property and across the site. Nevertheless, the low set position of the property adjacent to a mature hedgerow along its boundary means that views north across the site are limited by the landform and this foreground hedgerow, given that this is a single storey property. Views from some garden areas mainly to the west of the property would also gain some visibility north to Bested Hill and the site, although again this is partly limited by existing vegetation along the northern property boundary. Whilst visibility of the proposal would be limited, it would be relatively proximate and on rising land, where initially a moderate magnitude of change is expected and a significant effect on the visual amenity of these residents would occur. It is important to note that the views available from the property and grounds would not be as open as those illustrated by Viewpoint 2. However, this viewpoint does give a good indication of the mitigation measures that are proposed along the southern boundary of Bested Hill and how this planting would screen views of the proposal in relation to the boundary with The Paddock, which is

visible in the far right of the viewpoint. A new hedgerow is proposed along the southern boundary of Bested Hill, which is located on higher ground than The Paddock, and an area of low density woodland is proposed along the southern boundary of the proposal, as well as a hedgerow adjacent to the southern fence line of the proposal. Over time, these measures would entirely screen the proposal from The Paddock, with this planting anticipated to take approximately 5 – 7 years to begin to effectively screen the proposal. In cumulative terms, Sellindge Solar Farm is entirely screened from view from this property by intervening topography, built form and vegetation.

### *Forehead, Hogben Farm and Forehead Farm*

11.121 A number of other properties are located adjacent to Church Lane, including Forehead (approximately 300m south of the proposal), Hogben Farm (330m south), Forehead Farm and an adjacent property (640m and 680m south, respectively), and each of these properties is expected to gain some limited visibility of the proposal, mainly of sections of the Bested Hill portion of the development. Existing mature vegetation along Church Lane would predominantly screen the other portions of the proposal from view, even in winter months, with any visibility of the Bested Hill section of the proposal viewed over the top of The Paddock and constrained by the woodland at Backhouse Wood which extends towards The Paddock. Many of these views towards Bested Hill are secondary, upper storey views from these properties and would be limited to approximately 15 – 200 in extent, where their main views would remain unaffected by the proposal. Initially a slight magnitude of change and a moderate effect on the visual amenity of these residents is expected, which would not be significant. Over time the mitigation proposals would add further vegetation into these views, similar to that illustrated by Viewpoint 2, which would reduce visibility of the proposal even further. However, as these properties are all two storey properties, some upper storey visibility of the proposal may remain available, although this would be below the level of significant effects. In cumulative terms, the CZTV in **Figure 11.8** indicates that topography entirely screens the Sellindge Solar Farm from view from these properties.

### *Middle Park Farm, Lower Park Farm & adjacent properties*

11.122 A series of four properties are located in the landscape east of Church Lane; Middle Park Farm and a property adjacent to it (approximately 890m and 830m south of the proposal, respectively) and Lower Park Farm and an adjacent property (approximately 450m and 430m south of the proposal, respectively). Fieldwork has found that from each property ground floor views of the proposal would be limited by garden vegetation as well as vegetation in the intervening landscape and that upper storey views would be similar to those illustrated by Viewpoint 4, where the intervening rise of the landform immediately to the south of the eastern portion of the proposal would screen large parts of the proposed solar arrays from view. Initially a slight adverse magnitude of change would be expected for residents at Lower Park Farm and the adjacent property, reducing down to negligible or lower

from upper storey views as a result of mitigation measures at Year 10. These effects would not be significant for these visual receptors. Middle Park Farm and the adjacent property are located at a slightly more elevated location than Lower Park Farm and whilst the views towards the eastern portion of the proposal would be largely the same, some limited visibility northwest towards parts of Bested Hill are available where parts of the western portion of the proposal would be discernible, mainly from upper storey windows of these properties. These views would be similar to, but less elevated and less open than, Viewpoint 6 where a moderate/ slight magnitude of change is predicted. For these residents, a more limited proportion of the proposal would be visible than illustrated by Viewpoint 6, especially from ground floor views which would be interrupted by garden and intervening vegetation, where a slight magnitude of change is predicted initially. Nevertheless, mitigation proposals on the southern edge of Bested Hill would over time add a degree of further screening of the proposal, reducing the magnitude of change to slight/negligible over time. These effects would not be significant for these visual receptors. The CZTV in **Figure 11.8** indicates that topography entirely screens the Sellindge Solar Farm from view from these properties.

### *Apple Barn*

11.123 Apple Barn is a property located northeast of the northern portion of the proposal at a distance of approximately 280m from the proposed development. Intervening between the property and the proposal is the M20, along with its embankment and associated mature vegetation. As a result, no part of the proposal would be visible from this property.

### *Harringe Court & nearby properties*

11.124 Harringe Court and a series of nearby properties are located to the east-southeast of the proposal, at distances ranging between approximately 670m and 770m from the closest part of the proposal. Fieldwork has indicated that parts of the proposal would be visible from these properties where intervening garden vegetation and the tree belt to the west of Harringe Lane allow. These views would be broadly similar to those illustrated by Viewpoint 5 and would be seen in the context of Sellindge Solar Farm, where a moderate/ slight magnitude of change and a moderate+ effect on the visual amenity of these residents would occur, which would not be significant.

### *Woodleas Farm*

11.125 Woodleas Farm is located to the west of Backhouse Wood and within the western edge of the farmyard, with a number of agricultural buildings located on the eastern side of the farmyard. At its closest point, the proposal would be located approximately 770m from this property and on the other side of Backhouse Wood, which would entirely screen the proposal from view from this property.

### *Little Goldwell Farm, Symnell & nearby properties*

11.126 Little Goldwell Farm, Symnell and a series of properties are located along Goldwell Lane approximately 850m – 1.0km to the southwest of the proposal. Backhouse Wood, vegetation in the intervening field boundaries and along Church Lane is expected to entirely screen the proposal from these residential properties.

### *Evegate Manor*

11.127 126. Evegate Manor includes residential properties as well as retail businesses and office space. At its closest point it is located approximately 550m west of the northern section of the site, with Park Wood intervening as a mature woodland on the western boundary of the site. The rail line and its associated planting intervenes to entirely obscure the eastern portion of the site and large parts of the western portion of the site, although the highest parts of Bested Hill may be very partially discernible in the middle distance over intervening woodland and the planting along the rail line. At worst a slight magnitude of change in the view may occur, which would not be significant for these receptors. A hedgerow along the western edge of the northern solar array is proposed and over time this would establish and mature to provide a screen to the views of the nearest solar panels within the northern section of the proposal. This would reduce the overall magnitude of change and resulting effects on visual amenity even further for these residents.

### *Park Wood Cottage*

11.128 This residential property is located approximately 520m west of the northern parcel of the site and adjacent to the rail line. A mature area of woodland is located approximately 170m east of the property, and this woodland is directly adjacent to the boundary of the site. This woodland would almost entirely screen the northern section of the proposal from view, although extremely limited and filtered visibility may be available, mainly in winter months, where a slight/ negligible or lower magnitude of change and a moderate/ minor+ or lower effect on visual amenity would be expected, which would not be significant. All the other parts of the proposal are expected to be screened from view by intervening mature vegetation and the rail line.

### *Visitor Attractions*

11.129 There are a few leisure facilities and visitor attractions within the study area including Aldington Races, a few fishing lakes, Hatch Park deer park and Port Lympne Wildlife Park.

11.130 The ZTV in **Figure 11.6** suggests no potential visibility of the proposal from Hatch Park deer park or Port Lympne Wildlife Park. Aldington Races is a point to point event occurring once a year on Easter Monday. The circular route of the event crosses fields immediately south of the eastern section of the proposal where some visibility of this part of the proposal would be available for both horse riders and spectators, although the focus of the event would be on the races. Nevertheless, at worst the proximate visibility of part of the proposal would initially result in a substantial/ moderate or moderate magnitude of change and a significant effect on these high sensitivity receptors. However, planting proposals of new hedgerows with scattered hedgerow trees along the southern boundary of the eastern part of the proposal would in time provide some screening to parts of these views, similar to the screening illustrated by Viewpoint 4. Depending on the position of the visual receptor around this point to point course, at best the mitigation planting would entirely screen their view of the proposal (as indicated by Viewpoint 4) or at worst, would reduce

the visibility of the solar panels so that a moderate/ slight or slight magnitude of change would be expected at Year 10, resulting in a moderate+ or moderate effect on receptors, which would not be significant. In cumulative terms, fieldwork found that Sellindge Solar Farm is not visible from the point to point course.

11.131 The nearest fishing lake to the site is a private members lake located immediately south of the northern portion of the proposal and west of the converter station. The lake is surrounded by mature woodland but is accessed along a track from Church Lane meaning that visitors would drive in the vicinity of the proposed solar farm to access the lake. Once at the fishing lake they would gain no visibility of the proposal. Therefore, whilst they would gain short-lived and glimpsed views of part of the proposal on their way to the lake, no visibility of the proposal would be available during fishing and so no significant effect on the visual amenity of these receptors would occur.

11.132 In cumulative terms, the Sellindge Solar Farm is shown on the CZTV in **Figure 11.8** as not visible in combination with the proposal from this fishing lake. Therefore, no cumulative effects with the proposed development are expected.

## Long Distance Recreational Routes

11.133 There are four long distance recreational routes within the study area, as shown on **Figure 11.6**, some of which are located at a distance from the proposed development. This figure also illustrates that of these routes, the proposed development would be screened entirely from The Royal Military Canal Towpath and Sustrans Route 2, although some limited potential visibility of the proposal may be available from the Saxon Shore Way and North Downs Way.

11.134 The Saxon Shore Way travels through the south of the study area at a distance of approximately 1.5km from the proposed development at its closest point. As the ZTV indicates, for the vast majority of this route within and close to the study area, the proposed development would be entirely screened. However, for a 1km section of the route in the vicinity of Aldington, potential visibility of the proposal is predicted. Viewpoint 8 is located on this section of the route and illustrates that at a distance of 1.7km away a negligible magnitude of change and a minor+ effect on the visual amenity of these walkers is expected due to the very limited potential visibility of the proposal. The viewpoint also illustrates that whilst the CZTV in **Figure 11.8** may suggest that the operational Sellindge Solar Farm is potentially visible from this section of the route, it would in fact be entirely screened from view. Therefore, no significant effects and no cumulative effects on walkers on this route would occur as a result of the proposed development.

11.135 The North Downs Way is a National Trail located just beyond the study area, although **Figure 11.6** indicates that some potential visibility of the proposal would be available from several sections of this route at distances of over 4.6km away. Fieldwork verified this to be the case, with Viewpoints 9 – 12 all located on this National Trail at distances of between 4.6km and 6.2km from the proposal. Each of the viewpoints illustrates the open, panoramic and

wide ranging views available from the section of the North Downs Way in the vicinity of the study area. The wealth of mature woodland within these views is also important to note as it is these woodland blocks which would recurrently screen large parts of the proposal from view. As the solar panels would be orientated to slope down to the south, it is the rear of the proposal that would be discernible from this long distance route to the north, and as such, the solar farm would be viewed as a dark swathe amongst interlocking woodland blocks and would generally not be definable as a solar development within this context. As a result, a moderate/ minor+ or lower effect on the visual amenity of walkers would be expected along some limited sections of this route, where no significant effect on the visual amenity of these walkers would occur. In cumulative terms, the CZTV in **Figure 11.8** suggests the operational Sellindge Solar Farm is recurrently visible from the North Downs Way. However, Viewpoints 9 – 12 indicate that it is entirely screened by intervening vegetation and so no cumulative effects with the proposal are anticipated for users of this route.

## Local Public Rights of Way

11.136 There is a network of public byways, footpaths and bridleways in the study area, including some footpaths crossing through the site itself and some footpaths just outside of the boundary of the site, as indicated on **Figure 11.7**. It is worthwhile noting that there are no bridleways or byways within 2.5km of the site centre and so the following text focusses on walkers (as horse riders and cyclists can only use bridleways and byways). Currently the footpaths through the site cross through the agricultural fields of the site and are at times bound on one side by woodland or tree belts. The proposal would introduce development to these fields, although a space of at least 10m to 15m width between the site fencing will be allowed for each footpath, with the solar panels set back at least a further 4m or 5m behind the fencing. Whilst this would inevitably alter the current open aspect across agricultural fields to create more enclosed views it is worthwhile noting that the footpaths through the site would not be tightly constrained by the proposed development. Nevertheless, for users of Footpaths AE432 and AE459 through the site, open and proximate visibility of the proposal would be available for the duration of the operational life of the development, where a significant effect on the visual amenity of these walkers would occur, as illustrated by Viewpoint 1.

11.137 Some mitigation planting is proposed along the southern boundary of the site on Bested Hill, near to Footpath AE457, so that over time these hedges and the low density woodland area would grow and establish a screen to views of the proposal. As illustrated by Viewpoint 2, immediately post construction this mitigation planting would be introduced only once construction is complete and so users of Footpath AE457 across the site would gain clear and open views of the proposal, where a significant effect on their visual amenity would occur. However, once these hedgerows and trees have established, they would provide screening of the proposal, even in winter months, where the solar farm would be entirely screened from view with no effects on views occurring for walkers. It is anticipated to take between 5 and 7 years for this vegetation to fully establish.

11.138 Users of some sections of Footpaths AE656 and AE437 would be located in the vicinity of the solar arrays and so would experience a significant effect on their visual amenity as a result of relatively open views of the proposal. However, other sections of these routes travel through woodland and tree belt areas where no visibility of the proposed development would be available. Furthermore, it is worthwhile noting Viewpoint 4 which illustrates a proximate view of the proposal from the junction of two footpaths at a distance of 380m from the proposed development. Here topography plays an effective role in reducing visibility of the proposal, despite its proximity, so that initially a slight magnitude of change and a moderate/ minor+ effect on the visual amenity of walkers is predicted (not significant), reducing down to no effect by Year 10 as a result of the screening effects of new mitigation hedgerows and scattered hedgerow trees.

11.139 Public rights of way in the landscape local to the site vary between enclosed character, partially enclosed and open, depending on the undulating landform and vegetation levels local to the route. As a result, visibility of the proposal would vary from different routes, but also from different sections of the same route. This has been summarised above for some of the closest routes to the proposal, but is also illustrated by a number of the viewpoints. Viewpoints 1, 2, 4, and 6 – 12 are all located on the public rights of way network at distances ranging between 0.02km and 6.2km from the proposal and from sections of the majority of these routes the proposal would be entirely screened, even some of those closest to the site. The viewpoints have sought to illustrate some of the most open and worst case views of the proposal. Of these viewpoints, VPs 1 and 2 are both located within 0.1km of the proposal and indicate a significant effect on the visual amenity of walkers would occur initially. However, the establishment of mitigation measures associated with the application would remove impacts at Viewpoint 2 entirely by Year 10. The Viewpoint Analysis has suggested that approximately 0.35km from the site would be the limit of significant effects on the visual amenity of walkers initially post construction and this is illustrated by Viewpoints 4 and 6 – 12 which, at distances of over 0.38km from the site, all suggest a moderate/ slight or lower magnitude of change and a moderate or lower overall effect on visual amenity, which would not be significant. It is worthwhile noting that these are individual points on these rights of way, many of which then travel further away from the proposal and that mitigation measures would reduce the visibility of the proposal even further over time from a number of these routes.

11.140 In cumulative terms fieldwork found that the operational Sellindge Solar Farm is visible from very few of the public right of way routes local to the site due to its position nestled adjacent to the HS1 rail line and surrounding woodland. None of the viewpoints from public rights of way show any visibility of the development. Furthermore, fieldwork noted that Footpath AE656 was not accessible in the vicinity of the solar farm so that proximate views of the development were unavailable. No significant cumulative effects on users of the rights of way network is expected.

*Public Highways*

11.141 Public highways in the 5.0km radius study area include the M20, A20, B2067, and a network of minor roads The viewpoint analysis has predicted that, for medium sensitivity receptors, such as motorists and their passengers, significant changes in the view are unlikely to occur more than 0.2km from the proposed development. The M20 motorway and Church Lane are the only two roads within 0.2km of the proposed development. It is also useful to note that the A20 is located to the north of the M20 and so fieldwork has found that the embankments and mature vegetation associated with the motorway would entirely screen the proposal from view.

11.142 Fieldwork has also found that in summer months the mature vegetation alongside the M20 would screen the proximate views of the proposal that may be available from the M20 in the vicinity of the site. However, in winter months some filtered views through the roadside tree belts may be available in the vicinity of the converter station where split second glimpsed views of the northern portion of the proposal and the western portion over Bested Hill may be available to the side of the direction of travel for those travelling towards Ashford. Nevertheless, this extremely short-lived visibility in the vicinity of views of the converter station and nearby pylons would not result in a significant effect on the visual amenity of these motorists whose main focus would be on the road itself. It is also important to note that no cumulative visibility with Sellindge Solar Farm would be available due to its position behind the rail embankment and converter station.

11.143 Church Lane crosses between the western and eastern portions of the site, with a part of the western portion of the proposal located directly adjacent to the road. Roadside hedgerows line much of the length of Church Lane, although a section of hedgerow has been removed close to the point that the route crosses under the HS1 rail line, as the road turns sharply. It is assumed that this section of hedgerow has been removed for safety purposes so as to be able to see oncoming traffic approaching (this reduced height would be maintained through the lifetime of the proposal). Therefore, a small section of the proposal would be openly visible in the field to the west (left) of Church Lane where the hedgerows have been removed, and also over roadside hedgerows within the Bested Hill field. South of Bested House the proposal is located to the east of Church Lane, approximately 150m set back from the roadside and would be partially visible over the roadside hedgerows here. This visibility along a 1km stretch of Church Lane would initially see the proposal in the foreground and middle distance, where a significant effect on the visual amenity of these road users would occur. Various mitigation measures are proposed as part of this application including improving some of the existing hedgerows along Church Lane which are gappy and thin in places, but also increasing their height to approximately 1.5m to match other hedgerows along this road. In addition, improvements to the hedgerow along the eastern boundary of the Bested Hill field are proposed, and new hedgerows are proposed along some parts of the proposal visible from Church Lane. As a result, as illustrated by the mitigation montages on Viewpoint 3 on Church

Lane, these measures would lessen the visibility of the proposal from this road over time. Nevertheless, some proximate visibility of the proposal would still remain available, mainly in the vicinity of the section of the route close to the HS1 rail line, where a significant effect on the visual amenity of motorists would occur. Sellindge Solar Farm is also located close to this route and close to the rail line although it is also set back from the roadside and roadside hedgerows screen the vast majority of any visibility of the solar farm from the road. A gated entrance does allow a split second view of the existing solar farm but this is located on a bend where drivers are generally focussed on the road ahead and no significant cumulative effects with the proposed solar farm are expected to occur.

11.144 A network of local roads service the study area, although none are particularly proximate to the site except for Church Lane. Viewpoints 5 and 8 are located on the local road network at distances of 0.77km and 1.7km from the proposal, respectively. Each would gain a very partial view of the proposal from the road. As a result, neither of the viewpoints indicates a significant effect on the visual amenity of motorists or their passengers.

11.145 In cumulative terms, roadside hedgerows or built form are a characteristic feature of most roads within the study area and so views out from local roads are often not available. As a result, no significant cumulative effects for motorists are anticipated.

### *Passenger Rail Routes*

11.146 HS1 and local rail services run centrally through the study area and divide the northern portion of the proposal from the western and eastern portions. Much of the route is on an embankment through the study area, with several areas of mature vegetation associated with the route. Nevertheless, especially in winter, some limited visibility of the proposal, mainly to the south of the rail line may be available. Given the speed of travel on this route, these would be extremely short-lived views, seen in association with pylons, Sellindge Solar Farm and also the nearby converter station, where at worst a moderate/ minor effect on the visual amenity of passengers would occur, resulting in no significant effect. From the perspective of rail passengers, the visibility of the operational solar farm in conjunction with the proposed solar farm would be concurrent and would seem linked; as an extension of the existing panels.

## CONCLUSIONS

11.147 This assessment has examined the likely effects of the proposed solar farm on the landscape and visual amenity of the site and surrounding area, in conjunction with the operational Sellindge Solar Farm within the study area. Consideration of other existing large scale development within the baseline of the study area has also been given.

11.148 Through careful site design the significant effects of this proposal would be limited to:

- The character of the landscape of the site and surrounding area up to approximately 0.3 – 0.4km from the site. This is contained to parts of the Evegate Mixed Farmland LCA and the East Stour Valley LCA. Over time mitigation measures associated with the application would limit these significant effects even further.

- The visual amenity of some residents within a few individual residential properties local to the proposal. Mitigation planting measures have been proposed, where feasible, to further screen the proposal and once established these measures would begin to add further filtering and screening of views of the solar panels from these properties.
- The visual amenity of users of a few sections of public rights of way local to the site (mainly the footpaths through and adjacent to the site itself). Some mitigation planting measures have been proposed to further screen the proposal and once established these measures would begin to add further filtering and screening of views of the solar panels.
- The visual amenity of users of a limited section of Church Lane immediately adjacent to the site. Over time mitigation measures associated with the application would reduce these significant effects further.

11.149 There would not be any significant adverse effects on landscape fabric, landscape designations or any of the other LCAs located within the 5.0km radius study area. There would be no significant effects on the visual amenity of the vast majority of residential receptors within the study area, or on the visual amenity of visitors to any of the visitor attractions, long distance footpath users or rail passengers within the study area.

11.150 Furthermore, over time the proposed mitigation measures within the site would establish and begin to provide increased filtering and screening of views of the proposal within the area local to the site, strengthening the local landscape fabric in the locality.

11.151 Therefore, it is considered that the significant effects on landscape and visual amenity as a result of the proposal would be very limited in this location.

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# INTRODUCTION

12.1 This chapter presents the findings of the assessment of likely significant effects of the construction, decommissioning and operational phases of the scheme in terms of archaeology and cultural heritage. It incorporates the results of a historic environment desk-based assessment (HEDBA) contained within **Appendix 12.1** and the results of a geophysical survey of the site (**Appendix 12.2**). This chapter has been prepared by Orion Heritage Ltd. In accordance with Regulation 18(5) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, as amended,.

12.2 The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains, to late 20th century industrial and military structures. It can be broadly divided into the following two categories:

- Archaeology - which comprises Scheduled Monument (SMs) and non-designated archaeological heritage assets; and
- Built Heritage - which comprises listed buildings (all grades), non-designated buildings of heritage interest, registered parks and gardens (all grades), conservation areas, historic battlefields and World Heritage Sites (WHS).

12.3 For reference, the site has been split into 6 areas as identified on **Figure 12.1**.

# POLICY CONTEXT, LEGISLATION, GUIDANCE AND STANDARDS

## Legislation

12.4 The Ancient Monuments & Archaeological Areas Act 1979 (as amended) protects the fabric of Scheduled Monuments but does not afford statutory protection to their settings.

12.5 The Planning (Listed Building and Conservation Areas) Act 1990 sets out broad policies and obligations relevant to the protection of listed buildings and conservation areas and their settings.

Section 66(1) states:

*"In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses".*

12.6 Section 69 of the Act requires local authorities to define as conservation areas any 'areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance' and Section 72 gives local authorities a general duty to pay special attention 'to the desirability of preserving or enhancing the character or appearance of that area' in exercising their planning functions.

## National Planning Policy Framework (NPPF) & Planning Practice Guidance (PPG)

12.7 Government policy in relation to the historic environment is outlined in Section 16 of the National Planning Policy Framework (NPPF) (2021), entitled Conserving and Enhancing the Historic Environment. This provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:

- delivery of sustainable development;
- understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition of the contribution that heritage assets make to our knowledge and understanding of the past.

12.8 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term.

12.9 Paragraph 194 states that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to understand the potential impact of the proposal upon the significance of that asset.

12.10 Paragraph 195 states that local planning authorities should take account of the particular significance of any heritage asset which may be affected by a proposal, and take this into account with considering any impact to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.

12.11 Paragraph 198 states that decisions regarding the removal of alteration of historic statues, plaques, memorials or monuments should have regard to the importance of their retention in situ and, where appropriate, explain their historic and social context rather than removal.

12.12 The key test in NPPF Paragraphs 199-202 is whether a proposed development will result in substantial harm or less than substantial harm to the significance of a designated heritage asset. Paragraph 200 states that;

*"Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:*

*a) Grade II listed buildings, or grade II registered parks or gardens, should be exceptional;*

*b) Assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional."*

12.13 Where harm to a designated heritage asset equates to less than substantial harm, paragraph 202 states:

*"Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use."*

12.14 Paragraph 203 requires the decision-maker to take into account the effect on the significance of non-designated heritage assets and to take a balanced judgement having regard to the scale of harm or loss and the significance of the asset(s) potentially affected.

12.15 **Heritage Assets** are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).

12.16 **Archaeological Interest** is defined as: a heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point.

12.17 **Designated Heritage Assets** comprise of: World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Registered Park and Gardens, Registered Battlefields and Conservation Areas designated under the relevant legislation.

12.18 **Significance** is defined as: the value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

12.19 **Setting** is defined as: the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

12.20 The NPPF is supported by the PPG (July 2019). Paragraph 18a-001 (001 Reference ID: 18a-001-20190723) makes a clear statement that any decisions relating to listed buildings and their settings and conservation areas must address the statutory considerations of the Planning (Listed Buildings and Conservation Areas) Act 1990 as well as satisfying the relevant policies within the development plan and the National Planning Policy Framework.

12.21 In relation to the historic environment, paragraph 002 (002 Reference ID: 18a-002-20190723) states that:

*"Where changes are proposed, the National Planning Policy Framework sets out a clear framework for both plan-making and decision-making in respect of applications for planning permission*

*and listed building consent to ensure that heritage assets are conserved, and where appropriate enhanced, in a manner that is consistent with their significance and thereby achieving sustainable development. Heritage assets are either designated heritage assets or non-designated heritage assets."*

12.22 Paragraph 18a-013 (Paragraph: 013 Reference ID: 18a-013-20190723) outlines that although the extent and importance of setting is often expressed in visual terms, it can also be influenced by other factors such as noise, dust and vibration. Historic relationships between places can also be an important factor stressing ties between places that may have limited or no intervisibility with each other. This may be historic as well as aesthetic connections that contribute or enhance the significance of one or more of the heritage assets. Paragraph 18a-013 concludes:

*"The contribution that setting makes to the significance of the heritage asset does not depend on there being public rights or an ability to access or experience that setting. This will vary over time and according to circumstance. When assessing any application for development which may affect the setting of a heritage asset, local planning authorities may need to consider the implications of cumulative change. They may also need to consider the fact that developments which materially detract from the asset's significance may also damage its economic viability now, or in the future, thereby threatening its on-going conservation."*

12.23 The key test in NPPF paragraphs 199-202 is whether a proposed development will result in substantial harm or less than substantial harm to a designated asset. However, substantial harm is not defined in the NPPF. Paragraph 18a-017 (Paragraph: 018 Reference ID: 18a-018-20190723) of the PPG provides additional guidance on substantial harm. It states:

*"What matters in assessing whether a proposal might cause harm is the impact on the significance of the heritage asset. As the National Planning Policy Framework makes clear, significance derives not only from a heritage asset's physical presence, but also from its setting.*

*Proposed development affecting a heritage asset may have no impact on its significance or may enhance its significance and therefore cause no harm to the heritage asset. Where potential harm to designated heritage assets is identified, it needs to be categorised as either less than substantial harm or substantial harm (which includes total loss) in order to identify which policies in the National Planning Policy Framework (paragraphs 194-196) apply.*

*Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated.*

*Whether a proposal causes substantial harm will be a judgment for the decision-maker, having regard to the circumstances of the case and the policy in the National Planning Policy Framework. In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest.*

*It is the degree of harm to the asset's significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset or from development within its setting.*

*While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later additions to historic buildings where those additions are inappropriate and harm the buildings' significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm, depending on the nature of their impact on the asset and its setting."*

12.24 Paragraph 202 of the NPPF outlines that where a proposed development results in less than substantial harm to the significance of a heritage asset, the harm arising should be weighed against the public benefits accruing from the proposed development. Paragraph 18a-020 of the PPG (Paragraph: 020 Reference ID: 18a-020-20190723) outlines what is meant by public benefits:

*"Public benefits may follow from many developments and could be anything that delivers economic, social or environmental objectives as described in the National Planning Policy Framework (paragraph 8). Public benefits should flow from the proposed development. They should be of a nature or scale to be of benefit to the public at large and not just be a private benefit. However, benefits do not always have to be visible or accessible to the public in order to be genuine public benefits, for example, works to a listed private dwelling which secure its future as a designated heritage asset could be a public benefit.*

*Examples of heritage benefits may include:*

- *Sustaining or enhancing the significance of a heritage asset and the contribution of its setting;*
- *Reducing or removing risks to a heritage asset; and*
- *Securing the optimum viable use of a heritage asset in support of its long term conservation."*

12.25 In considering any planning application for development, the planning authority will be mindful of the tests set out in Sections 66 and 72 of the Planning (Listed Buildings and Conservation Areas) Act 1990 and the framework set by government policy, in this instance the NPPF, by current Development Plan Policy and by other material considerations.

## Local Planning Policy

12.26 The Ashford Borough Council Local Plan 2030, adopted in 2019, contains the following policies relevant to this assessment:

**Policy ENV13 – Conservation and Enhancement of Heritage Assets**

*Proposals which preserve or enhance the heritage assets of the Borough, sustaining and enhancing their significance and the contribution they make to local character and distinctiveness, will be supported. Proposals that make sensitive use of heritage assets through regeneration, particularly where these bring redundant or under-used buildings and areas into appropriate and viable use consistent with their conservation, will be encouraged.*

*Development will not be permitted where it will cause loss or substantial harm to the significance of heritage assets or their settings unless it can be demonstrated that substantial public benefits will be delivered that outweigh the harm or loss.*

*Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, or where a non-designated heritage asset is likely to be impacted, harm will be weighed against the public benefits of the proposal, including securing the optimum viable use of the heritage asset.*

*All applications with potential to affect a heritage asset or its setting should be supported by a description of the asset's historic, architectural or archaeological significance with an appropriate level of detail relating to the asset and the likely impact of the proposals on its significance.*

### Policy ENV14 – Conservation Areas

*Development or redevelopment within Conservation Areas will be permitted provided such proposals preserve or enhance the character and appearance of the Area and its setting.*

*Proposals should fulfil each of the following:*

*a) The scale and detailed design of all new development and alterations should respect the historical and architectural character, proportion and massing, including roofscapes, of the area, the relationship between buildings, the spaces between them and with their setting;*

*b) The materials proposed should be appropriate to the locality and complement those of the existing buildings;*

*c) Buildings and streets of townscape character, trees, open spaces, walls, fences or any other features should be retained where they contribute positively to the character and appearance of the area;*

*d) The development should not generate levels of traffic, parking or other environmental problems which would result in substantial harm to the character, appearance or significance of the area;*

*e) The use should be appropriate to and compatible with the character, appearance and historic function of the area; and,*

*f) The development would not prejudice important views into or out of the conservation area.*

### Policy ENV15 – Archaeology

*The archaeological and historic integrity of Scheduled Monuments and other important archaeological sites, together with their settings, will be protected and where possible enhanced. Development which would adversely affect such designated heritage assets will be assessed in line with Policy ENV13.*

*In addition, where the assessment outlined in Policy ENV13 reveals that important or potentially significant archaeological heritage assets may exist, developers will be required to arrange for field evaluations to be carried out in advance of the determination of planning applications.*

*Where the case for development affecting a site of archaeological interest is accepted, any archaeological remains should be preserved in situ as the preferred approach. Where this is not possible or justified, appropriate provision for preservation by record may be an acceptable alternative dependent upon their significance. Any*

*archaeological recording should be by an approved archaeological body and take place in accordance with a specification and programme of work to be submitted to and approved by the Borough Council in advance of development commencing.*

## Other Guidance

### *Historic Environment Good Practice Advice In Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015)*

12.27 The purpose of this document is to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and PPG. It outlines a six-stage process to the assembly and analysis of relevant information relating to heritage assets potentially affected by a proposed development:

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;
- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change; and
- Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

### *Historic Environment Good Practice Advice In Planning Note 3: The Setting of Heritage Assets (Historic England 2017)*

12.28 Historic England's Historic Environment Good Practice Advice in Planning Note 3 provides guidance on the management of change within the setting of heritage assets.

12.29 The document restates the definition of setting as outlined in Annex 2 of the NPPF. Setting is also described as being a separate term to curtilage, character and context; while it is largely a visual term, setting, and thus the way in which an asset is experienced, can also be affected by noise, vibration, odour and other factors. The document makes it clear that setting is not a heritage asset, nor is it a heritage designation, though land within a setting may itself be designated. Its importance lies in what the setting contributes to the significance of a heritage asset.

12.30 The Good Practice Advice Note sets out a five-staged process for assessing the implications of proposed developments on setting:

- Identification of heritage assets which are likely to be affected by proposals;
- Assessment of whether and what contribution the setting makes to the significance of a heritage asset;
- Assessing the effects of proposed development on the significance of a heritage asset;

- Maximising enhancement and reduction of harm on the setting of heritage assets; and
- Making and documenting the decision and monitoring outcomes.

12.31 The guidance reiterates the NPPF in stating that where developments affecting the setting of heritage assets results in a level of harm to significance, this harm, whether substantial or less then substantial, should be weighed against the public benefits of the scheme.

12.32 The procedures and processes outlined in Commercial Renewable Energy Development and the Historic Environment Historic England Advice Note 15 (Historic England 2021), have been followed in this assessment.

## Methodology

12.33 The assessment process involves the production of a heritage desk-based assessment (DBA) contained within **Appendix 12.1** and a geophysical survey contained in **Appendix 12.2**. The desk based assessment identifies known and potential cultural heritage receptors that may be affected by the proposed development. Heritage receptors are either designated (Scheduled Monuments, Conservation Areas, Listed Buildings, Registered Parks and Gardens or Registered Battlefields) which are identified on the National Heritage List for England (NHLE) or areas of importance identified in local planning policy, or non-designated heritage assets.

12.34 The geophysical survey was undertaken in accordance with the CIfA's Standards and Guidelines for archaeological geophysical survey (CIFA 2014). Archaeological geophysical survey uses non-intrusive and non-destructive techniques to determine the presence or absence of anomalies likely to be caused by archaeological features, structures or deposits, as far as reasonably possible, within a specified area or site on land, in the inter-tidal zone or underwater. Geophysical survey determines the presence of anomalies of archaeological potential through measurement of one or more physical properties of the subsurface.

12.35 As defined in the PPG, non-designated heritage assets are, "buildings, monuments, sites, places, areas or landscapes identified by plan-making bodies as having a degree of heritage significance meriting consideration in planning decisions but which do not meet the criteria for designated heritage assets."

12.36 Non-designated heritage assets can comprise known heritage receptors, for example finds or features recorded in the Historic Environment Record or locally listed buildings recorded in local planning policy. The potential for previously unrecorded heritage assets is also considered, for example, previously unrecorded archaeological remains or previously unassessed built heritage asset.

12.37 Not all features recorded on Historic Environment Records are non-designated assets. As outlined in Managing Significance in Decision-Taking in the Historic Environment, Historic Environment Records includes "assets that are known to have been or destroyed or known only from antiquarian sources"; they are no longer physically present. Similarly, there is potential for non-designated heritage assets that are not recorded on the Historic Environment Record

or recorded in local planning policy to be present. Such remains may include previously unrecorded sub-surface remains, landscape features or buildings identified through an appraisal of sources or identification through a site visit.

12.38 PPG states that there are two categories of non-designated sites of archaeological interest:

*"(1) Those that are demonstrably of equivalent significance to scheduled monuments and are therefore considered subject to the same policies as those for designated heritage assets...*

*(2) Other non-designated heritage assets of archaeological interest"*

12.39 The value / significance of a non-designated heritage asset may change following assessment and evaluation and move from the second to the first category. For example, a trial trench evaluation identifies previously unrecorded archaeological remains of national significance (archaeological remains which score highly with reference to the DCMS's principles of selection for scheduled monuments (Paragraph 12.3.10 and 12.3.11; DCMS 2013).

12.40 The PPG states that applicants should, if required, submit an appropriate DBA and, where necessary, a field evaluation.

## *Study Areas*

12.41 The following study areas have been chosen for the cultural heritage impact assessment. There are no strict parameters for the setting of study areas. This has been defined based on professional judgement and experience, of potential significant direct and indirect effects likely to arise from the scheme:

- Archaeological study area: a 1km buffer from the application site boundary has been used to identify designated or non-designated archaeological assets which might be directly or indirectly impacted by the scheme and inform the potential for previously unrecorded archaeological remains.
- Settings assessment study area: a 1km buffer from the application site boundary has been used to identify designated or non-designated built heritage assets which might be indirectly impacted by the scheme. An assessment of designated heritage assets within a wider 2.5km area has been undertaken and no further receptors were identified.

12.42 The distribution of all relevant designated heritage assets are shown in **Figure 12.5**. This figure incorporates a 1km buffer from the site boundary identifying the study area. The HEDBA (**Appendix 12.1**) discusses the impacts on designated heritage assets located within the wider setting of the application site and demonstrates why these have been scoped out of consideration within this ES Chapter.

## *Baseline Data Collection*

12.43 A historic environment desk-based assessment is included as **Appendix 12.1** to this chapter. The desk-based assessment has been undertaken in line with the Chartered Institute for Archaeologists (CIfA's) Standards and Guidance for Historic Environment Desk Based Assessments (2017) and uses the following data sources in the compilation of the baseline data:

- Kent Historic Environment Record (HER) Data;

- LIDAR data held by the Environment Agency, and analysed using RVT software;
- Aerial imagery held by Google Earth and Bing Maps;
- The National Heritage List for England (NHLE) held by Historic England;
- Historic England Archive; Pastscape;
- Local studies and record office research;
- Review of historic mapping; and
- Site visit.

12.44 The application site has been subject to a geophysical survey (**Appendix 12.2**) in accordance with Chartered Institute for Archaeologists (CIfA's) Standard and Guidance for Geophysical Survey (2020).

## *Assessment Criteria*

### ASSESSING HERITAGE SIGNIFICANCE AND SENSITIVITY

12.45 The significance of a heritage asset is defined in the NPPF as "The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting." In the case of many heritage assets their importance has already been established through the designation (i.e. scheduling, listing and register) processes applied by Historic England (HistE).

12.46 In order to assess the heritage significance of previously unrecorded or non-designated heritage assets, the criteria used by the Department of Culture, Media, and Sports publication, 'Principles for Selection of Listed (DCMS 2010) and the Scheduled Monuments Policy Statements published by the same body (DCMS 2013), are used. The criteria for establishing significance of heritage assets for this assessment are presented in **Table 12.1** below.

Table 12.1 - *Determining the heritage significance of a Heritage Asset*

| Heritage Significance | Description |
|---|---|
| International | • Archaeological sites or monuments of international importance, including World Heritage Sites.<br>• Structures and buildings inscribed as of universal importance as World Heritage Sites.<br>• Other buildings or structures of recognised international importance. |
| National | • Scheduled Monuments and remains of comparable quality, assessed with reference to the DCMS's principles of selection for scheduled monuments (Paragraph 12.3.10 and 12.3.11; DCMS 2013).<br>• Listed Buildings.<br>• Non-designated built assets of national importance, assessed with reference to the Secretary of State's published Principles of Selection for Listing Buildings (DCMS 2010). |
| Regional/ County | • Archaeological sites and remains which, while not of national importance, score well against most of the DCMS's principles of selection for scheduled monuments (DCMS 2013).<br>• Conservation Areas. |
| Local | • Archaeological sites and remains which, while not of national importance, score well against most of the DCMS's principles of selection for scheduled monuments (paragraph 12.3.10 and 12.3.11; DCMS 2013)<br>• Historic buildings on a 'local list'. Non-designated built assets of local significance. |
| None | • Areas in which investigative techniques have produced negligible or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated. |

12.47 Significance has been assigned to effects relative to the heritage significance, its sensitivity to change and the magnitude of impact in accordance with best practice.

12.48 The sensitivity of a heritage receptor / resource is determined by evaluating a receptor's susceptibility to change and heritage significance. For direct physical impacts to below ground archaeological remains or built heritage assets, this is assessed in terms of potential reduction of heritage significance through the physical impact of a monument or building.

12.49 For indirect impacts to the setting of heritage assets, the heritage significance of an asset is not the same as its sensitivity to change (Historic England 2019). Thus, in determining effects upon the setting of assets by a proposed development, both heritage significance and sensitivity to changes to setting need to be considered. Factors considered when assessing sensitivity to indirect change include, but are not limited to, heritage significance (**Table 12.1**), condition, type and period of asset and landscape positioning. The assessment of settings impact

follows the methodology set out in the Historic Environment Good Practice Advice in Planning Note 3, The Setting of Heritage Assets. The heritage assets which require assessment have been selected with reference to the National Heritage List for England (NHLE) database held by Historic England, as well as information held by the Local Planning Authority (LPA) on Conservation Areas.

12.50 The criteria for assessing sensitivity to change is set out in **Table 12.2** below.

Table 12.2 - *Sensitivity of Heritage Receptor / Resource*

| Sensitivity | Receptor |
|---|---|
| High | The receptor/resource has little ability to absorb change without fundamentally altering its present international or national heritage significance; or<br>The Application Site makes a high contribution to the setting / heritage significance of a designated heritage asset. |
| Moderate | The receptor/resource has moderate capacity to absorb change without significantly altering its present regional heritage significance; or<br>The Application Site makes a moderate contribution to the setting / heritage significance of a designated heritage asset. |
| Low | The receptor/resource is tolerant of change without detriment to its heritage significance, is of low or local heritage significance; or<br>The Application Site makes a minor contribution to the setting of a designated heritage asset. |
| Negligible / Neutral | Negligible perceptible change to the significance of a building, archaeological site, or Conservation Area due to a change in setting. |

12.51 Not all designated heritage assets will require full assessment for impacts on an individual basis. Where a designated heritage asset has been excluded, a clear justification is provided, for example if the asset is sufficiently far away, and well screened from the application site. Also, not all assets require the same level of assessment. As set out in paragraph 194 of the NPPF, the level of detail required is that which is sufficient to inform the nature and degree of effect of development within the application site on the significance of the heritage asset in question.

## *Assessing Magnitude of Impact/ Change*

12.52 The nature and likelihood of the impacts of the scheme on archaeological and heritage features is assessed against clearly defined criteria.

12.53 1Archaeological and built heritage resources are susceptible to a range of direct impacts during site preparation as well as construction related activities, including:

- Site clearance/site preparation activities that disturb archaeological remains;
- Demolition or alteration of designated and non-designated built cultural heritage assets;
- Excavation that extends into archaeological sequences, for example foundations, or re-landscaping (for example attenuation ponds) resulting in the removal of the resource;
- Piling activities resulting in disturbance and fragmentation of the archaeological resource; and
- Dewatering activities resulting in desiccation of waterlogged remains and deposits.

12.54 Any such impacts are discussed, and value/sensitivity criteria applied. The significance of effects has been assessed using the magnitude of impact/change criteria set out in **Table 12.3**. Magnitude of impact/change are both used in this assessment; magnitude of impact may be more accurate when assessing physical impact to archaeological remains or a built heritage asset, whilst magnitude of change may be more appropriate when considering changes to the setting of heritage assets.

12.55 In terms of indirect impacts on heritage, the impacts of the development include the impact on the setting of a Listed Building / Conservation Areas / Scheduled Monument / non-designated heritage asset.

12.56 The magnitude of impact/change is a product of the extent of development impact on an asset or its setting. The magnitude of change is rated as Major, Moderate, Minor, Negligible and Minor. Change can be direct or indirect, adverse or beneficial. The criteria for assessing the magnitude of change are set out in **Table 12.3**.

Table 12.3 - *Magnitude of Impact/Change*

| Magnitude of Impact/ Change | Direct Impact | Indirect Change |
|---|---|---|
| Major Adverse | Demolition of built heritage assets or demolition within a Conservation Area.<br>Complete removal of an archaeological site. | Substantially harmful change to the significance of a designated heritage asset through change in setting. |
| Moderate Adverse | Harmful alteration (but not demolition) of a built heritage asset or alterations to a building in a Conservation Area.<br>Removal of a major part of an archaeological site and loss of research potential / significance. | Less than substantial harm to the significance of a designated heritage asset due to a change in setting.<br>Partial transformation of the significance of an archaeological site e.g. the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility, or appreciation of an archaeological site. |
| Minor Adverse | Alterations to a built heritage asset or Conservation Area resulting in minor harm. Removal of an archaeological site where a minor part of its total area is removed but the site retains significant future research potential. | Minor harm to the significance of an archaeological monument or built heritage asset or Conservation Area due to a change in setting. |
| Negligible | Negligible impact from changes in use, amenity, or access.<br>Negligible direct impact to the built heritage asset or Conservation Area. | Negligible perceptible change to the significance of a building, archaeological site, or Conservation Area due to a change in setting. |
| Minor Beneficial | Alterations to a built heritage asset or Conservation Area resulting in minor beneficial impacts.<br>Land use change resulting in improved conditions for the protection of archaeological remains. | Minor enhancement to the setting of a built heritage asset or Conservation Area.<br>Decrease in visual or noise intrusion on the setting of a building, archaeological site, or monument. |

| Magnitude of Impact/ Change | Direct Impact | Indirect Change |
|---|---|---|
| Moderate Beneficial | Alterations to a built heritage asset or Conservation Area resulting in moderate beneficial impacts.<br><br>Land use change resulting in improved conditions for the protection of archaeological remains plus interpretation measures (heritage trails, etc.) | Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site, or monument.<br><br>Improvement of the wider landscape setting of a built heritage asset, Conservation Area, archaeological site, or monument. Improvement of the cultural heritage amenity, access or use of a built heritage asset, archaeological site or monument.<br><br>Moderate enhancement to the setting of the built heritage asset and Conservation Area. |
| Major Beneficial | Arrest of physical damage or decay to a built heritage asset or structure.<br><br>Alteration to a built heritage asset or Conservation Area resulting in significant beneficial impact. | Significant enhancement to the setting of a built heritage asset, Conservation Area or archaeological site, its cultural heritage amenity and access or use. |

12.57 It is acknowledged that **Table 12.3** above primarily deals with visual factors affecting setting. Whilst the importance of visual elements of settings, e.g. views, intervisibility, prominence etc., are clear, it is also acknowledged that there are other non-visual factors which could potentially result in impacts to setting. Such factors could be other sensory factors, e.g. noise or odour, or could be associative. In coming to a conclusion about magnitude of change upon the significance of an asset, this assessment makes reference to traffic, noise, air quality, and townscape and visual assessments, reported in the ES, as appropriate.

## *Significance of Effect*

12.58 The significance of the impact of the proposed development on archaeological and heritage assets is determined by the heritage significance of the asset and the magnitude of impact to the asset.

12.59 The judgement of the significance of effects takes into consideration the impact on the heritage asset's heritage significance (as defined in Annex 2 of the NPPF). As part of this assessment, the impact on the contribution that the setting of a heritage asset makes to its significance is also considered. The nature of the contribution that the setting of an asset makes to its heritage significance varies from asset to asset (i.e. the setting of some assets have a greater contribution to the significance and vice versa). Consequently, where there are effects from a development on the setting of an asset that has only a limited contribution to the significance of that asset, the effect on the significance of the asset itself may be very limited or even potentially non-existent. Where a heritage asset has a setting that has a large contribution to the significance of that asset, effects on the significance of the asset itself will be greater. This is undertaken in line with Historic England guidance on the assessment of setting (Historic England 2017) and using professional judgement.

12.60 **Table 12.4** below presents a matrix that demonstrates how the significance of effect is established:

Table 12.4 - *Evaluation of Significance of Effect*

| | | **Magnitude of Impact/Change** | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible / Neutral** |
| **Sensitivity of Heritage Asset** | High | Major | Major | Moderate - Minor | Negligible |
| | Moderate | Major | Moderate | Minor | Negligible |
| | Low | Moderate | Minor | Minor - Negligible | Negligible |
| | Negligible | Negligible | Negligible | Negligible | Negligible |

12.61 'Major' and 'Moderate' levels of effect are 'significant' in the context of the EIA Regulations. 'Minor' and 'Negligible' are not significant in the context of the EIA Regulations. Professional judgement is also used in considering the significance of effects.

### *Limitations*

12.62 This assessment is based upon data obtained from publicly accessible archives as described in paragraph 12.5.12. Data was received from Kent Historic Environment Record in April 2021 and downloaded from the HistE website in April 2021.

## BASELINE CONDITIONS

### Archaeology

12.63 The locations of archaeological assets considered in the assessment are presented in **Figures 12.1**, **12.2** and **12.4**. The locations of designated and built heritage assets are presented in **Figure 12.5**.

12.64 The historic environment desk-based assessment (**Appendix 12.1**) outlines the archaeological and historical background for the study area. In brief summary, the application site is located within the East Stour River valley and is considered to have a moderate to high potential to contain archaeological finds and features from all prehistoric periods, except for the Palaeolithic, for which a low to moderate potential is considered. There is general theoretic potential for Iron Age to Romano-British occupation evidence based on proximity to known occupation sites and settlement evidence. In the early medieval, medieval and post-medieval periods the application site lies in the agricultural hinterland of known settlement.

12.65 The archaeological investigations conducted within the application site consist of the following (most recent first);

- A geophysical survey, undertaken with fluxgate gradiometer, has been conducted across the majority of the application site (102ha) (**Figure 12.3**).
- Archaeological excavation in Park Wood in 1967, in the northern area of the application site (**Figure 12.4**; EKE3720);
- Geophysical survey was carried out in 1995 prior to the Channel Tunnel Rail Link (CTRL) construction in part of the application site's northern area (**Figure 12.4**; EKE12235);
- Archaeological evaluation within and adjacent to the application site's northern area (**Figure 12.4**; EKE5094);
- Archaeological excavation was carried out in the same area in 1999 (**Figure 12.4**; EKE5097); and
- Archaeological watching brief was carried out immediately adjacent to the application site's southern and south-eastern areas during the construction of the transformer bases and during the cutting of associated cable trenches for the Sellindge Solar Farm (**Figure 12.4**; EKE15038).

12.66 The application site contains the following non-designated archaeological assets, which are recorded on the Kent HER, the HER reference numbers are shown alongside the assets (**Figure 12.2**):

- The location of a possible windmill mound (TR03NE20) and residual prehistoric lithic material (TR03NE242) from under the possible windmill mound in the centre-west of Area 1 (EKE3720). These have been effectively recorded and removed by archaeological investigation in the 1960's;
- Four Bronze Age ditches, maybe part of a field system (TR03NE60) recorded as part of an evaluation and excavation by OAU between 1997-99;
- Mesolithic to Bronze Age flint scatter at Station Road / Church Lane (TR03NE59) recorded as part of an evaluation and excavation by OAU between 1997-99; and
- A medieval silver coin findspot (MKE55982) in the north of Area 1.

## Summary of Archaeological Potential and Assessment of Significance

12.67 Past impacts within the application site comprise general historic ploughing / agricultural activity which may have impacted sub-surface remains across the application site as well as the planting and felling of trees and the removal and re-instatement of field boundaries, which may have had a localised impact. The construction and demolition of the sheepfold and radio station in the application site's southern area will have had a minor, localised impact.

12.68 Kent Historic Environment Record (KHER) records a number of archaeological interventions which in Area 1 will have effectively recorded and removed potential archaeological deposits in the following areas: the location of a possible windmill mound (TR03NE20) and residual prehistoric lithic material (TR03NE242) from under the possible windmill mound in the centre-west of Area 1 (KHER EKE3720); the south-west and south-east of Area 1 has been subject to archaeological investigation (EKE5094, EKE5097 and EKE12235; **Figure 12.4**). It is also noted that the KHER records a medieval silver coin findspot (MKE55982) in the north of Area 1 that has been removed from the site. Geophysical survey of the area has identified no evidence of associated features with either the find spot or the possible windmill mound (**Figure 12.2**).

12.69 Geophysical survey identified three possible areas of extraction that have probably been infilled with local material in the centre of the survey area; they are surrounded by archaeological anomalies, to which they are potentially related. Extensive drainage was noted in the eastern limit of the application site and evidence of modern ploughing.

12.70 The application site was part of the Stour Basin Palaeolithic Project, which was funded by English Heritage and took place between February 2013 and March 2015. The project produced a broad predictive model that identified and characterised areas of Palaeolithic potential of the underlying quaternary sands and gravels. The south-eastern part of Area 1 lies in character area 36, for which a moderate palaeolithic potential was established. The remainder of the application site lies in character area 38, for which a low palaeolithic potential was established.

12.71 In November 2021 a fluxgate gradiometer survey was completed across the c. 102ha study area (**Appendix 12.2**). The survey detected

anomalies of an archaeological origin, with possible rectilinear enclosures, ring ditch and field systems identified in the centre and east, and more disjointed linear and curvilinear anomalies identified in the southeast and east. A zone of more enhanced material has been identified surrounding the archaeology in the centre, related to the weathering of the underlying geology, with natural banding possibly obscuring any further archaeology. Further geological variations were present in the north, east and southeast, as a result of the topographic changes across the area. Three areas of possible extraction and natural infilling have been identified in the centre of the area. Further anomalies representing former field boundaries and watercourses have been identified on historical mapping. Drainage features follow the topography of the survey area. Anomalies of an undetermined origin have also been detected, and whilst these may relate to modern, natural or agricultural features, an archaeological origin cannot be ruled out. The impact of modern activity on the results is present around field edges, and surrounding pylons, overhead cables and a buried service, which may have obscured any weaker anomalies, if present, along with an area of made ground in the north and a former radio station in the centre. Geophysical survey has identified the following possible and undetermined areas of archaeological interest (**Figure 12.3**):

- [MS2a] linear and curvilinear anomalies (probable archaeology) in the centre of Area 2;
- [MS2b] linear and curvilinear anomalies (probable archaeology) in the centre of Area 2;
- [MS2c] two strong parallel linear anomalies (undetermined) in the east of Area 2;
- [MS5a] partial rectilinear enclosure measuring c. 100m wide with possible internal subdivision (probable archaeology) in the north-west of Area 5;
- [MS5b] partial enclosures (probable archaeology) in the south of Area 5;
- [MS5c] curvilinear anomaly which may represent a ring ditch (probable archaeology) in the south-east of Area 5;
- [MS5d] linear and curvilinear (probable archaeology) in the east of Area 5;
- [MS5e] area of possible extraction (probable archaeology) in the east of Area 5.

12.72 Based on the form of the geophysical anomalies, there is considered high potential for prehistoric occupation evidence in the centre of Area 2 [MS2a and 2b], the potential for multi-phase occupation evidence in this area cannot be ruled out entirely. The date and character of the linear anomalies of undetermined character [MS2c] in the west of Area 2 is currently unknown. Taking into consideration past impact, based on available evidence, this potential archaeological resource is considered likely to be of local to regional, rather than national heritage significance. The sensitivity of these remains is considerate moderate in line with the criteria outlined in **Table 12.4**.

12.73 Based on the form of the geophysical anomalies there is considered high potential for prehistoric – Romano-

British occupation across Area 5. A later, medieval to post-medieval date for the rectilinear enclosures [MS5a and 5b] cannot be ruled out at this stage. Taking into consideration past impact, based on available evidence, this potential archaeological resource is considered likely to be of local to regional, rather than national, heritage significance. The sensitivity of these remains is considerate moderate in line with the criteria outlined in **Table 12.4**.

12.74 There is considered low potential for remains of national significance that would pose a design or planning constraint.

## Designated Archaeological Assets

12.75 No statutory designations (Scheduled Monuments) are located within or immediately adjacent to the application site.

12.76 The scheduled remains of a Romano-British building (south of Burch's Rough) (NHLE 1004216) is recorded c. 975m south of the application site. The monument comprises a Roman villa surviving as buried remains, identified as a cropmark on aerial photography. It is situated on a north-west facing slope above a tributary of the East Stour River near Court-at-Street. Due to distance and lack of historical connection, the application site is not considered within the setting of this designated asset and it is not considered sensitive to change by the proposed development. No further assessment is considered necessary.

## Built Heritage

12.77 As outlined in Section 5 of the Historic Environment Desk Based Assessment **Appendix 12.1**, the application site does not fall within or near a Conservation Area, Registered Parks and Gardens, Registered Battlefields and World Heritage Sites. The application site does not contain or lie immediately adjacent to a listed building.

12.78 Within the 1km study area the following designated assets are recorded: Aldrington Church Conservation Area, Smeeth Conservation Area, two grade I listed buildings, two grade II* listed buildings and 37 grade II listed buildings. These lie between 250 and 1km from the application site. The area beyond this buffer was also reviewed and no sensitive designated heritage assets were identified as requiring assessment.

12.79 A site visit was undertaken in May 2021 to assess the setting of identified designated heritage assets. The conditions were cloudy with good visibility. Additional desk-based assessment using Google Earth and maps was also utilised. Due to a combination of the intervening M20 and associated planting, the railway embankment, topography, vegetation and distance the majority of these are not considered sensitive to change by the proposed development. This is further detailed in **Appendix 12.1**.

12.80 Based on the results of the site visit, desk-based GIS analysis and historical research, following assets are considered as being potentially sensitive to indirect change by the proposed development:

- Aldrington Conservation Area;
- Grade I listed Church of St Martin (NHLE 1071208) c.1km south of the application site;
- Grade II* listed Court Lodge Farmhouse (NHLE 1071209) c.1km south of the application site; and

- Grade II* listed Evegate Manor (NHLE 1362798) c.550m west of the application site.

### *Aldington Conservation Area – Church Area and Aldington – Clap Hill*

12.81 Aldington – Church Area Conservation Area was designated in July 1996 and covers the historic core of the settlement of Aldington. Aldington – Clap Hill, designated in February 1985 lies to the west of the modern settlement and comprises three listed buildings and their grounds.

12.82 The Church Area Conservation Area covers an area of c. 12ha and contains fourteen listed buildings, including the Grade I listed Church of St Martin and the Grade II* listed Court Lodge Farm House assessed separately above. The remaining twelve buildings are listed at Grade II, and are dispersed as ribbon development along Church Lane which runs north-south through the conservation area. No conservation area appraisal is available for the asset, and a brief summary of its character and appearance is therefore given below.

12.83 The key characteristics of the area are considered to be:

- The historic and architectural special interest derived from the historic buildings within the conservation area, particularly the group associated with the church and Court Lodge Farm House.
- The sinuous nature of the principal thoroughfare, Church Lane, which provides sequential glimpsed and clear views of the listed buildings within the conservation area.
- The sloping topography of the landscape which allows for some long views north of the wider surrounding landscape. Although these are partial and glimpsed as one passes through the settlement, the views open out in the vicinity of St Martin's Church.

12.84 The setting of the conservation area comprises the wider agricultural landscape and buildings within it, with the farm complex at Ruffin's Hill (Comprising one Grade II* listed and three Grade II listed buildings) being of particular importance for its illustrative and architectural value. In its present state the study site makes a positive contribution to the wider setting of the asset though the provision of rural context.

12.85 The Clap Hill Conservation Area covers an area of c. 1.25ha and contains three Grade II listed buildings. Principal among these is Clap Hill House, an eighteenth century property, with the other two buildings dating from the early nineteenth century.

12.86 The key characteristics of the area are considered to be:

- The historic and architectural special interest derived from the historic buildings within the conservation area
- The raised topography enabling views to the south-west.

12.87 The setting of the asset contributes illustrative value by way of rural context, although long views north are screened by belts of tree planting and the modern settlement of Aldington lies to the east. There are dispersed historic and designated farmsteads to the south-west of the conservation area and these contribute illustrative value to the setting. There is no intervisibility with the study site owing to distance, intervening built form and tree-screening.

### *Grade I listed Church of St Martin (NHLE 1071208)*

12.88 The Church of St Martin is a Grade I listed building located c.1km south of the application site, within Aldington Church Area Conservation Area. The listing description is included in the desk-based assessment (**Appendix 12.1**).

12.89 Due to its proximity to Canterbury, Ashford Borough has churches of great historical significance. The significance of the church resides in its architectural and historical interest as a former chapel to the adjacent hunting lodge of the Archbishops of Canterbury (see Court Lodge below), which was restored in 1876 by Sir Arthur Blomfield. Blomfield became president of the Architectural Association in 1861, a Fellow of the Royal Institute of British Architects in 1867 and vice-president of the RIBA in 1886. The application site was never owned by the church and there is no historic functional connection, however, the Deedes Family, who owned part of the southern part of the application site in the 19th century, were associated with the Church of St Martin and there is a monument to William Deedes at the church.

12.90 The church is visible from the highest point within the application site ('Bested Hill' on historic mapping) and from the south-eastern boundary of the application site. Due to intervening development in the form of Court Lodge and its associated structures, at ground level there are no views of the application site from the church.

12.91 The church stands overlooking the area to its north, east and west from an elevated position (LVIA viewpoints 8, 9 and 10). Its setting is formed by its immediate surroundings in the form of the churchyard and Court Lodge with its associated structures, as well as the wider agricultural/rural landscape surrounding the church. While the views from the application site towards the church are not designed views, the topography and sparse development do mean that they have a positive contribution to the significance of the church, as it allows for an appreciation of the church from a distance.

12.92 Whilst the Church is of national heritage significance it is considered to be of low sensitivity to the proposed development: the application site makes a minor contribution to the setting of this designated heritage asset.

### *Grade II* listed Court Lodge Farmhouse (NHLE 1071209)*

12.93 Court Lodge Farmhouse is a Grade II* listed building located c.1km south of the application site, within Aldington Conservation Area. The listing description is included in the desk-based assessment (**Appendix 12.1**).

12.94 The significance of Court Lodge Farmhouse resides in its archaeological interest as the whole complex is said to have had five kitchens, six stables and eight dovecotes in the 16th century, as well as in its architectural and historic interest as the former manor house and hunting lodge of the Archbishops of Canterbury.

12.95 The farmhouse sits on the eastern plot boundary, set back c.105m from Church Lane to the west. The Church of St Martin is located c.15m to the south. The setting of the farmhouse comprises its plot, the church and churchyard to the south and the field immediately to the east. It is within the plot and from the access track off Church Lane that the setting has a positive contribution to the significance of the house, as it is

within this context that the house has been experienced throughout most of its existence. The modern agricultural structures associated with the farmhouse have a negative contribution to its significance.

12.96 Court Lodge Farmhouse has a historic ownership link with the application site. At the time of the tithe survey in 1842 Court Lodge Farm was owned by William Deedes Esq, whose tenant was Stephen Southon. The estate included the application site's southern area. In 1950, the estate was put up for sale, and the application site's southern area formed part of Lot 2, which also included Court Lodge Farmhouse.

12.97 The rural and agricultural wider context of the asset generates a degree of illustrative context to the farmhouse. Under the proposed development the field boundaries would remain intact, therefore the legibility of historic field parcels remains unchanged, leaving the illustrative historic value to Court Lodge Farmhouse unaffected. The historic ownership link has been severed for 70 years and no functional connection to the application site remains. The application site in its current state is considered to make a neutral contribution to the setting, with no material contribution to the significance of the asset.

12.98 Whilst the Farmhouse is of national heritage significance it is considered to have negligible sensitivity to the proposed development.

### *Grade II* listed Evegate Manor (NHLE 1362798)*

12.99 Evegate Manor is a grade II* listed building located c.550m west of the application site. The listing description is included in the desk-based assessment (**Appendix 12.1**).

12.100 The significance of Evegate Manor (sometimes 'Thevegate') resides in its archaeological, architectural and historic interest as a former 14th century manor house, part of which appears to have been demolished by 1975. It was first mentioned in the 993AD Charter of Monastery of Hyde. The Domesday Book records Evegate as a settlement of only one household with one meadow of 8 acres, belonging to Hugh de Monfort. Some time after the compilation of the Domesday Book and the inquest of service in 1212, Evegate Manor was alienated from Constable's Honour and became part of the Honour of the Archbishop of Canterbury. The 1840 Smeeth tithe apportionments associated list Evegate House as belonging to Sir Edward Knatchbull. Sir Edward Knatchbulls' tenant, William W. Tilt. Knatchbull, owned the whole of the application site's northern area at that time, and plots 391 and 405 within the northern area were tenanted to William W. Tilt. This historic ownership link has since been severed.

12.101 The house sits along the western plot boundary, with access from the north-west, off Station Road, and the garden to the east and south of the house. The setting of the house comprises its plot and the open countryside to the south. The plot is bound by shrubs and trees and it is within it that the setting has a positive contribution to the significance of the house.

12.102 Due to topography and distance, only the top of the chimneystacks of Evegate Manor can be glimpsed from within the application site. Due to vegetation and topography, there are no views of the application site from

the house. The application site in its current state is considered to make a neutral contribution to the setting of Evegate Manor, with no material contribution to the significance of the asset.

12.103 Whilst the Manor House is of national heritage significance it is considered to have negligible sensitivity to the proposed development.

### *Locally Listed Heritage Assets*

12.104 Ashford Borough Council does not hold a list of locally listed heritage assets; no locally listed heritage assets have been identified that have the potential to be affected by the scheme.

### *Other Non-Designated Heritage Assets*

12.105 The application site contains no structures; the assessment has identified no non-designated heritage assets that have the potential to be affected by the scheme.

### *Baseline Evolution*

12.106 In general terms, changes in the baseline may result from the scheduling or listing of heritage assets within the study area or the discovery of new sites within or adjacent to the application site. The assessment has not identified any sites which are likely to be designated within the 1km study area. Archaeological intrusive works may occur prior to construction. These works have the potential to alter the heritage baseline.

12.107 In a 'no development' scenario, the heritage baseline conditions remain unchanged.

## EMBEDDED MITIGATION

### Construction and Decommissioning

12.108 The scheme has been designed to avoid the construction of solar panels across the entire site. The retention of open space in Area 2 serves to preserve in situ identified archaeological remains in this area. Specific fields were removed from development to minimise impacts (as discussed in **Chapter 3** – Site Selection and Design).

### Operation

12.109 No embedded mitigation is considered to be required.

### Potential Impact

#### *Potential Direct Impacts*

12.110 The following archaeological and cultural heritage receptors are identified as having the potential to be directly impacted by the proposed development:

- Non-designated prehistoric (or multi-period) occupation evidence in Area 2 of local significance, low sensitivity (this comprises peripheral features associated with a complex of features which will be retained in open space in Area 2);
- Non-designated prehistoric to Romano-British (or medieval to post-medieval) occupation evidence of local to regional significance, moderate sensitivity, in Area 5.

12.111 The desk-based assessment has considered the potential for Palaeolithic remains within the application site. The south-eastern part of Area 1 lies on quaternary sands and gravels which are considered to have moderate potential for Palaeolithic remains. This area of potential lies almost entirely outside the area of proposed solar panels and infrastructure. Taking this, and the anticipated depth of Palaeolithic remains into consideration, the sensitivity of this resource is considered low and no magnitude of impact or environmental effect is expected and no further assessment is considered necessary.

### *Potential Indirect Impacts*

12.112 Development of the site has the potential to have indirect impacts on the following designated heritage assets:

- Grade I listed Church of St Martin (NHLE 1071208) c.1km south of the application site;
- Grade II* listed Court Lodge Farmhouse (NHLE 1071209) c.1km south of the application site; and
- Grade II* listed Evegate Manor (NHLE 1362798) c.550m west of the application site.

12.113 The impacts upon these heritage assets are discussed individually below. The assessment of the overall impact of the scheme on the significance of heritage assets is evaluated by considering both the heritage significance of the heritage asset and the magnitude of the predicted effect on that significance. Mitigation is provided where necessary.

## ASSESSMENT OF LIKELY EFFECTS

### Construction and Decommissioning

12.114 It is proposed to install and operate a solar farm within the application site, together with all associated works, equipment and necessary infrastructure. The panels would be mounted on small piled foundations which would be driven to the ground. On average the piled foundations for the solar arrays would be driven approximately 1.5m into the ground and each pile would measure no more than 0.01m2 in area.

12.115 Foundations for the buildings to house welfare, store and substation are understood to be minimal (further information is provided separately in **Chapter 6** – The Development Proposal and associated figures). No large-scale ground reduction or landscaping is planned for the development.

12.116 The heritage desk-based assessment and the geophysical survey of the site concludes that the application site is considered to have a high potential for finds and features of prehistoric – Romano-British (or medieval to post-medieval) occupation across Area 5 (**Figure 12.2**). Taking into consideration past impact, based on available evidence, this potential archaeological resource is considered likely to be of local to regional, rather than national, heritage significance. The sensitivity of these remains is considered moderate in line with the criteria outlined in **Table 12.4**. No substantial groundworks are proposed in this area, impacts are restricted to the erection of the

panel piles. As such the magnitude of impact of the proposed solar panels on the potential archaeological resource within Area 5 is considered minor adverse: removal of a minor part of its total area but the site retains significant future research potential. This effect is considered Minor; not significant.

12.117 The heritage desk-based assessment and the geophysical survey of the site concludes that the application site is considered to have high potential for prehistoric occupation evidence in the centre of Area 2 [MS2a and 2b] (**Figure 12.2**), the potential for multi-phase occupation evidence in this area cannot be ruled out entirely. The date and character of the linear anomalies of undetermined character [MS2c] in the west of Area 2 is currently unknown. As shown in **Figure 12.2** these will be largely retained as open space as part of the proposed development. Two peripheral linear features lie within the area of the proposed solar panels which have the potential to be physically impacted by the proposed development. These remains are unlikely to be of more than local significance. Taking into consideration the proposed retention of the majority of the archaeological site and the limited impact of the proposed solar panels, the magnitude of change on this complex of archaeological remains is considered negligible: negligible perceptible change to the significance of an archaeological site from change in use, amenity or access. This effect is considered Negligible; not significant.

12.118 The impacts of the construction/ decommissioning of the scheme on surrounding designated and locally listed heritage assets will be of a comparable nature to those occurring at the operational stage, albeit of a much shorter duration.

## Operation

12.119 It is anticipated that there will be no operational and maintenance direct impacts on buried archaeological assets as impacts would occur during the construction phase as assessed above.

12.120 The operation of the scheme would potentially have indirect impacts on the setting of designated assets of national importance within the wider study area. That is, the scheme may be experienced visually within the settings of these assets and consequently may have an effect on the contribution that the settings have to the heritage significance of those assets.

### *Aldington Conservation Area – Church Area and Aldington – Clap Hill*

12.121 Aldington – Church Area Conservation Area was designated in July 1996 and covers the historic core of the settlement of Aldington. Aldington – Clap Hill, designated in February 1985 lies to the west of the modern settlement and comprises three listed buildings and their grounds.

12.122 The setting of the asset contributes illustrative value by way of rural context, although long views north are screened by belts of tree planting and the modern settlement of Aldington lies to the east. There are dispersed historic and designated farmsteads to the south-west of the conservation area and these contribute illustrative value to the setting. There is no intervisibility with the study site owing to distance, intervening built form and tree-screening.

12.123 It is considered that the development will cause the lowest levels of less than substantial harm to the Church of St Martin and Court Lodge Farm House, which in turn impacts on the significance of the Aldrington – Church Area Conservation Area, generating harm at the lowest level of less than substantial: Minor-Negligible in line with **Table 12.4**, and not significant.

### *Grade I listed Church of St Martin (NHLE 1071208)*

12.124 The Church of St Martin is a grade I listed building located c.1km south of the application site southern corner within Aldington Conservation Area. The Church of St Martin is located on an elevated position overlooking the wider surrounding countryside. Its setting is formed by its immediate surroundings in the form of the churchyard and Court Lodge with its associated structures, as well as the wider agricultural/rural landscape surrounding the church. While the views from parts of the application site towards the church are not designed views, the topography and sparse development do mean that they have a positive contribution to the significance of the church, as it allows for an appreciation of the church from a distance, as demonstrated in Viewpoints 8, 9 and 10 (ES Volume 4). Whilst the Church is of national heritage significance it is considered to be of low sensitivity to the proposed development: the application site makes a minor contribution to the setting of a designated heritage asset.

12.125 The proposed solar farm would mean that views of the church tower will still be possible from parts of the application site but will be seen in the context of the solar farm. Due to this change, the contribution that this view makes to the significance of the church will be reduced, but not removed entirely. The effect of the proposed development on the view from the application site towards the church is considered to have a very minor visual impact on the setting of the church. It is considered to be a less than substantial harmful effect on the lowest end of the scale, Minor-Negligible in line with **Table 12.4**, and not significant.

### *Grade II* listed Court Lodge Farmhouse (NHLE 1071209)*

12.126 Court Lodge Farmhouse is a grade II* listed building located c.1km south of the application site, within Aldington Church Area Conservation Area. As previously discussed, there is a historic ownership link between Court Lodge Farmhouse and the southern area of the application site, which has been severed for the last 70 years. The application site forms part of the wider countryside within which the farmhouse is located. Whilst the Farmhouse is of national heritage significance it is considered to have negligible sensitivity to the proposed development.

12.127 Under the proposed development the field boundaries would remain intact, therefore the legibility of historic field parcels remains unchanged, leaving the illustrative historic value to Court Lodge Farmhouse unaffected. It is considered that the proposed development would therefore have a negligible visual impact which equates to the lowest level of less than substantial harm, Negligible in line with **Table 12.4** and not significant.

### *Grade II* listed Evegate Manor (NHLE 1362798)*

12.128 Evegate Manor is a grade II* listed building located c.550m west of the application site. The top of the chimneystacks of Evegate Manor can be glimpsed from the western boundary of Area 1. Due to vegetation and topography, there are no views of the application site from the house. The historic ownership link with the application site's northern area has since been severed, with no contemporary connection to the application site. Therefore, the application site does not contribute to the significance of the farmhouse and the proposed development would have an impact of no harm on the asset's significance.

## CUMULATIVE EFFECTS

### Construction and Decommissioning

12.129 There are no strict guidelines for assessing cumulative effects. In terms of direct cumulative effects, due to the physical localised character of sub-surface archaeological remains, construction of 'other developments' will generally not result in cumulative direct impacts on designated or non-designated archaeological assets. The exception to this is archaeological deposits which extend beyond the development site which would be impacted by removal of contemporary deposits by development in the immediate vicinity. The potential for archaeological deposits to extend substantially beyond the limit of the site and be impacted by 'other developments' is considered low. No cumulative effects are identified. As the Pivot Power Battery Energy Storage (forthcoming application) is within the study site's boundary, it is necessary to consider potential cumulative effects resulting from this application.

### *Pivot Power Battery Energy Storage*

12.130 The Pivot Power Battery Energy Storage (separate application) is located in the south-east of Area 1 (**Figure 12.1, Volume 3**), west of Church Lane and the National Grid Sub Station. The area of the proposed Pivot Power Battery Energy Storage has been subject to previous archaeological evaluation and mitigation between 1997 and 2001 (KHET EKE5094; Oxford Archaeology 1997 and EKE5097; Oxford Archaeology 2001 and 2003). These investigations resulted in the identification and recording of the following finds or features in this part of the site:

- Medieval ditch (TR03NE206) recorded during 2001 evaluation and excavation (OAU 2001);
- Mesolithic to Bronze Age flint scatter (TR03NE59) recorded during 2001 evaluation and excavation (OAU 2001);
- Four Bronze Age ditches, which may have been part of a field system (TR03NE60) recorded during 1997-99 evaluation and excavation (OAU 2001); and
- A late Iron Age/early Roman field system (TR03NE205) recorded during 1997-99 evaluation and excavation (OAU 2001).

12.131 As this area has been fully evaluated and mitigated no effects to archaeology are anticipated to result from the forthcoming Pivot Battery Energy Storage application. As

such, no cumulative effects are also anticipated.

## Operation

12.132 No significant adverse effects have been identified in relation to the setting of heritage receptors. No cumulative effects are therefore identified.

### *Pivot Power Battery Energy Storage*

12.133 Cumulative effects in relation to Pivot Power Battery Energy Storage have been considered. This application will result in the construction of a c. 3m high structure. Due to intervening topography and vegetation no impacts on the setting, and therefore the significance, of the nearby Grade II listed buildings of Water Farm House (NHLE1185259) and the stable/ granary about 20m north west of Water Farm House (NHLE1362797) have been identified. No other receptors close by have been identified which may be sensitive to change. No cumulative effects are identified.

# FURTHER MITIGATION AND ENHANCEMENT

## Construction and Decommissioning

12.134 The heritage desk-based assessment and the geophysical survey of the site concludes that the application site is considered to have a high potential for finds and features of prehistoric – Romano-British (or medieval to post-medieval) occupation across Area 5. Based on available evidence, this potential archaeological resource is considered likely to be of local to regional. The assessment has also identified potential for prehistoric to Romano-British remains of local significance in Area 2. In Area 2 the majority of the archaeological resource will be preserved in situ in open space. The archaeological resource in Area 5 is located in an area of proposed solar panels.

12.135 Taking into consideration the limited impact of the proposed solar panels, the magnitude of change on the potential archaeological resource within Areas 2 and 5 is considered minor adverse: removal of a minor part of its total area but the site retains significant future research potential. This effect is considered Minor; not significant.

12.136 It is anticipated that a programme of archaeological evaluation will be required as a condition of planning to confirm the results of this assessment and supplement the existing record of the archaeological resource within the application site.

12.137 This would allow an appropriate strategy for the conservation of the archaeological remains to be developed and agreed with the LPA, either by protection via concrete foundations, archaeological recording, or a combination of these approaches.

## Operation

12.138 No significant adverse effects have been identified and therefore no further mitigation or enhancement is proposed.

# RESIDUAL EFFECTS

## Construction and Decommissioning

12.139 **Table 12.5** sets out a summary of the potential mitigation and assessment of residual effects arising from the scheme during demolition and construction. The assessment of the effects has used the significance criteria matrices set out in **Table 12.1, Table 12.2, Table 12.3** and **Table 12.4**.

12.140 The implementation of the programme of archaeological work at the application site will result in the preservation by record of archaeological deposits impacted by the proposed development. The resulting research will contribute to the increased knowledge and understanding of the landscape and settlement evolution of the wider area. This is considered to slightly reduce the overall effects on archaeology to Negligible - Minor Adverse, not significant in EIA terms.

Table 12.5 - *Summary of Residual Effects*

| | Receptor Name and Description | Potential Mitigation | Assessment of Residual Effects |
|---|---|---|---|
| Construction | Non-designated archaeological deposits. | It is anticipated that a programme of archaeological evaluation will be required as a condition of planning to confirm the results of this assessment and supplement the existing record of the archaeological resource within the application site.<br><br>This would also allow an appropriate strategy for the conservation of the archaeological remains to be developed and agreed with the LPA, either by exclusion, protection via concrete foundations, archaeological recording, or a combination of these approaches. | Negligible - Minor Adverse effect. |

## Operation

12.141 No further mitigation or enhancement is proposed. The residual effect will be Minor/Negligible and Not Significant in EIA terms.

## MONITORING

12.142 No significant adverse effects have been identified and therefore no monitoring is proposed.

## SUMMARY

12.143 This chapter presents the findings of the assessment of likely significant effects of the construction and operational phases of the proposed developments in terms of archaeology and cultural heritage. It incorporates the results of a heritage desk-based assessments (**Appendix 12.1**) and a geophysical survey contained in **Appendix 12.2**.

12.144 A review of the National Heritage List for England confirmed that there are no designated heritage assets within the application site. As such no designated assets will be directly impacted by the proposed development.

12.145 The heritage desk-based assessment and the geophysical survey of the site concludes that the application site is considered to have a high potential for finds and features of prehistoric – Romano-British (or medieval to post-medieval) occupation across the west-central part of the application site. Based on available evidence, this potential archaeological resource is considered likely to be of local to regional. The assessment has also identified potential for prehistoric to Romano-British remains of local significance in the east central part of the application site. In the east-central part of the application site the majority of the archaeological resource will be preserved in situ in open space. The archaeological resource in the west-central part of the site is located in an area of proposed solar panels.

12.146 Taking into consideration the limited impact of the proposed solar panels, the magnitude of change on the potential archaeological resource is considered minor adverse: removal of a minor part of its total area but the site retains significant future research potential. This effect is considered Minor; not significant.

12.147 It is anticipated that a programme of archaeological evaluation will be required as a condition of planning to confirm the results of this assessment and supplement the existing record of the archaeological resource within the application site.

12.148 This would allow an appropriate strategy for the conservation of the archaeological remains to be developed and agreed with the LPA, either by protection via surface mounted concrete foundations, archaeological recording, or a combination of these approaches. The resulting research will contribute to the increased knowledge and understanding of the landscape and settlement evolution of the wider area. This is considered to slightly reduce the overall effects on archaeology to Negligible - Minor Adverse, not significant in EIA terms.

12.149 No significant adverse effects have been identified in relation to the setting of heritage receptors.

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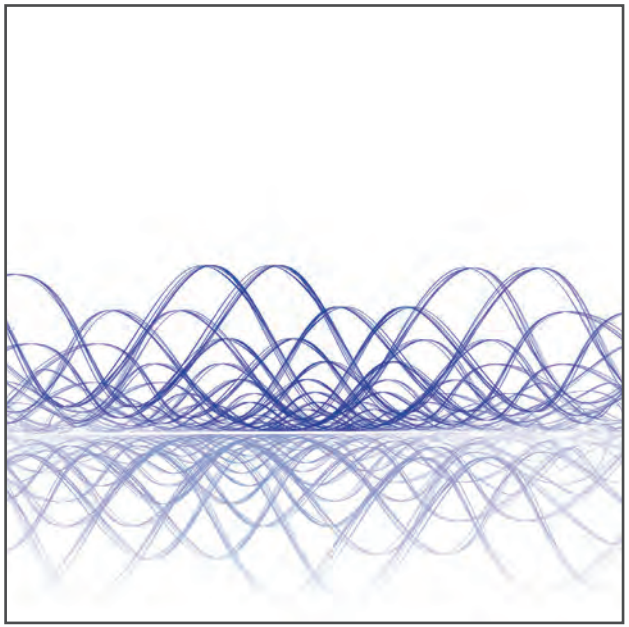
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## INTRODUCTION

13.1 This Chapter provides an assessment of the noise and vibration impacts associated with the East Stour Solar Farm. The assessment has been prepared by Ion Acoustics Ltd for the Applicant.

13.2 The assessments presented in this chapter include:

- A construction noise assessment;
- An operational noise assessment; and,
- Consideration of the cumulative impacts arising from other developments in the area.

13.3 The site is located in a largely rural area, approximately 6.5km to the south – east of Ashford, Kent. The nearest noise sensitive receptors (dwellings) are relatively close to the site boundary, being around 10m at the closest point.

13.4 The proposed solar farm has an overall site area of approximately 104ha and comprises a number of static solar panels and associated ancillary items i.e. inverters and transformers.

13.5 Construction noise impacts have been considered in line with British Standard BS 5228-1 and include indicative noise calculations for activities associated with construction phase traffic movements and the construction of the frame supports for the solar panels.

13.6 Operational noise levels from the proposed solar farm have been predicted to the nearest noise sensitive receptor locations in accordance with the methodologies detailed in International Standard ISO 9613-2 and compared with absolute noise limits derived from recognised national and international guidance.

## Noise from Solar Farms

13.7 Solar farms are not normally considered noisy. Nevertheless, various electrical components, such as inverters and transformers, can emit low levels of noise and can include fans for ventilation and / or cooling/ heating etc. Typically, these noise generating elements are positioned away from the perimeter of the solar farm, increasing the distance between the noise source and the nearest receptor locations. Noise levels are rarely audible outside of the site boundary.

13.8 The nature of solar farms is such that electricity is only generated during daylight hours. During the summer months this may extend into times considered to be part of the night (that is early mornings before 07:00 hours) and evenings (after 19:00 hours).

# LEGISLATION AND GUIDANCE

## National Legislation

### *National Planning Policy Framework*

13.9 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance in England. This document was revised in July 2021. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies.

*'174 Planning policies and decisions should contribute to and enhance the natural and local environment by: ……..*

*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…….'*

13.10 The document further states that:

*'185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

*a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*

*b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…'*

### *Noise Policy Statement for England (NPSE)*

13.11 The Noise Policy Statement for England (NPSE) sets out the government's policy on environmental, neighbourhood and neighbour noise for England. The policy sets out three aims:

- "avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

13.12 The NPSE introduces the following terms which are also used in the NPPF:

**'NOEL – No Observed Effect Level**

*This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

**LOAEL – Lowest Observed Adverse Effect Level**

*This is the level above which adverse effects on health and quality of life can be detected.*

**SOAEL – Significant Observed Adverse Effect Level**

*This is the level above which significant adverse effects on health and quality of life occur.'*

13.13 However, neither the NPSE nor the NPPF defines numeric bounds for NOEL, LOAEL or SOAEL. The limits of each effect level should be defined for each situation and location.

### *Government Online Planning Guidance*

13.14 Further Government planning advice is available online in the Planning Practice Guidance. This refers to the NPPF and NPSE and presents a noise assessment hierarchy table to provide further information on the boundaries between NOEL, LOAEL and SOAEL. This is shown in **Appendix 13.1**.

## Local Policy

13.15 A review of the Ashford Borough Council website and their Adopted Development Plan does not indicate any specific noise or noise pollution policy. It does however, reference the potential for noise impacts in a number of policies, most notably, for this assessment, Policy ENV10 – Renewable and Low Carbon Energy which states the following:

*'Planning applications for proposals to generate energy from renewable and low carbon sources will be permitted provided that:*

*b) the development does not generate an unacceptable level of traffic or loss of amenity to nearby residents (visual impact, noise, disturbance, odour);'*

13.16 No further pertinent policy relating to noise and vibration were found within the Council's guidance.

## Consultation

13.17 The Local Planning Authority (Ashford Borough Council) have provided a screening opinion which indicated that the proposed development would require an Environmental Impact Assessment (EIA). No specific reference to noise and vibration was made in the Council's response to the screening request.

13.18 The applicant's Scoping Report indicated that a desk-based noise assessment (this chapter would be included in the EIA). At the time of writing there has been no response to the Scoping Report and no further consultation was undertaken with the Council as part of this assessment.

# ASSESSMENT METHODOLOGY

13.19 This section of the chapter summarises the assessment methodologies used in the production of this chapter. The relevant guidance and standards are summarised below with further, additional detail presented, where appropriate in **Appendix 13.1**.

## Construction Noise

13.20 Construction noise will include noise from plant and equipment used on site, and noise from construction traffic on local roads. Construction traffic numbers for each phase of the development have been provided and are considered in detail within this chapter.

13.21 The assessment of noise impacts during the construction phase has been informed by British Standard 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise. Traffic noise during construction can be calculated with reference to the Department of Transport's Calculation of Road Traffic Noise guidance with the change in noise compared to guidance for short-term change in the Design Manual for Roads and Bridges (DMRB LA111 Noise and Vibration Rev 2).

13.22 There are no noise limits within the main text of BS5228:2009 and in fact,

the preferred approach is to use 'best practicable means' to reduce noise rather than setting limits. This strategy will be adopted here. Nevertheless, a number of possible construction noise significance thresholds are presented within BS5228-1 Annex E for 'projects of significant size such as the construction of a new railway or trunk road'.

13.23 The simplest construction noise criterion is a fixed daytime limit of 70dB(A) for rural, suburban and urban areas away from main road traffic and industrial noise. Where baseline ambient noise levels have been measured, BS5228-1 Annex E Example Method 2 can be used which is applicable for residential buildings as well as community and education buildings:

*'Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.'*

13.24 The cut-off values given above apply during the following times:

- 65 dB $L_{Aeq}$ Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00);
- 55 dB $L_{Aeq}$ Evenings & Weekends (19:00 – 23:00 Weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays); and
- 45 dB $L_{Aeq}$ Night-time (23:00 – 07:00).

13.25 For this scheme, baseline noise levels are likely to be relatively high given the proximity to the M20 and the Channel Tunnel Rail Link. As such a notional significance threshold of 65 dB $L_{Aeq}$ may be considered as conservative for daytime working. The limit would apply over a 10 to 12 hour working day. There are no proposals for evening or night-time working.

13.26 These limits are much higher than normal noise limits to protect amenity because it is recognized that construction does involve some unavoidable noise and is temporary. Irrespective of the limits, the contractor will be expected to use best practicable means to reduce noise and a construction environmental management plant (CEMP) will be prepared.

## Construction Vibration

13.27 Part 2 of BS 5228-2 considers vibration from construction. This is unlikely, but depending on the manner in which the solar panel supports are constructed, there is perhaps the potential for groundborne vibration to be generated i.e. if frame supports are impact driven. That said, it is the recommendation of this report that impact driven piles only be used as a last resort when other means of construction would not be effective.

13.28 The separation distance between the site and the receptors is generally more than 100m though there are a small number of receptors within this distance. The distance between the receptors and the nearest element of site infrastructure is greater than this therefore the significance of any perceived vibration is considered to be low. To that end, no further consideration of groundborne vibration is given in this report.

## Operational Noise

### *International Standards Organisation 9613-2 – Attenuation of sound during propagation outdoors*

13.29 For this project, operational noise levels have been predicted using ISO 9613-2. The calculation methodology includes consideration of a number of pertinent factors including distance propagation, screening, airborne absorption etc.

13.30 The calculations have been made using the IMMI noise modelling software which is known to faithfully employ the calculation protocols.

### *British Standard 4142: 2014 +A1:2019 – Methods for rating and assessing industrial and commercial sound*

13.31 The standard method for the assessment of commercial and industrial noise affecting nearby housing is British Standard BS 4142. The methodology typically derives the significance of the noise impact from the difference between the plant noise under consideration and the background sound level as represented by the $L_{A90}$ parameter, determined in the absence of the plant noise.

13.32 In instances where the background and rating levels are low, the standard states:

*'Where background sound levels and rating levels are low, absolute levels might be as, or more relevant that the margin by which the rating level exceeds the background…'*

### *British Standard 8233:2014 and WHO criteria*

13.33 British Standard BS 8233: 2014 and the World Health Organisation (WHO) also provide external noise criteria to protect residential amenity which could be adopted as absolute limits. These are detailed in **Table 13.1**.

Table 13.1 - *WHO / BS 8233: 2014 Guideline Noise Levels*

| Location | Critical Health Effect | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| Outside Bedroom Windows | Sleep Disturbance (Windows Open) | -- | 45dB $L_{Aeq,\ 8hours}$ (1) |
| Amenity Spaces (Gardens / Patios) | Moderate Annoyance<br>Serious Annoyance | 50dB $L_{Aeq,\ 16\ hours}$ (2)<br>55dB $L_{Aeq,\ 16\ hours}$ (2) | -- |
| Notes: From WHO Community Noise Guidelines (1999)<br>BS 8233: 2014 and WHO Community Noise Guidelines | | | |

13.34 The WHO guideline of 45 dB $L_{Aeq\ 8hr}$ represents an 8-hour $L_{Aeq}$ outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, equivalent free field level would be approximately 3dB lower, that is 42dB $L_{Aeq}$. The limits apply to relatively anonymous noises without character and are commonly applied to traffic noise etc.

## Offsite Traffic Noise

13.35 Increased traffic noise may be an issue during construction with the delivery of panels and other components etc. There will be no significant change in traffic during the operational phase.

### *Calculation of Road Traffic Noise (CRTN)*

13.36 The Technical Memorandum, Calculation of Road Traffic Noise (CRTN) (Department of Transport and Welsh Office, 1988) document details an empirical prediction methodology for the calculation of road traffic noise. Factors within the calculation include vehicle flow; speed, road gradient and road surface construction.

### *Design Manual for Roads and Bridges LA111 – Noise and Vibration (rev 2)*

13.37 The Design Manual for Roads and Bridges LA 111 Noise and Vibration (Rev 2) sets out the methodology for assessing and quantifying the potential noise impacts associated with changes to the local road network.

## Significance Criteria

13.38 This section of the chapter defines significance criteria associated with the assessment and consideration of noise drawing upon appropriate guidelines and standards.

13.39 Significant impacts will be deemed to occur if the following conditions are met/breached for each of the given phases of the development:

### *Construction Noise - Significant effects*

13.40 Significant construction noise impacts will be deemed to occur if noise generated by construction operations exceeds the proposed noise limits for the locality based upon the example criteria in Annex E BS5228. For daytime periods this is taken as $L_{Aeq}$ 65dB. Noise levels above this limit would be considered to result in an adverse noise impact.

13.41 The Design Manual for Roads and Bridges gives the following significance criteria for short-term changes:

- Negligible – Less than 1.0dB;
- Minor – 1.0dB to 2.9dB;
- Moderate – 3.0dB to 4.9dB; and
- Major – Greater than or equal to 5.0dB

13.42 These noise limits would apply to change in road traffic noise during the construction phase.

### *Operational Noise – Significant effects*

13.43 Given the very low expected noise levels and the separation distance between the site and the nearest receptors, the assessment of operational noise has been undertaken in line with absolute noise limits. The limits are derived from BS8233 and the WHO guideline criteria detailed in **Table 13.1** on **page 309.**

13.44 To ensure the proposed development is not a significant or prohibiting factor in achieving the relevant WHO guideline values at sensitive receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in **Table 13.1** on **page 309.** This would also ensure that cumulative effects are also low.

13.45 As such, a target of 32dB $L_{Aeq}$ (free field) is proposed for the solar farm. This is set on the basis of the night-time noise limit to ensure that sleep is protected during early morning periods during the summer when sunrise could be at 5am. During the daytime, even in rural areas, occasions when the background noise would be less than 32 dB $L_{Aeq}$ would be rare and therefore a target of 32dB $L_{Ar}$ in the daytime is also likely to be consistent with a rating of a low impact in accordance with BS4142.

13.46 Using the noise target and the guidance of BS4142, the following impact significance criteria in **Table 13.2** have been derived.

Table 13.2 - *Operational Noise Significance Criteria*

| Operational Noise Criteria | Impact Significance |
|---|---|
| Rating noise level less than or equal to noise limit | Negligible |
| Rating noise level less than or equal to noise limit +5dB | Minor |
| Rating noise level less than or equal to noise limit +10dB | Moderate (and significant) |
| Greater than 10dB above noise limit | Major (and significant) |

### *Off Site Road Traffic Noise*

13.47 Offsite traffic noise impacts would be deemed to be significant if a short-term increase in excess of 3dB(A) in the predicted traffic noise level is calculated.

## BASELINE ENVIRONMENT

### Noise Sensitive Receptors

13.48 The site is in a largely rural location to the south-east of Ashford, in the vicinity of the M20 and the Channel Tunnel Rail Link. The area is relatively sparsely populated though does have a small number of residential receptor locations in the vicinity. The closest noise sensitive receptors are identified in **Table 13.3** on **page 312**, where multiple dwellings, adjoining dwellings or assemblages of dwellings were identified, a representative receptor was used. The information includes an approximate grid reference and relative distance to the site boundary. Note; the distance detailed below is the distance to site boundary rather than the nearest solar panel or other plant item.

13.49 The locations of the receptor are more clearly identified at **Plate 13.1**.on **page 313**.

Table 13.3 - *Receptor Location*

| Receptor Location | Approximate OS Grid Co-ordinates, (E, N) | | Distance to Site Boundary, (m) |
|---|---|---|---|
| AL01 – Partridge Farm | 608871 | 137499 | 77 |
| AL02 – Bested House | 608187 | 137761 | 10 |
| AL03 – Water Farm | 608146 | 138837 | 203 |
| AL04 – Fairbank | 607469 | 139255 | 287 |
| AL05 – Evegate Manor | 606843 | 138963 | 493 |
| AL06 – Park Wood Cottage | 606921 | 138432 | 482 |
| AL07 – Woodleas Farm | 606664 | 137709 | 625 |
| AL08 – Hogben Farm | 607568 | 137155 | 200 |
| AL09 – The Paddock | 607703 | 137286 | 30 |
| AL10 – Lower Park Farm | 608164 | 136853 | 365 |




Plate 13.1 - *Receptor Location Plan*

## Baseline Noise Climate

13.50 As indicated in **Plate 13.1**, the site lies in the vicinity of the M20 motorway and the Channel Tunnel Rail Link. The result of this is that the noise climate, particularly in the northern portion of the site would be subject to relatively high levels of road and rail noise. There is also a large electricity substation close to the motorway.

13.51 No noise monitoring has been undertaken as part of this assessment however, indicative noise levels from the major infrastructure (road and rail) is freely available via the Extrium noise mapping website. The Extrium data set is from 2019 and is based on predicted noise modelling of the major roads and rail links in the area. The noise mapping for the area indicates that the ambient noise climate in the vicinity of receptors AL03, AL04 and AL05 would fall within the $L_{Aeq\ 16hr}$ 55dB to 59.9dB from road traffic noise. Park Wood Cottage (AL06) is very close to the train line and, the same Extrium mapping indicates noise levels in this vicinity would lie within the $L_{Aeq,\ 16hr}$ 55dB to 64.9dB.

13.52 While the noise mapping does not extend below the 55dB noise contour it would be reasonable to assume that the noise climate at the other receptors is affected by road and rail traffic noise to some extent. Given this, and the proximity of other minor roads in the area would indicate that the prevailing noise climate is not particularly tranquil and that very low noise levels, during the daytime period are unlikely.

# PREDICTED EFFECTS

## Construction Noise Effects

13.53 The construction phase of the development has the potential to cause short-term audible noise at nearby receptors. The construction phase is understood to cover a nine-month period and is likely to be phased across the site. To that end, noise impacts are likely to vary through the construction phase. Activities most likely to generate disturbance include:

- site establishment including ground works. This may include works for site access roads and hardstanding's and construction of solar panel support structures; and,
- construction traffic – increases in road traffic movements on the surrounding road network due to construction traffic have the potential to generate short-term noise impacts at receptor locations.

13.54 A qualitative assessment of construction noise in line with BS5228 has been undertaken, considering potential noise levels from typical construction processes, noise limits and control measures that could be implemented at the closest residential properties should it be necessary.

13.55 A predictive assessment of construction phase traffic impacts has been undertaken in line with CRTN and DMRB LA111, with the relative change in noise level during each month of the construction phase compared with the existing traffic flow on local roads.

13.56 Effects on specific identified receptors during the construction phase are expected to be short-term in duration, although the exact duration over which the construction phase will occur at each receptor is not yet known. Instead, and assessment is made below by considering the worst-case noise level during the installation of the frame supports based on the minimum distances and source data used in other assessments of this nature. In addition, best practicable means will be employed to reduce noise as set out in the mitigation section below. Construction noise and specific best practicable means measure to reduce noise will also be covered within the scope of a Construction Environmental Management Plan (CEMP).

13.57 Construction operations would generally only occur during daytime working hours – typically:

- 07:00 to 19:00hrs Monday to Friday; and
- 07:00 to 13:00 on Saturday.

## Construction Noise Predictions – Solar Panel Frame Construction

13.58 As previously stated, exact specifics of and the types of plant likely to be used in the construction of the site are not currently available. However, to provide a robust assessment, it is considered appropriate to present

potential worst-case noise levels from construction activity that would typically be used within a development of this type, specifically those used to construct panel support frames.

13.59 The preferred approach to install the frames is by being pushed into the ground by mobile machinery similar in size to a tractor. The following mode of operation is assumed, assuming the tractor is pushing the posts into ground for half the time (50% on time) and manoeuvring to the next installation point for the rest of the time:

- pushing in frame posts (50% on-time); and
- manoeuvring to the next installation point (50% on-time).

13.60 All predicted noise levels have been based on typical plant source noise levels taken from the appendices of BS5228 or from third party sources. The noise levels used in the construction calculations are detailed in **Table 13.4**.

Table 13.4 - *Construction Noise Sources*

| Plant List | No. of Plant Items | $L_{Aeq}$ at 10m | On-time (%) | Effective $L_{WA}$# |
|---|---|---|---|---|
| Pushing Panels for Solar Panels and Fence Posts | 1 | 75 dB | 50% | 100 dB |
| Tracked excavator (idling) | 1 | 67 dB | 50% | 92 dB |
| **Effective Sound Power for Activity** | | | | 101 dB |
| Data from Clement Acoustics Report ref. 14027-NIA-01 RevE, dated 19th November 2020) | | | | |

13.61 The closest receptor is Partridge Farm (AL01) which is approximately 91m from the nearest frame location. Partridge Farm is financially involved in the project, with the solar farm being built on land owned by the farmstead. The rest of the receptors are at distances more than 100m from the nearest frame structure.

13.62 Note that the distances used in the calculations are taken from the residences to the nearest part of the site boundary to provide a worst-case assumption. The majority of construction works will be taking place further away. The surrounding area is largely farmland, and all receivers are some distance away, therefore the following formula for soft ground distance correction from BS5228:2009 +A1:2014 is adopted:

$$K'_s = (25log_{10} R) + 1$$

13.63 The calculations in **Table 13.5** on **page 316** summarise the predicted noise level from push driven frame supports assuming one vehicle operate at closest approach to the receptor and no screening is used.

Table 13.5 - *Construction Noise Calculations*

| Receptor ID | Distance to Nearest Frame Structure (m) | Reference Sound Power Level, $L_{WA}$ (dB) | Soft Ground Distance Attenuation (dB) | Calculated Noise Level at Receptor, $L_{Aeq}$ (dB) |
|---|---|---|---|---|
| AL01 – Partridge Farm | 91 | 101 | 50 | 54 |
| AL02 – Bested House | 165 | | 56 | 47 |
| AL03 – Water Farm | 250 | | 61 | 43 |
| AL04 – Fairbank | 302 | | 63 | 41 |
| AL05 – Evegate | 505 | | 69 | 35 |
| AL06 – Park Wood Cottage | 482 | | 68 | 36 |
| AL07 – Woodleas Farm | 730 | | 73 | 31 |
| AL08 – Hogben Farm | 280 | | 62 | 41 |
| AL09 – The Paddock | 145 | | 55 | 49 |
| AL10 – Lower Park Farm | 415 | | 66 | 37 |

13.64 The calculations above indicate that the worst affected property, Partidge Farm, may see noise levels from construction of up to LAeq,T 54dB. This would fall within the construction noise criteria during the daytime, evening and weekend periods. It is noted that the calculations above represent activity at the closest point of the proposed frame supports to the receptors; this is unlikely to occur for more than one day as the construction work will progress fairly quickly. Note also that there is no shielding assumed in the calculations.

13.65 It is reiterated that the calculations above represent a worst-case assessment assuming construction activities take place at the closest point to the receptor location. These should be taken into account when preparing the CEMP.

## Construction Phase Traffic

13.66 Construction vehicles would access / exit the site at two points along Church Lane before joining the A20, and eventually joining the M20 at junction 10A. Church lane is a minor road, being a single carriageway between the site access and the underpass beneath the railway lines. From the substation the road widens to where it meets the A20.

13.67 Traffic information for all the roads is provided in **Chapter 8** of this ES and includes Department for Transport (DfT) traffic count data for the A20 and M20 and additional traffic counts undertaken on Church Lane.

13.68 The baseline data from the DfT count points is presented in **Table 13.6** on **page 317**.

Table 13.6 - *Baseline Traffic Data - DfT Count Points*

| Road Link | Average Weekday Traffic Volume (06:00 to 24:00) | Average Weekday HGV* Movements (06:00 to 24:00) | Percentage of HGVs |
|---|---|---|---|
| M20 - Count Point 7869 | 38416 | 7429 | 19 |
| A20 – Count Point 36252 | 11416 | 378 | 3 |
| * Note the definition of HGV in this instance include standard classifications OGV1 and OGV 2 | | | |

Table 13.7 - *Baseline Traffic Data - Additional Count Points*

| Road Link | Average Weekday (07:00 to 19:00) | Average Weekday (07:00 to 19:00) | Percentage of HGVs |
|---|---|---|---|
| Church Lane North | 743 | 9 | 1 |
| Church Lane South | 660 | 12 | 2 |
| * Note the definition of HGV in this instance include standard classifications OGV1 and OGV 2 | | | |

13.69 Traffic count data for Church Road is presented in **Table 13.7** above. This includes the data for Church Lane North (central site access point) and Church Lane South (access point near Partridge Plantation).

13.70 Using the data above, it is possible to calculate a Basic Noise Level (BNL) and appropriate correction for speed and percentage of HGVs in accordance with CRTN. This gives an indicative road traffic noise level for each identified link. Note the traffic flow at both count points on Church Lane would be considered low flow according to CRTN.

13.71 Information provided indicates that the construction phase would last for nine months. During that period the site would expect, on average, 8no vehicle movements per day. These include deliveries of materials and technology and other associated components. It is assumed that the deliveries would be made by HGV though it is possible that small elements would be delivered by smaller vehicles. The traffic data for the construction period is summarised in **Table 13.8** on **page 318**.

Table 13.8 - *Construction Phase Daily Traffic Movements*

| Programme Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Daily Average |
|---|---|---|---|---|---|---|---|---|---|---|
| Average Daily HGV Movements | 7 | 9 | 11 | 10 | 11 | 10 | 4 | 4 | 5 | 8 |

Table 13.9 - *Change in Road Traffic Noise Level – Construction Phase*

| Road Link | Baseline (Pre-construction) Road Traffic Noise Level, $L_{A10,1hr}$ dB | Construction Phase Road Traffic Noise Level, $L_{A10,1hr}$ dB | Difference, dB |
|---|---|---|---|
| Church Lane North | 55.1 | 55.2 | +0.1 |
| Church Lane South | 54.1 | 54.3 | +0.2 |
| A20 | 70.8 | 70.8 | +/-0.0 |
| M20 | 79.2 | 79.2 | +/-0.0 |

13.72 The number of daily HGV movements to / from the site vary depending on the programme month, ranging from 4 movements per day to 11 during the peak delivery months. Using this information and the traffic flow data summarised in **Tables 13.6** and **13.7** on **page 317**, the pre-construction and construction phase road traffic noise levels can be calculated and, by extension, the change in road traffic noise levels calculated. **Table 13.9** above summarises these calculations. Note the calculations are undertaken to a nominal receptor point at a distance of 10m from the carriageway edge.

13.73 The assessment above indicates very little change in road traffic noise level, even for Church Lane where the increase would be less than 1dB for dwellings in the immediate vicinity. Overall, the change in road traffic noise would be considered negligible in accordance with the criteria detailed in **paragraph13.43** on **page 310**.

## Predictions of Operational Noise

13.74 Solar farms do not typically generate high levels of noise however there are some noise emissions associated with the associated grid connection apparatus i.e. inverters, transformers, substations etc.

13.75 The assessments presented below assume all noise generating sources are operating at full capacity for 100% of the assessment period. This is typically considered representative of peak summer when the solar farm is generating at maximum capacity and higher ambient air temperatures require any associated cooling / ventilation fans to operate at maximum.

13.76 The predictions have been made using the IMMI computer noise modelling software implementing the ISO 9613-2. Details on the calculation methodology and assumptions made are presented in **Appendix 13.2** of this document.

13.77 As indicated above, the solar farm would only operate during daylight

hours however, during the summer months it is plausible that the sun could rise at around 05:00. This would be considered part of the night-time and therefore has been assessed against an absolute limit of 32 dB $L_{Ar}$ derived to be 10dB below WHO night-time sleep disturbance criteria.

13.78 The noise predictions are presented in the first instance as a noise contour plot **Figure 13.1** in ES Volume 3, Figures. The figure shows the predicted noise levels (dB $L_{Aeq}$) in contour bands and the nearest receptor locations. The contours assume that all equipment is running at full capacity, which is only likely to occur in the middle of a sunny day when all plant is operating at 100%. The figure demonstrates that the noise emissions are largely contained within the site area. The lowest contour shown (light green) is the 35dB (A) contour.

13.79 In addition to the noise contours, the model has been used to calculate specific noise levels at the third-party receptor locations shown with red house symbols on the appended figure. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142.

Table 13.10 - *Operational Noise Assessment*

| Receptor Location | Predicted (Specific) Noise Level LAs dB | Rating Correction dB | Rating Noise Level LAr, dB | Noise Limit dB | Difference dB |
|---|---|---|---|---|---|
| AL01 – Partridge Farm | 15.5 | +2 | 17 | 32 | -15 |
| AL02 – Bested House | 31.0 | +2 | 33 | 32 | +1 |
| AL03 – Water Farm | 27.0 | +2 | 30 | 32 | -2 |
| AL04 – Fairbank | 15.5 | +2 | 17 | 32 | -15 |
| AL05 – Evegate Manor | 15.6 | +2 | 17 | 32 | -15 |
| AL06 – Park Wood Cottage | 17.9 | +2 | 20 | 32 | -12 |
| AL07 – Woodleas Farm | 12.9 | +2 | 15 | 32 | -17 |
| AL08 – Hogben Farm | 20.2 | +2 | 22 | 32 | -10 |
| AL09 – The Paddock | 22.7 | +2 | 25 | 32 | -7 |
| AL10 – Lower Park Farm | 19.7 | +2 | 22 | 32 | -10 |

13.80 The predicted specific noise levels are very low at the identified receptor locations. The levels are sufficiently low to assume that any distinguishing features i.e. tonal content or intermittency, would be masked by other environmental noise: road traffic noise, train noise, bird song, wind noise etc. Notwithstanding this, to present very much a worst case, a +2dB rating correction has been applied to account for the potential for a 'just perceptible' tonal content.

13.81 The assessment above demonstrates that the predicted rating noise level from the proposed solar farm, while operating at 100% capacity would generally not exceed the proposed noise limits. The exception to this is receptor AL02, where the predicted rating noise level is 1dB above the noise limit. Notwithstanding this, the

predicted noise level, in absolute terms, is very low and the limits are derived from WHO guidelines to protect sleep during the night-time period and also not significant in terms of BS4142. It is likely that the Solar Farm will only operate at 100% during full sun during the daytime when the sun is high in the sky.

## Cumulative Impacts

13.82 A review of the available mapping indicates one adjacent solar farm development which could give rise to cumulative noise impacts. The solar farm is located on land at Partridge Farm and appears to have been constructed and is assumed to be operational.

13.83 The solar farm was originally refused consent under application reference 14/00398/AS. The reasons for refusal did not include any noise concerns. The solar farm was eventually granted planning through appeal in October 2015.

13.84 No noise assessment was submitted with the planning application or any of the subsequent amendments to the consent. As such, it is not possible to assess cumulative noise impact arising from the development. However, given that the worst case element of noise is associated with the construction phase, which has already taken place for this scheme, limited impact is anticipated.

13.85 Additional information indicates a Battery Energy Storage System (BESS) facility is proposed for a parcel of land between the M20 and the train lines, adjacent to the existing electricity substation.

13.86 No planning application has been submitted for the BESS facility at this time, however, it is understood to be imminent. In the absence of any specific details, it is difficult to calculate any particular cumulative impacts. It is noted however that existing noise levels in the area are likely to be high due to the proximity of the motorway, train lines and the existing substation. Noise generated by BESS facilities is generally low and typically only arises from cooling plant and grid connection equipment. In addition, the distance to the nearest noise sensitive receptor location is around +400m. As a result of these factors, the noise impact of the BESS facility is likely to be low at the nearest receptor locations and by extension, the cumulative impact, including noise from the proposed East Stour solar farm, is likely to be low / negligible.

# MITIGATION

## Construction Phase Mitigation Measures

13.87 The assessments summarised above demonstrate that noise during the construction phase would not exceed the relevant noise limits derived from both BS5228 and the DMRB. Notwithstanding this, some short-term impacts may occur at the closest receptor locations depending on the specifics of the construction programme.

13.88 Inherent mitigation measures to reduce construction have been included in the design. For example, an internal access route has been included to avoid traffic using a section of Church Lane.

13.89 In addition it has been shown that informing residents about the nature of work is an important factor in reducing

general complaints. It is recommended that public engagement be undertaken to alert local residents to the planned construction works and provide contact details for a site manager should any noise related complaints arise. Non-acoustic factors which affect the overall level of complaints must also be addressed, e.g. the use of wheel-washing to control mud on roads.

13.90 Further to the above, 'Best Practicable Means' should be employed across the construction phase to ensure impacts are minimised. These measures will be detailed in the CEMP. Examples of best practicable measures include:

- Equipment should be turned off when not in use and no vehicle idling should be permitted within the construction site including construction yards etc;
- Where possible all noisy plant and equipment should be replaced with less noisy alternatives;
- All plant should be properly maintained and all noise control measures be properly employed i.e. exhaust silencers fitted, vehicle panels closed etc;
- All panel frame supports should be push driven as far as possible. Pre-auguring can be used to facilitate this. Where ground conditions do not allow this, alternative methods should be selected with a view on their potential noise emissions. Impact driven supports should be viewed as a last resort;
- Do not drop materials i.e. access road surface materials etc, from excessive heights. Where necessary consider screens around material drop areas;
- Construction traffic should be timed and routed to minimise the impact to local residents; and
- Noise monitoring should be carried out in the event of valid complaints.

## Operational Phase Mitigation Measures

13.91 The locations of the sources of noise have been chosen to maximise, wherever possible, separation from potential receptors thereby including for mitigation inherently within the design.

13.92 Given the impact assessment presented in **Table 13.10** on **page 319**, and the very low predicted noise levels, no further noise mitigation measures are proposed for the operational phase of the development.

# RESIDUAL EFFECTS

13.93 The short-term effects of the construction phase would be controlled through the CEMP and may include some of the mitigation measures suggested within this chapter. This will ensure the noise impacts during the construction phase are suitably controlled and there are no residual effects due to the short-term nature of the construction phase.

13.94 Noise during the operational phase is likely to be negligible, even on a conservative assessment basis, and there are no residual noise effects.

# SUMMARY OF SIGNIFICANCE

## Construction Phase

13.95 The worst-case assessments summarised above demonstrate that noise during the construction phase should fall below the appropriate noise limits; therefore, no significant adverse noise impacts are anticipated. The CEMP will provide further detail on construction methods and mitigation once factors such as the phasing, methodology and equipment are known.

13.96 While there may be some noise impacts during the construction phase, with detailed consideration within the CEMP, the impacts are expected to be **negligible** given the short duration of the construction programme.

## Operational Phase

13.97 The assessment presented in **Table 13.10** on **page 319** demonstrates that operational noise from the solar farm would generally fall well below the proposed noise limits which are, in turn, significantly below the level at which sleep disturbance etc is likely to occur in accordance with the WHO Guidelines. The impact of this would be **negligible**.

13.98 The exception to the above is the predicted noise levels at receptor AL02 where predicted noise levels would be 1dB above the noise limit, giving a **minor** impact significance which is not significant in terms of BS4142.

Table 13.11 - *Summary of Impact Significance*

| Residual Receptor Effect | Sensitivity of Receptor | Magnitude of Impact | Duration | Nature | Significance |
|---|---|---|---|---|---|
| Construction Phase | | | | | |
| Construction Noise and Vehicle movements | High | Negligible | Short Term | Adverse | Negligible |
| Operational Phase | | | | | |
| Daytime Operational Noise | High | Negligible to Minor | Duration of the consent | Adverse | Negligible |
| Daytime Operational Vibration | High | N/A | N/A | None | Negligible |

# REFERENCES

Ministry of Housing, Communities & Local Government, 2012, National Planning Policy Framework, HMSO, UK

Department for Environment, Food and Rural Affairs (DEFRA), 2010, Noise Policy Statement for England, HMSO, UK.

BS 5228:2009 + A1:2014, 2009, Code of Practice for Noise and Vibration Control on Construction and Open Sites, UK.

Her Majesty's Stationery Office, Welsh Office, 1988, Calculation of Road Traffic Noise, UK

Highways England, 2020, Design Manual for Roads and Bridges LA111, Noise and Vibration

BS 4142:2014, 2014, Method for rating and assessing industrial and commercial sound, UK.

BS 8233:2014, 2014, Guidance on sound insulation and noise reduction for buildings, UK.

World Health Organisation, 1999, Guidelines for Community Noise,

International Organization for Standardization, 1996, ISO 9613-2, Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation

Extrium Noise Mapping: http://www.extrium.co.uk/noiseviewer.html

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## INTRODUCTION

14.1 Neo Environmental Ltd has been appointed by Engena on behalf of EDF Renewables (the "Applicant") to undertake a Glint and Glare Assessment for a proposed solar array development (the "Proposed Development") within a series of agricultural fields to the southeast of Ashford, west of Sellindge and northeast of Aldington, near the M20 motorway (the "Application Site").

14.2 For the purposes of this chapter, the site has three distinct areas. These areas can be viewed in **Appendices 14.1, 14.2** and **14.3**.

## Proposed Development Description

14.3 The Proposed Development will consist of the construction of PV panels mounted on metal frames, access tracks, storage and welfare containers, combined inverter/ transformer units, perimeter fencing and all ancillary grid infrastructure and associated works.

14.4 Please see **Figure 1.2** of overall site layout of the Proposed Development.

## Site Description

14.5 The Application Site is located c. 2.22km to the west of the village of Sellindge. Centred for the purposes of this assessment at approximate Grid Reference N137921 E607901, the Application Site covers a total area of c. 103.9 hectares. The Application Site consists of three distinct areas of land.

14.6 The Application Site comprises a single site and the Proposed Development will be accessed from Church Lane. The solar panels will be confined entirely to the Application Site at a height of approximately 3m.

14.7 The Application Site is generally well enclosed and consists of six fields. The site is surrounded by vegetation and adjacent to an existing solar farm. The solar panels and main infrastructure will occupy five fields in the Application Site.

## Scope of Study

14.8 Although there may be small amounts of glint and glare from the metal structures associated with the solar farm, the main source of glint and glare will be from the panels themselves and this will be the focus of this assessment.

14.9 Solar panels are designed to absorb as much light as possible and not to reflect it. However, glint can be produced as a reflection of the sun from the surface of the solar PV panel. This can also be described as a momentary flash. This may be an issue due to visual impact and viewer distraction on ground-based receptors and on aviation.

14.10 Glare is significantly less intense in comparison to glint and can be described as a continuous source of bright light, relative to diffused lighting. This is not a direct reflection of the sun, but a reflection of the sky around the sun.

14.11 This chapter concentrates on the effects of glint and glare and its impact on local receptors and will be supported with the following Figures and Appendices;

- **Figure 14.1**: Residential Based Receptors;
- **Figure 14.2**: Road Based Receptors;
- **Figure 14.3**: Rail Based Receptors;
- **Figure 1.2**: Site Layout;
- **Figure 14.4**: Panel Area Labels;
- **Appendix 14.1**: Residential Receptor Glare Results;
- **Appendix 14.2**: Road Receptor Glare Results;
- **Appendix 14.3**: Rail Receptor Glare Results;
- **Appendix 14.4**: Aviation Receptor Glare Results;
- **Appendix 14.5**; Visibility Evidence Assessment; and
- **Appendix 14.6**: Solar Module Glare and Reflectance Technical Memo.

## Definitions

14.12 This study examined the potential hazard and nuisance effects of glint and glare in relation to ground-based receptors, this includes the occupants of surrounding dwellings as well as road users. The Federal Aviation Authority (FAA) in their "Technical Guidance for Evaluating Selected Solar Technologies on Airports" have defined the terms 'Glint' and 'Glare' as meaning;

- Glint – "A momentary flash of bright light".
- Glare – "A continuous source of bright light".

14.13 Glint and glare are essentially the unwanted reflection of sunlight from reflective surfaces. This study used a multi-step process of elimination to determine which receptors have the potential to experience the effects of glint and glare. It then examined, using a computer-generated geometric model, the times of the year and the times of the day such effects could occur. This is based on the relative angles between the sun, the panels, and the receptor throughout the year.

### *General Nature of Reflectance from Photovoltaic Panels*

14.14 In terms of reflectance, photovoltaic solar panels are by no means a highly reflective surface. They are designed to absorb sunlight and not to reflect it. Nonetheless, photovoltaic panels have a flat polished surface, which omits 'specular' reflectance rather than a 'diffuse' reflectance, which would occur from a rough surface. Several studies have shown that photovoltaic panels (as opposed to Concentrated Solar Power) have similar reflectance characteristics to water, which is much lower than the likes of glass, steel, snow and white concrete by comparison (See **Appendix 14.6**). Similar levels of reflectance can be found in rural environments from the likes of shed roofs and the lines of plastic mulch used in cropping. In terms of the potential for reflectance from photovoltaic panels to cause hazard and/ or nuisance effects,

there have been a number of studies undertaken in respect of schemes in close proximity to airports. The most recent of these was compiled by the Solar Trade Association (STA) in April 2016 and used a number of case studies and expert opinions, including that from Neo. The summary of this report states that "the STA does not believe that there is cause for concern in relation to the impact of glint and glare from solar PV on aviation and airports…" .

### *Time Zones / Datums*

14.15 Locations in this chapter are given in Eastings and Northings using the 'British National Grid' grid reference system unless otherwise stated.

14.16 England uses British Summer Time (BST, UTC + 01:00) in the summer months and Greenwich Mean Time (GMT, UTC+0) in the winter period. For the purposes of this report all time references are in GMT.

## LEGISLATION AND GUIDANCE

14.17 A review of relevant legislation has been conducted to ensure the Proposed Development complies with the following:

- The Town and Country Planning (Environmental Impact Assessment) Regulations 2017;
- National Planning Policy Guidance on Renewable and Low Carbon Energy (UK); and
- Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems.

### National Planning Policy Guidance (NPPG) on Renewable and Low Carbon Energy (UK)

14.18 Paragraph 013 (Reference ID: 5-013-20150327) sets out planning considerations that relate to large scale ground-mounted solar PV farms. This determines that 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. Considerations to be taken into account by local planning authorities are;

- "the proposal's visual impact, the effect on landscape of glint and glare and on neighbouring uses and aircraft safety; and
- the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun."

## Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems

14.19 As outlined within the Building Research Establishment (BRE) document 'Planning Guidance for the Development of Large-Scale Ground Mounted Solar PV Systems':

*"Glint may be produced as a direct reflection of the sun in the surface of the solar PV panel. It may be the source of the visual issues regarding viewer distraction. Glare is a continuous source of brightness, relative to diffused lighting. This is not a direct reflection of the sun, but rather a reflection of the bright sky around the sun. Glare is significantly less intense than glint.*

*Solar PV panels are designed to absorb, not reflect, irradiation. However, the sensitivities associated with glint and glare, and the landscape/ visual impact and the potential impact on aircraft safety, should be a consideration. In some instances, it may be necessary to seek a glint and glare assessment as part of a planning application. This may be particularly important if 'tracking' panels are proposed as these may cause differential diurnal and/or seasonal impacts.*

*The potential for solar PV panels, frames and supports to have a combined reflective quality should be assessed. This assessment needs to consider the likely reflective capacity of all of the materials used in the construction of the solar PV farm."*

## Interim CAA Guidance – Solar Photovoltaic Systems (2010)

14.20 There is little guidance on the assessment of glint and glare from solar farms with regards to aviation safety. The Civil Aviation Authority (CAA) has published interim guidance on 'Solar Photovoltaic Systems', they also intend to undertake a review of the potential impacts of solar PV developments upon aviation, however this is yet to be published.

14.21 The interim guidance identifies the key safety issues with regards to aviation, including "glare, dazzling pilots leading them to confuse reflections with aeronautical lights." It is outlined that solar farm developers should be aware of the requirements to comply with the Air Navigation Order (ANO), published in 2009. In particular, developers should take cognisance of the following articles of the ANO, including:

- "Article 137 – Endangering safety of an aircraft – A person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft.";
- Article 221 - Lights liable to endanger – "A person must not exhibit in the United Kingdom any light which:
  - a) by reason of its glare is liable to endanger aircraft taking off or from landing at an aerodrome; or
  - b) by reason of its liability to be mistaken for an aeronautical ground light liable to endanger aircraft"; and
- Article 222 – Lights which dazzle or distract – "A person must not in the United Kingdom direct or shine any light at any aircraft in flight so as to dazzle or distract the pilot of the aircraft."

14.22 Relevant studies generally agree that there is potential for glint and glare from photovoltaic panels to cause a hazard or nuisance for surrounding receptors, but that the intensity of such reflections is similar to that emanating from still water. This is considerably lower than for other manmade materials such as glass, steel or white concrete (SunPower – 2009).

14.23 These Articles are considered within the assessment of glint and glare of the Proposed Development.

## US Federal Aviation Administration Policy

14.24 The FAA in their Solar Guide (Federal Aviation Authority, 2010) incorporates a chapter on the impact and assessment of glint from solar panels. It concludes that (although subject to revision):

*"…evidence suggests that either significant glare is not occurring during times of operation or if glare is occurring, it is not a negative effect and is a minor part of the landscape to which pilots and tower personnel are exposed."*

14.25 The current policy (Federal Register, 2013) demands that an ocular impact assessment must be assessed at 1-minute intervals from when the sun rises above the horizon until the sun sets below the horizon. Specifically, the developer must use the 'Solar Glare Hazard Analysis Tool' (SGHAT) tool specifically and reference its results as this was developed by the FAA and Sandia National Laboratories as a standard and approved methodology for assessing potential impacts on aviation interests, although it notes other assessment methods may be considered. The SGHAT tool has since been licensed to a private organisation who were also involved in its development and it is the software model used in this assessment.

14.26 Crucially, the policy provides a quantitative threshold which is lacking in the English guidance. This outlines that a solar development will not automatically receive an objection on glint grounds if low intensity glint is visible to pilots on final approach. In other words, low intensity glint with a low potential to form a temporary after-image would be considered acceptable under US guidance. Due to the lack of legislation and guidance within England, this US document has been utilised as guidance for this assessment.

14.27 The FAA guidance states that for a solar PV development to obtain FAA approval or to receive no objection, the following two criteria must be met:

- No potential for glint or glare in the existing or planned Air Traffic Control Tower (ATCT); and
- No potential for glare (glint) or "low potential for after-image" along the final approach path for any existing or future runway landing thresholds (including planned or interim phases), as shown by the approved layout plan (ALP). The final approach path is defined as 2 miles from 50 feet above the landing threshold using a standard 3-degree glide path.

14.28 The geometric analysis included later in this report, which defines the extent and time at which glint may occur, is required by the FAA as the methodology to be used when assessing glint and glare impacts on aviation receptors. This report follows the methodology required by the FAA as it offers the most robust assessment method currently available.

14.29 The Final Policy was introduced in May 2021 and supersedes the Interim Policy. The main difference between the two is that the FAA has withdrawn its requirement for the SGHAT approach in determining the ocular impact of glare. While still requiring a determination of the ocular impact, it is encouraged through a variety of methods and not just the singular method, as it was previously.

## Review of Local Plan

### *Ashford Borough Local Plan*

14.30 The Ashford Adopted Local Plan To 2030 was adopted in February 2019.

14.31 There are no policies contained within the Local Plan which are of relevance to this Glint and Glare assessment.

# METHODOLOGY

14.32 A desk-based assessment was undertaken to identify when and where glint and glare may be visible at receptors within the vicinity of the Proposed Development, throughout the day and the year.

## Sun Position and Reflection Model

### *Sun Data Model*

14.33 The calculations in the solar position calculator are based on equations from Astronomical Algorithms . The sunrise and sunset results are theoretically accurate to within a minute for locations between +/- 72° latitude, and within 10 minutes outside of those latitudes. However, due to variations in atmospheric composition, temperature, pressure, and conditions, observed values may vary from calculations.

### *Solar Reflection Model*

14.34 The position of the sun is calculated at one-minute intervals of a typical year, in this instance the year being assessed was 2021.

14.35 In order to determine if a solar reflection will reach a receptor, the following variables are required:

- Sun position;
- Observer location, and;
- Tilt, orientation, and extent of the modules in the solar array.

14.36 The model assumes that the azimuth and horizontal angle of the sun is the same across the whole solar farm. This is considered acceptable due to the distance of the sun from the Proposed Development and the minuscule differences in location of the sun over the Proposed Development.

14.37 Once the position of the sun is known for each time interval, a vector reflection equation determines the reflected sun vector, based on the normal vector of the solar array panels. This assumes that the angle of reflection is equal to the angle of incidence reflected across a normal plane. In this instance, the plane being the vector which the solar panels are facing.

14.38 On knowing the vector of the solar reflection, the azimuth is calculated and the horizontal reflection from

multiple points within the solar farm. These are then compared with the azimuth and horizontal angle of the receptor from the solar farm to determine if it is within range to receive solar reflections.

14.39 The solar reflection in the model is considered to be specular as a worst-case scenario. In practice the light from the sun will not be fully reflected as solar panels are designed to absorb light rather than reflect it. The text above and **Appendix 14.6** outlines the reflective properties of solar glass and compares it to other reflective surfaces. Although the exact figures in this report could be argued, it is included as a visual guide and it agrees with most other reports, in that solar glass has less reflective properties than other types of glass and that the amount of reflective energy drops as the angle of incidence decreases.

14.40 Most modern panels have a slight surface texture which should have a small effect on diffusing the solar radiation further. Although, this has not been modelled, so as to provide a worst-case scenario assessment.

14.41 The panel reflectivity has been modelled to assume an anti-reflective coating (ARC) which is the industry standard for photo-voltaic panels and further reduces the reflective properties of the PV panels.

## *Determination of Ocular Impact*

14.42 The software used for this assessment is based on the Sandia Laboratories Solar Glare Hazard Analysis Tool (SGHAT). This tool is specifically mentioned in the FAA guidance as the software which should be used in this type of assessment.

14.43 Determination of the ocular impact requires knowledge of the direct normal irradiance, PV module reflectance, size and orientation of the array, optical properties of the PV module, and ocular parameters. These values are used to determine the retinal irradiance and subtended source angle used in the ocular hazard plot.

14.44 The ocular impact of viewed glare can be classified into three levels based on the retinal irradiance and subtended source angle: low potential for after-image (green), potential for after-image (yellow), and potential for permanent eye damage (red).

14.45 Green glare can be ignored when looking at ground based and some aviation receptors. Green glare does not cause temporary flash blindness and happens at an instant with very slight disturbance. As per FAA guidelines mitigation is only required for green glare when affecting an Air Traffic Control Tower, but not for when affecting pilots. Therefore, it can be assumed that green glare is acceptable for ground-based receptors.

14.46 The subtended source angle represents the size of the glare viewed by an observer, while the retinal irradiance determines the amount of energy impacting the retina of the observer. Larger source angles can result in glare of high intensity, even if the retinal irradiance is low.

## *Relevant Parameters of the Proposed Development*

14.47 The photovoltaic panels are oriented in a southwards direction to maximise solar gain and will remain in a fixed position throughout the day and during the year (i.e. they will not rotate to track the movement of the sun).

The panels will face south and will be inclined at an angle of 20 degrees.

14.48 The height of the panels above ground level is a maximum of 3m and points at the top of the panels are used to determine the potential for glint and glare generation.

## Identification of Receptors

### *Study Areas*

14.49 A 1km study area from the panels was deemed appropriate for the assessment of ground-based receptors as this seemed to contain a good spread of residential and road receptors in most directions from the Proposed Development. The further distance a receptor is from a solar farm, the less chance it has of being affected by glint and glare due to scattering of the reflected beam and atmospheric attenuation, in addition to obstructions from ground sources, such as any intervening vegetation or buildings. These study areas can be viewed in **Figure 14.1, 14.2** and **14.3**.

14.50 Buffer zones to identify aviation assets vary depending on the safeguarding criteria of that asset. All aerodromes within 30km will be identified, however generally the detailed assessments are only required within 20km for large international aerodromes; 10km for military aerodromes; and 5km for small aerodromes.

## Ground Based Receptors

14.51 Glint is most likely to impact upon a ground-based receptor close to dusk and dawn when the sun is at its lowest in the sky. Therefore, any effect would likely occur early in the day or late in the day, reflected to the west at dawn and east at dusk.

14.52 A 1km study area from the panels was deemed appropriate for the assessment of ground-based receptors as this seemed to contain a good spread of residential and road receptors in most directions from the Proposed Development. The further distance a receptor is from a solar farm, the less chance it has of being affected by glint and glare due to scattering of the reflected beam and atmospheric attenuation, in addition to obstructions from ground sources, such as any intervening vegetation or buildings

14.53 An observer height of 2m was utilised for residential receptors, as this is a typical height for a ground-floor window. With regards to road users, a receptor height of 1.5m was employed as this is typical of eye level. Rail driver's eye level was assumed to be 2.75m above the rail for signal signing purposes and therefore this is the height used for assessment purposes.

14.54 An assessment was undertaken to determine zones where solar reflections will never be directed near ground level.

14.55 Where there are several residential receptors within close proximity, a representative dwelling or dwellings is/ are chosen for full assessment as the impacts will not vary to any significant degree. Where small groups of receptors have been evident, the receptors on either end of the group have been analysed in detail with the worst-case impacts attributed to that receptor.

### *Aviation*

14.56 Glint is only considered to be an issue with regards to aviation safety when the solar farm lies within close proximity to a runway, particularly when the aircraft is descending to land. En-route activities are not considered an issue as the flight will most likely be at a higher altitude than the solar reflection.

14.57 Should a solar farm be proposed within the safeguarded zone of an aerodrome then a full geometric study may be required which would determine if there is potential for glint and glare at key locations, most likely on the descent to land.

### *Sensitivity*

14.58 All receptors within this chapter will be deemed as having a High sensitivity. In reality, the sensitivity of a static receptor such as a dwelling, will have a lower sensitivity than a road user, due to the safety aspect. However, it is considered that categorising all receptors as High is the best option to present a worst case scenario in respect of glint and glare impacts.

## Magnitude of Impact

### *Static Receptors*

14.59 Although there is no specific guidance set out to identify the magnitude of impact from solar reflections, the following criteria has been set out for the purposes of this report:

- High - Solar reflections impacts of over 30 hours per year or over 30 minutes per day;
- Medium - Solar reflections impacts between 20 and 30 hours per year or between 20 minutes and 30 minutes per day;
- Low - Solar reflections impacts between 0 and 20 hours per year or between 0 minutes and 20 minutes per day; and
- None - Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

### *Moving Receptors (Road and Rail)*

14.60 Again, no specific guidance is available to identify the magnitude of impact from solar reflections on moving receptors except in aviation, however it is thought that a similar approach should be applied to moving receptors as aviation, based on the ocular impact and the potential for after-image.

14.61 The FAA guidance states that for a solar PV development to obtain FAA approval or to receive no objection the following criteria must be met:

- No potential for glare (glint) or "low potential for after-image (Green Glare)" along the final approach path for any existing or future runway landing thresholds (including planned or interim phases), as shown by the approved layout plan (ALP).

14.62 The FAA produced an evaluation of glare as a hazard and concluded in their report that:

*"The more forward the glare is and the longer the glare duration, the greater the impairment to the pilots' ability to see their instruments and to fly the aircraft. These results taken together suggest that any sources of glare at an airport may be potentially mitigated if the angle of the glare is greater than 25 deg from the direction that the pilot*

*is looking in. We therefore recommend that the design of any solar installation at an airport consider the approach of pilots and ensure that any solar installation that is developed is placed such that they will not have to face glare that is straight ahead of them or within 25 deg of straight ahead during final approach."*

14.63 It is reasonable to assume that although this report was assessing pilots' vision impairment, it can be also applied to drivers of other vehicles. Therefore, the driver's field of view will also be analysed where required and if the glare is greater than 25 degrees either side of their line of sight, then any impacts will reduce to low.

14.64 Based on the above, the following criteria has been set out for the purpose of this report when assessing the magnitude of impact on Road or Rail receptors:

- High –Yellow Glare impacts upon the receptors that are within 25 degrees either side of the receptors field of view;
- Low – Green Glare impacts or Yellow Glare impacts outside the receptors 25-degree field of view; and
- None - Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

## *Moving Receptors (Aviation)*

### APPROACH PATHS

14.65 Each final approach path which has the potential to receive glint is assessed using the SGHAT model. The model assumes an approach bearing on the runway centreline, a 3-degree glide path with the origin 50ft (15.24m) above the runway threshold.

14.66 The computer model considers the pilot's field of view. The azimuthal field of view (AFOV) or horizontal field of view (HFOV) as it is sometimes referred, refers to the extents of the pilot's horizontal field of view measured in degrees left and right from directly in front of the cockpit. The vertical field of view (VFOV) refers to the extents of the pilot's vertical field of view measured in degrees from directly in front of the cockpit. The HFOV is modelled at 90 degrees left and right from the front of the cockpit whilst the VFOV is modelled at 30 degrees.

14.67 The FAA guidance states that there should be no potential for glare or 'low potential for after-image' at any existing or future planned runway landing thresholds for the Proposed Development to be acceptable.

14.68 Based on the above, the following criteria has been set out for the purpose of this report:

- **High** – Any Yellow Glare impacts upon the receptors that are within 25 degrees either side of the receptors field of view;
- **Low** – Green Glare impacts or Yellow Glare impacts outside the receptors 25-degree field of view; and.
- **None** - Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

## *Air Traffic Control Tower (ATCT)*

14.69 An air traffic controller uses the visual control room to monitor and direct aircraft on the ground, approaching and departing the aerodrome. It is essential that air traffic controllers have a clear unobstructed view of the aviation activity. The key areas on

an aerodrome are the views towards the runway thresholds, taxiways, and aircraft bays.

14.70 The FAA guidance states that no solar reflection towards the ATCT should be produced by a proposed solar development, however this should be assessed on a site by site case and will depend on the operations at a particular aerodrome.

14.71 In order to determine the impact on the ATCT, the location and height of the tower will need to be fed into the SGHAT model and where there is a potential for 'low potential for After-Image' or more, then mitigation measures will be required.

14.72 Based on the above, the following criteria has been set out for the purpose of this report:

- **High** – Any Glare impacts upon the receptors; and
- **None** - Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening.

## *Significance of Effects*

14.73 The significance of effects has been defined in accordance with the criteria outlined within **Table 14.1** below. The sensitivity of the attribute and the magnitude of the potential impact have been combined to identify the significance of the effect. Where **Table 14.1** is shaded red (Major), it identifies a significant effect.

Table 14.1 - *Rating of Significant Environmental Impacts*

| **Magnitude of Impact** | **Sensitivity of Receptor** | | |
|---|---|---|---|
| | High | Medium | Low |
| High | Major | Moderate | Minor |
| Medium | Moderate | Moderate | Minor |
| Low | Minor | Minor | Minor |

*Assessment Limitations*

14.74 Below is a list of assumptions and limitations of the model and methods used within this report:

- The model does not consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc;
- The model does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results;
- Due to variations in atmospheric composition, temperature, pressure and conditions, observed values may vary slightly from calculated positions; and
- The model does not account for the effects of diffraction; however, buffers are applied as a factor of safety.
- The model assumes clear skies at all times and does not account for meteorological effects such as cloud cover, fog, or any other weather event which may screen the sun.

14.75 Due to these assumptions and limitations the model overestimates the number of minutes of glint and glare which are possible at each receptor and presents the worst-case scenario. Where glint and glare are predicted, a visibility assessment is carried out to determine a more accurate, real-world prediction of the impacts.

# BASELINE CONDITIONS

## Ground Based Receptors Reflection Zones

14.76 Based on the relatively flat topography in the area, solar reflections between five degrees below the horizontal plane to five degrees above it are described as near horizontal. Reflections from the proposed solar farm within this arc have the potential to be seen by receptors at or near ground level.

14.77 Further analysis showed that this will only occur between the azimuth of 238.15 degrees and 298.73 degrees in the western direction (late day reflections) and 64.76 degrees and 129.14 degrees in the eastern direction (morning reflections) and therefore any ground-based receptor outside these arcs will not have any impact from solar reflections.

14.78 **Figures 14.1, 14.2** and **14.3** show the respective study areas whilst also subtracting from this the areas where solar reflections will not impact on ground-based receptors due to the reasons set out in **paragraphs 14.75 to 14.76**.

## Residential Receptors

14.79 Residential receptors located within 1km of the Application Site have been identified (**Table 14.2**). Glint was assumed to be possible if the receptor is located within the ground-based receptor zones outlined previously.

14.80 There are 26 residential receptors (Receptors 37 – 62) which are within the no-reflection zones and are clearly identifiable in **Figure 14.1**. The process of how these are calculated is explained in **paragraphs 14.75 to 14.76** of this report.

Table 14.2 - *Residential Receptors*

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 1 | 606888 | 139141 | Yes |
| 2 | 606836 | 139087 | Yes |
| 3 | 606961 | 139063 | Yes |
| 4 | 606949 | 138995 | Yes |
| 5 | 606821 | 138979 | Yes |
| 6 | 606732 | 139007 | Yes |
| 7 | 606919 | 138445 | Yes |
| 8 | 606639 | 137693 | Yes |
| 9 | 606425 | 137577 | Yes |
| 10 | 606418 | 137541 | Yes |
| 11 | 606634 | 137352 | Yes |
| 12 | 606568 | 137268 | Yes |
| 13 | 606572 | 137216 | Yes |
| 14 | 607499 | 136768 | Yes |
| 15 | 607513 | 136838 | Yes |
| 16 | 607555 | 137140 | Yes |
| 17 | 607646 | 137124 | Yes |
| 18 | 607708 | 137277 | Yes |
| 19 | 608173 | 137786 | Yes |
| 20 | 608855 | 137498 | Yes |
| 21 | 609339 | 137210 | Yes |
| 22 | 609416 | 137114 | Yes |
| 23 | 609456 | 138041 | Yes |

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 24 | 609047 | 138497 | Yes |
| 25 | 608972 | 138520 | Yes |
| 26 | 608857 | 138492 | Yes |
| 27 | 608783 | 138615 | Yes |
| 28 | 608834 | 138731 | Yes |
| 29 | 608901 | 138791 | Yes |
| 30 | 608939 | 138812 | Yes |
| 31 | 608195 | 138857 | Yes |
| 32 | 608154 | 138855 | Yes |
| 33 | 608088 | 139091 | Yes |
| 34 | 608018 | 139038 | Yes |
| 35 | 607913 | 139057 | Yes |
| 36 | 607960 | 139130 | Yes |
| 37 | 607473 | 139924 | No |
| 38 | 607461 | 139910 | No |
| 39 | 607451 | 139893 | No |
| 40 | 607326 | 139746 | No |
| 41 | 607344 | 139676 | No |
| 42 | 607295 | 139625 | No |
| 43 | 607250 | 139567 | No |
| 44 | 607233 | 139526 | No |
| 45 | 607143 | 139561 | No |
| 46 | 607421 | 139519 | No |
| 47 | 607363 | 139487 | No |

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 48 | 607465 | 139278 | No |
| 49 | 607716 | 139202 | No |
| 50 | 607089 | 139328 | No |
| 51 | 607046 | 139305 | No |
| 52 | 606743 | 139425 | No |
| 53 | 606828 | 139452 | No |
| 54 | 606894 | 139498 | No |
| 55 | 606864 | 139575 | No |
| 56 | 606773 | 139608 | No |
| 57 | 606729 | 139754 | No |
| 58 | 608141 | 136822 | No |
| 59 | 608019 | 136467 | No |
| 60 | 607955 | 136421 | No |
| 61 | 607562 | 136433 | No |
| 62 | 607509 | 136476 | No |

## *Road / Rail Receptors*

14.81 There are seven roads within the 1km study area that require a detailed Glint and Glare Assessment; Bower Road, Church Lane, Station Road, Goldwell Lane, Haringe Lane, the M20 and Hythe Road (A20). There are some minor roads which serve dwellings; however, these have been excluded from assessment as vehicle users of these roads will likely be travelling at low speeds and therefore, there is a negligible risk of safety impacts resulting from glint and glare of the Proposed Development.

14.82 The ground receptor no-reflection zones are clearly identifiable on **Figure 14.2** and the process of how these are calculated is explained in **paragraphs 14.75 to 14.76** of this report.

14.83 **Table 14.3** shows a list of assessed receptor points within the study area which are 200m apart.

Table 14.3 - *Road Based Receptors*

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 1 | 606445 | 139109 | Yes |
| 2 | 606618 | 139010 | Yes |
| 3 | 606773 | 139042 | Yes |
| 4 | 606785 | 138849 | Yes |
| 5 | 606793 | 138651 | Yes |
| 6 | 606728 | 138462 | Yes |
| 7 | 606605 | 138337 | Yes |
| 8 | 606506 | 138198 | Yes |
| 9 | 606400 | 137804 | Yes |
| 10 | 606522 | 137674 | Yes |
| 11 | 606634 | 137562 | Yes |
| 12 | 606624 | 137362 | Yes |
| 13 | 606605 | 137163 | Yes |
| 14 | 609260 | 136636 | Yes |
| 15 | 609277 | 136835 | Yes |
| 16 | 609353 | 137018 | Yes |
| 17 | 609362 | 137214 | Yes |
| 18 | 609386 | 137411 | Yes |
| 19 | 609429 | 137606 | Yes |
| 20 | 609422 | 137805 | Yes |
| 21 | 609523 | 137977 | Yes |
| 22 | 609332 | 138037 | Yes |
| 23 | 609146 | 138109 | Yes |

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 24 | 608964 | 138192 | Yes |
| 25 | 608786 | 138283 | Yes |
| 26 | 608613 | 138384 | Yes |
| 27 | 608442 | 138489 | Yes |
| 28 | 608271 | 138591 | Yes |
| 29 | 608095 | 138687 | Yes |
| 30 | 607918 | 138781 | Yes |
| 31 | 607740 | 138870 | Yes |
| 32 | 607558 | 138953 | Yes |
| 33 | 607737 | 139161 | Yes |
| 34 | 607915 | 139070 | Yes |
| 35 | 608094 | 138980 | Yes |
| 36 | 608272 | 138890 | Yes |
| 37 | 608449 | 138797 | Yes |
| 38 | 608620 | 138692 | Yes |
| 39 | 608791 | 138587 | Yes |
| 40 | 608973 | 138505 | Yes |
| 41 | 608252 | 138431 | Yes |
| 42 | 608110 | 138301 | Yes |
| 43 | 608157 | 138114 | Yes |
| 44 | 608200 | 137950 | Yes |
| 45 | 608143 | 137759 | Yes |
| 46 | 608030 | 137594 | Yes |
| 47 | 607885 | 137458 | Yes |

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 48 | 607751 | 137313 | Yes |
| 49 | 607675 | 137128 | Yes |
| 50 | 607576 | 136970 | Yes |
| 51 | 607568 | 136770 | Yes |
| 52 | 607491 | 139970 | No |
| 53 | 607357 | 139822 | No |
| 54 | 607224 | 139672 | No |
| 55 | 607168 | 139489 | No |
| 56 | 607049 | 139330 | No |
| 57 | 606483 | 139475 | No |
| 58 | 606642 | 139354 | No |
| 59 | 606816 | 139255 | No |
| 60 | 606999 | 139174 | No |
| 61 | 607186 | 139101 | No |
| 62 | 607373 | 139029 | No |
| 63 | 607559 | 139253 | No |
| 64 | 607379 | 139340 | No |
| 65 | 607199 | 139428 | No |
| 66 | 607020 | 139518 | No |
| 67 | 606843 | 139611 | No |
| 68 | 606669 | 139709 | No |
| 69 | 607548 | 136571 | No |

14.84 There are two parallel and immediately adjacent railway lines within the 1km study area that pass from east to west between the North Array and the Central Array (see **Figure 14.4**) which requires a detailed assessment – the two lines have been assessed as a single receptor.

14.85 The ground receptor no-reflection zones are clearly identifiable on **Figure 14.3** and the process of how these are calculated is explained in **paragraphs 14.75 to 14.76** of this report.

14.86 **Table 14.4** shows a list of assessed receptors points within the study area which are 200m apart.

Table 14.4 - *Rail Based Receptors*

| Receptor | Easting | Northing | Glint and Glare Possible |
|---|---|---|---|
| 1 | 606366 | 138568 | Yes |
| 2 | 606554 | 138501 | Yes |
| 3 | 606745 | 138443 | Yes |
| 4 | 606939 | 138392 | Yes |
| 5 | 607134 | 138349 | Yes |
| 6 | 607331 | 138313 | Yes |
| 7 | 607527 | 138276 | Yes |
| 8 | 607724 | 138240 | Yes |
| 9 | 607922 | 138204 | Yes |
| 10 | 608118 | 138167 | Yes |
| 11 | 608315 | 138131 | Yes |
| 12 | 608513 | 138096 | Yes |
| 13 | 608709 | 138059 | Yes |
| 14 | 608906 | 138022 | Yes |
| 15 | 609103 | 137986 | Yes |
| 16 | 609300 | 137951 | Yes |
| 17 | 609496 | 137915 | Yes |

## *Aviation Receptors*

14.87 Aerodromes within 30km of the Proposed Development can be found in **Table 14.5**.

Table 14.5 - *Airfields within Close Proximity*

| Airfield | Distance | Use |
|---|---|---|
| Haringe Court Farm | 0.85km | Small grass strip |
| Pent Farm | 4.90km | Small grass strip |
| Monks Field Airfield | 8.51km | Small grass strip |
| Coldharbour Farm | 13.69km | Small grass strip |
| Challock Airfield | 13.80km | Small grass strip |
| Clipgate Farm | 15.29km | Unlicensed small grass strip |
| Lydd Airport | 15.29km | Licensed aerodrome |
| Waldershare Park Airfield | 22.10km | Small grass strip |
| Headcorn Aerodrome | 22.43km | Licensed small grass strip |
| Maypole Airfield | 28.18km | Small grass strip |

14.88 There is one aerodrome, Pent Farm, which requires a detailed assessment due to this airfield being within its respective safeguarding buffer zones outlined in **paragraph 14.49**.

## HARINGE COURT FARM

14.89 Haringe Court Farm is a Visual Flight Rules (VFR) only aerodrome. It is located approximately 4.5NM (8.33km) northwest of Folkestone.

14.90 The elevation of the aerodrome is 279ft (85m). It has one grass strip runway, details of which are given in **Table 14.6**.

Table 14.6 - *Runways at Haringe Court Farm*

| Runway Designation | True Bearing(°) | Length (m) | Width (m) |
|---|---|---|---|
| 02 | 018 | 370 | 10 |
| 20 | 198 | 370 | 10 |

Table 14.7 - *Runway Threshold Locations and Heights*

| Runway Designation | Threshold Latitude | Threshold Longitude | Height AOD (m) |
|---|---|---|---|
| 02 | 51° 05' 25.32" N | 000° 59' 17.01" E | 88 |
| 20 | 51° 05' 36.72" N | 000° 59' 23.05" E | 84 |

Table 14.8 - *Runways at Pent Farm*

| Runway Designation | True Bearing(°) | Length (m) | Width (m) |
|---|---|---|---|
| 05 | 51 | 800 | 20 |
| 23 | 231 | 800 | 20 |

Table 14.9 - *Runway Threshold Locations and Heights*

| Runway Designation | Threshold Latitude | Threshold Longitude | Height AOD (m) |
|---|---|---|---|
| 05 | 51° 06' 27.22" N | 001° 02' 58.45" E | 81 |
| 23 | 51° 06' 41.91" N | 001° 03' 31.72" E | 90 |

14.91 The threshold location and height of the runway at Haringe Court Farm are given in **Table 14.7**.

14.92 There is no Airport Reference Point (ARP) or air traffic control tower (ATCT) at Heringe Court Farm.

## *Pent Farm*

14.93 Pent Farm is a Visual Flight Rules (VFR) only aerodrome. It is located approximately 4.5NM (8.33km) northwest of Folkestone.

14.94 The elevation of the aerodrome is 279ft (85m). It has one grass strip runway, details of which are given in **Table 14.8**.

14.95 The threshold location and height of the runway at Pent Farm are given in **Table 14.9**.

14.96 There is no Airport Reference Point (ARP) or air traffic control tower (ATCT) at Pent Farm.

# IMPACT ASSESSMENT

14.97 Following the methodology outlined earlier in this chapter, geometrical analysis comparing the azimuth and horizontal angle of the receptors from the Proposed Development and the solar reflection was conducted. Although this assessment did not take into account obstructions such as vegetation and buildings, discussion on the potentially impacted receptors is provided where necessary.

## Ground Based Receptors

### *Residential Receptors*

14.98 **Table 14.10** identifies the receptors that could potentially experience solar reflections based on solar reflection modelling and whether the reflections will be experienced in the morning (AM), evening (PM), or both.

14.99 The 26 receptors which were within the no-reflection zones outlined previously have been excluded from the detailed modelling as they will never receive any glint and glare impacts from the Proposed Development.

14.100 **Appendix 14.1** shows the analysis with the solar panels at a tilt angle of 20 degrees and a height of 3m. **Table 14.10** shows the worst-case impact at each receptor.

Table 14.10 - *Potential for Glint and Glare impact on Residential Receptors*

| Receptor | Glint Possible from Site | | Potential Glare Impact (per year) | | Magnitude of Impact | Significance of Effect |
|---|---|---|---|---|---|---|
| | AM | PM | Minutes | Hours | | |
| 1 | No | No | 0 | 0 | None | None |
| 2 | No | No | 0 | 0 | None | None |
| 3 | No | No | 0 | 0 | None | None |
| 4 | Yes | No | 161 | 2.68 | High | Major |
| 5 | Yes | No | 298 | 4.97 | High | Major |
| 6 | Yes | No | 102 | 1.70 | High | Major |
| 7 | Yes | No | 33 | 0.55 | High | Major |
| 8 | Yes | No | 3013 | 50.22 | High | Major |
| 9 | Yes | No | 2921 | 48.68 | High | Major |
| 10 | Yes | No | 2932 | 48.87 | High | Major |
| 11 | Yes | No | 3103 | 51.72 | High | Major |
| 12 | Yes | No | 3110 | 51.83 | High | Major |
| 13 | Yes | No | 3209 | 53.48 | High | Major |
| 14 | Yes | No | 1056 | 17.60 | High | Major |
| 15 | Yes | No | 1552 | 25.87 | High | Major |
| 16 | Yes | No | 2566 | 42.77 | High | Major |
| 17 | Yes | No | 2668 | 44.47 | High | Major |
| 18 | Yes | No | 2273 | 37.88 | High | Major |
| 19 | No | Yes | 2971 | 49.52 | High | Major |
| 20 | No | Yes | 4952 | 82.53 | High | Major |
| 21 | No | Yes | 4989 | 83.15 | High | Major |

| Receptor | Glint Possible from Site | | Potential Glare Impact (per year) | | Magnitude of Impact | Significance of Effect |
|---|---|---|---|---|---|---|
| | AM | PM | Minutes | Hours | | |
| 22 | No | Yes | 4501 | 75.02 | High | Major |
| 23 | No | Yes | 3279 | 54.65 | High | Major |
| 24 | No | Yes | 1687 | 28.12 | High | Major |
| 25 | No | Yes | 1722 | 28.70 | High | Major |
| 26 | No | Yes | 1362 | 22.70 | High | Major |
| 27 | No | Yes | 1622 | 27.03 | High | Major |
| 28 | No | Yes | 1429 | 23.82 | High | Major |
| 29 | No | Yes | 1040 | 17.33 | High | Major |
| 30 | No | Yes | 964 | 16.07 | High | Major |
| 31 | No | Yes | 485 | 8.08 | High | Major |
| 32 | No | Yes | 560 | 9.33 | High | Major |
| 33 | No | No | 0 | 0 | None | None |
| 34 | No | No | 0 | 0 | None | None |
| 35 | No | No | 0 | 0 | None | None |
| 36 | No | No | 0 | 0 | None | None |

14.101 As can be seen in **Table 14.10**, there is a predicted High impact at 29 receptors, including two residential areas, and no impact for the remaining seven receptors. **Appendix 14.1** shows detailed analysis of when the glare impacts are possible, whilst also showing which parts of the solar farm the solar glare is reflected from.

14.102 **Appendix 14.4** shows Google Earth images that give an insight into how each receptor will be impacted by glint and glare from the Proposed Development. There is a mixture of images used, which include aerial, ground level and street level. The aerial images show the location of the receptor with the solar farm drawn as a white polygon and can be seen on the images when the solar farm is theoretically visible. The area of the solar farm from where reflections may be possible has been drawn as a yellow polygon. The ground level terrain is based on the height data of the surrounding land showing no intervening vegetation or buildings. The white and yellow polygons can be seen in this view also. The street view gives a good indication as to whether the area of the solar farm where reflections are theoretically possible will be visible from the receptor point.

RECEPTORS 4 - 6

14.103 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.5** shows that reflections from a small northwest corner of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.104 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to **None** with the significance of effect being **None**.

RECEPTOR 7

14.105 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from a central section of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.106 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTORS 8 - 13

14.107 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from all of the South Array and a northwest section of the East Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.108 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards Proposed

Development. These images confirm that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

## RECEPTORS 14 AND 15

14.109 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from southeast sections of the East Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.110 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

## RECEPTORS 16 AND 17

14.111 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the East Array (see **Figure 14.4**) except a small northwest corner and a small southeast corner in the Proposed Development can potentially impact on the receptor.

14.112 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

## RECEPTOR 18

14.113 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the East Array (see **Figure 14.4**) except a small northwest corner and a small southeast corner in the Proposed Development can potentially impact on the receptor.

14.114 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

## RECEPTOR 19

14.115 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from a central section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.116 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second, third and fourth images were taken (red pin). The second image is a street view image with a view towards Receptors. This image confirms that the vegetation is insufficient to screen all views of the Proposed Development where glint and glare is possible. The third and fourth images are ground level images with a view towards the Proposed Development showing the position of the sun 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

## RECEPTORS 20

14.117 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the South Array except a northern section and northern sections of the East Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.118 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

## RECEPTORS 21 AND 22

14.119 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the South Array except a northern section and most of the East Array except a small northeast section (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.120 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

## RECEPTOR 23

14.121 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from all of the North Array and the northern half of the East Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.122 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTORS 24 - 27

14.123 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from all of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.124 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 28

14.125 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the North Array except a southern section (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.126 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None

RECEPTOR 29

14.127 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from most of the North Array except a southern section (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.128 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 30

14.129 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from the northern half of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.130 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Proposed Development. This image confirms that the vegetation is sufficient to

screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTORS 31 AND 32

14.131 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.1** shows that reflections from a small northern section of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptors.

14.132 The first image in **Appendix 14.5** is an aerial image showing the position of the receptors (yellow pins) in relation to the Proposed Development, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptors. This image confirms that the vegetation is sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RESIDENTIAL AREA 1

14.133 This encompasses a number of residential receptors including those at Receptors 4 – 6 (assessed previously) (See **Figure 14.1**). Each receptor assessed represents multiple receptors as they are in close proximity of each other, so the worst-case scenario is assumed for the impact of glint and glare. All receptors were considered within the visibility analysis, and it was concluded their impacts were similar. As per the assessments of these ten receptors, the impacts on the other receptors within this area are assessed as being None with the significance of effect being None (worst case scenario).

RESIDENTIAL AREA 2

14.134 This encompasses a number of residential receptors including those at Receptors 11 – 13 (assessed previously) (See **Figure 14.1**). Each receptor assessed represents multiple receptors as they are in close proximity of each other, so the worst-case scenario is assumed for the impact of glint and glare. All receptors were considered within the visibility analysis, and it was concluded their impacts were similar. As per the assessments of these ten receptors, the impacts on the other receptors within this area are assessed as being None with the significance of effect being None (worst case scenario).

## *Road Receptors*

14.135 **Table 14.11** shows a summary of the modelling results for each of the Road Receptor Points whilst the detailed results and ocular impact charts can be viewed in **Appendix 14.2**.

14.136 The 17 receptors within the no-reflection zones outlined previously have been excluded from the detailed modelling as they will never receive glint and glare impacts from the Proposed Development.

Table 14.11 - *Potential for Glint and Glare impact on Road Based Receptors*

| Receptor | Green Glare (mins) | Yellow Glare (mins) | Red Glare (mins) | Magnitude of Impact | Significance of Effect |
|---|---|---|---|---|---|
| 1 | 0 | 0 | 0 | None | None |
| 2 | 0 | 71 | 0 | High | Major |
| 3 | 0 | 0 | 0 | None | None |
| 4 | 0 | 1281 | 0 | High | Major |
| 5 | 0 | 3357 | 0 | High | Major |
| 6 | 0 | 2659 | 0 | High | Major |
| 7 | 1 | 2786 | 0 | High | Major |
| 8 | 0 | 1 | 0 | High | Major |
| 9 | 11 | 1843 | 0 | High | Major |
| 10 | 3 | 2974 | 0 | High | Major |
| 11 | 128 | 3031 | 0 | High | Major |
| 12 | 331 | 3124 | 0 | High | Major |
| 13 | 261 | 3278 | 0 | High | Major |
| 14 | 0 | 0 | 0 | None | None |
| 15 | 0 | 1080 | 0 | High | Major |
| 16 | 0 | 3227 | 0 | High | Major |
| 17 | 2 | 4611 | 0 | High | Major |
| 18 | 54 | 3015 | 0 | High | Major |
| 19 | 77 | 2546 | 0 | High | Major |
| 20 | 55 | 3108 | 0 | High | Major |
| 21 | 70 | 3173 | 0 | High | Major |
| 22 | 32 | 3164 | 0 | High | Major |
| 23 | 15 | 3101 | 0 | High | Major |
| 24 | 14 | 3055 | 0 | High | Major |
| 25 | 0 | 2921 | 0 | High | Major |
| 26 | 19 | 3048 | 0 | High | Major |
| 27 | 1 | 2846 | 0 | High | Major |

| Receptor | Green Glare (mins) | Yellow Glare (mins) | Red Glare (mins) | Magnitude of Impact | Significance of Effect |
|---|---|---|---|---|---|
| 28 | 0 | 3046 | 0 | High | Major |
| 29 | 0 | 2109 | 0 | High | Major |
| 30 | 0 | 1801 | 0 | High | Major |
| 31 | 0 | 1224 | 0 | High | Major |
| 32 | 0 | 361 | 0 | High | Major |
| 33 | 0 | 0 | 0 | None | None |
| 34 | 0 | 0 | 0 | None | None |
| 35 | 0 | 24 | 0 | High | Major |
| 36 | 0 | 261 | 0 | High | Major |
| 37 | 18 | 472 | 0 | High | Major |
| 38 | 4 | 1459 | 0 | High | Major |
| 39 | 33 | 1904 | 0 | High | Major |
| 40 | 88 | 1910 | 0 | High | Major |
| 41 | 0 | 1927 | 0 | High | Major |
| 42 | 0 | 2333 | 0 | High | Major |
| 43 | 0 | 1592 | 0 | High | Major |
| 44 | 0 | 6865 | 0 | High | Major |
| 45 | 0 | 2145 | 0 | High | Major |
| 46 | 0 | 2976 | 0 | High | Major |
| 47 | 0 | 18886 | 0 | High | Major |
| 48 | 0 | 1873 | 0 | High | Major |
| 49 | 3 | 2772 | 0 | High | Major |
| 50 | 1 | 2314 | 0 | High | Major |
| 51 | 0 | 1020 | 0 | High | Major |

14.137 As can be seen in **Table 14.11**, there are 46 receptor points which have potential glare impacts with the "potential for after-image" (yellow glare), which is a High impact. **Appendix 14.3** shows detailed analysis of when the glint and glare impacts are possible, whilst also showing from which parts of the solar farm the solar glint is reflected from.

14.138 **Appendix 14.5** shows Google Earth images that give an insight into how each receptor will be impacted by glint and glare from the Proposed Development. There is a mixture of images used, which include aerial, ground level and street level. The aerial images show the location of the receptor with the solar farm drawn as a white polygon and can be seen on the images when the solar farm is theoretically visible. The area of the solar farm from where reflections may be possible has been drawn as a yellow polygon. The ground level terrain is based on the height data of the surrounding land showing no intervening vegetation or buildings. The white and yellow polygons can be seen in this view also. The street view gives a good indication as to whether the area of the solar farm where reflections are theoretically possible will be visible from the receptor point.

14.139 As can be seen in **Appendix 14.5**, views of the Proposed Development from all receptors, except Receptors 5, 16 and 43 – 47 are blocked by a mixture of intervening vegetation, topography and buildings. Therefore, impacts upon these receptors reduce to **None** with the significance of effect being **None**. Ground level images taken at 18:00 UTC on May 1st and July 1st respectively confirm that the sun is the main source of glint and glare at Receptor 16. Therefore, impacts upon this receptor reduce to **Low**.

## *Rail Receptors*

14.140 **Table 14.12** shows a summary of the modelling results for each of the Rail Receptor Points whilst the detailed results and ocular impact charts can be viewed in **Appendix 14.3**.

14.141 There are no receptors within the no-reflection zones outlined previously, therefore none have been excluded from the detailed modelling.

Table 14.12 - *Potential for Glint and Glare impact on Rail Receptors*

| Receptor | Green Glare (mins) | Yellow Glare (mins) | Red Glare (mins) | Magnitude of Impact | Significance of Effect |
|---|---|---|---|---|---|
| 1 | 0 | 3 | 0 | High | Major |
| 2 | 9 | 2025 | 0 | High | Major |
| 3 | 0 | 2711 | 0 | High | Major |
| 4 | 0 | 2708 | 0 | High | Major |
| 5 | 0 | 2720 | 0 | High | Major |
| 6 | 0 | 1426 | 0 | High | Major |
| 7 | 0 | 0 | 0 | None | None |
| 8 | 0 | 0 | 0 | None | None |
| 9 | 0 | 1060 | 0 | High | Major |
| 10 | 0 | 2032 | 0 | High | Major |
| 11 | 0 | 2381 | 0 | High | Major |
| 12 | 0 | 2716 | 0 | High | Major |
| 13 | 0 | 2894 | 0 | High | Major |
| 14 | 0 | 2909 | 0 | High | Major |
| 15 | 11 | 2987 | 0 | High | Major |
| 16 | 39 | 3089 | 0 | High | Major |
| 17 | 71 | 3101 | 0 | High | Major |

14.142 As can be seen in **Table 14.12**, there are 15 receptor points which have potential glare impacts with the "potential for after-image" (yellow glare), which is a High impact. **Appendix 14.2** shows detailed analysis of when the glint and glare impacts are possible, whilst also showing from which parts of the solar farm the solar glare is reflected from.

14.143 **Appendix 14.5** shows Google Earth images that give an insight into how each receptor will be impacted by glint and glare from the Proposed Development. There is a mixture of images used, which include aerial, ground level and street level. The aerial images show the location of the receptor with the solar farm drawn as a white polygon and can be seen on the images when the solar farm is theoretically visible. The area of the solar farm from where reflections may be possible has been drawn as a yellow polygon. The ground level terrain is based on the height data of the surrounding land showing no intervening vegetation or buildings. The white and yellow polygons can be seen in this view also. The street view gives a good indication as to whether the area of the solar farm where reflections are theoretically possible will be visible from the receptor point.

RECEPTOR 1

14.144 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a small northwest section of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.145 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver, and the location from which the second image was taken (red pin). The second image is a street view image taken with a view towards the Receptor. This image confirms that the vegetation and topography are sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 2

14.146 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from most of the North Array (see **Figure 14.4**) except a small southern section in the Proposed Development can potentially impact on the receptor.

14.147 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver, and the location from which the second image was taken (red pin). The second image is a street view image taken with a view towards the Receptor. This image confirms that the vegetation and topography are sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 3

14.148 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from most of the North Array (see **Figure 14.4**) except the northwest corner and a small southern corner in the Proposed Development can potentially impact on the receptor.

14.149 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation and topography are sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 4

14.150 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from most of the North Array (see **Figure 14.4**) except the northwest corner in the Proposed Development can potentially impact on the receptor.

14.151 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 06:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 5

14.152 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from the southeast half of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.153 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second image is a ground level image taken from the position of the receptor with a view towards the Proposed Development. This image confirms that the topography is sufficient to screen all views of the Proposed Development where glint and glare are possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 6

14.154 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a small southeast section of the North Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.155 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second image is a ground level image taken from the position of the receptor with a view towards the Proposed Development. This image confirms that the topography is sufficient to screen all views of the Proposed Development where glint and glare are possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 9

14.156 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a small southern corner of the North Array and a small northern section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.157 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 10

14.158 14.164.The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a small southern corner of the North Array and a small northern section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.159 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 11

14.160 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a small southern corner of the North Array and a northern section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.161 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 12

14.162 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a southern section of the North Array and a small northern section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.163 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 13

14.164 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from a southern section of the North Array and a northern section of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.165 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 14

14.166 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from the southern half of the North Array and the northern half of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.167 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 15

14.168 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from the southern half of the North Array and the northern half of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.169 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver. The second and third images are ground level images taken from the position of the receptor with a view towards the Proposed Development showing the position of the sun at 18:00 UTC on April 1st and July 1st respectively. These images confirm that the sun is the main source of glint and glare at the receptor. Therefore, the impact reduces to Low with the significance of effect being Minor.

RECEPTOR 16

14.170 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from most of the North Array except a northern section and the northern half of the South Array (see **Figure 14.4**) in the Proposed Development can potentially impact on the receptor.

14.171 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation and topography are sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

RECEPTOR 17

14.172 The 'Glare Reflections on PV Footprint' chart in **Appendix 14.3** shows that reflections from most of the North Array except a northern section and most of the South Array (see **Figure 14.4**) except a southern section in the Proposed Development can potentially impact on the receptor.

14.173 The first image in **Appendix 14.5** is an aerial image showing the position of the receptor (yellow pin) in relation to the Proposed Development and visibility cones from the perspective of the train driver, and the location from which the second image was taken (red pin). The second image is a street view image with a view towards the Receptor. This image confirms that the vegetation and topography are sufficient to screen all views of the Proposed Development where glint and glare is possible. Therefore, the impact reduces to None with the significance of effect being None.

*Aviation Receptor*

14.174 **Table 14.13** shows a summary of the modelling results for the Pent Farm runway approach paths as well as the ATCTs whilst the detailed results and ocular impact charts can be viewed in **Appendix 14.4**.

14.175 As can be seen in **Table 14.13**, green glare is expected to impact Runway 23 at Pent Farm. Green glare is described as 'Low Potential for After Image' which is an acceptable impact when pilots are approaching runways/helipads, according to FAA guidance. The impact on approach at this runway is therefore deemed as not significant.

14.176 As can be seen in Table 14.13, no glare is expected to impact aviation receptors at Haringe Farm. Therefore, the impact is None.

14.177 The impact on aviation receptors is Low resulting in the significance of effect being Minor for aviation receptors. Therefore, the effects are not significant.

Table 14.13 - *Summary of Glare Results*

| Component | Green Glare (mins) | Yellow Glare (mins) | Red Glare (mins) |
|---|---|---|---|
| Pent Farm | | | |
| Runway 05 | 0 | 0 | 0 |
| Runway 23 | 397 | 0 | 0 |
| Haringe Farm | | | |
| Runway 02 | 0 | 0 | 0 |
| Runway 20 | 0 | 0 | 0 |

## GROUND BASED RECEPTOR MITIGATION

14.178 Mitigation is required to be put in place when there are potentially significant effects from High and Medium impact views into the Proposed Development.

14.179 Mitigation is required to ensure the High impact views from Road Receptors 5 and 43 – 47 into the Proposed Development are screened. This includes (please refer to **Figure 11.9** of ES Volume 3, Figures):

- Native hedgerows/woodland to be planted/infilled along a central section of the western boundary of the North Array. When implemented this will initially reduce views intermittently and reduce the impact to Low and significance of effect to Minor. Once established this will screen views from Road Receptor 5. Therefore, reducing the impact to None and significance of effect to None.
- Native hedgerows/woodland to be planted/infilled along the western edge of Church Lane adjacent to the South Array, and along the eastern edge of the East Array and maintained to a height of at least 3m. When implemented this will initially reduce views intermittently and reduce the impact to Low and significance of effect to Minor. Once established this will screen views from Road Receptors 43 – 47. Therefore, reducing the impact to None and the significance of effect to None.

14.180 **Table 14.14, Table 14.15** and **Table 14. 16** show the impacts at each stage of the glint and glare analysis, with the final residual impacts considered once the mitigation is in place.

Table 14.14 - *Potential Residual Glint and Glare Impacts on Residential Receptors*

| Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | After Geometric Analysis | After Visibility Analysis | Residual Impacts Following Mitigation | Residual Effect (When Mitigation Established) |
| 1 | None | None | None | None |
| 2 | None | None | None | None |
| 3 | None | None | None | None |
| 4 | High | None | None | None |
| 5 | High | None | None | None |
| 6 | High | None | None | None |
| 7 | High | None | None | None |
| 8 | High | None | None | None |
| 9 | High | None | None | None |
| 10 | High | None | None | None |
| 11 | High | None | None | None |
| 12 | High | None | None | None |
| 13 | High | None | None | None |
| 14 | High | None | None | None |
| 15 | High | None | None | None |
| 16 | High | None | None | None |
| 17 | High | None | None | None |
| 18 | High | None | None | None |
| 19 | High | Low | Low | Minor |
| 20 | High | Low | Low | Minor |

| Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | After Geometric Analysis | After Visibility Analysis | Residual Impacts Following Mitigation | Residual Effect (When Mitigation Established) |
| 21 | High | None | None | None |
| 22 | High | None | None | None |
| 23 | High | None | None | None |
| 24 | High | None | None | None |
| 25 | High | None | None | None |
| 26 | High | None | None | None |
| 27 | High | None | None | None |
| 28 | High | None | None | None |
| 29 | High | None | None | None |
| 30 | High | None | None | None |
| 31 | High | None | None | None |
| 32 | High | None | None | None |
| 33 | None | None | None | None |
| 34 | None | None | None | None |
| 35 | None | None | None | None |
| 36 | None | None | None | None |

Table 14.15 - *Potential Residual Glint and Glare Impacts on Road Receptors*

| Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | After Geometric Analysis | After Visibility Analysis | Residual Impacts Following Mitigation | Residual Effect (When Mitigation Established) |
| 1 | None | None | None | None |
| 2 | High | None | None | None |
| 3 | None | None | None | None |
| 4 | High | None | None | None |
| 5 | High | High | None | None |
| 6 | High | None | None | None |
| 7 | High | None | None | None |
| 8 | High | None | None | None |
| 9 | High | None | None | None |
| 10 | High | None | None | None |
| 11 | High | None | None | None |
| 12 | High | None | None | None |
| 13 | High | None | None | None |
| 14 | None | None | None | None |
| 15 | High | None | None | None |
| 16 | High | Low | Low | Minor |
| 17 | High | None | None | None |
| 18 | High | None | None | None |
| 19 | High | None | None | None |
| 20 | High | None | None | None |
| 21 | High | None | None | None |
| 22 | High | None | None | None |
| 23 | High | None | None | None |
| 24 | High | None | None | None |
| 25 | High | None | None | None |

| Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | After Geometric Analysis | After Visibility Analysis | Residual Impacts Following Mitigation | Residual Effect (When Mitigation Established) |
| 26 | High | None | None | None |
| 27 | High | None | None | None |
| 28 | High | None | None | None |
| 29 | High | None | None | None |
| 30 | High | None | None | None |
| 31 | High | None | None | None |
| 32 | High | None | None | None |
| 33 | None | None | None | None |
| 34 | None | None | None | None |
| 35 | High | None | None | None |
| 36 | High | None | None | None |
| 37 | High | None | None | None |
| 38 | High | None | None | None |
| 39 | High | None | None | None |
| 40 | High | None | None | None |
| 41 | High | None | None | None |
| 42 | High | None | None | None |
| 43 | High | High | None | None |
| 44 | High | High | None | None |
| 45 | High | High | None | None |
| 46 | High | High | None | None |
| 47 | High | High | None | None |
| 48 | High | None | None | None |
| 49 | High | None | None | None |
| 50 | High | None | None | None |
| 51 | High | None | None | None |

Table 14.16 - *Potential Residual Glint and Glare Impacts on Rail Receptors*

| Receptor | Magnitude of Impact | | | |
|---|---|---|---|---|
| | After Geometric Analysis | After Visibility Analysis | Residual Impacts Following Mitigation | Residual Effect (When Mitigation Established) |
| 1 | High | None | None | None |
| 2 | High | None | None | None |
| 3 | High | None | None | None |
| 4 | High | Low | Low | Minor |
| 5 | High | None | None | None |
| 6 | High | None | None | None |
| 7 | None | None | None | None |
| 8 | None | None | None | None |
| 9 | High | Low | Low | Minor |
| 10 | High | Low | Low | Minor |
| 11 | High | Low | Low | Minor |
| 12 | High | Low | Low | Minor |
| 13 | High | Low | Low | Minor |
| 14 | High | Low | Low | Minor |
| 15 | High | Low | Low | Minor |
| 16 | High | None | None | None |
| 17 | High | None | None | None |

Table 14.17 - *Solar Reflections: Residential Receptors*

| Magnitude | Theoretical Visibility | Actual Visibility (No Mitigation) | Actual Visibility with Mitigation |
|---|---|---|---|
| High | 29 | 0 | 0 |
| Medium | 0 | 0 | 0 |
| Low | 0 | 2 | 2 |
| None | 7 | 34 | 34 |

- **High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day
- **Medium** – Solar reflections impacts between 20 and 30 hours per year or between 20 minutes and 30 minutes per day
- **Low** – Solar reflections impacts between 0 and 20 hours per year or between 0 minutes and 20 minutes per day
- **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening

Table 14.18 - *Solar Reflections: Road Receptors*

| Magnitude | Theoretical Visibility | Actual Visibility (No Mitigation) | Actual Visibility with Mitigation |
|---|---|---|---|
| High | 46 | 6 | 0 |
| Medium | 0 | 0 | 0 |
| Low | 0 | 1 | 1 |
| None | 5 | 44 | 50 |

- **High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day
- **Medium** – Solar reflections impacts between 20 and 30 hours per year or between 20 minutes and 30 minutes per day
- **Low** – Solar reflections impacts between 0 and 20 hours per year or between 0 minutes and 20 minutes per day
- **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening

Table 14.19 - *Solar Reflections: Rail Receptors*

| Magnitude | Theoretical Visibility | Actual Visibility (No Mitigation) | Actual Visibility With Mitigation |
|---|---|---|---|
| High | 15 | 0 | 0 |
| Medium | 0 | 0 | 0 |
| Low | 0 | 8 | 8 |
| None | 2 | 9 | 9 |

- **High** – Solar reflections impacts of over 30 hours per year or over 30 minutes per day
- **Medium** – Solar reflections impacts between 20 and 30 hours per year or between 20 minutes and 30 minutes per day
- **Low** – Solar reflections impacts between 0 and 20 hours per year or between 0 minutes and 20 minutes per day
- **None** – Effects not geometrically possible or no visibility of reflective surfaces likely due to high levels of intervening screening

## CUMULATIVE ASSESSMENT

14.181 The Proposed Development is adjacent to an existing solar farm which adjoins the Proposed Development to the north of the East Array (see **Figure 14.4**). Impacts are currently Low impacts upon Residential Receptors 19 and 20 and Rail Receptors 4, 9 – 15. However, upon review of the actual visibility of the existing solar farm development, it has been concluded that this will not be visible from Residential Receptor 20 and Rail Receptors 4, 9 - 15. Regarding Residential Receptor 19, as noted in the Ashford Council Report of Development Control Managers Planning Committee , Glint and Glare impacts upon Bested House from the existing solar farm would not result in harm to residential amenity. Therefore, it is anticipated that there will not be any cumulative effects on ground-based receptors as a result of the construction of the Proposed Development.

14.182 Impacts are currently Low upon Runway 23 at Pent Farm. These impacts will remain Low when taking into account the existing solar farm

development as the glint and glare impacts only occur from the North Array (See **Figure 14.4**), and not the arrays that are adjacent to the existing solar farm. Therefore, it is anticipated that there will not be any cumulative effects on aviation receptors as a result of the construction of the Proposed Development.

14.183 Within the Application Site boundary there will be a Battery and Energy Storage System (BESS) planning application submitted by Pivot Power (Part of EDF). This future BESS application will not add any additional Glint and Glare impacts as there will not be any additional panels as a result of this future BESS application. Therefore, it is anticipated that there will not be any cumulative effects on receptor as a result of the construction of the Proposed Development.

## CONCLUSION

14.184 There is little guidance or policy available in the UK at present in relation to the assessment of glint and glare from proposed solar farm developments. However, it is recognised as a potential impact which needs to be considered for a proposed solar farm development, therefore this assessment considers the potential impacts on ground-based receptors such as roads, rail, and residential dwellings as well as aviation assets.

14.185 This assessment considers the potential impacts on ground-based receptors such as roads, rail and residential dwellings as well as aviation assets. A 1km study area around the Application Site is considered adequate for the assessment of ground-based receptors, whilst a 30km study area is chosen for aviation receptors. Within 1km of the Application Site, there are 62 residential receptors, 69 road receptors and 17 rail receptors which were considered. As per the methodology section, where there are a number of residential receptors within close proximity, a representative dwelling or dwellings is/are chosen for full assessment as the impacts will not vary to any significant degree. Where small groups of receptors have been evident, the receptors on either end of the group have been assessed in detail. 26 residential receptors and 18 road receptors were dismissed as they are located within the no reflection zones. 15 aerodromes are located within the 30km study area; one of which, Pent Farm, required an assessment due to the Proposed Development falling within its respective safeguarding buffer zone, which is outlined in **paragraph 14.50**.

14.186 Geometric analysis was conducted at 36 individual residential receptors, 51 road receptors and 17 rail receptors, as well as one runway at Haringe Court Farm and one runway at Pent Farm.

14.187 The assessment concludes that:

- Solar reflections are possible at 29 of the 36 residential receptors assessed within the 1km study area. The initial bald-earth scenario identified potential impacts as High at 29 receptors and None at the remaining seven receptors. Upon reviewing the actual visibility of the receptor, glint and glare impacts reduce to Low at two receptors and None at 34 receptors. The effects from the Proposed Development are therefore not significant.
- Solar reflections are possible at 46 of the 51 road receptors assessed within the 1km study area.

The initial bald-earth scenario identified potential impacts as High at 46 receptors and None at the remaining five receptors. Upon reviewing the actual visibility of the receptors, glint and glare impacts remain High at six receptors and reduce to Low at one receptor and None at all remaining receptors. Once mitigation measures were considered all impacts reduce to Low at one receptor and None at all remaining receptors. The effects from the Proposed Development are therefore not significant.

- Solar reflections are possible at 15 of the 17 rail receptors assessed within the 1km study area. The initial bald-earth scenario identified potential impacts as High at 15 receptors and None at the remaining two receptors. Upon reviewing the actual visibility of the receptors, glint and glare impacts reduce to Low at eight receptors and None at all remaining receptors. The effects from the Proposed Development are therefore not significant.
- Green glare impacts are predicted on the approach path for Runway 23 at Pent Farm. According to FAA guidance, green glare impacts are acceptable on runway approach paths. The effects from the Proposed Development are therefore not significant.

14.188 Mitigation is required to ensure the High impact views from Road Receptors 5 and 43 - 47 into the Proposed Development are screened. This includes native hedgerows/woodland to be planted/infilled along a central section of the western boundary in the North Array and native hedgerows to be planted/infilled along the eastern and western edges of the South Array and the East Array respectively and maintained to a height of at least 3m.

14.189 The effects of glint and glare and their impact on local receptors has been analysed in detail and the impact on all receptors is predicted to be Low impacts upon aviation, residential and rail receptors. Impacts upon road receptors are None once mitigation has been considered. Residual effects on road receptors is None, whilst residual effects are Minor for aviation, residential and rail receptors. Therefore, the effects are not significant.

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# CHAPTER 15 - AVOIDANCE AND MITIGATION


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Proposed Mitigation Measures 388

Proposed Enhancement Measures 396

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## AVOIDANCE AND MITIGATION SUMMARY TABLE

16.1 The following tables provides a summary of the measures applied to the proposed East Stour Solar Farm to avoid or mitigate identified effects.

16.2 For each environmental assessment undertaken within the EIA there is a summary of:

- avoidance measures (**Table 15.1 on page 378**);
- mitigation measures (**Table 15.2 on page 388**); and
- enhancement measures (**Table 15.3 on page 396)**.

16.3 **Chapter 16** goes on to summarise the residual effects of the development.

Table 15.1 - *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 designation in the proposed site area. | 3.22 |
| | - | Potential for the development to be visible. | There is existing field boundary vegetation and woodland blocks which create a good basis for screening. | 3.28 |
| | - | Potential impacts to ecological receptors. | Appropriate separation distances have been applied from ecological features contained in and around the site. | 3.31 |
| | - | Potential for direct impact on designated heritage assets. | There are no designation in the proposed site area. | 3.37 |
| | - | 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. | 3.46 - 3.47 |
| | - | Disruption to operation and maintenance of existing infrastructure. | Setbacks were provided from the existing on site electrical infrastructure. | 3.77 |
| | 3.80 | Landscape character impacts when viewed from some rights of way to the south of the site. | Removal of panels from an area of some 4.9ha to the far south-east of the site to reduce landscape character impacts when viewed from some rights of way to the south of the site. | 3.80 |
| Chapter 4 - Existing Conditions | N/A | | | |
| Chapter 5 - Environmental Impact Assessment | N/A | | | |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 6 - Development Proposal | - | Sub-optimal conditions for sheep grazing. | The lower edge of the panels will be approximately 1.0m above the ground to allow for safe grazing. | 6.7 |
| | - | Habitat disturbance. | It is proposed that existing field entrances will be utilised and upgraded where necessary to allow access to individual segments of the solar array. | 6.10 |
| | - | Land use and ecological disturbance. | Where possible, the layout of the proposed access tracks (Figure 1.2 and Figure 1.3 in ES Volume 3) has followed the route of the existing farm tracks to minimise land loss and impacts on ecological habitat. Where new access tracks are required these have been designed to follow field boundaries where possible to minimise the impacts on farming practices. | 6.13 |
| | - | Landscape and visual impact. | Electrical cables pass along the rear of the panels then underground across site to the inverter/transformer units.<br><br>Underground cables will connect from the inverter/transformer units to the on-site substations and grid connection point. | 6.19<br><br>6.20 |
| | - | Landscape and visual impact and ongoing land management. | All connection cables will be run across the site in underground cable trenches below agricultural depth. | 6.30 |
| | - | 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 2.0m tall...<br><br>Access points for wildlife will be included in the fence line to ensure permeability across habitat. | 6.31 - 6.32 |
| | - | Landscape and visual impact and potential impact on ecological receptors. | No visible lighting is proposed as part of the East Stour Solar Farm for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye. | 6.35 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 7 - Construction, Operation and Decommissioning | - | Increase in traffic during operation | The use of remote monitoring reduces the number of site visits required. | 7.25 |
| | - | Impacts upon geology and soils | Potential impacts on geology and soils from the construction of the civil works associated with the solar farm (the solar panels and frames, inverter/transformers, substation and other site cabins, foundations, and access track) are avoided through considered design of these various elements and in the design of the site layout. | 7.57 |
| | - | Sourcing and volume of construction materials required | ... Locally sourced construction materials will be used in construction works as far as possible. ... | 7.57 - 7.58 |
| | | | The volumes of all footings and foundations are inherently designed to minimise the volumes of stone and concrete required within safe engineering margins. | 7.59 |
| | - | Surface water drainage at the site entrance | 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.<br>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. | 7.60 - 7.61 |
| | - | Degradation of soils | 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) ... | 7.62 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 7 - Construction, Operation and Decommissioning (continued) | - | Construction personnel injury | All site work for the East Stour Solar Farm would comply with the Construction (Design and Management) Regulations 2007, and 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. | 7.68 - 7.71 |
| | - | Potential impact on health and the environment as a result of the use, storage and disposal of hazardous substances. | 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 solar farm 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.<br><br>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.<br><br>Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance to regulations and manufacturer/supplier's guidelines.<br><br>No hazardous materials will be stored on site during the operational phase of the proposed development. | 7.72 - 7.74 |
| Chapter 8 - Traffic and Access | - | Construction traffic disturbance to nearby villages. | To avoid construction traffic travelling through the nearby villages, all construction vehicles will be required to use the access route identified from the A20 and HGVs will be required to approach from the identified route from Junction 10a of the M20. No construction traffic be it HGV, LGV or PSV will be permitted south of the Church Lane highway crossing. | 8.122 |
| | | | | |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 8 - Traffic and Access (Continued) | 8.92 | For existing road users, impacts may arise through traffic delays caused by construction vehicles, or to their visual amenity (which is considered further in Chapter 11 - LVIA). | As a key design principle, construction traffic was removed from the highway at the earliest point by using one access point for the northern area and a single site access point from Church Lane immediately south of the railway bridges - moving traffic to on-site tracks and restricting highway disruption any further south to a single crossing point of Church Lane which enables access to the eastern Partridge Plantation parcel of land.<br><br>Advance notification of potential delay for road and PRoW users will be provided through appropriate signage and advertisement. The Applicant will liaise with the Highways Authorities and Police prior to the construction phase commencing. | 8.117<br><br>8.119 |
| | 8.94 | The road width and junctions in the approach to site are considered to be adequate for the intended use for conventional HGV traffic. Therefore there is low potential for damage to highway verges. | The proposed site entrance complies with the Manual for Streets (2007) and DMRB (2020), thereby ensuring appropriate visibility for vehicles entering and exiting the site as well as those travelling along the highway. | 8.99 |
| | - | The visibility at the highway crossing of the East Stour could be compromised by boundary hedge growth. | The Applicant is committing to maintain reduced height hedges in proximity to the Church Lane crossing of the East Stour to maximise highway visibility. | 8.128 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 9 - Geology, Hydrology and Hydrogeology | 9.59 | Lack of infiltration over a longer time scale through the introduction of impermeable infrastructure, could lower the aquifer recharge rate in the area, part of the southern and northern sites are overlying a principal bedrock aquifer. Due to the small area of the permanent infrastructure, and given retained vegetation surrounding the panels, this is assumed to be a small impact. There is potential for soil erosion from surface water runoff if vegetation cover is not maintained across the site. We consider that there will be no impacts to geology as this receptor will not be exposed during this phase. | When constructing the access track, the lengths of open excavations would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion/siltation. These would be constructed on existing tracks that are already compacted, where possible. Gravel material will be used as opposed to tarmac to allow a level of infiltration through permeable tracks, better representing the baseline soil conditions.<br><br>When constructing the access track, the lengths of open excavations would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion/siltation. These would be constructed on existing tracks that are already compacted, where possible. Gravel material will be used as opposed to tarmac to allow a level of infiltration through permeable tracks, better representing the baseline soil conditions. Soil stockpiles would be managed to contain sediment to that locality, preventing input to watercourses. The ground will be restored as quickly as possible following construction and existing vegetation replanted.<br><br>The layout of the panels would be designed to minimise the risk of local scour problems. For example, the panels would be angled with approximately a 20° tilt to allow water to drip from the panels along the length of each row. This will prevent high velocity flow of rainwater from scouring the soil below the panels. | 9.68<br><br>9.69<br><br>9.70 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 9 - Geology, Hydrology and Hydrogeology (continued) | 9.62 | During operation there is a risk of spillage of chemicals from maintenance vehicles which could infiltrate into the soil or be entrained with surface water runoff into the local watercourses. There is also a risk of increased siltation if vegetation cover is not maintained surrounding the panel array. | All fuel, lubricants and chemicals would be stored within bund containment areas, with the capacity to store at least 10% more volume than the maximum storage volume required. Furthermore, any filling points will be within the bunded area or have secondary containment provided. | 9.72 |
| | | | Refuelling, cleaning and routine maintenance of vehicles will be carried out off-site. Drip trays or absorbent mats will be placed under standing plant. Spill kits and other necessary equipment will be provided to contain and clean up any spills of fuel, lubricants or other chemicals. | 9.73 |
| | | | All solid and liquid waste materials would be properly disposed of in controlled landfill sites away from the site. Welfare facilities would be provided on site and any effluent contained within a sealed unit which would be appropriately disposed of offsite. | 9.74 |
| | 9.65 | The proposed development would result in the increase of impermeable areas through the construction of inverter, welfare and store blocks. The access track is to be constructed from permeable materials. An increase in impermeable area on site, leads to a reduction in infiltration and an increase in surface water runoff. This means rainwater can reach rivers faster, carrying a larger volume of water, subsequently increasing downstream flood risk. | The proposed built infrastructure, where surface water flow would be impeded, are located outside of the areas indicated to be at risk of surface water flooding to ensure existing surface water drainage routes are not impeded. Due to the design of the panel ground anchors, we would not expect them to impede the surface water drainage routes. | 9.77 |
| | | | All of the infrastructure of the site will be placed outside of the flood exclusion zone, defined in the FRA and Drainage strategy (**Appendix 9.1**) from the embankment level of the Aldington Flood Storage Area. This will ensure that no storage volume is displaced, and flood flows will not be impeded. | 9.78 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 10 - Ecology | Table 10.5 | Direct/indirect impacts on waterbodies – East Stour, brook and off-site ponds / fishing lakes | Buffer zones and preventative construction methods. | Table 10.5 |
| | - | Dormouse - construction disturbance | Clearly defined working zones to ensure works outside of the application boundary in woodland / hedgerow habitats are avoided. | Table 10.6 |
| | Confidential badger appendix | [redacted] | [redacted] | Confidential badger appendix |
| | - | Otters and water vole - construction disturbance | Standard pollution control measures to be implemented during construction, including silt trap fencing. | Table 10.6 |
| | - | Breeding bird - construction disturbance. | Habitat removal will be completed outside of the breeding bird season and the arable fields will be left bare / uncropped / ploughed in the preceding spring to prevent birds from breeding within the working areas. | Table 10.6 |
| | - | Reptiles - construction disturbance. | Standard measures to include storage of materials away from suitable edge habitats. | Table 10.6 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 11 - LVIA | 11.100 | Impacts on the purpose of the Kent Downs AONB. | At its closest point, this designation is located approximately 1.3km south and 3.3km northeast of the closest part of the proposed development. | 11.98 - 11.99 |
| Chapter 12 - Archaeology and Cultural Heritage | Table 12.3 | Direct impacts on unknown assets. | The scheme has been designed to avoid the construction of solar panels across the entire site. The retention of open space in Area 2 serves to preserve in situ identified archaeological remains in this area. | 12.108 |
| Chapter 13 - Noise | 13.87 | The assessments summarised above demonstrate that noise during the construction phase would not exceed the relevant noise limits derived from both BS5228 and the DMRB. Notwithstanding this, some short-term impacts may occur at the closest receptor locations depending on the specifics of the construction programme. | Inherent mitigation measures to reduce construction have been included in the design. For example, an internal access route has been included to avoid traffic using a section of Church Lane.<br><br>It is recommended that public engagement be undertaken to alert local residents to the planned construction works and provide contact details for a site manager should any noise related complaints arise. Non-acoustic factors which affect the overall level of complaints must also be addressed, e.g. the use of wheel-washing to control mud on roads. | 13.88<br><br>13.89 |

| Chapter | Paragraph Reference | Potential Impact | Avoidance Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 13 - Noise (Continued) | | (Continued). | Further to the above, 'Best Practicable Means' should be employed across the construction phase to ensure impacts are minimised. These measures will be detailed in the CEMP. Examples of best practicable measures include:<br>• Equipment should be turned off when not in use and no vehicle idling should be permitted within the construction site including construction yards etc;<br>• Where possible all noisy plant and equipment should be replaced with less noisy alternatives;<br>• All plant should be properly maintained and all noise control measures be properly employed i.e. exhaust silencers fitted, vehicle panels closed etc;<br>• All panel frame supports should be push driven as far as possible. Pre-auguring can be used to facilitate this. Where ground conditions do not allow this, alternative methods should be selected with a view on their potential noise emissions. Impact driven supports should be viewed as a last resort;<br>• Do not drop materials i.e. access road surface materials etc, from excessive heights. Where necessary consider screens around material drop areas;<br>• Construction traffic should be timed and routed to minimise the impact to local residents; and,<br>• Noise monitoring should be carried out in the event of valid complaints. | 13.90<br><br>13.91 |
| Chapter 14 - Glint & Glare | | N/a | | |

Table 15.2 - *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. | 3.60 |
| Chapter 6 - Development Proposal | - | Landscape and visual impact of site infrastructure e.g. inverters/ transformers and site cabinets. | The external finish will be agreed with the Local Planning Authority prior to construction commencing. | 6.18, 6.23, 6.26 |
| | - | 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. | 6.36 |
| Chapter 7 - Construction, Operation and Decommissioning | - | Landscape and visual impact. | Where new access tracks are required these will have a running width of 4m. As described in **Chapter 6 - Development Proposal**, 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. | 7.12 |

| 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 East Stour Solar Farm. | 7.56 |
| Chapter 8 - Traffic and Access | 8.92 | For existing road users, impacts may arise through traffic delays caused by construction vehicles, or to their visual amenity (which is considered further in Chapter 11 - LVIA). | During construction and decommissioning, deliveries will be restricted, wherever possible, to off-peak weekdays to reduce impacts on local road users. Off-peak is considered to be between 09:00 and 15:00. | 8.118 |
| | | | At the construction site entrances, traffic management measures will be deployed as deemed necessary by Kent County Council. | 8.120 |
| | | | Any vehicle approaching the 3.81m height limit of the local services rail tunnel will be required to register at the northern temporary construction compound before being permitted to proceed through the tunnel. Where a suitable delivery vehicle/load geometry is not available, loads will be broken down within this compound and transported on appropriately sized vehicles. | 8.121 |
| | | | A rolling set of traffic lights will be employed during the laying of the verge-side grid connection cable. | 8.124 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 8 - Traffic and Access (continued) | 8.93 | With respect to road impacts there is the potential to damage road surfaces through the delivery of aggregates. | It is suggested a scheme for pre-construction and post-construction road and drainage surveys to identify then rectify any damage to the highway, verges and drains caused by construction traffic be produced by the Applicant and agreed with Kent County Council in advance of construction commencing.<br>In addition, prior to construction, precautionary mitigation measures are suggested to include:<br>• A drainage scheme should be devised to ensure that no water enters the highway from the site access or a suitable system is agreed; and<br>• Wheel wash facilities as appropriate and sweeping is to be carried out to ensure the road is kept reasonably clear of any deposits from the construction works and the local drains are kept clear. | 8.126<br>8.127 |
| | - | Construction traffic impacts on existing road users and highways. | The Construction Traffic Management Plan (CTMP) to be agreed with the Local Planning Authority prior to construction commencing will include details of all traffic management proposals, both on site and leaving site to enter the highway. A draft CTMP is contained at Appendix 8.3. | 8.100 |
| | 8.106 | During the construction phase of the proposed solar farm the PRoW crossing the site will remain fully open for use. There may be some minor disruption for users. | As well as advance notification and appropriate signage, banksmen will be used on the PRoWs to minimise risk and disruption to users of the footpath during the construction phase. | 8.123 |
| | 8.110 | Driver distraction. | The Applicant is committing to maintain reduced height hedges in proximity to the Church Lane crossing of the East Stour River to maximise highway visibility. | 8.128 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 9 - Hydrology and Hydrogeology | 9.59 | Lack of infiltration over a longer time scale through the introduction of impermeable infrastructure, could lower the aquifer recharge rate in the area, part of the southern and northern sites are overlying a principal bedrock aquifer. Due to the small area of the permanent infrastructure, and given retained vegetation surrounding the panels, this is assumed to be a small impact. There is potential for soil erosion from surface water runoff if vegetation cover is not maintained across the site. We consider that there will be no impacts to geology as this receptor will not be exposed during this phase. | If scour or siltation could occur on steeper sections of the site, silt traps, soil bunds and grass filter strips will be used to capture any sediment, preventing this from entering any watercourses draining the site.<br><br>Maintaining vegetation under and around panels will be undertaken, which will work to reverse the compaction of soil over time. Additionally, a traffic management plan would be adopted to minimise the concentration of soil compaction. The reduction of soil compaction through these methods would minimise any loss of groundwater recharge. | 9.68<br><br>9.71 |
| | 9.62 | During operation there is a risk of spillage of chemicals from maintenance vehicles which could infiltrate into the soil or be entrained with surface water runoff into the local watercourses. There is also a risk of increased siltation if vegetation cover is not maintained surrounding the panel array. | If scour or siltation could occur on steeper sections of the site, silt traps, soil bunds and grass filter strips will be used to capture any sediment, preventing this from entering any watercourses draining the site. | 9.68 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| | 9.65 | The proposed development would result in the increase of impermeable areas through the construction of inverter, welfare and store blocks. The access track is to be constructed from permeable materials. An increase in impermeable area on site, leads to a reduction in infiltration and an increase in surface water runoff. This means rainwater can reach rivers faster, carrying a larger volume of water, subsequently increasing downstream flood risk. | The additional surface water run-off resulting from impermeable surfaces on the site will be attenuated by extensive planting and captured at strategic locations using cut-off swales. These will be designed to provide long term storage for runoff resulting from the rainfall events on the site. There will be the possibility of infiltration into the soil or evaporation of water whilst stored. It will be necessary that vegetation is maintained under and around the solar panels to attenuate runoff. | 9.77 |
| Chapter 11 - LVIA | - | Visual impact of construction. | All the site tracks within the layout would utilise existing field entrances and gaps in field boundaries thereby minimising any potential loss of landscape fabric (excepting the small loss of boundary ‘scrub’ on the western side of the Church Lane at the crossing point to the south). | 11.14 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 11 - LVIA (Continued) | - | Visual impact of operation. | Seeding between solar panels with native grasses also wild flower seeding. A comprehensive mitigation scheme is also proposed including tree belts, new hedgerows and hedgerow management.<br><br>From a landscape and visual perspective, the number of visual elements present over the anticipated 40 year operational phase has been minimised by siting the proposal close to existing infrastructure in the form of an existing solar farm, pylon lines, High Speed 1 (HS1) and local services railway lines, M20 motorway, Sellindge Substation and Converter Station. In addition, some of the solar arrays have been positioned adjacent to existing mature vegetation and woodland.<br><br>The proposed mitigation scheme will take several years to establish and provide additional screening of the proposed development, although year on year this screening will gradually improve. Therefore, the aspects of the operational phase that are likely to initially give rise to significant effects on landscape character and visual amenity during the operational life are the solar arrays, site tracks, stock style fencing, CCTV, inverter/ transformer units, substations, spare parts and storage cabinet and welfare cabin, and these are considered in the Landscape and Visual Assessments below. The | 11.15<br>11.16<br>11.17<br>Figure 11.9 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 11 - LVIA (Continued) | - | Visual impact of operation (continued). | proposed development has also then been assessed at a stage ten years after completion of construction when the landscaping proposals are expected to be established, providing some further screening of the proposed development from parts of the study area, and contributing beneficially to the landscape character and landscape fabric of the local area. It should be noted that beyond this ten year period the landscaping proposals would continue to mature and integrate within the locality. | 11.15<br>11.16<br>11.17<br>Figure 11.9<br>(continued) |
| | - | Visual impacts of decommissioning. | The effects on landscape and visual amenity during the decommissioning phase would be minimised by the limited duration of the works, by removing all above ground structures and materials, by leaving all deep below-ground structures in place and by restoring the ground disturbed by the works. All planting proposals associated with this application would remain in place. | 11.19 |
| | 11.61 | Landscape fabric (operational phase). | Once the construction phase has been completed, the proposed mitigation measures would be implemented. These measures are illustrated on Figure 11.9 and include some sizeable areas of tree and hedgerow planting, hedgerow management to maintain and grow the height of some existing site hedgerows and hedgerow enhancement to gap up and improve some existing site hedgerows. In addition, some areas of wildflower/ riparian/ grassland have been accommodated within the layout to encourage biodiversity. There would be a beneficial effect on landscape fabric as a result of these measures which would last throughout the operational phase of the proposed development and would be maintained and replaced where necessary through an operational planting management plan. | 11.61 |

| Chapter | Paragraph Reference | Potential Impact | Mitigation Measure | Paragraph Reference |
|---|---|---|---|---|
| Chapter 12 - Archaeology & Cultural Heritage | 12.134 - 12.135 | Taking into consideration the limited impact of the proposed solar panels, the magnitude of change on the potential archaeological resource within Areas 2 and 5 is considered minor adverse: removal of a minor part of its total area but the site retains significant future research potential. This effect is considered Minor; not significant. | It is anticipated that a programme of archaeological evaluation will be required as a condition of planning to confirm the results of this assessment and supplement the existing record of the archaeological resource within the application site.<br>This would allow an appropriate strategy for the conservation of the archaeological remains to be developed and agreed with the LPA, either by protection via concrete foundations, archaeological recording, or a combination of these approaches. | 12.136 - 1.137 |
| Chapter 13 - Noise | N/A | | | |
| Chapter 14 - Glint & Glare | 14.98 - 14.177, 14.179 | Mitigation is required to ensure the High impact views from Road Receptors 5 and 43 – 47 into the Proposed Development are screened. | • Native hedgerows/woodland to be planted/ infilled along a central section of the western boundary of the North Array.<br>• Native hedgerows/woodland to be planted/ infilled along the western edge of Church Lane adjacent to the South Array, and along the eastern edge of the East Array and maintained to a height of at least 3m. | 14.179 |

Table 15.3 - *Proposed Enhancement Measures*

| Reference | Enhancement | Paragraph Reference |
|---|---|---|
| Chapter 6 - Development Proposal | The biodiversity enhancements will be incorporated with the development of the solar farm and managed over the project life in accordance with a Landscape and Environment Management Plan (LEMP). As shown in Figure 11.9, ES Volume 3, the measures include:<br>• local species rich grassland and wild flower meadow between and under the rows of solar panels, providing habitat for birds and invertebrates;<br>• wide meadow belts between the public footpaths and proposed solar panels in the area east of Park Wood and to the south of Bested Hill;<br>• establishing a large meadow between Church Lane and Bested Hill;<br>• hedge and tree planting around the site to:<br>– reinstate hedgerows and create new hedgerow lines;<br>– strengthen existing hedgerows;<br>– continue roadside hedgerows; and<br>– plant new low density woodland on the west side of Church Lane at the south of Bested Hill to provide visual screening.<br>• bat boxes will be positioned on trees around the development site to provide additional bat roosting opportunities;<br>• birds boxes will be positioned around the site; and<br>• habitat piles for invertebrates to be introduced in appropriate areas around the site to encourage native bees, amongst other species, to maximise benefits of the wildflower and grassland areas. | 6.48 |

| Reference | Enhancement | Paragraph Reference |
|---|---|---|
| Chapter 10 - Ecology | The enhancements to the existing hedgerows will result in a transition from poor quality, low ecologically valuable hedgerows with some (limited) habitat connectivity to hedgerows that are species rich, thick and tall offering nesting opportunities for bird species, and improved habitat connectivity to extend mammal corridors on site. | 10.141 |
| | Enhancements for bats will be provided through the provision of 15 bat boxes which will be installed within the application boundary. This will comprise of five large pole-mounted bat boxes suitable for maternity or hibernation colonies and 10 smaller multi-purpose woodcrete bat boxes, suitable for summer roosts (**Figure 10.2** of ES Volume 3 - Figures). | 10.154 |
| | The proposed landscaping plan which includes the conversion of arable land and improved grassland into wildflower grassland as well as the proposed hedge and low-density woodland will significantly improve opportunities for breeding birds across the site. | 10.162 |
| | Habitat creation works will ensure that the scheme has a long-term positive impact on reptiles. | 10.169 |
| | **Arable /Improved Grassland** - Creation of wildflower meadow under all panels and additional 13.6 ha grassland in Southern Array (previously bare earth field). | Table 10.5 |
| | **Hedgerows/woodland** - 2.2 km new hedge, 1.5 km enhanced hedge, 1.1 ha of woodland planting. | |
| | **Waterbodies** (East Stour, brook and off-site ponds / fishing lakes) - Creation of riparian meadows. | |

| Reference | Enhancement | Paragraph Reference |
|---|---|---|
| Chapter 10 - Ecology (continued) | **Dormouse** - Landscaping plan will result in 2.2 km of new hedge and 1.5 km of enhanced hedge as well as 1.1ha of woodland. New habitats link to Backhouse Wood. Significant increase in available habitat.<br><br>**Bats** - Landscaping plan will result in 2.2 km of new hedge and 1.5 km of enhanced hedge as well as 1.1ha of woodland. New habitats link to existing woodland areas / hedgerow network. Significant increase in foraging and commuting habitats. Provision of bat boxes will provide additional roosting opportunities.<br><br>**Breeding birds** - Creation of wildflower meadows across the site including 13.6ha of meadow without solar panels will provide alternative nesting habitat for ground nesting birds. Planting of 2.2 km of new and enhancement of a further 1.5 km of existing hedgerow as well as will 1.1ha of woodland will ultimately provide additional nesting and foraging habitat for a range of breeding bird. Bird boxes to be erected across the site.<br><br>**Reptiles** - Creation of wildflower meadows, new and enhanced hedgerows and area of woodland will increase suitable habitat across the site. | Table 10.6 |
| Chapter 11 - LVIA | Once the construction phase has been completed, the proposed mitigation measures would be implemented. These measures are illustrated on **Figure 11.9** and include some sizeable areas of tree and hedgerow planting, hedgerow management to maintain and grow the height of some existing site hedgerows and hedgerow enhancement to gap up and improve some existing site hedgerows. In addition, some areas of wildflower/ riparian/ grassland have been accommodated within the layout to encourage biodiversity. There would be a beneficial effect on landscape fabric as a result of these measures which would last throughout the operational phase of the proposed development and would be maintained and replaced where necessary through an operational planting management plan. | 11.61 |

# CHAPTER 16 - RESIDUAL IMPACTS

Residual Impacts 401

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# RESIDUAL IMPACTS

16.1 The following table (**Table 16.1 on page 402**) provides a summary of the residual impacts of the proposed East Stour Solar farm, for each environmental assessment undertaken within the EIA.

Table 16.1 - *Residual Impacts*

| Chapter | Para. | Residual Impact |
|---|---|---|
| Chapter 6 - Development Proposal | 6.41 | The proposed operational period for the East Stour Solar Farm is 40 years. |
| Chapter 7 - Construction, Operation and Decommissioning | 7.29 | During normal operations, personnel will visit the site approximately once a month, in a light van or four-wheel drive vehicle. |
| | 7.31 | As stated at **Chapter 1 - Introduction** it is predicted that the solar farm at this site would have a potential annual yield of approximately 69 800MWh. |
| | 7.32 | In terms of household electricity usage this would be sufficient to offset the equivalent annual energy needs of 17 000 (to 3 S.F) average Ashford Borough homes (as noted in **Chapter 1**). |
| | 7.34 | 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. |
| | 7.44 | On this basis the electricity produced by the East Stour Solar Farm will offset approximately **14 800 000kg$CO_2$/annum or 14 800 tonnes $CO_2$ per annum** (to 3 S.F.). This can be considered a conservative estimate of the carbon offset by the East Stour Solar Farm. |
| | 7.47<br><br>7.55 | At the end of the operating life of the solar farm, 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.<br><br>A Waste Management Plan will be agreed with Ashford Borough Council and will include measures for the treatment of waste arising during the decommissioning phase. This plan will maximise re-use and recycling in accordance with the waste management hierarchy. |

| Chapter | Para. | Residual Impact |
|---|---|---|
| Chapter 8 - Traffic and Access | 8.130 | The predicted peak HGV movements are less than 10% of daily movements on the M20 and A20 and as such, no significant impacts are predicted on the wider highway network. Movements along Church Lane to the site entrances, and at the highway crossing point are more than 30% of the average daily HGV total vehicular movements at these locations, and so assessed as potentially significant. However, given the sequential nature of construction across the site over time, not all stretches of Church Lane will be affected for the full nine-months of construction. |
| | 8.131 | Residual construction impacts are likely to remain significant, although limited to Church Lane. |
| | 8.132 | Minimal non-significant impacts are predicted for users of Public Rights of Way surrounding the proposed development with temporary delays as vehicles cross the rights of way under the control of banksmen. |
| Chapter 9 - Hydrology and Hydrogeology | 9.80 | Residual effects have been assessed by reviewing the proposed mitigation measures against the potential effects outlined above. It is considered that all of the potential impacts can be managed appropriately through mitigation measures, good practice construction methods and sustainable design. **Table 9.5** and **Table 9.6** outline how the proposed mitigation results in no significant effects for each of the potential impacts from construction, decommissioning and operation of the site respectively. It can be concluded from this that there will be no significant effects on the drainage, flood risk, geology, soils, water quality and hydrogeology receptors associated with the site when all mitigation is employed. |

| Chapter | Para. | Residual Impact |
|---|---|---|
| Chapter 10 - Ecology | Table 10.5 | **Arable / Improved Grassland** - Long-term, permanent major positive increase in grassland / wildflower habitat across the application site.<br><br>**Hedgerows / Woodland** - Long-term, permanent, major positive impact to hedgerow network and habitat connectivity.<br><br>**Waterbodies** (East Stour, brook and off-site ponds / fishing lakes) - Neutral to minor positive. Reduction in fertilisers and pesticides on the arable land likely to have a minor positive impact on the brook and East Stour River. |
| | Table 10.6 | **Dormouse** - Negligible to minor positive.<br><br>**Bats** - Negligible to minor positive.<br><br>**Otters and Water Vole** - No impact / neutral. Reduction in fertilisers and pesticides on the arable land likely to have a minor positive impact on the brook and East Stour River and species it supports.<br><br>**Breeding birds** - Minor positive.<br><br>**Reptiles** - Negligible to minor positive |
| Chapter 11 - LVIA | 11.148 | Through careful site design the significant effects of this proposal would be limited to:<br><br>• The character of the landscape of the site and surrounding area up to approximately 0.3 – 0.4km from the site. This is contained to parts of the Evegate Mixed Farmland LCA and the East Stour Valley LCA. Over time mitigation measures associated with the application would limit these significant effects even further.<br><br>• The visual amenity of some residents within a few individual residential properties local to the proposal. Mitigation planting measures have been proposed, where feasible, to further screen the proposal and once established these measures would begin to add further filtering and screening of views of the solar panels from these properties.<br><br>• The visual amenity of users of a few sections of public rights of way local to the site (mainly the footpaths through and adjacent to the site itself). Some mitigation planting measures have been proposed to further screen the proposal and once established these measures would begin to add further filtering and screening of views of the solar panels.<br><br>• The visual amenity of users of a limited section of Church Lane immediately adjacent to the site. Over time mitigation measures associated with the application would reduce these significant effects further. |

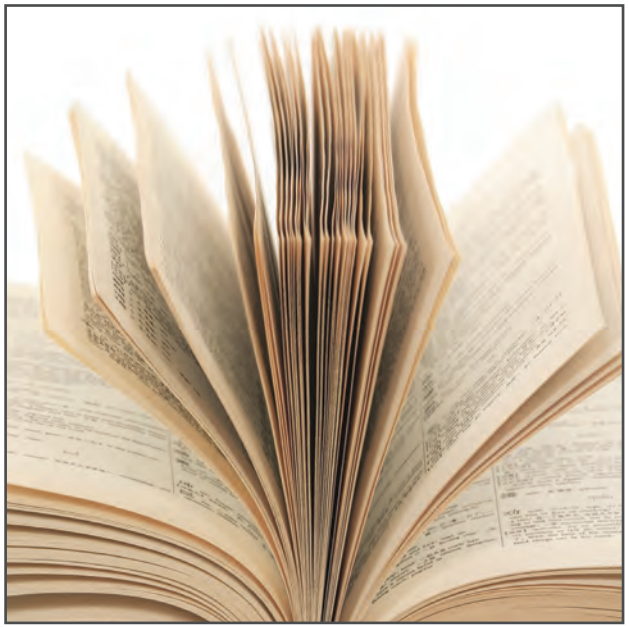
| Chapter | Para. | Residual Impact |
|---|---|---|
| Chapter 11 - LVIA (continued) | 11.149 | There would not be any significant adverse effects on landscape fabric, landscape designations or any of the other LCAs located within the 5.0km radius study area. There would be no significant effects on the visual amenity of the vast majority of residential receptors within the study area, or on the visual amenity of visitors to any of the visitor attractions, long distance footpath users or rail passengers within the study area. |
| | 11.150 | Furthermore, over time the proposed mitigation measures within the site would establish and begin to provide increased filtering and screening of views of the proposal within the area local to the site, strengthening the local landscape fabric in the locality. |
| | 11.151 | Therefore, it is considered that the significant effects on landscape and visual amenity as a result of the proposal would be very limited in this location. |
| Chapter 12 - Archaeology & Cultural Heritage | 12.140 | The implementation of the programme of archaeological work at the application site will result in the preservation by record of archaeological deposits impacted by the proposed development. The resulting research will contribute to the increased knowledge and understanding of the landscape and settlement evolution of the wider area. This is considered to slightly reduce the overall effects on archaeology to Negligible - Minor Adverse, not significant in EIA terms. |
| Chapter 13 - Noise | 13.93 | The short-term effects of the construction phase would be controlled through the CEMP and may include some of the mitigation measures suggested within this chapter. This will ensure the noise impacts during the construction phase are suitably controlled and there are no residual effects due to the short-term nature of the construction phase. |
| | 13.94 | Noise during the operational phase is likely to be negligible, even on a conservative assessment basis, and there are no residual noise effects. |
| Chapter 14 - Glint & Glare | 14.189 | The effects of glint and glare and their impact on local receptors has been analysed in detail and the impact on all receptors is predicted to be Low impacts upon aviation, residential and rail receptors. Impacts upon road receptors are None once mitigation has been considered. Residual effects on road receptors is None, whilst residual effects are Minor for aviation, residential and rail receptors. Therefore, the effects are not significant. |

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# CHAPTER 17 - GLOSSARY AND ACRONYMS


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## INTRODUCTION

18.1 This chapter provides a list of common abbreviations and terms used in relation to the environmental assessments undertaken for the proposed development.

## ACRONYMS

| | |
|---|---|
| **AC** | Alternating Current |
| **AGLV** | Areas of Great Landscape Value |
| **ALC** | Agricultural Land Classification |
| **AOD** | Above Ordnance Datum |
| **AODN** | Above Ordnance Datum Newlyn |
| **AONB** | Area of Outstanding Natural Beauty |
| **ASMW** | Ancient Semi Natural Woodland |
| **ATC** | Automatic Traffic Count |
| **BAP** | Biodiversity Action Plan |
| **BGL** | Below Ground Level |
| **BGS** | British Geological Survey |
| **BOAT** | Byway Open to All Traffic |
| **BOCC** | Birds of Conservation Concern |
| **BRE** | Building Research Establishment |
| **BTO** | British Trust for Ornithology |
| **CBC** | Common Bird Census |
| **CCC** | Climate Change Committee |
| **CDA** | Critical Drainage Area |
| **CIEEM** | Chartered Institute of Ecology and Environmental Management |
| **CLVIA** | Cumulative Landscape and Visual Impact Assessment |

| | |
|---|---|
| **CoP** | Conference of the Parties |
| **CROW** | Countryside and Rights of Way |
| **CWS** | County Wildlife Site |
| **DBA** | Desk Based Assessment |
| **DBEIS** | Department for Business Energy and Industrial Strategy |
| **DBRC** | Devon Biodiversity Records Centre |
| **DC** | Direct Current |
| **DCERG** | Devon Climate Emergency Response Group |
| **DECC** | Department of Energy and Climate Change |
| **DEFRA** | Department for Environment, Food and Rural Affairs |
| **DfT** | Department of Transport |
| **DMRB** | Design Manual for Roads and Bridges |
| **DNO** | Distribution Network Operator |
| **DPD** | Development Plan Document |
| **DTM** | Digital Terrain Model |
| **EIA** | Environmental Impact Assessment |
| **EOAC** | European Ornithological Atlas Committee |
| **EPS** | European Protected Species |
| **ES** | Environmental Statement |
| **ESA** | Environmental Stewardship Agreement |
| **ETSU** | Energy Technology Support Unit |
| **FEP** | Farm Environment Plan |
| **FRA** | Flood Risk Assessment |
| **GLVIA** | Guidelines for LVIA |
| **GRP** | Glass Reinforced Plastic |
| **GSP** | Grid Supply Point |
| **HER** | Historical Environmental Records |
| **HSI** | Habitat Suitability Index |
| **HMSO** | Her Majesty's Stationery Office |
| **HLC** | Historic Landscape Characteristics |
| **IEMA** | Institute of Environmental Management and Assessment |
| **IPCC** | International Panel on Climate Change |
| **IRZ** | Impact Risk Zone |
| **JNCC** | Joint Nature Conservation Committee |
| **kW** | Kilo Watt |
| **kWp** | Kilo Watt Peak |
| **LCT** | Landscape Character Types |
| **LDF** | Local Development Framework |
| **LDN** | Local Distribution Network |
| **LLFA** | Lead Local Flood Authority |
| **LPA** | Local Planning Authority |
| **LVIA** | Landscape and Visual Impact Assessment |
| **MAGIC** | Multi-Agency Geographical Information for the Countryside |
| **MHCLG** | Ministry of Housing, Communities and Local Government |

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|---|---|
| **MW** | Mega Watt |
| **NBN** | National Biodiversity Network |
| **NCR** | National Cycle Route |
| **NERC** | Natural Environment Research Council |
| **NHLE** | National Heritage List for England |
| **NMR** | National Monuments Record |
| **NPPF** | National Planning Policy Framework |
| **NPPG** | National Planning Practice Guidance |
| **NPS** | National Policy Statement |
| **NPSE** | Noise Policy Statement for England |
| **NTS** | Non Technical Summary |
| **ODPM** | Office of the Deputy Prime Minister |
| **PEA** | Preliminary Ecological Appraisal |
| **PRoW** | Public Right of Way |
| **PV** | Photovoltaic |
| **Ramsar** | Convention signed in Iran. |
| **RPG** | Registered Parks and Garden |
| **SAC** | Special Area of Conservation |
| **SAM** | Scheduled Ancient Monument |
| **SAPs** | Species Action Plans |
| **S.F.** | Significant Figures |
| **SIA** | Simple Index Approach |
| **SMR** | Sites and Monuments Record |
| **SNH** | Scottish Natural Heritage |
| **SPA** | Special Protection Area |
| **SPL** | Sound Power Level |
| **SSSI** | Site of Special Scientific Interest |
| **STA** | Solar Trade Association |
| **SuDS Manual** | Sustainable Drainage Systems Manual |
| **SWDS** | Surface Water Drainage Strategy |
| **SWMP** | Site Waste Management Plan |
| **UNESCO** | United Nations Educational Scientific and Cultural Organization |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **UWS** | Unconfirmed Wildlife Sites |
| **VP** | View/Vantage Point |
| **WSI** | Written Scheme of Investigation |
| **ZTV** | Zone of Theoretical Visibility |

# 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. |
| Aquifier | 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 | 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.<br><br>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). |

| Term | Definition |
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| Birds of Conservation Concern | The BTO (2002) lists Birds of Conservation Concern (BoCC), which fall into three categories:<br>•Red list (species of high concern);<br>•Amber list (species of medium concern); and<br>•Green list (species of lower concern).<br>Species are placed on these lists based, among other criteria, on the percentage decline of breeding or wintering populations in the recent past. |
| 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 | There is the potential for cumulative landscape effects where two or more developments would result in:<br>Changes to the physical fabric of the landscape;<br>Changes to landscape character; and<br>Changes to the character and integrity of designated landscapes. |
| Cumulative Visual Effects | There is the potential for cumulative visual effects where two or more developments would be visible:<br>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);<br>In different sectors of the view at a viewpoint location, i.e. with the developments > 90 degrees apart, so that an observer has to move their head in order to see both developments (successive visibility); and<br>One at a time at a series of locations along a linear route (sequential visibility). |
| 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 sub-surface groundwater movement. |
| Hydrology | The prediction of rainfall and rain water flow rates. |
| 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 that 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 | Landscape results from the way that different aspects of our environment (physical, social, aesthetic and perceptual) interact together and are perceived by us:<br>•Physical elements – e.g. geology, landform, soils, flora and fauna;<br>•Social elements – e.g. land use, enclosure patterns, and the patterns, form and scale of settlements and other built development;<br>•Aesthetic factors – e.g. colour, form, visual texture and pattern, sounds, smells and touch; and<br>•Perceptual factors – e.g. memories, associations, stimuli and preferences. |

| 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 will avoid, reduce, remedy or compensate for the predicted significant effects of a development on the environmental baseline. |

| 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 wind turbines 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 | *Land with public access includes:*<br><br>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.<br><br>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.<br><br>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.<br><br>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. |

| Term | Definition |
|---|---|
| Public Access (continued) | 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.<br>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:<br>No symbol – land open to public with permission of owners.<br>White oak leaf in purple box – National Trust, always open.<br>Purple oak leaf in white box – National Trust limited access.<br>Tree symbols in purple box – Forestry Commission.<br>Single leaf in purple box – Woodland Trust.<br>White 'AL' in purple box – other access land.<br>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. |
| 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.<br><br>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.<br><br>Most ZTVs for wind farms are based on bare-ground digital terrain models (DTMs) and use the wind turbine hubs or blade tips in the upright position as the targets, so do not take into account the screening effects of surface features (e.g. walls, trees, buildings, etc.) and, whilst they indicate the number of turbines (hubs or tips) that may be visible, usually do not illustrate how much of each turbine may be visible.<br><br>Cumulative ZTVs for wind farms are ZTVs as above, but show the zones where one or more wind turbines (hubs or tips) from two or more wind farms under consideration may be visible. |

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