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

7.35 A PCS unit is typically required for each battery container unit.

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

Plate 7.7 - *Typical Battery Energy Storage System*

7.37 The individual battery module and PCS containers are typically 6m long, 2.4m wide and 3.5m tall and 3.7m long, 2.4m wide and 3.5m tall respectively (height includes mounting plinths).

7.38 A detailed typical layout of the BESS is provided at **Figure 7.9**, with illustrative elevations provided as **Figure 7.10** and as block elevations in **Figure 7.11 (ES Volume 3)**.

7.39 Each component battery module within each rack of batteries within each battery container contains temperature and condition monitoring systems that will isolate the module in case of thermal instability or electrical malfunction.

7.40 Individual battery cell charge and discharge characteristics can be additionally analysed to monitor the health status of cells and to identify abnormal cells in advance.

7.41 In the unlikely event of a fire within a module, a fire suppressant system ensures that the fire is self contained within the module, and is quickly extinguished.

Substation Compound

7.42 To connect to the local electricity distribution network for the export of power stored and generated, a link must be made between the solar farm and BESS's electrical distribution network cables and the local electricity distribution network through appropriate protection equipment (e.g. fuses), isolation switches, metering equipment and site transformer.

7.43 The substation compound will be segregated in to an area for the operator's equipment and an area for the DNO's equipment. At this location the DNO is UK Power Networks (UKPN).

7.44 The tallest elements of the substation compound are the UKPN Control Room and Solar PV and BESS Substation buildings at 6.0m.

7.45 Underground cables will run from the solar transformer containers and BESS switchgear containers to the on-site substation compound adjoining the BESS. The compound contains a switchgear container, a control room as well as isolation equipment and site transformer.

7.46 From the on-site substation compound, underground cables will connect to the Distribution Network Operator's (DNO's) 33kV network at Fulbourn Substation following the highway and field/track margins (**Plate 7.8 on page 94**). The grid

connection is subject to a separate consenting process, the route however has been considered within the EIA (Chapter 9 - Ecology).

Plate 7.8 - *Likely Grid Connection Route to Wilbraham Road (shown in blue, site and access track in red). © Getmapping plc.*

7.47 The substation compound buildings will be constructed of brick or Glass Reinforced Plastic (GRP) (as shown at **Plate 7.9 on page 94**) finished in a colour to match the local vernacular and to be agreed with the Local Planning Authority. A detailed typical layout of the BESS and Substation Compound is provided at **Figure 7.9**, with illustrative elevations provided as **Figure 7.10**, BESS elevations as **Figure 7.11** and substation elevations at **Figure 7.12**.

7.48 For safety, the BESS and substation compound will be fenced with palisade fencing (**Figure 7.13**).

Plate 7.9 - *Typical Brick and GRP Substation Units*

Temporary Construction Compound

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

7.50 The compound will be located in the south-east of the of solar array immediately north of the BESS and substation compound. Temporary welfare facilities will likely move around as the construction team move across the site.

7.51 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.

7.52 The layout of elements within the construction compounds may vary but the overall dimensions will be approximately 45m by 80m. A typical layout of the Temporary Construction Compound is provided at **Figure 7.14**.

Operational Period

7.53 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 Six Oaks Renewable Energy Park is 40 years.

PROPOSAL SUMMARY

7.54 In summary, the elements forming the Six Oaks Renewable Energy Park are:

- solar photovoltaic panels up to 3m high with a total export capacity of up to 49.9MW;
- panel frames with ground anchors;
- new access track, typically up to 4m wide;
- approximately 232 inverters mounted to the rear of the panels
- nine transformer units;
- 1 customer cabin;
- a perimeter fence, up to 1.8m tall with a single site entrance gate;
- cables and conduits;
- CCTV cameras on 2m posts;
- a 1.1ha BESS and substation compound with 28 containerised battery units, 28 attendant PCS modules and 14 switchgear containers;
- a substation compound; and
- a temporary construction compound with welfare, storage and office facilities.

7.55 The arrangement of these elements is shown on **Figure 1.2, Figure 1.3** and **Figure 7.9 (ES Volume 3**).

7.56 In addition to the technical infrastructure required, a series of ecological and landscape enhancements are proposed. These are discussed further from **Paragraph 7.57 on page 95** and detailed within **Chapter 9 - Ecology** and **Chapter 10 - Landscape and Visual Assessment**, and shown on **Figure 9.3 (ES Volume 3)**.

SUMMARY OF ENHANCEMENTS

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

7.58 **Chapter 9 - Ecology** and **Chapter 10 - LVIA** describe the outline ecological and landscape and visual assessments of the proposed renewable energy park and, where relevant, identify whether mitigation is required or enhancements are suitable. These measures are summarised at **Chapter 11 - Avoidance and Mitigation**.

7.59 The biodiversity enhancements will be incorporated with the development of the solar farm and managed over the project life in accordance with an Landscape and Biodiversity and Landscape Mitigation Plan (BLMP) once agreed with the Council. The

outline BLMP is provided as **Appendix 9.6** with **Figure 9.3 ES Volume 3** illustrating the proposed measures. The measures include:

- Planting of some 76ha of biodiverse neutral grassland wildflower meadow.
- 800m of native hedgerow planting and a further 5.8km of existing hedge restored to native species-rich hedgerow.
- a line of native trees will be planted in the south-east corner of the site.
- Barn owl box, 20 mixed songbird boxes and ten bat boxes.

7.60 A mix of local native species will be used and will be agreed with East Cambridgeshire District Council through the BLMP (to be agreed under Condition). To avoid creating a uniform habitat, a mixture of specimen sizes will be used and ongoing maintenance through grazing or mowing and rotational trimming will allow variation in height to result in a natural appearance whilst maximizing screening benefits. The planting has been specifically designed to reflect the wider pattern and scale of woodland and hedging in the area.

7.61 The environmental management of the site for the life of the project will be detailed within a BLMP to be secured via planning condition and to be materially in accordance with the BLMP. 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.

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CHAPTER 8 - CONSTRUCTION, OPERATION AND DECOMMISSIONING

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INTRODUCTION

8.1 This chapter describes the construction, operation and decommissioning phases of the proposed Six Oaks Renewable Energy Park

8.2 Potential impacts associated with the respective phases of the development are addressed individually within the following ES assessment chapters: **Chapter 5 - Agricultural Land**, **Chapter 9 - Ecology and Chapter 10 - Landscape and Visual Impact Assessment**. Where impacts are not likely to be potentially significant in EIA terms, these have been assessed in the reports accompanying the application.

THE RENEWABLE ENERGY PARK CONSTRUCTION PHASE

Construction Process

8.3 The construction of a renewable energy park is a relatively straight forward process.

8.4 The principal phases to the construction are:

- temporary construction compound is established, site access tracks are built or upgraded and site fencing is erected;
- site containers 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;
- substation and BESS compound is established;
- cable trenches are dug to install the main cables;
- all electrical connections are made;
- the site is commissioned; and
- landscape mitigation planting takes place during the autumn.

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

8.6 A typical construction programme for a project of the scale of the Six Oaks Renewable Energy Park is shown in **Table 8.1 on page 102**.

8.7 **Plate 8.1 on page 103** provides an overview of the construction process as a photographic sequence.

Table 8.1 - *Typical Construction Programme*

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

Plate 8.1 - *Photographic Sequence of Construction Process*

Groundworks

8.8 Works across the site will be staged as the construction teams progress across the field comprising the site.

8.9 The proposed development will be accessed from Wilbraham Road using the existing farm entrance and farm track.

8.10 From the site entrance, using existing farm tracks as far as is possible, access will be provided to the transformer unit locations. Access tracks are kept to a minimum and are not required to access each row of panels. The existing field entrance has been used so that no new breaks in hedgerows will be required for access through the proposed site.

8.11 Where new access tracks are required these will have a running width of typically 4m. As described in **Chapter 7 - 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.

8.12 A temporary construction compound will be established to the south-east of the solar array immediately north of the BESS and substation compound (**Figure 1,.2, ES Volume 3**). The compound 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 compound will commence at the start of works.

8.13 The BESS and substation compound will be layed out with crushed stone over geotextile in the same manner as the site tracks.

8.14 Stock proof fencing providing security will be installed around the perimeter of the solar farm. Fence posts will be driven into the ground wherever ground conditions permit. Wire mesh is then tensioned between the posts.

8.15 Palisade fencing will be erected around the BESS and substation compound using concrete footings at each fence post.

8.16 Shallow concrete footings or piers are cast for the site cabinets, transformer units BESS and substation components where required. Concrete will also be used to anchor the posts holding the CCTV cameras.

8.17 Cable trenches will be excavated from the array 'table' ends to the transformer unit pads, and from the transformer units to the substation. Electrical and telecommunication cables will be installed as the trench is excavated, and the trench filled immediately afterwards wherever possible.

8.18 The various pre-assembled container units are delivered directly on to their pads and installed.

8.19 The installation of the solar panel frame legs follows a similar approach to fencing installation, these are push or pile-driven into the ground.

8.20 The frames are then assembled. Firstly the edges of the frames are installed, and then the horizontal bars are bolted on to form a lattice onto which the panels are installed.

8.21 The panels are then mounted onto the frames, and electrically connected with the wires carried behind the panels.

8.22 The wiring is then fed to the inverter units.

8.23 Following commissioning, the site is cleared and the temporary construction compound removed. Panels are installed on the temporary construction compound area as it is removed.

8.24 Planting is undertaken during the autumn planting season.

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

8.26 Whilst subject to a separate consenting procedure, an underground 33kV cable will run from the substation compound across fields to Wilbraham Road and on to Fulbourn Substation following the highway and field/track margins.

OPERATIONAL PHASE

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

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

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

8.30 The use of remote monitoring reduces the number of site visits required. However, regular checks will be undertaken to ensure the panels, frames, fittings, inverters, batteries, PCSs, substation components and fencing are all in good working order.

8.31 The panels will be cleaned periodically to ensure maximum production, as shown at **Plate 8.2**. 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.

8.32 The battery will charge either during daylight when the panels are generating or at times when electricity demand is low. It will be called on to generate at times of high demand or when immediate generation is required on the electricity network for example either because of a loss of a large generator elsewhere on the network or when frequency support is required to balance load on the network.

Plate 8.2 - *Typical Solar Farm Cleaning Unit*

8.33 During normal operations, personnel will visit the site approximately once

a month, in a light van or four-wheel drive vehicle.

Predicted Electricity Generation

8.34 Six Oaks Renewable Energy Park will connect directly in to the Fulbourn substation at 33kV. Whilst the site is generating it will supply electricity directly into the local distribution offsetting the import of power from the National Grid.

8.35 As stated at **Chapter 1 - Introduction** it is predicted that the renewable energy park at this site would offset the equivalent annual electricity needs of approximately 10 700 East Cambridgeshire homes (based on average domestic consumption per household of 4 540kWh p.a., (DBEIS 2022)), all figures to 3 S.F.

Emissions

8.36 It has been predicted that the proposed solar farm will generate an annual average of approximately 48 700 000kWh (net) of electricity (to 3 S.F.).

8.37 The generation of this electricity will offset electricity generated from other sources. The project is connected to the distribution network's 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.

8.38 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.

8.39 For carbon dioxide these assumptions range from 860gCO_2/kWh (based upon coal generation) to 355gCO_2/kWh (based upon gas generation).

8.40 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 8.3 on page 107** (as also discussed in **Chapter 2 - Development Rationale**), electricity is also imported from overseas.

8.41 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 8.3**.

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

8.43 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.

8.44 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.

8.45 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 8.3**) they can be considered conservative as this mix includes for renewable energy sources and renewable energy generation is not used to offset itself.

8.46 The conversion factors for 2021, published in June 2022, provide the most up to date figures as shown in **Table 8.2**.

Table 8.2 - *GHG Conversion Factors (DBEIS, 2022)*

	$kgCO_2e/kWh$
Electricity Generation	0.19338

8.47 On this basis the electricity produced by the Six Oaks Renewable Energy Park will offset approximately **9 430 000$kgCO_2$/annum or 9 430 tonnes CO_2 per annum** (to 3 S.F.). This can be considered a conservative estimate of the carbon dioxide offset by the Six Oaks Renewable Energy Park.

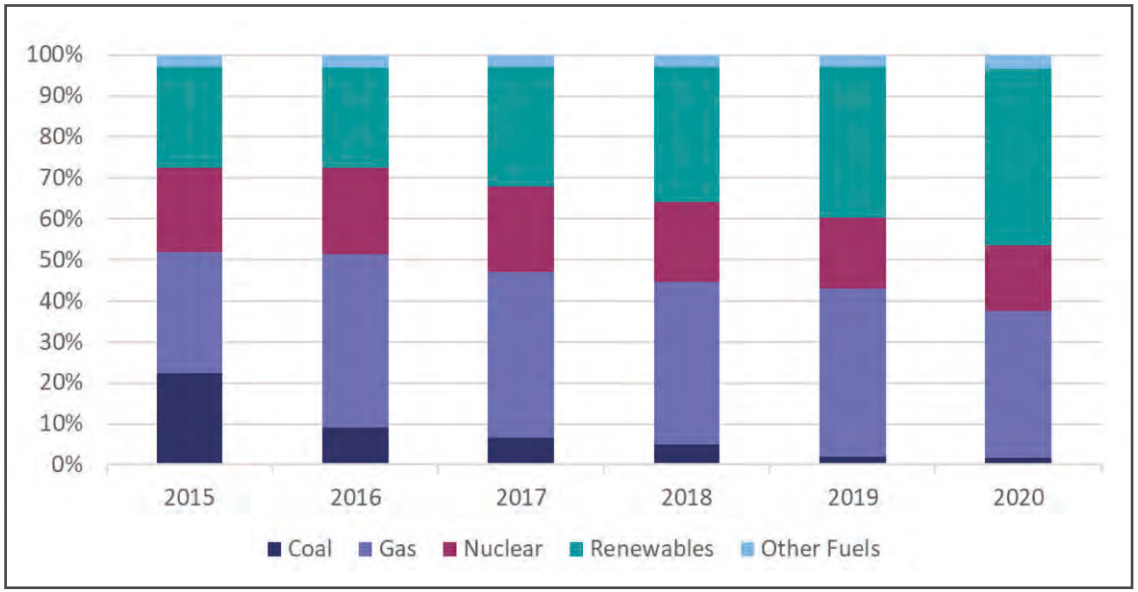

Table 8.3 - *2015 Electricity Fuel Mix Compared to 2020 Electricity Fuel Mix (Source: Digest of UK Energy Statistics (DBEIS, 2021)*

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

DECOMMISSIONING PHASE

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

8.50 If a replacement development is both applied for and consented, then a partial decommissioning may be undertaken, typically involving the removal of the existing solar panels. This process would be analysed within an Environmental Impact Assessment or Environmental Report for the replacement site application against the baseline environment at that time.

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

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

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

8.54 The transformers, site containers and cabinets will be removed from the site and foundation piers and pads removed.

8.55 Fencing and CCTV equipment will be removed.

8.56 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.

8.57 Materials recovered during decommisioning will be re-used or recycled in accordance with the waste management hierarchy. Currently more than 90% of solar arrays can be recycled and this is expected to increase as more arrays are installed.

PROTECTION MEASURES THROUGH CONSTRUCTION AND DECOMMISSIONING PHASES

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

Geology and Soils

8.59 Potential impacts on geology and soils from the construction of the civil works associated with the renewable energy park (the solar panels and frames, inverter/transformer units and other site containers, foundations, and access track) are avoided through considered design of these elements and in the design of the site layout.

8.60 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.

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

8.62 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.

8.63 Wheel washing facilities will be in place to avoid debris exiting site onto the public highway.

8.64 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.

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

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

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

8.66 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.

8.67 Wastes arising will be used wherever possible in the reinstatement of the site. Any excess stored material will be disposed of off-site in full accordance with Environment Agency guidance to minimise the risk of pollution and degradation of habitats. Waste handling procedures will be detailed in a Site Waste Management Plan to be agreed with East Cambridgeshire District Council.

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

Health and Safety

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

8.70 Risk assessments will be conducted prior to all phases of the development. These would include, but would not be limited to: travel to the site; working on agricultural land in a rural environment; use of heavy tools and machinery; working around electrical equipment; working around highways and rail infrastructure; site visits to the operational renewable energy park; and contagious diseases (such as SARS-Cov-2).

8.71 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.

8.72 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.

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

Hazardous Substances

8.74 Any substances classed by regulation as hazardous that are used during the construction, operation (either during normal operations, scheduled maintenance or on the occasion of a major component replacement or repair) and decommissioning phases of the proposed renewable energy park development will be used and disposed of responsibly off site, in accordance with manufacturer's guidance and regulations governing use of the material. Materials with potential to be classified as hazardous are most likely to be coolants, oils, fuels and lubricants.

8.75 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.

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

8.77 No hazardous materials will be stored on site during the operational phase of the Proposal.

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CHAPTER 9 - ECOLOGY

INTRODUCTION

9.1 This chapter presents an Ecological Impact Assessment (EcIA) of the proposed Six Oaks Renewable Energy Park, Cambridgeshire (the 'proposed development') on the ecological resource in the vicinity of the proposed development. This Chapter is supported by the following Technical Appendix documents:

9.2 **Appendix 9.1**: Six Oaks Renewable Energy Park, Cambridgeshire: Wintering Bird Survey 2019-20, July 2022.

- **Appendix 9.2**: Six Oaks Renewable Energy Park, Cambridgeshire: Breeding Bird Survey 2020 Report, July 2022.
- **Appendix 9.3**: Six Oaks Renewable Energy Park, Cambridgeshire: Bat Survey 2020 Report, August 2022.
- **Appendix 9.4 (Confidential)**: Ecology Report for the Six Oaks Renewable Energy Park, Cambridgeshire: Protected Species Surveys for Badgers, August 2022.
- **Appendix 9.5 (Confidential)**: Breeding bird records for species protected under Schedule 1 of the 1981 Wildlife and Countryside Act.
- **Appendix 9.6**: Biodiversity and Landscape Management Plan.
- **Appendix 9.7**: Six Oaks Renewable Energy Park, Cambridgeshire: Breeding Bird Survey 2022.

9.3 This chapter includes the following elements:

- Legislation, Policy and Guidance;
- Assessment Methodology and Significance Criteria;
- Baseline Conditions;
- Assessment of Potential Effects prior to mitigation measures;
- Mitigation and Residual Effects;
- Cumulative Ecological Assessment;
- Summary of Effects; and
- Statement of Significance.

9.4 A full description of the Development is provided in Chapter 6 – Development Proposal. The site selection and design evolution is provided in **Chapter 4 – Site Selection and Design**.

9.5 This assessment was undertaken by Dr Steve Percival, a highly experienced ecological surveyor. He has a B.Sc. (Hons) degree in Biological Sciences from the University of Durham, UK (awarded in 1984) and a Ph.D. in Zoology from the University of Glasgow, UK (awarded in 1988), and is a member of the Chartered Institute for Ecology and Environmental Management (UK),

the British Ecological Society and the British Ornithologists' Union. As principal of his own private practice, Ecology Consulting, he has a wide experience of nature conservation and renewable energy issues, and has been involved in over 380 renewable energy projects, including carrying out ecological assessments, preparation of ecological material for environmental statements and giving evidence at public inquiries, in the UK and internationally.

LEGISLATION, POLICY AND GUIDANCE

9.6 The following documents have been taken into account in the ecological assessment.

Legislation

9.7 The Wildlife and Countryside Act 1981, as amended;

- The Countryside and Rights of Way [CRoW] Act 2000;
- EU Council Directive 79/409/EEC and 2009/147/EC on the Conservation of wild birds (the 'Birds Directive');
- EU Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive');
- Environmental Impact Assessment Directive 85/337/EEC, as amended (the EIA Directive);
- The Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'), which consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments and translates the Birds and Habitats Directives into UK Law; and
- Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

National Policy Guidance

- The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, updated July 2021);
- 'Managing Natura 2000 Sites' (European Communities 2000), which gives guidance on the implementation of the Birds and Habitats Directives;
- Guidelines for Ecological Impact Assessment in the UK and Ireland; Terrestrial, Freshwater and Coastal (CIEEM 2018);
- Assessing connectivity with Special Protection Areas (SPAs) (SNH 2016);
- Birds of Conservation Concern (BoCC) 5: the population status of birds in the United Kingdom,
- Channel Islands and the Isle of Man (Stanbury et al. 2021); and
- The UK Post-2010 Biodiversity Framework.

Scope of Assessment

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

- Habitat loss during construction;
- Pollution from noise, vibration, dust, surface water run-off during construction;

- Disturbance/harm during construction;
- Change in habitat during operational phase (dependent on the management of the site after construction);
- Disturbance during operation (if species are displaced as a result of the presence of the solar panels and associated infrastructure); and
- Cumulative effects.

Key Target Species (Valued Ecological Receptors)

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

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

9.10 The ecological assessment has, therefore, given particular consideration to all species/ communities recorded during the baseline surveys present in the study area that meet any of these criteria.

Elements Scoped Out of Assessment

9.11 No ecological issues were scoped out from this assessment.

Study Areas

9.12 The site is located approximately 9km east of Cambridge, in Cambridgeshire. It is predominantly open arable farmland and lies mainly within the 'East Anglian Chalk' NE Natural Area.

9.13 The desk study to support this assessment covered all European protected sites (designated and proposed) within 30km of the proposed development, all nationally important sites within 5km and all other protected nature conservation sites within 2km.

9.14 The field survey areas were chosen to include all areas within the potential zone of ecological influence of the development, where there was habitat that could support important populations, plus an area around that to provide wider context to inform the assessment. The extended Phase 1 habitat survey, breeding bird surveys and protected species surveys covered the proposed development plus up to a 500m buffer (where access/viewing was possible), whilst the wintering bird surveys extended up to a 1km buffer (see **Figure 9.1**).

Methodology for the Assessment of Effects

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

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

Table 9.1 - *Value (conservation importance) of species/communities*

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

Table 9.2 - *Definition of terms relating to the magnitude of ecological impacts*

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

9.18 The combined assessment of the magnitude of an impact and the value of the receptor was used to determine whether or not an adverse impact was significant. These two criteria were cross- tabulated to assess the overall significance of that impact (**Table 9.3 on page 120**). This gives a guide as to the determination of significance, though the final assessment was still subject to professional judgment.

Table 9.3 - *Matrix of magnitude of impact and receptor value used to test the significance of effects. The significance category of each combination is shown in each cell. Shaded cells indicate potentially significant effects in terms of the Environmental Impact Assessment (EIA) Regulations.*

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

9.19 The interpretation of these significance categories was as follows:

- Minor and Negligible are not normally of concern, though normal design care should be exercised to minimise adverse effects;
- Major and Major-Moderate represent ecological effects which are regarded as significant for the purposes of EIA; and
- Moderate represents a potentially significant effect on which specific professional judgment has to be made, though for which it is likely that mitigation will reduce it below the significance threshold for adverse effects.

Assessment Limitations

9.20 No significant information gaps have been identified. Inevitably with any ecological survey it cannot be guaranteed to detect all target species/individuals and surveys cannot be fully representative of all conditions (e.g. severely reduced visibility). However, in this case it was concluded that the baseline surveys provide a robust data set on which to carry out the assessment.

BASELINE SURVEY METHODS

Desk Study Methods

9.21 A desk study was carried out to determine the protected nature conservation sites in the area (using a search radius of 5km for nationally important sites and 30km for internationally important sites); and collate available records of key species from the site and its surrounds. Information was collated from the following sources:

- Natural England and Magic Map web site - statutory protected area site boundaries and citation details, protected species records and distribution of priority habitats;
- Cambridgeshire and Peterborough Environmental Records Centre (CPERC) – protected and notable species records found within a 2km search area around the site, and further information on statutory and non-statutory sites (including Local Wildlife Sites).

Ecology Field Survey: Extended Phase 1 Survey Methods

9.22 An extended Phase 1 survey was carried out (consistent with the UKHAB habitat classification), including identification and mapping of the vegetation communities present within the study area. The survey area boundary for this work included up to a 500m buffer outside the proposed development (where access/viewing was possible). This Extended Phase 1 survey was undertaken during a site visit on 1 September 2020 and a further update visit on 15 August 2022.

9.23 The survey also included a habitat suitability assessment for protected species, including bats, badgers, water voles, otters, reptiles and amphibians, or any other protected species that could occur at the site, to inform the need for further specific surveys.

Wintering Bird Surveys 2019-20

9.24 Wintering bird surveys were undertaken during the 2019-20 winter. This included a field survey based on a simple 'look-see' method, counting the bird numbers within a pre-defined survey area (Gilbert et al. 1998) and a vantage point survey, monitoring bird flight activity to quantify movement rates across the survey area, and included daytime movements and dawn/dusk roost flights. Full details are provided in **Appendix 9.1**.

Breeding Bird Surveys 2020 and 2022

9.25 Breeding bird surveys were undertaken during the 2020 breeding season, following the standard Common Birds Census methodology, with four surveys undertaken at approximately monthly intervals during April-July 2020. Breeding season vantage point surveys of bird flight activity were also undertaken, and surveys of a wider area (up to 2km buffer) for species specially protected under Schedule 1 of the Wildlife and Countryside Act (1981). Full details are provided in **Appendix 9.2**.

9.26 A second year of breeding bird surveys was undertaken in 2022, following the same methodology as 2020, though with six rather than four breeding bird survey visits (reflecting emerging Natural England guidance). Details of these surveys are given in **Appendix 9.7**.

Bat Surveys

9.27 The bat survey programme was designed with reference to the recent SNH/Natural England et al. (2019) guidance on 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation'. Though designed primarily for assessing wind farm developments, the baseline survey requirement and site evaluation methodology are equally applicable to other renewable energy developments. The surveys comprised the following:

- Roost potential survey - to assess all potential roost sites within the proposed development site and its surrounds.
- Ground-level activity surveys – one transect-based survey each month from April-September 2020.
- Automated surveys at ground level - these were deployed to enable collection of representative data across the site's habitats, from April through to September 2020.
- Static detectors were deployed at eight locations across the survey area representative of the habitats available.

9.28 The surveys were carried out during April-September 2020. Full details are provided in **Appendix 9.3**.

Badger Surveys

9.29 Though there were no records from the desk study within 1km of the proposed development, this appeared to be largely a result of low survey effort in this species area rather than absence from the locality. Badger surveys were undertaken in September 2020 of the proposed development area plus a 500m buffer, following the method of Harris et al. 1989 and SNH (2003). All areas of potential value to badgers were surveyed and any evidence of badger activity recorded including details of setts and associated soil excavation, latrines and dung pits, prints, hairs, paths and evidence of foraging activity.

BASELINE ECOLOGICAL CONDITIONS AND CONSERVATION VALUE

Statutory Designations: International and Nationally Important Sites

9.30 There are 12 statutory designated internationally/nationally important nature conservation sites in the search area around the proposed renewable energy park (5km for nationally important SSSIs, 30km for internationally important European Protected SPAs, SACs and Ramsar Sites). All distances are given for the minimum distance from the proposed development:

- Newmarket Heath SSSI – 2.4km NE– the largest expanse of unimproved chalk grassland remaining in Cambridgeshire, of particular importance for its chalk heath. Notified for its geomorphological and botanical interest.
- Great Wilbraham Common SSSI – 2.5km WSW– neutral grassland communities of the calcareous loam grassland type, and one of the largest remaining species-rich grasslands in Cambridgeshire. Notified for its botanical interest.
- Wilbraham Fens SSSI – 4.2km W – a large area of fen and neutral grassland with associated scrub and open water communities. Notified for its botanical interest.
- Fulbourn Fen SSSI – 3.5km SW– species-rich neutral grassland on calcareous loam and peat, with remnants of 'fen' woodland. Notified for its botanical interest.
- Fleam Dyke SSSI – 3.5km SSW - chalk scrub and species-rich chalk grassland communities, notified for its botanical interest.
- Devil's Dyke SAC/SSSI – 4.4km NE– designated for its semi-natural dry grasslands and scrub on calcareous substrate, and as the only known UK dry grassland site for the lizard orchid Himantoglossum hircinum.
- Wicken Fen and Chippenham Fen Ramsar sites/Fenland SAC – 10km north– designated for its extensive examples of the tall herb-rich purple moor-grass Molinia caerulea/meadow thistle Cirsium dissectum fen-meadow.
- Breckland SPA/SAC – 16km NE– designated for its breeding nightjar, stone-curlew and woodlark populations.
- Rex Graham Reserve SAC – 22km NE – a disused chalk pit which supports the largest population of military orchid Orchis militaris in the UK. It is designated for this and for its dry grasslands and scrublands on chalk/limestone habitat.

- Eversden and Wimpole Woods SAC – 22km SW – a mixture of ancient coppice woodland and high forest woods that has been designated for its population of barbastelle bats.
- Ouse Washes SPA/Ramsar site/ SAC – 23km NW - a wetland of major international importance comprising traditionally managed seasonally flooded washlands. It provides breeding and winter habitats for important assemblages of wetland bird species, particularly wildfowl and waders. The SAC has been designated for its population of spined loach.

9.31 Given their ecological interest features and their distance from the proposed development, none of these would be likely to be affected by it.

Other Sites/Priority Habitats

Local Nature Reserves

9.32 There are no Local Nature Reserves (LNR) within 2km of the site, and none that would be affected by the proposed development.

County Wildlife Sites

9.33 Two County Wildlife Sites (CWS) are located within 2km of the proposed development (**Table 9.4**) and an additional one just outside this zone (2.2km from the proposed renewable energy park). Their locations are shown in **Figure 9.1**.

Table 9.4 - *County Wildlife Sites within 2km of the proposed Six Oaks Renewable Energy Park.*

Site Name	Grid Reference	Area (ha.)	Distance from Proposed Development (km)	Reasons for Designation
Heath Road/ Street Way Green Lanes	TL5758	6.8	Adjacent to the site	Supports frequent numbers of at least eight neutral grassland indicator species and a population of a Nationally Scarce vascular plant species (Medicago sativa ssp. falcata).
St George's Churchyard	TL581567	1.4	1km SE	Supports frequent numbers of at least eight neutral grassland indicator species.
Bottisham Park	TL5461	61.6	2.2km NW	The site qualifies for parkland as it contains 5 or more veteran trees in association with other semi-natural habitat, for neutral grassland, and for plant species which are rare in the county (Ophrys insectifera, Dipsacus pilosus).

Ancient Woodland

9.34 There are no sites on the Ancient Woodland Register within 2km of the proposed development, and none would be affected by it.

Other Priority Habitats

9.35 **Deciduous woodland** – this habitat is scattered over a wide area across the 2km zone around the proposed development, but none within the site itself or its likely zone of ecological influence (**Figure 9.1**). The closest lies 250m south from the site.

9.36 **Traditional orchard** – there are four small areas of traditional orchard within the 2km zone around the proposed development, but none within the site itself or its likely zone of ecological influence (**Figure 9.1**). The closest lies 580m NE from the site.

9.37 **Lowland calcareous grassland** – there is none mapped within 2km of the proposed development, but it forms part of the Newmarket Heath SSSI (2.4km NE from the site at its closest point), outside the likely zone of ecological influence of the proposed renewable energy park.

Protected Species Records (CPERC)

9.38 **Great Crested Newt** (searches included CPERC plus NE licence return and eDNA databases). There were no records within 2km of the proposed development, and none within its likely zone of influence. No potentially suitable habitat was identified for this species within that zone either.

9.39 **Red Kite** – there have been occasional sightings but no breeding records within the potential zone of influence of the proposed development.

9.40 **Peregrine** – a breeding site has been reported within the search area. Details are provided in the Confidential **Appendix 9.5**.

9.41 **Barn Owl** – there were two records from the CPERC database, outside the likely zone of influence for this species (>300m), including one found dead beside the A11.

9.42 **Brown Hare** – there were several records from the CPERC database in proximity to the proposed development and it was seen frequently across the site during the baseline bird and other ecology surveys.

9.43 **Badger** – there were several records of this species from the CPERC database but none within 1km of the site and none within the likely zone of influence for this species.

9.44 **Hedgehog** – there were no records of this species within 2km of the proposed development but several just outside that area, and it is likely to use the field margins within the site given the habitats present.

9.45 **White-letter hairstreak** – there was a single record from the CPERC database (the closest 600m east from the proposed development, but outside the likely zone of influence of the proposed development.

9.46 **Bat species** – there were records of several bat species from the CPERC database, including serotine, Natterer's, common pipistrelle, soprano pipistrelle, and brown long-eared bat.

Phase 1 Habitat Survey

9.47 The Extended Phase 1 survey map of the proposed development is shown in **Figure 9.2**. Each of the Phase 1 habitats that were recorded at the site during the survey are described in **Table 9.5**. The Table shows the areas of each habitat within the survey area, and within the proposed development. The proposed area in which the solar panels , batteries and associated infrastructure will be located is currently entirely arable land.

Table 9.5 - *Phase 1 habitats recorded in the proposed Six Oaks Renewable Energy Park survey area and the Proposed Development*

Phase 1 code	Phase 1 Habitat	Area (ha.) – whole survey area	% whole survey area	Area (ha.) – Renewable Energy Park	% Renewable Energy Park
A1.1.1	Broadleaved woodland – semi-natural	19.4	3.0%	0	-
A1.1.2	Broadleaved woodland - plantation	9.6	1.5%	0	-
A1.2.2	Coniferous woodland - plantation	0.5	0.1%	0	-
A1.3.2	Mixed woodland - plantation	0.8	0.1%	0	-
A2.1	Scrub - dense/ continuous	2.5	0.4%	0	-
A2.2	Scrub - scattered	0.5	0.1%	0	-
B2.1	Neutral grassland - unimproved	8.1	1.2%	0	-
B2.2	Neutral grassland - semi-improved	30.6	4.7%	0	-
B4	Improved grassland	44.8	6.8%	0	-
J1.1	Cultivated/disturbed land - arable	533.5	813%	76.0	100%
J3.6	Buildings	5.9	0.9%	0	-

9.48 There are widespread intact species-poor hedgerow and defunct species-poor hedgerow across the survey area, but none within the proposed development itself.

9.49 Some of the broad-leaved woodland is NERC Section 41 priority habitat but this is located outside the area that would be affected by the proposed development.

9.50 The linear habitats found within the survey area are summarised in **Table 9.6**. Their locations are shown in **Figure 9.2**. The hedgerows across all of the survey area were largely species-poor native hedgerow dominated by hawthorn.

9.51 Habitat suitability within the survey area was assessed as high for bats and badgers, so specific surveys for these were undertaken (see following section).

Table 9.6 - *Phase 1 linear habitats recorded in the Six Oaks Renewable Energy Park survey area.*

JNCC Code	Linear Habitat	Length (km)
J2.1.1	Native species-rich hedge intact	9.9
J2.1.2	Species-poor hedge intact	8.0
J2.2.1	Native species-rich hedge defunct	1.7
J2.2.2	Species-poor hedge defunct	6.3

Protected Species Surveys

Bats

9.52 The large majority of the potential bat roost sites were located around the fringes of the survey area, with few within the proposed development site itself (see **Appendix 9.3 Figure 1**). The bat numbers recorded within the proposed development were generally low, reflecting the low quality bat habitat across the survey area.

9.53 The baseline bat surveys have shown the survey area to hold generally low levels of bat activity. Twelve species of bat were recorded in total during the surveys. Common pipistrelle was much the most frequently recorded species, with soprano pipistrelle, Daubenton's bat, noctule, Nathusius' pipistrelle and serotine also frequently encountered. Other less abundant species comprised: whiskered bat, Brandt's bat, Natterer's bat, barbastelle, Leisler's and brown long-eared bats. Full details of the bat surveys undertaken are given in **Appendix 9.3**.

9.54 All bats are all specially protected as European Protected Species (so all have been classed as high value). Barbastelle, noctule, brown long-eared and soprano pipistrelle are also NERC Species of Principal Importance. All bat species have therefore been taken forward for further assessment.

Badgers

9.55 Though there were no records from the desk study within 1km of the proposed development (and only a small number in the 1-2km zone), this appeared to be largely a result of low survey effort in this species area rather than absence from the locality. Signs of badger activity were found during the field surveys with one active sett located (though outside the likely zone of influence of the proposed development) and there is widespread suitable habitat for this species in the survey area. As this species is subject to persecution, details of their locations are given in a Confidential Appendix (**Appendix 9.4**). As a specially protected species under the Badgers Act, this species has been classed as high value and has been taken forward for further assessment.

Other Species

9.56 **Otter, Water Vole and Great Crested Newt**: there was no suitable habitat present in the survey area for any of these species.

9.57 There were also regular sightings of small numbers of brown hares during the baseline bird and other ecology surveys. As a NERC Species of Principal Importance, this species has been classed as medium value and has been taken forward for further assessment.

9.58 Three additional Red Data Book species (two bee species and one plant) were recorded along the bridleways/tracks within the County Wildlife Site during the surveys and have been classed as high value and taken forward for further assessment:

- Large Scabious Mining Bee Andrena hattorfiana Red Data book RDB3 (Rare) – several seen on 22/06 & 07/0720.
- Small Scabious Mining Bee Andrena marginata, Red Data Book (Scarce/Notable A) – one seen on 22/07/20.
- Meadow Saffron Colchicum autumnale, Red Data Book (Near Threatened) – seen on 01/09/20

Wintering Bird Surveys

9.59 The full results of the wintering bird surveys are given in **Appendix 9.1**. The conservation value of the wintering bird populations observed in the Six Oaks survey area during the wintering bird surveys has been summarised in Table 9.7 below. This included six high sensitivity species (marsh harrier, red kite, golden plover, barn owl, peregrine and merlin) that are EU Birds Directive Annex 1/Wildlife and Countryside Act Schedule 1 species, seven medium sensitivity species (UK BAP priority/ red listed species of conservation concern and /or present in regionally important numbers; lapwing, black-headed gull, common gull, herring gull, yellow-legged gull, lesser black-backed gull and raven), and four low sensitivity species.

Table 9.7 - *Conservation evaluation of the autumn/winter non-breeding bird populations in the Six Oaks survey area*

Species	Peak count (2019-20)	Peak in site + 100m buffer	>1% regional population	EU Birds Dir Ann 1	W and C Act Sch 1	Red [R]/ Amber [A] List	UK BAP Priority sp	Value
Greylag Goose	7	0				A		Low
Mallard	2	0				A		Low
Sparrowhawk	1	1						Nil
Marsh Harrier	1	0	√	√	√	A		High
RedKite	4	2	√	√	√			High
Buzzard	7	5						Nil
Lapwing	17	0				R	√	Medium
Golden Plover	117	117		√				High
Black-headed Gull	430	113	√			A		Medium
Common Gull	198	86	√			A		Medium
Herring Gull	25	2				R	√	Medium
Yellow-legged Gull	1	1	√			A		Medium
Lesser Black-backed Gull	195	185	√					Medium
Great Black-backed Gull	1	0				A		Low
Barn Owl	1	0	√		√			High
Kestrel	4	3				A		Low
Peregrine	1	1	√	√	√			High
Merlin	1	0	√	√	√	R		High
Raven	1	0	√					Medium

9.60 There was no evidence that the survey area (including the proposed development site) was particularly important for any wintering bird populations. No parts of that area held any notable concentrations of birds and no important wintering bird habitats occurred within it.

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

9.62 Key species identified in this evaluation were taken forward for further analysis and assessment. Though six high value and seven medium value species were recorded, only six of these (red kite, golden plover, black-headed gull, common gull, lesser black-backed gull and peregrine) were taken forward for further assessment as the others were only present irregularly in very small numbers.

Breeding Bird Surveys

9.63 The full results of the breeding bird surveys are given in **Appendices 9.2 (2021) and 9.7 (2022)**. The survey area supported a typical range of farmland breeding birds, including several NERC Act priority species. The breeding populations and their conservation value are summarised in **Table 9.8 on page 130**. This included four high sensitivity species (quail, red kite, hobby and common crossbill) that are a Wildlife and Countryside Act Schedule 1 species, twelve medium sensitivity species (NERC Act priority/ red listed species of conservation concern; grey partridge, lapwing, skylark, yellow wagtail, dunnock, song thrush, house sparrow, linnet, bullfinch, yellowhammer, reed bunting and corn bunting), and nine low sensitivity species.

Table 9.8 - *Conservation evaluation of the breeding bird populations in the Six Oaks survey area*

Species	Breeding pairs (study area) 2020	Breeding pairs (study area) 2022	Breeding pairs (site+100m buffer) 2020	Breeding pairs (site+100m buffer) 2022	W and C Act Sch 1	Red [R]/ Amber [A] List	NERC Priority sp	Value
Red-legged Partridge	6	8	4	5			√	Nil
Grey Partridge	4	3	4	3		R		Medium
Quail	6	0	3	0	√	A		High
Pheasant	4	3	2	0				Nil
Red Kite	0	1	0	0	√			High
Sparrowhawk	0	2	0	1		A		Low
Buzzard	3	5	1	2				Nil
Kestrel	1	2	0	1		A		Low
Hobby	1	0	0	0	√			High
Lapwing	1	0	0	0		R	√	Medium
Stock Dove	8	4	8	3		A		Low
Woodpigeon	54	44	28	12		A		Low
Green Woodpecker	1	1	0	0				Nil
Great Spotted Woodpecker	1	0	0	0				Nil
Skylark	76	129	22	105		R	√	Medium
Swallow	0	1	0	0				Nil
Meadow Pipit	0	3	0	3		A		Low
Yellow Wagtail	15	8	8	4		R	√	Medium
Pied Wagtail	1	1	1	1				Nil
Wren	10	13	7	3		A		Low
Dunnock	14	20	9	12		A	√	Medium
Robin	8	20	5	5				Nil
Blackbird	15	20	5	8				Nil
Song Thrush	2	3	1	1		A	√	Medium

Species	Breeding pairs (study area) 2020	Breeding pairs (study area) 2022	Breeding pairs (site+100m buffer) 2020	Breeding pairs (site+100m buffer) 2022	W and C Act Sch 1	Red [R]/ Amber [A] List	NERC Priority sp	Value
Mistle Thrush	1	1	0	0		R		Low
Blackcap	12	9	7	0				Nil
Garden Warbler	0	1	0	0				Nil
Lesser Whitethroat	6	4	3	1				Nil
Whtiethroat	36	41	22	34				Nil
Chiffchaff	3	6	1	0				Nil
Goldcrest	2	0	2	0				Nil
Long-tailed Tit	1	3	1	0				Nil
Blue Tit	5	16	5	7				Nil
Great Tit	5	8	3	4				Nil
Coal Tit	0	1	0	0				Nil
Jay	1	0	1	0				Nil
Magpie	3	4	1	0				Nil
Jackdaw	0	2	0	0				Nil
Rook	0	3	0	0		A		Low
Carrion Crow	12	13	5	8				Nil
House Sparrow	2	2	2	1		R	√	Medium
Chaffinch	21	14	13	8				Nil
Greenfinch	0	2	0	1		R		Low
Goldfinch	12	25	9	18				Nil
Linnet	26	42	16	33		R		Medium
Common Crossbill	0	1	0	1	√			High
Bullfinch	1	1	0	0		A		Medium
Yellowhammer	31	49	18	38		R		Medium
Reed Bunting	18	20	15	20		A		Medium
Corn Bunting	20	51	11	41		R		Medium

9.64 Only the breeding birds within and adjacent to the proposed development site are likely to be affected (i.e. those within the zone of ornithological influence of the development). For the purpose of this assessment, this has been defined as the site plus a 100m buffer, in order to include birds that may be affected by disturbance as well as direct habitat loss. The numbers of breeding birds within this zone are given in **Table 9.8 on page 130**. It did not hold any notable concentrations of any breeding birds but was generally typical of the open arable farmland habitats across the survey area.

9.65 Two high value species were recorded breeding within the survey area during 2020, quail and hobby, and a further two in 2022, red kite and common crossbill. As a species specially protected from disturbance during breeding under Schedule 1 of the Wildlife and Countryside Act, these have been taken forward for further assessment.

9.66 Of the twelve breeding species classed as medium conservation value, ten have been taken forward for further assessment, as they occurred within the proposed development site or in proximity to it, and so could potentially be affected: grey partridge, skylark, yellow wagtail, dunnock, song thrush, house sparrow, linnet, yellowhammer, reed bunting and corn bunting. All were classed as medium value for their listing as NERC Act Section 41 priority species.

ECOLOGICAL IMPACT ASSESSMENT

Potential Ecological Effects of the Development

9.67 The main potential effects of solar farms on ecology are direct loss of breeding or feeding habitat, indirect loss of habitat from disturbance (either temporary during construction or more permanent from operational solar panels), and (for birds) collision risk with solar panels structures and new overhead lines (Harrison et al. 2016, Jenkins et al. 2017). No new overhead lines are proposed for the Six Oaks Renewable Energy Park.

9.68 Habitat loss is the potential impact from large-scale solar PV development that has raised most concern to date in relation to birds (Lovich and Ennen 2011, Smit 2012, UNEP/CMS 2015), particularly in relation to species with restricted ranges and very specific habitat requirements (though this would not be a factor at this site as no such species would be affected). The greatest impacts would be if key species were displaced from restricted habitat that is not available elsewhere, and in that case, it would be expected to lead to local population reduction.

9.69 Management of site during operation can also be important. In some case vegetation may be removed altogether, but in others it has been managed to promote biodiversity interests and can provide opportunities for habitat enhancements (Blaydes et al. 2021).

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

9.71 Other possible impacts of solar PV farms (Jenkins et al. 2017) include noise and disturbance generated by construction and maintenance activities, and the attraction of novel species to an area by the artificial provision of otherwise scarce resources – for example perches, nest sites and shade (DeVault et al. 2014). Overhead lines would not be an issue with this development as no new overhead wires will be required.

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

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

Potential Ecological Effects of the Development during Construction

Habitat Loss

9.73 The extent of the development is shown in **Figure 9.1** and summarised in **Table 9.9 on page 134**. It includes:

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

9.74 The grid route will be a separate consenting process. It will be underground and will cross Heath Road, and run adjacent to Streetway to the public road. After that it would be underground along road verges and/or field margins. No significant ecological effects would be expected but this will be subject to pre-construction check surveys (and implementation of mitigation measures as required).

9.75 The solar panels and associated infrastructure would all be located on land that is currently arable farmland. The panels will cover about 32 ha of the 76 ha total land within the proposed development. Only a small proportion of this area of arable farmland would actually be lost. With the solar panels raised above the ground, the permanent land take would typically be only about 5% of the site (BRE 2014).

9.76 There would be 4.4 km (1.76 ha.) of new access track, a loss of 1.09 ha. for the substation/battery storage and 0.05 ha. for the six transformers, and a temporary loss of 0.4ha. for the construction compound. All of this loss would be of arable farmland. There would be a minor loss of native species-rich intact hedgerow (10m) and species-rich defunct hedgerow 95m) to allow access between fields within the site. There would be no watercourse crossings.

Table 9.9 - *Six Oaks Renewable Energy Park: development details and habitats affected*

Description	Area/Length Affected	Habitat Type
Solar Panels	31.9	Arable farmland
Substation/battery storage	1.09	Arable farmland
Temporary construction compound	0.4	Arable farmland
Transformers (six)	0.05	Arable farmland
New access track (4m wide)	1.74 (4.4km)	Arable farmland
Hedgerow removal	10m	Native species-rich intact hedgerow (10m)
	5m	Native species-rich defunct hedgerow (5m)

9.77 No statutory protected nature conservation site would be affected by the proposed development.

9.78 One County Wildlife Site, the Heath Road/Street Way Green Lanes lies adjacent to the proposed development. It will be crossed by the site access track. Careful site design has ensured that any adverse effects on this site will be minimised, and that it will benefit through the Biodiversity and Landscape Management Plan (BLMP). This applies too to the three red data species that were recorded on this site during the baseline surveys (Large Scabious Mining Bee, Small Scabious Mining Bee and Meadow Saffron).

9.79 The only loss of habitat would, therefore, be of arable farmland, a habitat of low ecological value. The loss of land would be an effect of low magnitude, and not significant.

Pollution

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

Disturbance/harm during Construction and Decommissioning

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

BADGERS

9.82 Badgers were active within the survey area, with one active sett located. No evidence was found of any badger activity within the 30m distance from the development at which disturbance to this species may occur. It is possible, however, that new setts could be established within the site prior to construction (as several were located nearby), so further checks would be required pre- construction to confirm their absence or to inform the need for any further mitigation if they were found to be present at that time. Any

effect in this high value species would then be of negligible magnitude and not significant.

BATS

9.83 No potential bat roosting sites would be affected by the proposed development (all have been avoided in the site design process), so the only disturbance effect during construction would be to commuting/foraging habitat for bats. The main areas that these species would be likely to use (the field margins, hedgerows and a small number of woodland edges) have been buffered by at least 5m. As a result, any effect on these high value species would be of negligible magnitude and not significant.

BREEDING BIRDS

9.84 Four high value (quail, red kite hobby and common crossbill) and ten medium value breeding species were taken forward for further assessment, as they are open ground species that occurred within the proposed development site or in proximity to it, and so could potentially be either displaced by disturbance, or have their nests damaged/destroyed: grey partridge, skylark, yellow wagtail, dunnock, song thrush, house sparrow, linnet, yellowhammer, reed bunting and corn bunting.

9.85 There will need to be a Breeding Bird Protection Plan to ensure compliance with the 1981 Wildlife and Countryside Act (which protects Schedule 1 species from disturbance and all active birds' nests from destruction). Further details are given in the mitigation section below. With that mitigation in place, effects on breeding birds would be of low magnitude effect on high/medium value receptors and not significant.

WINTERING BIRDS

9.86 Six wintering bird species were taken forward for assessment: red kite, golden plover, black-headed gull, common gull, lesser black-backed gull and peregrine. Red kite, golden plover and peregrine are high value species that were seen regularly through the winter surveys, and the three gull species were medium value species present in regionally important numbers. Whilst some displacement from the development site and its surrounds may occur during construction, the area from which any such displacement may occur was not particularly important for any of these species and did not hold any habitat that was not widely available nearby. As a result, this would be an effect of only low magnitude on high/medium value species (and not significant).

Potential Ecological Effects of the Development during Operation

Habitat Change

9.87 The habitat within the development site will change from open arable farmland to wildflower meadow with solar panels after construction. The grassland will be managed to provide a more ecologically rich habitat than is currently present (as detailed in the BLMP set out in **Appendix 9.6**). This will create a medium value habitat in a positive medium magnitude effect, with minor significance (though will result in a positive beneficial ecological impact). Furthermore, the site will be buffered by open grassland habitat around hedgerow/woodland habitat, which too will deliver an ecological gain.

Disturbance

9.88 It is likely that some breeding bird species, particularly those that prefer more open ground, could be displaced from the site as a result of the presence of the solar panels. Of the key ecological receptors, those most likely to be affected include grey partridge, skylark and yellow wagtail. Mitigation measures are set out below that will deliver a net gain to these species and enable the local populations to be maintained. As a result, the effects on breeding birds would be of low magnitude effect on high/medium value receptors and not significant.

9.89 There could also be some operational phase disturbance effects on wintering birds. However, given that the area from which any such displacement may occur was not particularly important for any of the key species and did not hold any habitat that was not widely available nearby, this would be an effect on high/medium value species of at most low magnitude (and not significant).

MITIGATION MEASURES AND HABITAT ENHANCEMENT

Mitigation through Avoidance in Design

9.90 Buffers to the development have been applied to avoid the more ecologically sensitive habitats within the site. This included:

- Minimum 30m buffer from any badger setts.
- Minimum 5m buffer from all hedgerows.

9.91 Potential adverse effects on the Heath Road/Street Way Green Lanes CWS have been avoided though site design.

9.92 The site has also been designed to minimise any loss of hedgerow by using existing breaks and farm tracks, and avoid any tree felling/damage. There would be no new watercourse crossings.

Mitigation for Breeding Birds

9.93 Four species specially protected under Schedule 1 of the Wildlife and Countryside Act from disturbance during breeding were found during the 2020 surveys (quail, ed kite, hobby and common crossbill), and given the habitat present it is possible that species such as barn owl and peregrine could breed there in the future. It would be important to ensure that no Schedule 1 species are disturbed during the breeding season, particularly during the construction phase of the development. Given the potential to breed within the solar farm site, a Breeding Bird Protection Plan (BBPP) should be developed and implemented. This should include further surveys for Schedule 1 species at fortnightly intervals through the breeding season (March-August) during the construction period to inform the BBPP and ensure compliance with the 1981 Wildlife and Countryside Act.

9.94 The BBPP should also include measures to ensure the protection of all other nesting birds. Where works affecting habitats that could be used by nesting birds must take

place between March and August (inclusive), they should only be carried out following an on-site check for nesting birds by an experienced ecologist, to ensure compliance with the 1981 Wildlife and Countryside Act.

9.95 It is likely that some breeding birds will be displaced from the site during the operational phase by the presence of the solar panels, particularly open ground species such as grey partridge, skylark, and yellow wagtail. All these species are NERC Act Species of Principal Importance. Measures to deliver benefit for these species have been included as part of the BLMP(see **Appendix 9.6**).

Mitigation for Other Protected Species

9.96 No other protected species are likely to be affected by the development given the results from the ecological surveys, but badgers could move into the impact zone, and for which, therefore, check surveys should be undertaken prior to construction (to inform the need for any mitigation measures). Pre-construction surveys for badgers will therefore be undertaken within 30m of the development footprint. If they were found to be present where they could be affected by the construction works, then further consultation would be needed with Natural England to determine the licensing and mitigation requirement.

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

CUMULATIVE ECOLOGICAL EFFECTS

9.98 The potential ecological effects of the proposed development have been considered in combination with the impacts from other schemes in the wider area, including new housing developments and other solar farm applications. As the Six Oaks Renewable Energy Park will deliver a net biodiversity gain, it will not contribute to any adverse cumulative ecological effects, so no further cumulative assessment has been undertaken.

BIODIVERSITY NET GAIN

9.99 The data gathered during the field surveys have been used to undertake a biodiversity net gain calculation for the project, following the DEFRA/ Natural England Biodiversity Metric 3.1 methodology (Panks et al. 2021). The DEFRA Biodiversity Metric 3.1 Tool was used to audit the habitats present on the site, the losses that would occur as a result of the development and the biodiversity net gain that would be achieved through the BLMP.

9.100 Two specific habitat enhancement measures are proposed within the site boundary:

- Restoration of lowland species-rich grassland – most of the site is currently arable farmland of low diversity and low ecological value. This will be restored to grassland habitat, will be managed after construction of the renewable energy park by sustainable grazing (or cutting) and to promote the re-establishment of a diverse meadow community, with abundant wildflowers to provide food for pollinators. An area of 76ha. of arable farmland will be enhanced to deliver a more biodiverse neutral grassland wildflower meadow.

This will be located under and around the proposed solar panel land within the site.

- Native hedgerow planting – 1.1km of new native hedgerow will be planted and a further 2.5km of existing hedgerow restored to native species-rich hedgerow.
- Native tree planting – a line of Rowan will be planted in the south-east corner of the site.

9.101 Further details of these measures are provided in the BLMP in **Appendix 9.6**.

9.102 Ongoing management of the grassland will be carried out primarily by grazing stock (sheep). Levels of grazing will be varied through the year to optimise the wildflower meadow diversity, adopting the following regime (though to be refined as the restored grassland becomes established, informed by the monitoring programme):

- No grazing March-June;
- Heavier grazing (5-10 sheep per ha) July – October; and
- Grazing continued at a lower level (3-5 sheep/ha) through the winter (October – February) unless ground conditions too wet (in which case no grazing over-winter).

9.103 If grazing with sheep were not possible, then an alternative cutting regime would be implemented to achieve a similar effect on the vegetation, with a single cut per year, in August/September.

9.104 An area of grassland will be set aside for ground nesting birds.

9.105 Wood piles would be provided for invertebrates.

9.106 With regard to ongoing management of the new hedgerows, the hedges will be trimmed annually (between January and March) in the first three years after planting to encourage bush growth. Thereafter it will be trimmed once every three years. A target 3m height and 2m width will be maintained through lifetime of the renewable energy park.

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

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

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

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

9.110 Additionally, breeding bird surveys will be carried out to inform the implementation of the BMP. Surveys will follow the same methodology as the baseline surveys carried out in 2020 (so they will be directly comparable) and will be undertaken during the first three years of the operation of the renewable energy park. After that the results will be reviewed and the surveys discontinued as long as the BMP has delivered the required net gain to the local breeding bird population. If not then measures to improve the site's management will be recommended and the survey continued in years 5, 10 and 15.

9.111 The biodiversity net gain calculation headline results are shown in **Table 9.10**. Whilst there will be a small loss of arable farmland habitat to the development, the proposed enhancement measures set out above will deliver a clear net gain. There will be a net 66% gain in habitat units, from 152 to 253 Biodiversity Units. Hedgerow units will increase from 123 to 126 Units.

Table 9.10 - *Biodiversity Net Gain Headline Results*

Six Oaks Renewable Energy Park

Headline Results

Return to results menu

On-site baseline	*Habitat units*	152.00
	Hedgerow units	123.40
	River units	0.00
On-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	252.52
	Hedgerow units	125.69
	River units	0.00
On-site net % change (Including habitat retention, creation & enhancement)	*Habitat units*	66.13%
	Hedgerow units	1.86%
	River units	0.00%
Off-site baseline	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Off-site post-intervention (Including habitat retention, creation & enhancement)	*Habitat units*	0.00
	Hedgerow units	0.00
	River units	0.00
Total net unit change (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	100.52
	Hedgerow units	2.29
	River units	0.00
Total on-site net % change plus off-site surplus (including all on-site & off-site habitat retention, creation & enhancement)	*Habitat units*	66.13%
	Hedgerow units	1.86%
	River units	0.00%
Trading rules Satisfied?	Yes	

CONCLUSIONS

9.112 The proposed Six Oaks Renewable Energy Park will not have any effect on any statutory protected nature conservation sites.

9.113 One County Wildlife Sites would be affected, but overall a net gain would be delivered through the BLMP the grassland habitat that it supports will be extended through conversion of arable land within the Renewable Energy Park to grassland.

9.114 The proposed development is located on arable farmland, and this is the only habitat that would be lost to the development (other than a small loss of native species-poor hedgerow). There will be no need for any tree felling, and no watercourse crossings are required.

9.115 The site design has ensured that only lower quality habitats would be affected, with buffers applied from all hedgerows (minimum 5m). These buffers will also ensure that any adverse effects on bats are avoided.

9.116 Mitigation measures will be required during construction to avoid any significant impacts on breeding birds, through the implementation of a Breeding Bird Protection Plan.

9.117 Pre-construction survey checks will also be required for badgers, to inform any additional mitigation for this species (in case they have moved into the site prior to construction).

9.118 A BLMP will deliver a net gain of 101 habitat units (an increase of 66%) and 3 hedgerow units (an increase of 2%).

9.119 Overall, with the proposed mitigation in place, there would be no significant residual adverse ecological effects from the proposed Six Oaks Renewable Energy Park.

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CHAPTER 10 - LANDSCAPE AND VISUAL ASSESSMENT

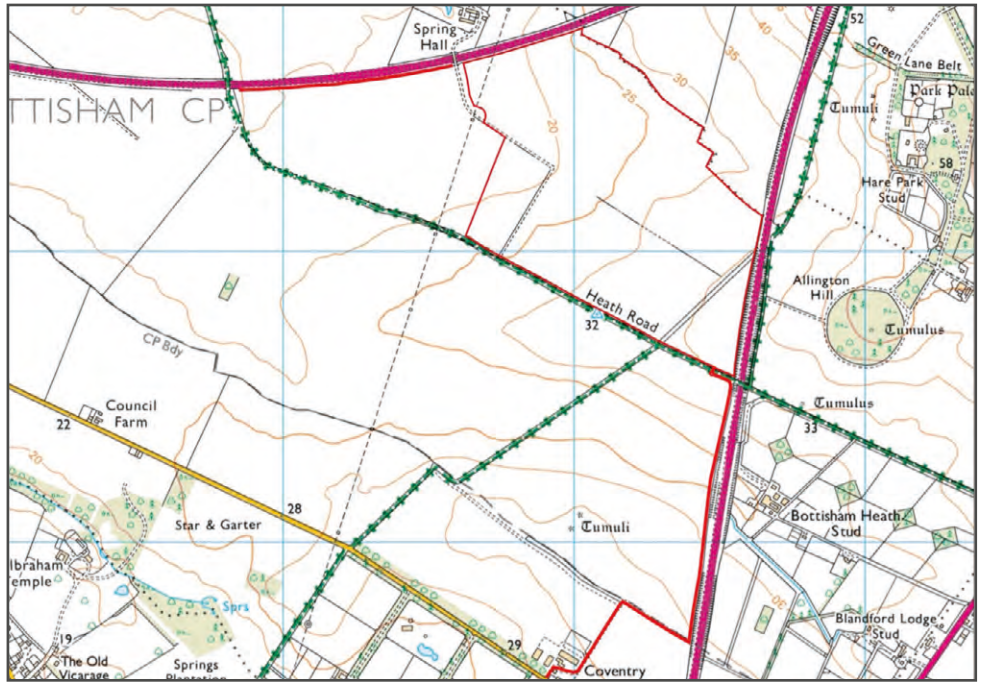
INTRODUCTION

10.1 Planning permission is being sought for the development of a Renewable Energy Park extending to 76ha with a capacity of up to 49.9MW on arable farmland to the south-east of Bottisham, Grid Reference TL57015935 (Field No = TL 5759 0135) ('the site') (Postcode CB8 0UZ).

10.2 The application is in full with all matters, including access arrangements defined.

10.3 The Environmental Statement incorporating the design and access statement, associated figures and a planning statement support the application and should be referred to when reading this LVIA (landscape and visual impact assessment).

Plate 10.1 - *Map Indicating the Site Location*



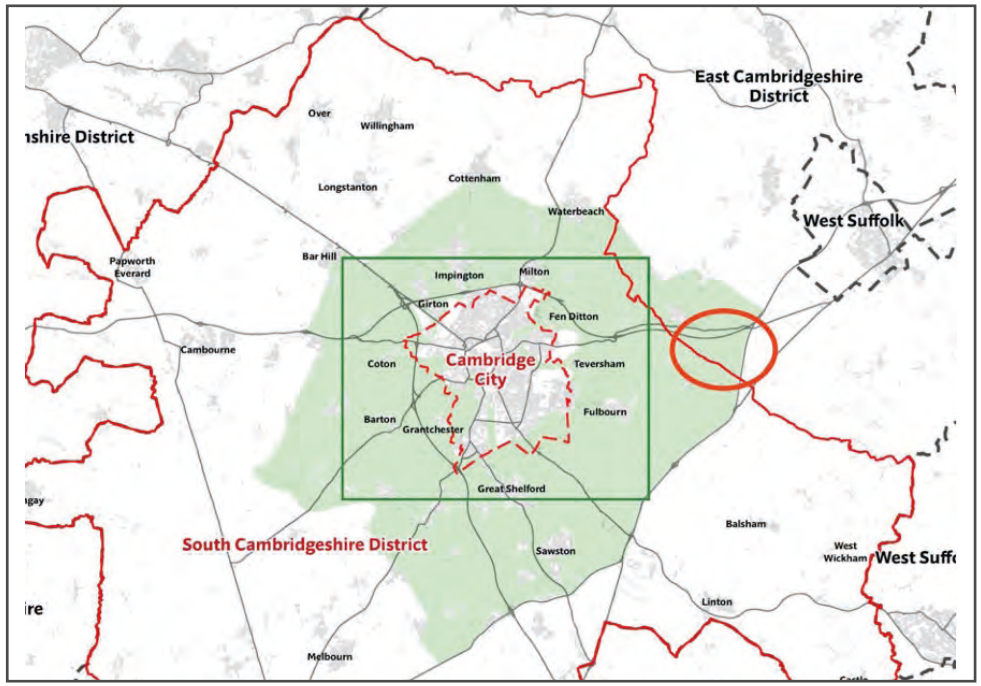
10.4 The Cambridge Green Belt extends as far east as the A11, and therefore across the site (**Plate 10.2**).

10.5 The site lies outside of any designated landscape.

10.6 The relevance of the undesignated status of the site is explored as part of the landscape and visual impact assessment, in the LVIA conclusions and in the Planning Statement.

10.7 The applicant's planning consultant, Engena, has taken environmental impacts into consideration from the start of the project, including the commissioning of specialists to undertake the assessment of effects.

Plate 10.2 - *Cambridge Greenbelt Extent in Relation to the Site*



10.8 The siting and form of the proposed 49.9MW Renewable Energy Park and ancillary structures have been carefully considered by the Applicant and landscape architect Anne Priscott to sit sympathetically in the receiving landscape.

10.9 The development falls within the remit of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) and has been deemed EIA through formal Screening with the Council.

Introduction to the Site

10.10 The proposed development extends across a number of field parcels of arable cultivation within an extensive network of very large-scale hedge-bound fields together. There are ditches in the broader landscape, including parallel to Heath Road opposite the site.

10.11 There are no listed buildings or other notable heritage assets on the site.

10.12 There are a high number of listed buildings in the broader landscape.

10.13 Within 2km of the land area under consideration there are:

- Five Scheduled Monuments - a Romano-British settlement west of Allington Hill (c. 120m E), three bowl barrows to the north-west of Hare Park Stud (c. 520m ENE), five bowl barrows to the north of Hare Park Stud (c. 560m E), four bowl barrows at Allington Hill (c. 780mE), and a moated site south of 72 Bendyshe Farm (c. 2km NW); and
- 43 Listed Buildings, comprising one Grade I asset (Church of Holy Trinity, c. 2km NW), 5 grade II* assets (Six Mile Bottom Windmill, c.1.4km SE; Wilbraham Temple and its associated Outbuilding, both c. 1.5km SW; Church of St John the Evangelist, c. 1.7km WSW; and Church of St Nicholas, c. 2km SW and 37 grade II assets. The nearest listed building to the potential site is the Barn at Spring Hall Farm (Grade II),140m to the north of the site, on the other side of the A14.

10.14 These buildings relate strongly to the local context being vernacular buildings of historic note, relating to the landscape context. However, none are likely to be impacted upon by the proposed development, and are noted for contextual information only. They are locally characteristic and have no designed vistas or other specific landscape connections.

10.15 There are two parks and gardens at Lode, Anglesey Abbey (Grade II*) to the northwest and Wilbraham Temple (Grade II) at Great Wilbraham to the south-west, both set within well-wooded enclosed locations where impacts are not anticipated.

10.16 There are also a number of scheduled monuments, including the Romano-British settlement 200m west of Allington Hill to the east of the site, and east of the A11, and Four bowl barrows at Allington Hill, 420m south west of Allington Hill Farm, all set within well-wooded enclosed locations where no landscape or visual impacts are anticipated. There is intervisibility between the Three bowl barrows (640m north west of Hare Park Stud) and Five bowl barrows (270m north of Hare Park Stud) and the site. The Historic Environment Assessment reports that there would be less than substantial harm to the significance of the assets and mitigation (hedgerow planting along northern/north-eastern part of the site) would further reduce impact.

10.17 A substantial range of contemporary sheds lies to the south of the site. The site occupies a vast open landscape with enclosure on the eastern edges from shelterbelts and tree belts enclosing the studs to the east of the A11 corridor. The presence of these stud buildings influences the perception of the landscape in terms of scale, with the land to the south-east of the site being more enclosed and modest in scale. The presence of the A14, A11, A1303 and A1304 strongly influences the perception of the landscape, the speed of travel through the landscape and the scale of the features present. The presence of public access along Heath Road and Street Way gives access to an otherwise remote landscape and has consequently influenced the viewpoint selection.

10.18 The landform of the site is gently sloping with the western end of the site lying at c 19m AOD and the south-eastern part rising to about 37m AOD. The site sits within a very gently sweeping tract of land rising from 12m AOD around Bottisham across to a shallow plateau of 52m AOD where the A1303, A14 and A11 intersect to the north of the site. The landscape has a number of notable springs. There are no open waterbodies present.

10.19 The surrounding farmland is mainly managed for arable with some horse grazing.

10.20 The whole area is noted for heathland qualities and drove (lane)-side hedges and ditches in an otherwise open arable landscape. These are a defining characteristic of this part of the landscape.

10.21 Individual trees are present and pine lines a dominant characteristic, particularly around the farm on the surrounding open farmland, but are not present on the site.

10.22 The character, form and magnitude of the landform and land cover visual screening is explored in detail in the visual analysis.

10.23 Heath Road, a public right of way runs from the A1303 over a bridge crossing the A14 and then east along the wide grass strip of 'road open to all vehicles' parallel to the southern edge of the site. The route of Heath Road continues; however, a user can turn south onto Street Way to Great Wilbraham. All of the route, except for the section south of Little Wilbraham Road, lies in the ZTV. There are no public rights of way within the proposed development layout, apart from the access track crossing point and the cable route crossing.

10.24 There are no other public rights of way, including bridleways, crossing the site. However, there is a bridle way running north of the site between Bottisham and Chalk Farm that lies in the ZTV.

10.25 The planning history of the site and planning policy background are fully described in the Planning Statement.

10.26 The development has the potential to impact on the physical character of the site and on the perception of the immediate context of the site, as described in the LVIA below. The local roads and public rights of way have been driven and walked and the character and nature of views recorded. This analysis forms an important part of the description of the baseline.

10.27 Within the site area there are relic hedges, devoid of their function through the prevalence of permanent cropping. Beyond the site are well-established treelines, including Scots Pine lines that are characteristic of heathland environments. The land to the east of the site appears far more enclosed than the site or land to the west. The enclosure is created by shelterbelts and woodlands surrounding land managed for horse studs. In this part of the landscape the overarching character is one of estates and studs. The A11 is set down into the landscape where it passes the site and has well-treed embankments creating enclosure for those using this route.

10.28 These are a defining characteristic of this part of the Cambridge landscape of the Chalk Hills.

Report Structure

10.29 Landscape and visual impact assessments comprise separate, although linked, processes that are undertaken in parallel. The physical resource can be described objectively through the identification and categorisation of the landscape into landscape character types and areas. The physical resource that can be seen as a "view" is interpreted as visual amenity.

10.30 The assessment is illustrated by LVIA Viewpoints 1-9 and supported by additional technical information contained in the Technical Appendices. The report is structured as follows:

- the relevant planning policy framework, and the national and local landscape designations within the study area;
- a description of the visual characteristics of the proposed renewable energy park development;
- a description of the baseline landscape and visual context of the proposed scheme within a 5km radius;
- an assessment of the effect of the proposed solar panels, battery energy storage and associated infrastructure on the landscape resource;
- an assessment of the effect of the proposed solar panels, battery energy storage and associated infrastructure on the visual resource and visual amenity of viewers (including views from residential properties) and visual receptors such as users of roads, public rights of way, settlements and individual dwellings;
- an assessment of the effect of the proposed renewable energy park infrastructure on designated landscapes;
- an assessment of the effect of the proposed renewable energy park infrastructure on planning designations;
- an assessment of the cumulative effect of the proposed renewable energy park in combination with other operational, consented or planned solar farms or renewable energy parks in the area (excluding wind turbines); and
- a summary and conclusions of the effects and their significance set out in relation to the relevant policy context to the site.

Anne Priscott Associates

10.31 Anne Priscott Associates Ltd has been commissioned by Engena Ltd to undertake a landscape character and visual impact assessment (LVIA) of the proposal on behalf of the developer Ridge Clean Energy Ltd.

10.32 Anne Priscott Associates Ltd is an independent landscape architecture consultancy with offices in Somerset. The practice provides advice in the fields of landscape architecture and landscape planning matters. Ms Anne Priscott has undertaken the assessment and all reporting for the Six Oaks Renewable Energy Park. Anne Priscott (CMLI) holds a BA Honours Degree in Landscape Architecture awarded by Edinburgh College of Art / Herriot-Watt University; is a chartered member of the Landscape Institute and principal of Anne Priscott Associates Ltd, with over 25 years' experience as a landscape architect and having worked nation-wide on projects, including undertaking over 100 LVIAs for a range of developments, including within Green Belts, designated landscapes and land within East Cambridgeshire District and having appeared at over 20 hearings and public inquiries dealing with landscape and visual matters for both developers and determining authorities.

10.33 The photography, 3D modelling, and all of the visualisations have been carried out by Mr Mike Spence a Chartered Landscape Architect and Registered EIA Practitioner who is a Technical Advisor to the Landscape Institute on Photography and Photomontages in Landscape and Visual Impact Assessment.

Instructions

10.34 Anne Priscott Associates Ltd was commissioned to assist the applicant by providing this landscape and visual impact assessment report information in January 2021, following the review of the case file and a discussion with Engena's planner. Further discussions have been held with the team to agree mitigation.

10.35 A full site visit was made in good clear weather conditions for the purposes of design and mitigation and viewpoint selections on 10th & 11th March 2022. Further site visits were made in good clear weather conditions for the purposes of on-site photography in 2022, including off-site photography undertaken using a full-sensor lens camera with a 50mm equivalent digital lens.

Cumulative Assessment

10.36 The assessment considers cumulative effects of other nearby renewable energy developments both completed and any current applications or consents for renewable energy schemes not yet implemented.

INTRODUCTION TO THE RELEVANT NATIONAL AND REGIONAL LANDSCAPE POLICIES WITHIN THE STUDY AREA

10.37 In the following part of the LVIA the national and local planning policies and guidance documents are introduced. The policies drive the design, and the way the mitigation and landscape enhancement strategies are formulated. The potential effect of the proposed development is assessed in relation to these areas and policies.

Development Plan Policies

10.38 Development Plan policy is designed to be a 'tiered' system, with the higher-level national policies feeding down into the more regional and local planning policies, which provide greater detail and guidance to support local decision making.

National Planning Policy Framework

10.39 The National Planning Policy Framework (2021) sets out the overarching policies and guidelines within which the proposed development would sit.

Paragraph 147

10.40 Paragraph 147 of the NPPF states that:

Inappropriate development is, by definition, harmful to the Green Belt and should not be approved except in very special circumstances.

Paragraph 151

10.41 Paragraph 151 records that:

When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development. In such cases developers will need to demonstrate very special circumstances if projects are to proceed. Such very special circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources.

Paragraph 174

10.42 Paragraph 174 records that:

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.

Natural England Technical Information Note (TIN101)

10.43 Natural England has published a Technical Note relating to maximising the potential benefits of solar farms. It notes that:

Well located and designed solar parks may not only avoid negative environmental impacts, but may also deliver additional benefits to the environment beyond low carbon energy." In the section relating to landscape, the document states that solar parks "… can change the character and visual experience of a given area or landscape, and that they may become an element of the future UK landscape as part of our response to climate change. Careful site selection and design is the best way to avoid or minimise potential adverse landscape and visual impacts.

Planning Practice Guidance for Renewable and Low Carbon Energy

10.44 The Government updated (18 June 2015) planning guidance to provide advice on renewable energy developments and this identifies that local authorities are responsible for renewable and low carbon energy development of 50MW or less. The guidance notes that local authorities should take account of;

The potential impacts on the local environment, including from cumulative impacts.

10.45 The guidance sets out how local authorities can use landscape character areas to form the basis of identifying the most suitable locations for different types of renewable energy, and it notes that county or district level assessments may be more appropriate than national character assessments. This assessment will utilise relevant assessments and additional evidence base documents where available.

10.46 The guidance has been revised to provide specific planning considerations which relate to large-scale ground mounted solar schemes and these in effect underpin criteria-based local policy on the appropriate siting of renewable development as required by NPPF paragraph 98. The considerations relevant to landscape and visual assessment are:

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;

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 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;

The potential to mitigate landscape and visual impacts through, for example, screening with native hedges.

10.47 The guidance does recognise that:

With effective screening and appropriate land topography the area of a zone of visual influence could be zero.

10.48 The guidance also places assessment of cumulative effects of large-scale solar schemes in the same context as for wind turbines and suggests that cumulative effects are best considered separately.

10.49 In the case of the Six Oaks Solar Renewable Energy Park proposal cumulative effects have been assessed because there are a number of other solar developments that are consented or planned in the context of the site or surrounding area, including within the ZTV, and therefore, cumulative effects are part of this assessment. This has been confirmed through reviews of the local authority published planning lists.

Landscape Designations and Development Plan Policies

10.50 The site and surrounding landscape to the north are located within East Cambridgeshire and this Council's Local Plan and Core Strategy are relevant to the development proposals. The southern part of the access track, running through the farmyard, lies in South Cambridgeshire, however, is existing and requires no engineering works, and whilst increased traffic is anticipated in the construction stage, it is not of a magnitude to bring about significant landscape or visual impacts, and accordingly the South Cambridgeshire policies have not been considered in this LVIA.

10.51 A number of studies have been undertaken that underpin the Local Plan (2015) however, there is currently no district or county level Landscape Character Assessment other than the 1991 Cambridge Landscape Guidelines.

10.52 The local plan records in relation to Landscape and settlement character (para 6.2.1)

Attractive and distinctive local landscapes help to raise both the overall quality of the environment and the quality of people's lives. A high priority is therefore given to the protection, conservation and enhancement of traditional landscape character. New development that is well designed and helps to sustain and create landscapes and townscapes with a strong sense of place and local identity is important to achieving this objective. The importance of planning for the protection and enhancement of landscape character is endorsed strongly by the NPPF.

10.53 Stating at para 6.2.2:

The countryside in East Cambridgeshire is characterised by three distinctive and contrasting landscape types which are consistent with the qualities defined in the national Landscape Character Assessment:

- Fens – these cover the northern part of the district and are characterised by large open, flat and low lying fields under wide skies, crossed by numerous waterways and drainage channels. There are fine long distance views of buildings and settlements, and most settlements are located on old 'islands'.
- Chalk hills – these extend between Cambridge and Newmarket, and are a broad scale landscape of large fields, low hedges and relatively few trees. Villages are mainly nuclear in form.
- Clay hills – these lie to the south-east, and are an undulating landscape of gently rolling hills and scattered woodland. A number of small hamlets and villages have developed in sheltered locations, often originally built to take advantage of the natural springs.

10.54 The site falls within the Chalk Hills.

Policy ENV 1: Landscape and settlement character

Proposals for development should be informed by, be sympathetic to, and respect the capacity of the distinctive character areas defined in the Cambridgeshire Landscape Guidelines.

Development proposals should demonstrate that their location, scale, form, design, materials, colour, edge treatment and structural landscaping will create positive, complementary relationships with existing development and will protect, conserve, and where possible enhance:

- The pattern of distinctive historic and traditional landscape features, such as watercourses, characteristic vegetation, individual and woodland trees, field patterns, hedgerows and walls, and their function as ecological corridors for wildlife dispersal.
- The settlement edge, space between settlements, and their wider landscape setting.
- Visually sensitive natural and man-made skylines, hillsides and geological features.
- Key views into and out of settlements; this includes quintessential views of Ely Cathedral and the setting of the City as a historic 'isle' settlement close to the fen

edge and the valley of the River Great Ouse.

- The unspoilt nature and tranquillity of the area.
- Public amenity and access; and
- Nocturnal character of rural areas free from light pollution. Suitable compensatory provision must be made in the event of significant harm where necessary.

Neighbourhood Plan

10.55 The site, apart from a short part of the site access track, lies within the parish of Bottisham where a Neighbourhood Plan Vision Document has been developed, falling short of an adopted document. The draft policies reinforce the district local plan.

ASSESSMENT GUIDELINES AND METHOD OF ASSESSMENT

Screening, Pre-application and Post-application Consultation

10.56 Consultation forms an important part of the design and assessment process. During the pre-application stage the developer undertook consultation with the local planning authority. Public exhibitions were held in Great Wilbraham on Monday 28th March 2022 and Bottisham on Tuesday 29th March 2022. The applicant also met with Bottisham Parish Council on 7th March 2022.

10.57 The Six Oaks Renewable Energy Park proposal has been screened by East Cambridgeshire District Council ('the Council') and found to require a full Environmental Impact Assessment under the auspices of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011.

10.58 GLVIA3 records at paragraph 1.17 that:

The [European Union] Directive [enacted in England by the EIA Regulations 1988 – 2011] is clear that the emphasis is on the identification of likely significant environmental effects. This should embrace all types of effect and includes, for example, those that are positive / beneficial and negative / adverse, direct, indirect, and long and short term, as well as cumulative effects. Identifying significant effects stresses the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of its likely effects. Judgement needs to be exercised at all stages in terms of the scale of investigation that is appropriate and proportional. This does not mean that effects should be ignored or their importance minimised but that the assessment should be tailored to the particular circumstances of each case. This applies to 'appraisals' of landscape and visual impacts outside of the formal requirements of EIA as well as those that are part of formal assessment.

10.59 The screening opinion of the Council also identified its requirements for development control purposes.

10.60 The planting specification and 40 year site management plan will be agreed with East Cambridgeshire District Council and submitted as documents for pre-commencement condition discharge.

Assessment Guidelines and Method of Assessment

10.61 The approaches used for this report are based on the methodologies and guidelines current at the time of writing and are set out in **Appendix 10.1** to the Document. Best practice has been followed at all times.

10.62 Some effects on landscape and visual amenity as a result of any development are inevitable, as with any new structures located in either an urban or a rural location.

10.63 This report focuses on the magnitude of change in terms of extent, duration and scale of effect that would be experienced due to the proposal and the resultant significance of the effect of such change on receptors of varying sensitivity. The author sought to adopt a precautionary approach, whereby effects are assessed as being significant if they are moderate to substantial or greater. This threshold allows for consistency of reporting. In addition, within this report it is assumed that all effects would be considered adverse unless otherwise stated, notwithstanding the likelihood that the responses of individuals may vary from person to person.

10.64 However, effects are not necessarily significant or adverse, and adverse effects are not necessarily unacceptable, as evaluated in the conclusions section of this Report.

The Proposed Development

10.65 The full description of the development is recorded in the Design and Access Statement. The proposed development is a renewable energy park comprising 49.9MW of solar arrays and 50MW batteries with 2-hour duration, within an application site area of 76.4 ha.

10.66 The assessment sets out the visual effects of the changes to the landscape through the development of the proposed Six Oaks Renewable Energy Park comprising module frames and ancillary infrastructure, as shown on the application drawings. The development comprises solar arrays with a DNO substation, customer cabin, transformers and inverters, battery container units, a temporary compound, site access tracks, fencing and CCTV units.

The Solar Arrays

10.67 The proposed solar array comprises rows of fixed solar photovoltaic (PV) panels, mounted on steel frames and set into the ground by direct piling or screw piling. The panels are designed to be non-reflective. The rows of panels are arranged in east-west running rows, tilted southwards at approximately 25-degrees from horizontal, with a maximum height above ground of 3m to the top of the panel frame on level ground. The panels are 4.48m wide and the rows placed 3m apart. The panels and frames can be completely removed and largely recycled, when the site ceases operation. The lower edge of the array is at least 0.9m above ground level, with some variation to overcome micro topography.

Ancillary Structures

10.68 Within the Renewable Energy Park other structures, namely transformers and a substation, are required. Also string inverters (approximately 77cm x 83cm x 44cm) mounted on the panel frames.

10.69 There will be 16 transformer housing units occupying a footprint of approximately 2.9m(h) x 3.0m(w) x 6.2m(l). These transformer units would be mounted on concrete plinths. There is also a proposed substation and battery compound. This would be comprised of several electrical structures, averaging 3.7m tall, across a footprint of 50m x 70m. There will also be a number of spare part containers (2.7m(h) x 2.4m(w) x 6.1m(l)). The locations of these structures are shown on the Site Plan (**Application Figure 1.2**).

10.70 Battery storage amounting to 50MW within containers is also proposed.

Security Fencing

10.71 The site's field boundary vegetation will be retained, and a sufficient (best practice) off-set distance will be maintained between the boundary vegetation and security fencing as illustrated on the layout plan **Application Figure 1.2**; the separation will be sufficient to preserve the root stock of the hedging plants and trees. The security fence will be 2m high and will comprise wooden posts and wire mesh as shown on the application drawings. There will be a number of securely locked gates in the fence, to allow access for maintenance vehicles, operatives and the landowner. The security fence will not impinge on the maintenance of the boundary vegetation. Fencing surrounding the rows of modules will be set back from the existing hedgerows by a minimum of 3m.

Surveillance

10.72 There will be no flood lighting as part of the operational scheme, although some may be required during the construction phase during the winter months at twilight hours.

10.73 No permanent lighting is proposed. Manually operated lights may be attached to the substation in the event of an emergency maintenance visit being required in the hours of darkness.

10.74 Surveillance cameras are incorporated into the scheme as shown on the application drawings.

Site Access and Decommissioning

10.75 Construction and maintenance traffic will use the existing highway network and access roads from the south onto the private access track passing through the farm up to the site. The existing sections of track utilised will be upgraded using crushed and condensed permeable aggregate to form a consistent 4.0m wide access track using an un-bound surface. The additional length will be constructed in the same manner. Movement of construction staff to and from the site will be undertaken during an approximate 9 month construction period.

10.76 A single crossing point over Heath Road will be required to enable construction traffic to access the site. The public right of way will remain open.

10.77 The proposals also include for landscape enhancement and mitigation through the creation of new hedgerows, new hedgerow tree planting, a new rowan tree planting

area, scrub management and whole-site arable reversion to grassland and the creation of areas of species diverse grassland with wild flowers.

10.78 At the end of the life of the Renewable Energy Park, anticipated to be 40 years, the solar PV arrays will be completely decommissioned and all associated equipment will be removed. The land will revert back to agricultural use.

10.79 The proposal is considered in its three phases:

- construction;
- operation; and
- decommissioning.

Construction Phase

10.80 The construction phase for this part of the proposed development would be approximately 9 months from start of work on-site, and the activities and temporary features with the potential to cause an effect on the landscape and visual amenity of the study area would include:

- utilisation of existing access road;
- provision of temporary construction compound, site office and welfare facilities;
- construction of security fences and surveillance cameras;
- excavation of cable trench and laying of cable between solar PV arrays and switchgear and control room building and Distribution Network Operator (DNO) substation building;
- movement of construction vehicles;
- construction of solar PV arrays;
- Installation of inverters, transformers and battery units;
- reinstatement works, including mitigation and removal of temporary site fencing, signage and office; and
- Implementation of the landscape and wildlife scheme.

10.81 The visual effects of the various aspects of the construction phase will be temporary and intermittent and will be minimised by the short construction programme. Ground disturbance will be minimised and there will be full reinstatement over all temporarily disturbed and excavated areas.

10.82 Impacts on the users of the public right of way crossing through the site have been fully considered in the application. The Renewable Energy Park development proposal will bring about changes in view from the adjacent footpath. During the construction stages there would be some temporary signage and fencing, the applicant intends to allow movement through the site safely in this period. The public right of way will remain open and the construction traffic will be controlled through a Construction Traffic Management Plan, with banksmen ensuring safety of all users.

Operational Phase

10.83 The main elements that will be visible over the 40-year operational life of the site will be:

- Solar PV arrays and ancillary structures, with the following characteristics:
- Solar PV arrays with a maximum height of 3m;

- Transformer housing units and the substation buildings, as detailed in the application drawings;
- 2m high wooden post and wire mesh security fence;
- surveillance cameras mounted on the fence posts; and
- Maintenance track (on-site), allowed to grass over in time.

10.84 During the operational period the landscape character of the site will gradually change through the gradual letting up of the hedges by approximately 1m, the addition of the proposed new hedges, tree planting both within hedges and as stand-alone features and the reversion of the arable parts of the farmland to pasture and low-intensity grassland.

10.85 The letting up of the hedges will have the greatest impact on limiting the visibility of the solar arrays.

10.86 The number of visual elements present over the 40-year operational phase has been minimised by keeping the site cables underground. This has also been achieved by utilising the existing track and as much of the existing infrastructure as is possible. The external appearance of the supporting infrastructure can be controlled by way of a planning condition.

Decommissioning Phase

10.87 The decommissioning phase will remove all above ground structures and restore the ground disturbed by the works.

LANDSCAPE AND VISUAL BASELINE

The Study Area

10.88 The landscape assessment has examined an initial 5km study area that (following field work and the production of a ZTV) has been refined to just the areas covered by the ZTV (where visibility would be theoretically possible), including parts of the local road network, and the public rights of way near the site that fall within the ZTV, to identify the main effects on the fabric, character and perception of the landscape. Those dwellings with the potential for a view have also been considered from public vantage points.

10.89 The broad grain of the landscape can be appreciated from the public footpaths and the local road network.

Landscape Character Context: Wider Landscape Character Context

National Landscape Character

10.90 The character of the English landscape has been evaluated nationally in 'The Character of England: Landscape, Wildlife and Natural Features' (Natural England, 1999). The site lies within the East Anglian Chalk National Character Area 87 (NCA87).

10.91 The East Anglian Chalk National Character Area (NCA) is characterised by the narrow continuation of the chalk ridge that runs south-west–north-east across southern England. The underlying geology is Upper Cretaceous Chalk, which is covered in a surface deposit of ice and river-deposited material laid down during the last ice age. This creates a visually simple and uninterrupted landscape of smooth, rolling chalkland hills with large regular fields enclosed by low hawthorn hedges, with few trees, straight roads and expansive views to the north.

10.92 The national-scale assessment was found to be too generic to provide specific characterisation of the site; although the local planning authority has not undertaken a recent landscape character assessment, the Greater Cambridgeshire LCA 2021 covers the site that lies just over the border in East Cambridgeshire District Council. This LCA, undertaken by Chris Blandford Associates, has very effectively carried the national character areas through to their district-level landscape character assessment.

Cambridgeshire Landscape Strategy (1991)

10.93 The Cambridgeshire Landscape Strategy (1991) is the only document covering the site produced by the local planning authority. This is a very broad-brush assessment, placing the site in the Chalklands. However, it is a useful and valued background document.

10.94 The document records that:

The complex history of settlement and the impact of people on the landscape over the centuries is particularly apparent in this part of the County. Roman roads, Anglo-Saxon earthworks, large fields, modern roads and developments are all interlinked.

The region was mostly too dry for early settlement. However, this dryness and light vegetation meant that it was ideal for communications and it is traversed by a major prehistoric and historic highway, the Icknield Way. Its importance as a highway also gave it strategic value. In the Iron Age it was controlled by Wandlebury hill fort and in Anglo-Saxon times by the three great linear dykes which span the chalkland from the fen edge east of Cambridge to the wooded edge on the higher claylands (a fourth 'Bran Ditch' near Fowlmere has been almost completely destroyed).

These artificial elements overlie the smooth rolling chalkland hills. The hills are dissected by the two gentle valleys of the Granta and the Rhee, which converge to form the river Cam just south of Cambridge.

10.95 The area was used for sheep farming well into the nineteenth century, leading to the creation of botanically rich grasslands which now only survive in well-protected locations.

The majority of the chalkland is devoted to growing cereal crops, despite the frequently poor, thin soils. It is a broad-scale landscape of large fields, low mechanically trimmed hedges and few trees. The eastern part of this area has a number of woodlands and shelter belts which help to break up the long distant views and give some form and character. Certain high points have small beech copses or 'hangers' which are prominent and characteristic features in the open landscape.

The essentially geometrical field pattern resulting from the downland hedge enclosure is further subdivided in an area to the south-west of Newmarket. Here the relatively modern growth and prosperity of the racehorse industry has imposed a distinctive pattern of small, tree-lined paddocks, which imparts a well-wooded character to the area. This has arisen from the need to provide shelter from cold winds and driving rain and also visual enclosure, to avoid external movements frightening the young horses. The stud farms are expanding away from the immediate surroundings of Newmarket, and no doubt their landscape pattern will also follow.

10.96 This document sets out the principles for landscape improvement and management in the Chalklands, the relevant ones are set out below:

1. The future pattern is for a large-scale landscape defined by rolling hills, large fields, bold shelter belts, sweeping masses of woodland and occasional beech hangers:

2. Management and creation of chalk grasslands: the majority of the grasslands should remain open and uncluttered. The promotion of species-rich grassland on thin chalk soils would provide visual and wildlife value. Road verges should also be managed to promote plant diversity and interest.

3. Management of existing shelter belts: these should be restocked to encourage young tree growth and fill gaps.

4. Planting new mixed woodlands and shelter belts: carefully sited to enclose large tracts of rolling farmland and emphasise landforms.

6. Hedgerows: selected hedgerows should be reinforced, or managed for particularly significant impact, based upon their visual and wildlife potential. Historically significant hedgerows should be carefully conserved, and new hedges planted to emphasise the existing landscape.

7. Footpath corridor improvements: the Roman Road is an important route across the chalk landscape. Planting small woodlands at selected locations such as hill tops or to frame views, as well as carefully managing the existing rich flora, would enhance the route. A similar approach could be adopted for other footpaths in the area, concentrating on a small number of linked corridors.

8. Road corridor improvements: the M11 has had minimal planting to soften its impact on the landscape. The planting of selected embankments and adjacent field margins with native trees and shrubs would provide interest for those using the road as well as helping to integrate the road with the surrounding countryside.

9. Conservation of the linear dykes: selective removal of scrub growth and re-establishment of sheep grazing, if possible, would enable the massive scale of these historic earthworks to be appreciated and promote chalk grass and flora communities. Some areas of scrub should be retained for habitat and visual diversity. The significance of the dykes in the landscape could be reinforced by managing adjacent strips of agricultural land as grassland or scrub.

Landscape Character Types – Greater Cambridgeshire Landscape Character Assessment (2021) Incorporating the Site and Surrounding Area in East Cambridgeshire District.

10.97 The site lies within the Chalk Hills landscape character type (LCT7) and is defined by the underlying bands of Upper Cretaceous Chalk, which forms part of the East Anglian Chalk ridge that extends across the south of England. This is overlain with deposits of alluvial silt, sand gravel and till on the higher landform.

10.98 The overlying soils vary in respect of the underlying geology and terrain. They are predominantly free draining, lime rich and often loamy, which gives rise to fertile soils that support the dominant arable land use, with woodland and grassland habitats.

10.99 This is a free draining landscape with frequent dry valleys, some of which contain small, seasonal watercourses that are often not visually obvious.

10.100 This is predominantly an arable landscape, with permanent pasture and woodland on steeper slopes. Ancient semi-natural beech, lime and sycamore woods are often situated on summits and slopes of the hills and form prominent and characteristic features in the open landscape.

10.101 Fragments of remnant chalk grassland is found through the Chalk Hills, including along road verges, in chalk pits and along sections of ancient linear dykes, Roman roads and disused railway lines. The landscape is characterised by a medium to large scale, regular field pattern that is defined by hedgerows in places. Smaller scale, tighter field patterns occur around the dispersed villages, hamlets and country estates. These are well defined by hedge and tree boundaries.

10.102 There are a number of designated ecological sites, particularly within the east and west of the Chalk Hills. These include Sites of Special Scientific Interest (SSSI) along linear Roman features, at former pits/quarries and designated significant areas of chalk grassland. There are also a small number of, often linear County Wildlife Sites within the Chalk Hills landscape.

10.103 Priority habitats found across the Chalk Hills are primarily deciduous woodland and lowland calcareous grassland. Lowland mixed woodland is a predominant habitat type of the upland chalk landscapes in the Study Area.

10.104 The Chalk Hills are dominated by late enclosure of former arable fields and common grazing. There is evidence of other enclosures that appear to represent early piecemeal enclosure of common fields.

10.105 Historic features such as tracks and hill forts occur throughout this LCT. The Icknield Way passes through parts of the Chalk Hills and was historically an important highway. In the Iron Age it was controlled by Wandlebury hill fort in the north of this LCT. In Anglo-Saxon times it was controlled by the distinctive linear dykes that span the chalkland from the fen edge east of Cambridge to the wooded edge of the higher chalklands to the south/ southeast of the LVA Study Area.

10.106 There are a small number of designated historic sites across the Chalk Hills.

10.107 This is generally a sparsely settled landscape, forming the transition between the upland villages along the wooded ridgeline with the Wooded Chalklands and the villages along the springline in the Lowland Chalklands.

10.108 Settlement predominantly comprises scattered large farms, granges, halls and cottages with occasional small villages and hamlets at the edge of the LCT. Farms and larger properties are often encompassed by woodland copses and shelter belts.

10.109 Traditional building materials used within the Chalk Hills include flint, clunch and pale brick.

10.110 The following key characteristics are specifically noted for the Chalk Hills landscape character type:

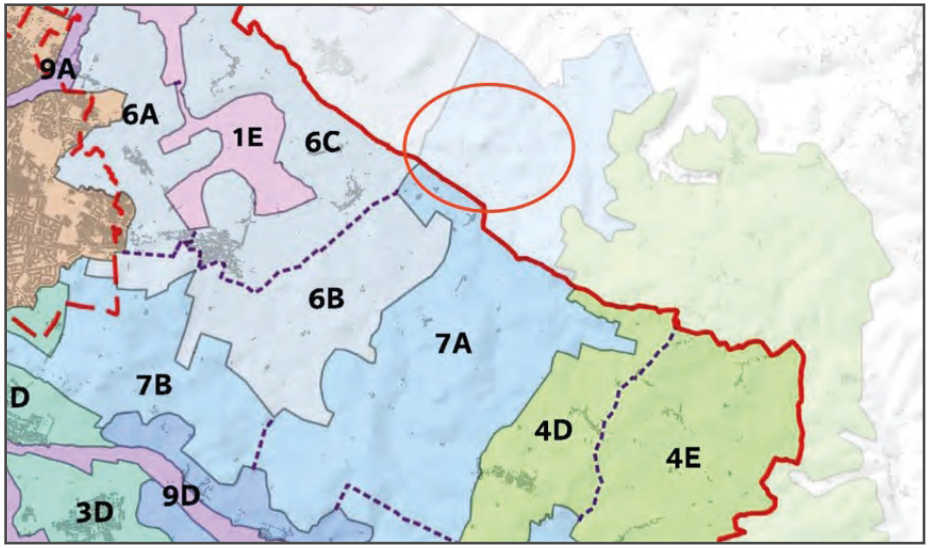
- Locally prominent, elevated chalk hills with localised steep-sided slopes and incised by dry valleys that create a rounded, rolling landform;
- Free-draining landscape with dry valleys that contain small, seasonal watercourses;
- A predominantly arable landscape with some permanent pasture and woodland on steeper slopes;
- Tree cover comprises scattered woodland across the rising landform and concentrated around historic parkland or estates;

- Various historic features including ancient routes, earthworks and hill forts;
- A generally unpopulated landscape, interspersed with large farms, granges, halls and cottages; and
- A simple and tranquil landscape with long distance panoramic views.

10.111 Whilst there are no sites of cultural heritage importance within the site boundary, there are many sites of heritage significance in the broader context of the site, and these are mentioned as being important to the local landscape character in the landscape character description.

10.112 The locations of the character types and areas are shown on **Plate 10.3**. The north-western side of the site parallel to the A14 is characterised as being the Fen Edge Chalklands (LCT6). Site visits have confirmed that the Chalk Hills character is continuous across the site and therefore the boundary of this characterisation taken to be the A14 for the purposes of the assessment of effects on landscape character.

Plate 10.3 - *Extracts from the 2021 Greater Cambridgeshire Landscape Character Assessment incorporating the site and surrounding area in East Cambridgeshire and South Cambridgeshire Districts*



1: THE FENS
1A: Ouse Floodplain Fens
1B: Cow Fen
1C: Bare Fen to Fidwell Fen
1D: North Fen to Milton Fen
1E: Fulbourn Fen

2: FEN EDGE CLAYLANDS
2A: Longstanton Fen Edge Claylands
2B: Cottenham Fen Edge Claylands

3: LOWLAND FARMLANDS
3A: Croxton Lowland Farmlands
3B: Bourn Tributaries Lowland Farmlands
3C: Rhee Tributaties Lowland Farmlands
3D: Cam & Granta Tributaries Lowland Farmlands

4: WOODED CLAYLANDS
4A: Croxton to Conington Wooded Claylands
4B: Lolworth to Longstowe Wooded Claylands
4C: Hatley Wooded Claylands
4D: West Wratting Wooded Claylands
4E: West Wickham Wooded Claylands
4F: The Camps Wooded Claylands

5: WOODED GREENSAND RIDGE
5A: Gamlingay Wooded Greensand Ridge

6: FEN EDGE CHALKLANDS
6A: Fen Ditton Fen Edge Chalklands
6B: Wilbraham Fen Edge Chalklands
6C: Fulbourn Fen Edge Chalklands

7: CHALK HILLS
7A: Eastern Chalk Hills
7B: Gog Magog Chalk Hills
7C: Linton Chalk Hills
7D: Newton Chalk Hills
7E: Wimpole Chalk Hills
7F: Southern Chalk Hills

8: LOWLAND CHALKLANDS
8A: Pampisford Lowland Chalklands
8B: Morden to Duxford Lowland Chalklands

9: RIVER VALLEYS
9A: Cam River Valley - Cambridge
9B: Cam River Valley
9C: Rhee River Valley
9D: Granta River Valley

10.113 The Greater Cambridgeshire landscape character assessment was written in 2021 and is therefore up to date in terms of the evaluations of the condition and perception of the landscape. The Landscape Condition and Strength of Character evaluation recorded that overall the condition is good and strength of character strong, but in the context of the site the condition is moderate. Strength of character is also judged to be moderate and this judgement is significantly influenced by the condition of landscape elements e.g. relic and poor condition hedgerows and therefore, the objectives are to enhance and restore the landscape.

10.114 The key landscape sensitivities are:

- Distinctive, elevated landscape that forms locally prominent hills and ridges that contrast with the surrounding, low lying landscape that is characteristic of Greater Cambridge;
- Open, long distance, panoramic views across Greater Cambridge and beyond from this upland landscape;
- Scattered woodland including ancient woodland on summits and slopes;
- Network of historic routes and earthworks that contribute to the area's sense of place;
- Wooded and undeveloped ridgelines are visually sensitive; and
- Tranquil, often remote rural landscape away from major roadways

Landscape Strategy

10.115 The LCT incorporates guidance for integrating development into the landscape, stating in relation to developments of this form that development should:

Ensure new agricultural buildings, such as large storage sheds, are sited and designed to reduce their apparent mass, minimising their impact on the wider landscape by the appropriate use of texture, colour and planting

Protect prominent hills and ridges and their skylines by avoiding locating tall structures including masts and wind turbines in visually prominent locations, and by using topography and the landscape's woodlands to reduce the visual impact

Baseline Visual Context

10.116 Landscape character as defined by topography and landscape features strongly influences visibility. The site and site context are rural in character, and rural farmsteads, studs and estate farms are a key characteristic of the landscape with farms and villages accessed from the network of unclassified roads. The site access is from the Little Wilbraham Road, continuing onto the Wilbraham Road and then utilising the existing farm access. The access lies outside of the solar panels ZTV at the point of accessing the highway.

10.117 The character of the site is set within the context of relic hedges and dry ditches bounding vast arable fields with a uniform character. The landscape is dominated in the foreground and near-distance views of the site by the combination of the presence of arable fields, their broad-scale set within this framework of hedges that are not stockproof, with occasional mature and semi-mature trees, pylons and the infrastructure relating to the major arterial routes that run through the landscape of the A1303, A14 and A11. Long-range views are infrequent and

not a characteristic and not afforded from many footpath users or roadside viewers, however, where experienced they are locally valued.

10.118 Long-range views towards the direction of the site from the north-west in the environs of Bottisham village are absent, with the A1303 and A14 routes and vegetation and infrastructure on land in the foreground concealing views. From the north views are absent due to the shelterbelts and tree lines that conceal anything other than near-distance views from road and path users. From the south there are no road views afforded due to the presence of hedgerows. However, views are readily afforded by footpath users. Views from the longer-range are very limited, with only occasional glimpses afforded from gateways beside roads and from some footpaths in the environs of Little Wilbraham Road. There are limited views of the site from the Wilbraham Road and Little Wilbraham Road to the west. The lack of long-range views is a characteristic in this part of the LCT 7A: Chalk Hills landscape. The context of these views is clearly shown in Viewpoints 1-9.

10.119 The overarching site character is agrarian, arable and open in the context of the site, becoming more enclosed east of the A11 where the estate and stud farmlands predominate. This has been confirmed through site visits and the study into the impact on viewers, as detailed in the visual analysis.

Proposed development: Zone of Theoretical Visibility (ZTV)

10.120 Zone of Theoretical Visibility (ZTV) maps have been generated for the proposed development and show the area from which an object could theoretically be seen. ZTVs are based on digital terrain models (DTMs).

10.121 There are two principal types of ZTV:

- Bareground: where the underlying model just represents the topography, without screening vegetation or structures. These ZTVs depict the worst-case scenario.
- Screened: where the model includes topography as well as screening features.

10.122 In this scenario a bareground ZTV has been used without any account taken of screening from trees, hedges or built structures. The digital terrain model has been produced from Ordnance Survey Terrain 5 data. Terrain 5 data has an elevation value for each 5m by 5m area and is the most commonly used data set for producing ZTVs of development proposals where the LVIA study area may be between 2 and 5km from the site.

10.123 ZTVs are normally produced using scripts in Geographical Information System (GIS) software. The scripts can take into account earth curvature and atmospheric refraction (bending) of light, which influence visibility especially in more distant views. In this scenario markers have been places across the site that are at the height of the proposed panels and battery storage containers and this models the theoretical visibility.

10.124 The ZTV map has therefore been generated based on the proposed design and has been used as a tool to inform the professional judgements made in this LVIA during the iterative planning and assessment stages. ZTV modelling in combination with site visits identified that changes in the solar farm layout, such as the removal of panels from the west of the site, had an impact on overall visibility.

10.125 The ZTV is included at **Figure 10.1**, indicating areas of potential visibility of the proposed development from the surrounding landscape. The analysis was carried out using a topographic model that does not take account of trees or hedges and accordingly gives a projection of the worst case scenario potential visibility based on bare-ground conditions that were checked in the field. As a result, the extent of actual visibility experienced on the ground is less than that indicated by the ZTV.

10.126 The ZTV was then used to determine which landscape and visual receptors are likely to be affected and merited detailed consideration in the landscape and visual assessments of effects.

10.127 The ZTV shown on **Figure 10.1** indicates that the theoretical visibility of the proposed development would be confined to the following main areas:

10.128 Visibility is typically contained close to the site. North-east of Bottisham no land falls within the ZTV along the Whiteland Springs valley. A zone of theoretical visibility runs north-east from Spring Hall around Chalk Farm. Then to the north-east no views would be afforded due to no visibility in the environs of the New England Stud north and east of the A14 and A1303. Visibility is indicated across the west of Hare Park, however field checking has confirmed no publicly afforded views in this part of the landscape.

10.129 In theory land to the south east would be afforded a view, east of the A1304 corridor and between the A1304 and A11 corridors. However, in reality the road embankments and pine lines would conceal views from all of this area, and this has been confirmed by way of field visits. The majority of land to the south of Wilbraham Road lies outside of the ZTV, including all of Great Wilbraham to the west that lies outside of the ZTV. Land farther to the west in the range of 2km theoretically would be afforded views in bare-ground conditions, however much of this land is bound by dense hedges and vegetation around the New Cut stream valley. In the environs of Bottisham visibility is theoretically afforded, however the number of elements between the site and the village mean this visibility is in actuality absent.

10.130 The ZTV indicates that there would potentially be some more distant views present between 2-5km. However, field checking has shown that in reality the anticipated main area of visibility, based on fieldwork observations, as described above, is far more contained. The 'Zone of Visual Influence' (ZVI), where views are likely to be able to be appreciated, means that these views would be fully screened by the intervening hedges and woodland, including any potential views from the south facing slopes of Bottisham Park.

10.131 The only locations where the majority of the site can be appreciated, are from the public right of way crossing the southern land to the site, and these views are recorded in the Viewpoint study. From more distant open points, views of the proposed development are not that obvious or perceptible where views show the site would form a very small minor component of a wider view.

10.132 With the exception of these few open locations, views of the proposed development would be generally confined to public rights of way crossing fields and the unclassified

road to the south of the site on the approach to Wilbraham and Little Wilbraham Roads. In these scenarios the views are across the landscape and seen at a slightly lower elevation than the site. Viewpoints 1, 2 & 4-6 are representative of this visual characteristic.

Visual Receptors

10.133 GLVIA, 3rd edition, para 6.3 defines visual receptors as: "the different groups of people who may experience views of the development". In order to identify those groups who may be significantly affected the ZTV study, baseline desk study and site visits have been used, with the results recorded by group in the Visual Analysis.

10.134 Nine representative viewpoints (some showing a view from more than one direction of view) have been selected to assess the effects on visual receptors, **Figure 10.2**. GLVIA, 3rd edition, para 6.19 records that illustrative viewpoints should also be used to:

Demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations.

ASSESSMENT OF EFFECTS ON THE LANDSCAPE RESOURCE

Potential Effects on Landscape Fabric

Sensitivity to change

10.135 The site lies within the Chalk Hills landscape character type (LCT7) as defined in the Greater Cambridgeshire (2021) Landscape Character Assessment. The Fen Edge Chalklands (LCT6) landscape character type also extends to cover much of the northern surrounding area, forming a broad band of similarly characterised land. The Chalk Hills landscape character type (LCT7) also covers almost all of the ZTV, and only Viewpoint 2 lies on the edge of this landscape character type bordering the Fen Edge Chalklands (LCT6), however, accords with the character of the Chalk Hills.

10.136 Field work has confirmed that the descriptions recorded in the Greater Cambridgeshire (2021) Landscape Character Assessment broadly reflect the landscape character of the site and study area that lies in the adjoining East Cambridgeshire area that does not have an up to date landscape character assessment. Site observations have also indicated that the site, whilst arable, is set within a broader landscape character context that displays a mix of arable and pasture relating to large-scale studs with a heathland character that is very redolent of the area, albeit managed in a more intensive way with considerable historic field amalgamation.

10.137 The character of the site accords with the rural aspects of the landscape character assessment descriptions. However, many characteristic features of the local landscape have been lost such as and including hedges, ponds and grazed land by livestock. The overhead pylons are notable local features in the local landscape that in combination with the large-scale farm buildings present on the south eastern side of the site, and adjacent to the site access track, lend a larger-scale to the landscape than that is defined by the overarching large field scale and pattern. The regional routes of the A11, A14, A1303 and A1304 passing through this landscape lend a large scale and rapid speed of movement to the site context.

10.138 The landscape character of the Chalk Hills landscape character type (LCT7) has experienced some modifications in the form of other solar and wind farm developments. The presence of pylons and these electricity related elements are a notable 20th and early 21st century change. The solar installations are listed in the cumulative assessment development baseline. Field observations have recorded that cumulative effects are highly unlikely. No intervisibility or cumulative landscape or visual impacts are anticipated.

10.139 GLVIA3, para. 5.40 states in relation to susceptibility that:

Susceptibility indicates the ability of a landscape or visual receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.

10.140 The Chalk Hills landscape character type (LCT7) is judged to be of medium susceptibility, whereby undue consequences may arise to the proposed development due to the nature of development with the rural farmland area. However, the presence of a weakened pattern of hedges and woodland on broad-scale undulating landform lend the landscape a semi-open and often less sheltered character. However, the landscape is strongly contained by high degree of visual containment brought about by arterial road embankments and planting schemes that are mature.

10.141 The quality of the landscape is assessed in terms of the landscape structure, patterns, landform and cover, sense of place, management and land use. The area is not within a nationally designated area (nor within the setting any landscape designations) that influences its value, and the valued landscape elements, such as the villages with their high number of listed buildings and conservation areas are outside of the ZTV, or in areas checked to have no likelihood of views.

10.142 This landscape character type is mostly in fair condition, with an absence of well managed semi-natural habitats on the site and relatively disrupted field patterns through field amalgamation. Some renewable energy wind turbine installations can be seen from the public rights of way in the context of the site, in the opposite direction from the proposed Renewable Energy Park from the site but are not highly visible from long distances across the landscape and are not detracting from the traditional rural character.

10.143 Broadly, the surrounding landscape is defined by vast relic hedge-enclosed, predominantly arable farmland, with horse grazing, and trees on the heathland studs to the north and east of the site. Most of the land is cultivated, exposing the light chalk soils. The hedge pattern is characterised by late enclosures with regular boundaries.

Plate 10.4 - *Map overlay over 1st Edition OS historic map and modern aerial view underneath for road context*

10.144 The site is currently arable, however, the local landscape value, being within an undesignated landscape that displays a low number of valued features, is medium to low as would be anticipated where there is a homogeneity and lower concentration of valued landscape characteristic and features than the typical agrarian Cambridgeshire landscape.

10.145 The immediate context of the site is not specifically noted for national landscape quality.

10.146 The LVIA author has considered the susceptibility of the landscape to changes from field-scale solar farm with battery storage developments to be low to moderate. This is based on the way in which the key arable farming characteristics are clearly expressed over much of the area. The heathland characteristic of the Chalk and Fen landscape are absent from the immediate site context. There is moderately strong landscape structure, particularly the hedges and ditches that are robust and not highly susceptible to change, and not susceptible to this type of development. Views through the landscape are not formally noted in the LCA as a key characteristic. The area would have a moderate degree of compatibility with these factors.

10.147 The sensitivity to the proposed development is medium to low. This is a landscape with mainly local landscape value and with features and special qualities of higher value either outside of the ZTV or screened from the site by local vegetation that is sufficiently dense for all-year-round cover creating a moderate to low susceptibility to the type, scale and location of development proposed.

10.148 Changes to landscape fabric can arise where there would be direct or indirect physical changes to the landscape. In general, changes to landscape fabric occur only within the application boundary of a site. The development proposed is described in its phases in The Design and Access Statement.

Site-level Landscape Character Assessment

10.149 The site was surveyed and visited on a number of dates in spring 2022. The individual elements creating the site-level character were noted and the condition of features and elements on the site were recorded. These observations were combined to provide data on which to assess the sensitivity of the site and its ability to accommodate the proposed renewable energy park.

10.150 The site is greenfield land currently being managed by a single landowner for perpetual arable cropping. The site occupies a single continuous block of land. The boundary hedges do form minor landscape features and are generally intact with some relic sections, gaps and occasional hedgerow trees, creating distinct edges to the field parcels forming the site.

10.151 The network of hedgerows present within the site were all assessed as being species poor by the ecologists. The majority were located adjacent to a dry ditch and were not on notable hedge banks. Woody species present included hawthorn blackthorn, field maple, hazel and Dog rose. A number of the hedgerows had mature oak and ash trees present. Most hedgerows were adjacent to or directly above a dry ditch, none of the ditches were found to hold water during the phase I survey, however, and during landscape field surveys in March 2022. At that time a number of the ditches in the broader landscape were wet.

10.152 The majority of hedgerows are managed to less than 1m through flailing. (See Phase 1 Habitat Survey Plan and target notes within the Ecology report).

10.153 The characteristics of the site and the features present on the site that will influence the assimilation of the proposed development into the landscape have been considered.

10.154 Footpaths (**Plate 10.6 on page 195** appear to be well-used in the context of the site, however they currently only run in a north-south direction south of the site and east-west along the southern boundary to the site and the loop of path is so long that the paths are used by cyclists more than walkers and are poorly connected by paths to villages, but well connected by the local network of A and unclassified roads. The main A11 and A14 roads create strong lines through the landscape that make the land to the north of the site impenetrable on foot.

10.155 The character of the site is predominantly defined by its arable field vegetation, hedge boundaries and the high levels of tree cover on the stud and estate heathlands east and north of the site that conform with the overall character description at the district level. The land slopes down towards the site from the surrounding farmland to the north, creating the sinuous very shallow convex slopes to the stream valley of New Cut south of Little Wilbraham. Treelines, hedges and woodland create dense skylines on the shallow horizons and broadly contain the site from views from the east. There are very limited views into the site from beyond the site boundaries due to the tree and hedge layers on the relatively shallow horizons. Longer-range views are afforded from the south-west.

10.156 From the aerial view the individual components of the landscape are readily seen, as shown on LVA **Figure 10.1**: Extent of Theoretical Visibility (ZTV).

Potential Effects on Landscape

10.157 Changes to landscape fabric can arise where there would be direct or indirect physical changes to the landscape. In general, changes to landscape fabric occur only within the application boundary of a site such as is proposed here.

10.158 Through the proposed development there will be minimal field-level ground disturbance and the panels will all be driven into the formerly ploughed land. Other than some weed and scrub removal no site features will be lost.

10.159 The proposals will result in the change of approximately 76 ha of arable land to permanent pasture with solar arrays, batteries and associated infrastructure and there will be some temporary hard-standing areas created to facilitate vehicle movements. However, the field margins, ditches, hedgerows and trees will, be retained, (see Ecology Phase 1 Habitat Survey Plan and the ecological assessment for details) and best-practice off-set distances maintained from hedges extending to 5m.

10.160 Battery storage is proposed, located to the south-east of the site, and will be contained within an area to be planted with rowan trees, characteristic of the local landscape.

Design Approach in Respect of Landscape and Visual Matters

10.161 The consideration of potential long-term landscape character and visual effects has formed an integral role in the design of the proposed development.

10.162 The site was visited by Anne Priscott the consultant landscape architect in spring 2022 and constraints and opportunities mapped and discussed with the client team. A number of the suggestions and proposed landscape and visual enhancements were taken on board. These are listed below.

10.163 While the proposed development would inevitably result in a change to the character of the site and its immediate surroundings, the design of the proposed development has been informed by the local landscape and visual context from this early stage in the design evolution. This included landscape architect and ecologist input into the layout options at all stages of the assessment. The overarching concept was for the design to read as one solar farm, with consistency of view, rather than as a number of individual arrays.

10.164 The proposed development would retain all of the existing tree and hedgerow field boundaries around the site, apart from a 5m section of hedgerow where the access crosses Heath Road to the site, with built development confined to field parcels to ensure the proposed development is well integrated into the landscape, within the context of the existing good levels of inherent screening from the north, east and west. Careful consideration has been given to the access tracks, initially proposed to be located along the public right of way on Heath Road, now proposed along the existing farm tracks. Heath Road will need to be crossed by construction traffic, but this should not harm the use of the public right of way by walkers, riders or cyclists. The number of crossings has been kept to a minimum. A single crossing of Heath Road is needed, and only 2 field boundary breaches are required to this route.

10.165 The location and width of the access tracks along this corridor has been minimised as far as possible to retain the landscape structure and habitat

connectivity and appreciation of the local landscape by users of Heath Road.

10.166 Landscape enhancement is at the heart of the design, with the intention being for the landscape to be in better condition at the end of the 40 year development than it is currently.

10.167 The elements of enhancement proposed include meaningful green infrastructure (GI) enhancements that provide both ecological connectivity, enhanced landscape features and an enhanced experience for users of the byways in the context of the site in a landscape where landscape features are infrequent.

10.168 Hedge enhancement is a key aspect of delivering environmental gains in terms of landscape quality, wildlife potential and visual amenity gains. The mitigation also includes the bolstering of existing hedgerows where they are thin/gappy and change in management of all existing hedgerows to enable them to be increased in height by 25cm for four years to establish early in the scheme enhanced visual screening and biodiversity gains. Substantial areas of species diverse grassland are also proposed, extending throughout the site.

Glint and Glare

10.169 Glint and glare are defined as being:

- Glint – a momentary flash of bright light typically received by moving receptors or from moving reflectors;
- Glare – a continuous source of bright light typically received by static receptors or from large reflective surfaces.

10.170 In context, glint will be witnessed by moderate to fast moving receptors whilst glare would be encountered by static or slow-moving receptors with respect to a reflector. The term 'solar reflection' is used in this report to refer to both reflection types i.e. glint and glare.

10.171 The Planning Practice Guidance for Renewable and low carbon energy (2015) specifically regarding the consideration of solar farms at paragraph 013 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: the proposal's visual impact, the effect on landscape of glint and glare (see guidance on landscape assessment) …the extent to which there may be additional impacts if solar arrays follow the daily movement of the sun.

10.172 The detailed assessment of glint and glare has been undertaken by Neo Environmental and is submitted as part of the planning application.

10.173 A list of key considerations for assessing glint and glare with respect to surrounding ground-based receptors includes:

- Where no view of the proposed solar farm is possible, there can be no potential for glint and glare to that visual receptor.
- Equally a view of a solar panel does not guarantee that a solar reflection is possible. Solar PV

panels are purposely designed to absorb rather than reflect light.

- There is no technical limit to the distance from which a solar reflection is possible for a visual receptor. However, the significance of a reflection decreases with distance. This is because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases.
- Meteorological, seasonal and astronomical variations may change the view from a visual receptor towards the solar panels and the likelihood of potential glint and glare.
- Terrain and screening by vegetation are more likely to obstruct an observer's view at both near and longer distances.

Mitigation and Environmental Enhancement

10.174 The landscape strategy objective articulated through the landscape impact assessment is directly related to the planting and management of trees and hedges. The historic inherent patterns of land managed on a rotation with arable and grazing land use has forged the landscape character and woodland is generally therefore not a feature of the LCT. The mitigation and environmental strategy the developer has taken on is to:

- Conserve, restore and enhance continuous linear hedge / tree cover along hedge lines, ditches and watercourses;
- Seek opportunities to return arable areas to pasture;
- Seek to retain the strongly linear form of the landscape;
- Seek opportunities to restore lost hedge features; and
- Discourage construction works that would interrupt the linear unity of the landscape.

10.175 These articulate some sound principles that have been established by Councils throughout the country include advising developers to:

- Select a site with close proximity to a grid connection, and utilise underground connections where possible, carefully planning the route to avoid damage to heritage, landscape or wildlife features;
- Seek to utilise previously developed land where available;
- Seek sites with less visibility in public views;
- Avoid sites where substantial levelling works will be required;
- Retain, protect, actively manage and enhance hedgerow network and tree cover to help absorb solar parks, battery storage, substations and maintain and enhance biodiversity. Laid hedges can be stock proof and improve the security of the site;
- Ensure that proposals do not compromise the objectives of sites and areas that are designated for their natural beauty, heritage value or biodiversity;
- Avoid higher grade agricultural land, i.e. that defined as best and most versatile (grades 1, 2 and 3a). Seek to manage ground vegetation by sheep grazing, as this allows the panels to be kept relatively low to the ground. Grazing by larger animals should

be avoided as this requires the panels to be raised up, increasing their visibility and disruptiveness in the landscape;

- Encourage floriferous native ground flora to enhance biodiversity;
- Ensure that the project is constructed to be reversible so that there is no permanent degradation of the landscape. For example pile or screw foundations can be used that are capable of easy removal;
- Locate access tracks connecting to the installation to run alongside linear features such as hedges or stone walls, but;
- Allow for at least 5+m buffers to existing hedgerows to conserve ground flora, allow for the movement of wildlife and to prevent shading;
- Locate and design any buildings to blend with the landscape and to reflect local building form and materials;
- Ensure that top and sub soil is correctly handled and stripped and stored in accordance with best practice for reinstatement once the scheme is installed;
- Ensure that installations and access tracks are 'reversible' at the end of their life, so that the land can be returned to its original form and condition;
- Where security fencing is necessary utilise a design that is not intrusive (such as weld mesh in a dark colour), that it does not form a barrier to wildlife movement and use existing hedges to screen;
- Minimise security lighting and use passive infra-red (PIR) to minimise glare, light pollution and impacts on biodiversity;
- If CCTV is required this must be carefully located and integrated with the landscape scheme to minimise visual and landscape impact; and
- Ensure that drainage is designed to avoid concentration of run off and the formation of gulleys.

10.176 On the proposed site all of these generic guidelines have been taken into account in designing the proposal.

Baseline Landscape Character Review

Local Landscape Character

10.177 The key characteristics of the Chalk Hills landscape character type are set out above at **10.111 on page 164**. Currently, arable farming practices have the greatest influence on the overall character of the site itself, creating a monoculture that is species poor contrasting with the diverse heathland, field boundaries, ditches, stream valleys and springs, ponds and linear tree cover and small isolated areas of riparian scrub colonisation and native shrub growth, particularly lining streams, ponds, and their tributaries. The field margins are also far more species diverse than the fields themselves where historically agriculturally improved to arable cultivation.

10.178 A number of mitigation measures have been developed over time by solar farm developers, such as, the design of the solar PV arrays, their angle, the design of ancillary development and

approaches to the siting and layout of the component parts of the proposed development.

10.179 Whilst the mitigation of effects on visual amenity are not possible within the site boundary, due to the nature of solar PV panels, the enhancement of the boundary landscape features that are key in defining the character of the local landscape is achievable. The potential and proposals for the enhancement of the landscape through the positive management of features on the site is now set out.

10.180 The developer has offered to maintain and enhance the hedge boundaries to the site including letting them up to gain an increased dense woody structure for a further 1m. This would bring about a moderate landscape gain. This, together with species-diverse grassland establishment and management proposals will bring about beneficial fabric impacts through the development of the proposed Six Oaks Renewable Energy Park site. They will also provide a measure of environmental enhancement on the broader perception of the landscape fabric, condition and quality, of the site and local landscape character.

10.181 A separate Design and Access Statement submitted with the planning application explains the design approach to the proposed Renewable Energy Park and lists the mitigation and enhancement measures proposed. The Landscape and Ecological Management Plan will record the enhancement measures in detail. The LVIA addresses the embedded design principles of the scheme and the methods by which an iterative design approach has sought to reduce adverse effects and improve the final design of the development.

Landscape and Ecological Management Plan

10.182 The strategy underpinning a Landscape and Ecological Management Plan has been produced to accompany the application. This broadly takes into account the long-term aspiration of the Council as articulated through the landscape character assessment. The actual Landscape and Ecological Management Plan will be agreed with the Council and produced under a pre-commencement condition.

10.183 In the management plan the following measures will be included to minimise any impacts to features of landscape and ecological interest and ensure that there would be no net loss of biodiversity and connectivity. The following are recommended:

- Hedgerows – From the date permission is granted, hedges are to be let up by approximately 25cm per year to an overall increase in height of 1m. By gradually letting the hedges up the resultant hedge will be dense without a single line of woody knots. Once the development has been constructed, the existing hedges around the site should be maintained at this new height. There will be some hedge management including the removal of any dead or poor sections that have been smothered by brambles on the boundaries of the site and the removal of some overhanging limbs;
- Woody shrubs and hedge gapping - Once constructed, gaps at site boundaries or areas of landscape screening should be planted with native species to create the effect of hedgerows or semi-natural scrub cover (70-75% Hawthorn

(Crataegus monogyna), 25-30% Field Maple (Acer campestre), Hazel (Corylus avellana), Blackthorn (Prunus spinosa) with occasional Purging Blackthorn (Rhamnus cathartica);

- Ditches - All ditches in the context of the site are to be maintained in rotation as part of the management plan;
- Breeding birds – Clearance of any scrub should be undertaken outside of the nesting season (the breeding season is typically from end of February to end of August);
- Species diverse permanent grassland - Grassland within the site should be seeded and maintained to encourage the development of a species diverse and flower-rich habitat over time. This could be achieved through sowing with an appropriate wildflower mix on the margins and permanent grassland with a shade tolerant mix on the main part of the site, allowing growth over the summer months before cutting and potential aftermath grazing with sheep;
- Reptiles - Areas of buried rubble should be maintained if at all possible. If this is not possible, they should be removed by hand at a suitable time of year (i.e. outside the hibernation period) to avoid any incidental injury or mortality to reptiles. Reptile hibernacula, such as small piles of stones, piles of wood, should be created along the site boundaries.

10.184 The proposed solar scheme would provide an opportunity to create an area of species diverse grassland extending across the site. The arrangement and spacing of the solar panels, together with the majority of the panel area having over 0.9m clearance and 3m gaps between the rows mean that grass can be grown beneath. A chalk grassland seed mix incorporating shade tolerant species would establish and provide habitat for a range of protected species.

10.185 Long-term the potential use of sheep grazing on site would be a relatively simple management regime to create a more diverse flora. By removing stock from the field between the end of February and the beginning of July of the first year a more diverse hay meadow flora can be developed. Intermittent grazing between the July of the first year and February of the second year will keep weed species to a minimum. The cycle then repeats.

10.186 The location of the solar panels is of prime concern to reduce impacts on linear features of importance on site. A minimum of a 5m buffer will be uniform across the site. This will ensure that 'habitat corridors' remain throughout the site that will maintain habitat linkage and enhance the site's overall value for biodiversity.

10.187 Buffers along hedgerows and woodland should be seeded with a wildflower/grassland mix. These species are specifically tolerant of semi-shaded marginal environments and will compliment species already present along the field margins to create an improved habitat for breeding birds, reptiles and invertebrates.

10.188 The existing hedge boundaries to the site are in good condition. However, management over the 40-year life of the scheme will be required to maintain and potentially improve the hedge structure by gapping up and controlling the encroachment of scrub

and brambles, which would otherwise have the potential to overshade the hedges.

10.189 Hedgerows on site should initially be managed by cutting back to 25cm higher than the previous year and then on a rotation of cutting to the new height in alternating years. A single side cut should be made in autumn (outside of breeding bird season) every other year to promote growth and maintain a healthy, dense structure. With the additional margin provided by clearing of the scrub the hedgerow will not encroach over the site.

10.190 After decommissioning of the Renewable Energy Park the site should continue to function as a site of importance to biodiversity and the landscape features that are valued will be in better condition.

Effects on Landscape

10.191 Effects on landscape are considered during the construction and operational phases.

Construction Stage Effects on Landscape

10.192 The proposed development will, with the exception of new gateways 4m wide, and a 5m section of hedgerow where the access crosses Heath Road to the site, not involve the loss of any characteristic boundary or "point" features, such as walls, hedges or indigenous trees within the site.

10.193 The integrity of site will be protected during the construction and operational phases of the development through good site management.

10.194 The effects of the proposed development would be primarily on the less tangible aspects of the landscape character, as explored in the following section.

10.195 The landscape character is moderately valued and of medium to low susceptibility to changes brought about by the development of a Renewable Energy Park.

10.196 The patterns within the site and surrounding the site are clear. The summary description within the landscape character assessment sets out the key characteristics (**10.111 on page 164**).

10.197 The impacts of the development are considered in terms of effects on the landform, land cover and cultural heritage aspects as expressed by these key characteristics, and the specific local characteristics not present in the broader landscape that the LCA description covers. These, in combination, define the overarching landscape character.

Assessment of Effects on Landscape Fabric

10.198 The assessment of effects on landscape fabric considers the existing landscape elements and features on the site and the predicted residual (physical) effects of the proposed development on the site landscape taking into account firstly the design mitigation measures (pre-enhancement) and then the landscape and habitat enhancement measures (post- enhancement), and makes a judgement as to whether there is

likely to be any significant beneficial or adverse effect on landscape fabric based on the following definitions:

10.199 Significant beneficial effects on landscape fabric would occur where the proposed development would result in the addition, reinstatement or improvement of important/mature/diverse/distinctive components, which had previously been lost or degraded as the result of agricultural operations or other development.

10.200 Significant adverse effects on landscape fabric would occur where the proposed development would result in the permanent loss (or long-term temporary loss) of important/mature/diverse/distinctive components and the effects cannot be adequately mitigated.

10.201 The proposed development will not involve the loss of any characteristic boundary or "point" features, such as walls, hedges or indigenous trees within the site, with the exception of two short gateway openings c. 4m wide and areas of scrub that are predominantly of bramble and low value species.

10.202 The solar PV arrays, battery storage and ancillary structures have been located on land that is arable or improved grassland that is heavily disturbed by ploughing and is currently under intense arable land management, lying on a series of linked parcels of land in a relatively visually isolated part of the rural landscape (when viewed from the north-west, north and east and south-east).

10.203 The integrity of the aspects of the site that are valued will be protected during the construction, operation and decommissioning phases of the development through good site management.

Construction Stage Effects on Landscape Fabric

10.204 There will be a number of temporary effects on the landscape fabric of the site as the result of ground disturbance during the 9 month construction phase for the Renewable Energy Park.

10.205 There will be some hedge management including the removal of any dead or poor sections that have been smothered by brambles on the boundaries of the site and the removal of some overhanging limbs. These latter operations are within the bounds of good tree and hedge management practices.

10.206 The structures that would form part of the foundations of the panels would be driven, penetrating the former ploughed arable or improved grassland land. The detail is provided within the project description chapter of this document and in the Design and Access Statement.

10.207 The site is characterised by intensively managed arable land, with the proposed Renewable Energy Park planned for three fields, as shown on **Figure 1.2**. There will be 3m wide spaces between the rows of panels and most of the grassland under the panels will be present with at least 0.9m ground clearance. Therefore, the majority of the site will be able to be grazed and managed for grass and not inaccessible. Careful site layout has meant that, any areas of higher landscape (and ecological) sensitivity, including the lower-lying parts of the land, the land around the environs of Heath Road and the 5m buffers against the hedges, have been

avoided on the site, and engineering works have been designed to minimise disturbance to the site. Any loss of field vegetation will be short-term and good site management combined with reinstatement at the end of the construction phase will minimise the extent and duration of these effects.

10.208 There will be very minor, localised, long-term, but reversible effects on the landscape fabric of the site during the construction of the development. These would be as a result of the installation of the ground-mounted supports for the panels, and to form the hardstanding areas to the east of the site for the substation and the battery storage area.

10.209 The cable to export electricity from within the solar site will run underground to the substation, to the east of the site. The electricity will then be exported onto the electricity grid underground from the substation to Fulbourn substation.

10.210 The current use and management of the land will change from arable cropping, but with more inherently characteristic biodiversity improvements through creation of meadows and the reinforcement of hedges on the site. Consequently, the proposed management will result in a net gain to biodiversity and landscape fabric once the site is reinstated and operational.

10.211 These changes are directly linked to the panels and substation / battery compound. With the exception of the track through the site and the two new hedges, the development will be reversible once the Renewable Energy Park is decommissioned. There will be no loss on the site of distinctive landscape features, such as the field boundaries. The sensitivity to the proposed development is medium to low (see **paragraph 10.136 on page 168**) onwards for identification of the sensitivity of the landscape to the proposed development). The magnitude of change to the fabric of the site during construction is high, based on a broad area of change, a long but not permanent duration and a medium scale of development features with a low vertical height. The effects of the development on the landscape fabric of the site will therefore be moderate/moderate to substantial, temporary and not significant.

Operational Effects on Landscape Fabric

10.212 With the exception of the site office / construction compound, all of the elements that will be in place at the end of the construction period will be part of the site for the 40-year duration of the development. Therefore, the operational direct effects would be high, and due to the medium to low sensitivity of the site, would bring about moderate/moderate to substantial and not significant effects, as would be anticipated with any field-scale solar development. The effects would be contained within the site boundary.

10.213 The changes to the landscape that would be brought about through the grassland creation as detailed in the strategy underpinning the proposed Landscape and Ecological Management Plan would not be apparent in the first 1-3 years of the operational life of the development. They would become more apparent during years 3-5. The hedge reinforcement on the boundaries to the site, most notably from the south, would become effective during years 4 and onwards. However, they would

not reduce the moderate /moderate to substantial operational direct effects identified on the fabric of the site.

Landscape Character Effects

Effects on Landscape Character of the Site

10.214 The construction stage and operational effects are likely to be very similar and they are therefore considered in one assessment as set out below.

10.215 The assessment of effects on landscape character considers the predicted residual effects of the proposed development, drawing on the landscape context, the ZTV analysis, the viewpoint analysis (pre and post enhancement) and other fieldwork observations, and predicts the degree and extent of the likely significant adverse or beneficial effects on landscape character as a consequence of the addition of the proposed development, either directly (into the host landscape) or indirectly (into views from the surrounding landscape).

10.216 The effects of the proposed Six Oaks Renewable Energy Park would be primarily on the less tangible aspects of the landscape character.

10.217 The site is located within the Chalk Hills Landscape Character Type. Impacts on each of the key characteristics of the Chalk Hills landscape character type are now assessed before a summary draws conclusions over impacts on the landscape character as a whole. The viewpoints are drawn on in this assessment to illustrate particular points.

10.218 The following key characteristics are specifically noted for the Chalk Hills landscape character type:

Locally prominent, elevated chalk hills with localised steep-sided slopes and incised by dry valleys that create a rounded, rolling landform

10.219 From Viewpoint 2 the rounded rolling plain character is readily observed with land in the foreground undulating and rising gently towards higher ground of the A14/ A11 interchange on the skyline to the north-east of the site. Negligible /no impact on the perception of this key characteristic.

Free-draining landscape with dry valleys that contain small, seasonal watercourses.

NEGLIGIBLE /NO IMPACT.

A predominantly arable landscape with some permanent pasture and woodland on steeper slopes.

10.220 The development would bring about the reversion to grassland across the site. This would over time develop some heathland characteristics. The perpetual arable cultivation of the land has weakened and depleted the soils. Therefore, whilst arable cultivation is characteristic, it is not sustainable in the current regime of perpetual arable cultivation. The reversion of this land will bring about a longer-term broad-scale beneficial change of a high magnitude that, based on the medium to low sensitivity of the land to change would bring about moderate/ moderate to substantial gains on the cusp of significance. These effects would become apparent over the lifetime of the scheme.

Tree cover comprises scattered woodland across the rising landform and concentrated around historic parkland or estates.

NEGLIGIBLE / NO IMPACT.

Various historic features including ancient routes, earthworks and hill forts.

10.221 The character of the site is agricultural, and the strong agrarian patterns are the overarching theme, however there is an absence of historic features on the site. Negligible / no impact.

A generally unpopulated landscape, interspersed with large farms, granges, halls and cottages.

10.222 The fields are large as is typical for the area, being representative of the large-scale of this landscape. The addition of a large-scale solar development with battery storage in this landscape will accord with the scale. The development will have a negligible / no impact on the settlement patterns seen in this landscape.

A simple and tranquil landscape with long distance panoramic views

10.223 The viewpoint analysis in combination with the visual analysis has informed the assessment of effects on visual receptors below. Long-range views are only one aspect of the assessment. In landscape character terms the only long range views afforded are from Wilbraham Road and Little Wilbraham Road, in the context of the large scale of the landscape seen in the direction of the view and the adjacent A11 and A14 routes. The change in this part of the landscape would be of a medium magnitude, however the landscape is not particularly sensitive to the change, and the resultant effect slight to moderate/moderate.

10.224 The site is set between the A11 and A14 corridors, creating the perception of movement, light and sound in the landscape, creating an area of low tranquillity. However, when walking on Heath Road the levels of tranquillity are higher than would be anticipated in such a busy landscape. The proposals include for elements to enhance the visitor experience when using Heath Road. The construction period is short and once built no kinetic movement or disruption to auditory tranquillity is anticipated apart from the short section near the battery / substation compound, although this is already impacted by the proximity of the A11. Users of the byway heading south-east will have the backs of the panels in their view. For north-west-bound users the full fronts of the panels will be in the direction of travel. This is the only location that the impact on this key characteristic would be readily observed for a sufficient duration for there to be an impact. Accordingly, some disruption to tranquillity is anticipated, however this is very minor and the landscape enhancements will in part mitigate for these effects. The change to the perception of tranquillity and distant views in this part of the landscape would be of a medium magnitude, however the landscape is not particularly sensitive to the change, and the resultant effect slight to moderate/moderate effect would not be of significance. The establishment of the mitigation along Heath Road would reduce the perception of the change to the landscape, with the magnitude reducing to low, creating a slight effect from 15 years.

10.225 The landscape effects of the proposed development are summarised in **Table 10.1 on page 184**. Overall, there will be a medium magnitude of change to the perception of the character area brought about by the addition of a solar farm and battery storage facility to the landscape, that based on the medium to low sensitivity of the landscape to change would bring about a slight -moderate/moderate effect.

Influences of Character on Visibility

10.226 The basic terrain-based (bare-ground) ZTV (**Figure 10.1**: Extent of Theoretical Visibility (ZTV)) has been interrogated, followed by field visits to areas identified as being likely to be afforded a view, as well as those areas that would be screened by local vegetation and woodland.

10.227 Accordingly, the following sections of the LVIA look in detail at users of the nearest roads and footpaths crossing land within a closer proximity to the site, drawing out some of the characteristics of the settlement and landscape character that influence where views are more likely to be afforded, and where there is potential for indirect visual effects.

Effects on National Landscape Designations

10.228 There are no national landscape designations within the study area, and therefore no effects.

Assessment of Effects on the Visual Resource

Visual Analysis

10.229 The detailed analysis of the locations in the landscape where a view would be afforded of the proposed Six Oaks Renewable Energy Park is fully explored in the LVIA for each receptor group.

Viewpoint Analysis

10.230 Fieldwork observations were used in conjunction with the ZTV to select locations where views of the proposed Renewable Energy Park would be afforded. These viewpoints are shown within the separately bound Viewpoints 1-9, and their locations shown on the ZTV at LVIA **Figure 10.1**.

10.231 The viewpoints are drawn on in the assessment and through this their analysis has examined changes in landscape character and views that would occur as a consequence of the proposed development during construction and then when the proposed development is first constructed (pre-enhancement) and then once the landscape and habitat enhancement measures have resulted in the improved hedgerow screening, from years 4 onwards, fully realised at years 10-15 years (post-enhancement). The viewpoint analysis has been undertaken at the viewpoint locations that represent locations in the ZTV within the study area where the main landscape resources and visual receptor groups are located.

10.232 The predicted effects on landscape character and views at each viewpoint (pre- and post-enhancement) have been assessed separately but follow the same assessment process as outlined in GLVIA3. Firstly, the sensitivity of the location is derived from the value attached to the location or view, together with the susceptibility to change (of the landscape resource or visual receptor group). This is then combined with the predicted magnitude of change (in landscape character or in the view) in order to predict the overall effects (on landscape character or views) and whether these predicted effects would be significant.

10.233 The criteria used to judge value, susceptibility, sensitivity, magnitude and significance of effects on landscape character and views are provided in the Methods of Assessment (at **Appendix 10.2**).

Table 10.1 - *Landscape Effects*

Landscape Effects Figure LA4								
Landscape Receptor and Reference	Judged Sensitivity of Landscape Receptor			Magnitude of Effect	Overall Effect at Construction Phase	Overall Effect Upon Completion	Overall Effect at 15 Years Post Completion	Is the Overall Effect Significant?
	Value **High** **Medium** **Low**	**Susceptibility to Change** **High** **Moderate** **Low**	**Overall Sensitivity** **High** **Medium** **Low**	**Size/Scale of Visual Effect (including degree of contrast/ integration) at Stages of Project** **High** **Medium** **Low** **Negligible/ None**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Yes** **No**
Landscape fabric	Medium-low	Moderate - low	Medium-low	high	moderate/ moderate to substantial adverse	moderate/ moderate to substantial adverse	moderate/ moderate to substantial adverse	No
Landscape character of the site (landform, landcover and land use)	Medium-low	Moderate - low	Medium-low	high	moderate/ moderate to substantial adverse	moderate/ moderate to substantial adverse	moderate/ moderate to substantial adverse	No
*Overall Character of **Chalk Hills** Landscape Character Type*	Medium-low	Moderate - low	Medium-low	medium	Slight to moderate/ moderate adverse	Slight to moderate/ moderate adverse	Slight to moderate/ moderate adverse	No
Key characteristic: ***Locally prominent, elevated chalk hills with localised steep-sided slopes and incised by dry valleys that create a rounded, rolling landform***	Medium-low	Moderate - low	Medium-low	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No
Key characteristic: ***Free-draining landscape with dry valleys that contain small, seasonal watercourses***	Medium-low	Moderate - low	Medium-low	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No
Key characteristic: ***A predominantly arable landscape with some permanent pasture and woodland on steeper slopes***	Medium-low	Moderate - low	Medium-low	high	-	-	moderate/ moderate to substantial beneficial	No
Key characteristic: ***Tree cover comprises scattered woodland across the rising landform and concentrated around historic parkland or estates***	Medium-low	Moderate - low	Medium-low	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No

Landscape Effects Figure LA4								
Landscape Receptor and Reference	Judged Sensitivity of Landscape Receptor			Magnitude of Effect	Overall Effect at Construction Phase	Overall Effect Upon Completion	Overall Effect at 15 Years Post Completion	Is the Overall Effect Significant?
	Value **High** **Medium** **Low**	**Susceptibility to Change** **High** **Moderate** **Low**	**Overall Sensitivity** **High** **Medium** **Low**	**Size/Scale of Visual Effect (including degree of contrast/ integration) at Stages of Project** **High** **Medium** **Low** **Negligible/ None**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or** **Beneficial**	**Yes** **No**
Key characteristic: ***Various historic features including ancient routes, earthworks and hill forts***	Medium-low	Moderate - low	Medium-low	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No
Key characteristic: ***A generally unpopulated landscape, interspersed with large farms, granges, halls and cottages***	Medium-low	Moderate - low	Medium-low	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No
Key characteristic: ***A simple and tranquil landscape with long distance panoramic views***	Medium-low	Moderate - low	Medium-low	Medium (low at 15 years)	slight / slight to moderate	slight / slight to moderate	slight	No
Landscape designations	--	--	--		--	--	--	

Table 10.2 - *Viewpoint Analysis*

Viewpoint	Landscape Character	Viewers	Visual Sensitivity	Magnitude *Construction* Operational (With mitigation 10 years onwards)	Effect *Construction* Operational (With mitigation 10 years onwards)
VIEWPOINT 1: Taken from Little Wilbraham Road west of the site looking east across the foreground arable land towards the site below the skyline.	Edge of Chalk Hills	Road users	Medium	*Negligible* Negligible Negligible	*Negligible* Negligible (Negligible)
VIEWPOINT 2: Taken from Wilbraham Road where it intersects with Little Wilbraham Road west of the site looking east across the foreground arable land towards the site below the skyline.	Edge of Chalk Hills	Road users	Medium	*Medium-low* Medium-low (Medium-low)	*Slight to moderate/ moderate* Slight to moderate/ moderate (Slight to moderate/ moderate)
VIEWPOINT 3: Taken from the Wilbraham Road bridge over the A14 west of the site looking east across the foreground arable land towards the site below the skyline.	Chalk Hills	Road users	Medium	*Medium-low* Medium-low (Medium-low)	*Slight to moderate/ moderate* Slight to moderate/ moderate (Slight to moderate/ moderate)

Viewpoint	Landscape Character	Viewers	Visual Sensitivity	Magnitude *Construction* Operational (With mitigation 10 years onwards)	Effect *Construction* Operational (With mitigation 10 years onwards)
VIEWPOINT 4: Taken from the north-western end of Heath Road public right of way where the route has crossed over the A14 and the view of the site first opens up, looking west.	Chalk Hills	Public right of way (footpath) users	High	*Medium-low* Medium-low (Medium-low)	*Moderate/moderate-substantial* Moderate/moderate-substantial (Moderate/moderate-substantial)
VIEWPOINT 5: Taken from the western end of Heath Road public right of way where there is a full open view across the site for a viewer looking east	Chalk Hills	Public right of way (footpath) users	High	*Medium-low* Medium-low (Medium-low)	*Moderate/moderate-substantial* Moderate/moderate-substantial (Moderate/moderate-substantial)
VIEWPOINT 6: Taken from the Heath Road public right of way where there is a full open view across the site for a viewer looking north at the closest point to the site.	Chalk Hills	Public right of way (footpath) users	High	*High* High (High)	*Substantial* Substantial (Substantial)

Viewpoint	Landscape Character	Viewers	Visual Sensitivity	Magnitude *Construction* Operational (With mitigation 10 years onwards)	Effect *Construction* Operational (With mitigation 10 years onwards)
. VIEWPOINT 7: Taken from Streetway public right of way south of the site where there is a full open view across the site for a viewer looking north.	Chalk Hills	Public right of way (footpath) users	High	*Medium-low* Medium-low (Medium-low)	*Moderate/moderate-substantial* Moderate/moderate-substantial (Moderate/moderate-substantial)
VIEWPOINT 8: Taken from Streetway public right of way south of the site towards Little Wilbraham Road where there is the first full open view across the site for a viewer looking north.	Chalk Hills	Public right of way (footpath) users	High	*Medium* Medium (Medium-low)	*Moderate/moderate-substantial* Moderate/moderate-substantial (Moderate/moderate-substantial)
VIEWPOINT 9: Taken from Wilbraham Road where there is a gateway view across the site for a viewer looking north to north-east.	Chalk Hills	Road users	No view	*No view* No view (No view)	*No effect* No effect (No effect)

10.234 The photography for these viewpoints was all taken in bare-leaf conditions in March and April 2022.

10.235 The magnitude of change in the view from each of the nine viewpoints has been assessed and is considered in the assessment of effects.

10.236 This section discusses the potential effects of the proposed renewable energy park on the visual amenity of fixed viewpoint receptors, including residents in settlements, scattered farmsteads and individual residential properties, visitors to tourist, leisure and recreational facilities, and linear route receptors such as motorists on the major and minor roads, cyclists on the Sustrans Route cycle paths, walkers on the footpaths, named paths and National Trails, and horse riders on the bridleways.

10.237 For each receptor group, this assessment considers the extent of the predicted and actual visibility, the magnitude of the change in views and whether these changes will be significant. The judgement as to whether a change will be significant for a receptor group will depend on the receptor activities, whether the receptors will be stationary or moving, the orientation of the receptor in relation to the view, whether receptors are likely to be there for the purposes of enjoying the view and the duration of the view for each receptor (in relative terms).

10.238 The assessment of effects on visual amenity draws on the predicted residual effects of the proposed development, the landscape and visual baseline, the ZTV analysis, the viewpoint analysis (pre- and post-enhancement) and other fieldwork observations, and makes a judgement as to whether there are likely to be any significant effects on the visual amenity of the main visual receptor groups and locations in the study area, based on the following definition:

10.239 Significant effect on visual amenity can occur where a development would result in significant effects on the primary view(s) at a location or along a route and the view(s) is one that is valued and can be appreciated by receptors that are at that location for purposes that include the appreciation of the view(s).

10.240 Whether a significant change in a view will have an unacceptable effect on visual amenity depends on the opinions of the receptors to the type of development proposed (i.e., public perception).

10.241 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/observers. The variability of public opinion on renewable energy installations is such that it is difficult to define significant effects on visual amenity as a result of this project as definitely beneficial or definitely adverse for all members of the public who may experience that view.

10.242 However, in order to assess the worst case, it is recommended that all predicted significant effects on visual amenity are placed on the negative side of the planning balance, but that the variability in public perception and the likely numbers of receptors who would be affected are also taken into account in the planning balance.

10.243 The viewpoint analysis and field studies have indicated that the magnitude of change of view falls to low at distances of about 500m from the proposed renewable energy park

scheme in the most open locations, of which there are very few, other than from one raised bridge over the A14, illustrated at Viewpoint 3. At these distances highly sensitive visual receptors would cease to be significantly affected by the proposed Renewable Energy Park. This, combined with the ZTV, has informed the study areas for the visual assessment on linear route and fixed-point receptors. Therefore, for highly sensitive visual receptors the impacts will be assessed up to a distance of 1km from the site, and for medium sensitivity receptors to a distance of 500m from the site.

10.244 The reporting concentrates on effects that are significant and that fall at the threshold of significance. Distant, non-significant effects are not reported.

Fixed Viewpoint Receptors

10.245 The potential for the proposed renewable energy park to impact on views from settlements and individual buildings (dwellings) is assessed in the following section, with findings reported by receptor group.

Settlements

10.246 This assessment has considered all of the settlements within the context of the site, including Bottisham, Little Wilbraham and Great Wilbraham and identified that, whilst parts of Bottisham and the Church at Little Wilbraham lie in the ZTV, they all lie outside of the area of any potential visibility, confirmed by field checking in bare-leaf conditions. Bottisham is characterised by dense hedges and many trees on the site-side of the settlement.

10.247 Overall, the assessment has concluded that there would be no significant changes in views from within any of the settlements and therefore no significant impacts.

Individual Dwellings

10.248 The likely change of view from all properties has been looked at as part of the overall assessment, in greater detail for adjacent and nearer than more distant individual houses. The analysis of the site layout has assisted in this assessment.

10.249 Within the context of the proposed site there are a relatively low number of individual dwellings where a view would be afforded, in part due to the vast scale of the landscape and lack of rural dwellings and the layers of roadside embankment planting and trees creating screening for the low numbers of rural dwellings in the context of the site.

10.250 The Landscape Institute have issued guidance in Technical Guidance Note (LITGN) 02/2019 stating that only visual effects "of such nature and / or magnitude that it potentially affects 'living conditions' or Residential Amenity" need to be considered in LVIAs. The LITGN goes on to record that:

It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before."

10.251 All of the properties in the context of the site have been considered and none, including the nearest dwellings at Spring Hall, Colville Farm and Council Farm to the north and south would experience a change in view that would come close to a level commensurate with an impact on residential amenity. This is because the nearest dwellings, other than Spring Hall 150m north of the site, are some distance from the proposed development; all are set within mature vegetation, including trees; and they do not directly view the panels from the south where there would be potential for glint and glare effects.

10.252 This LVIA does not include a separate residential amenity assessment. It is considered that the effects resulting from the proposed development would fall below the Residential Visual Amenity Threshold referred to.

Tourist and Recreational Facilities

10.253 Out of doors tourist attractions are assessed to be highly sensitive to views. There are none within the ZTV and none in the study area where a view would be afforded.

Linear Route Vehicular Receptors

Motorists

A AND TRUNK ROADS & B ROADS

10.254 There are four major roads in the context of the site, the A11, A14, A1303 and A1304. The A11 and A14 are dual-carriage way arterial routes. These routes carry a very high volume of traffic however the travellers are not particularly sensitive to the change proposed and assessed as being of medium sensitivity.

10.255 The A11 runs in a north-south direction along the eastern boundary of, and parallel to, the site. The ZTV identifies potential intermittent visibility for north bound drivers for a distance of 2km. The road is in and out of cutting and has more verge and embankment vegetation than the A14. The road enters a cutting adjacent to the site. The magnitude of change of view would be medium for most of the 350m road length approaching the site, where there would be a moderate effect due to the changes in view.

10.256 The ZTV identifies potential intermittent visibility for A11 south bound drivers for a distance of 1.3km from the A11/ A14 interchange west. The road is in a cutting for much of the distance, but when parallel to the site a full open view would be afforded of the front faces of the panels for a duration of 150m. The road then enters a cutting adjacent to the site. The magnitude of change of view would be high for most of this 150m road length, where there would be a moderate to substantial and significant effect due to the changes in view.

10.257 The A14 runs in an east-west direction along the north-western boundary of, and parallel to, the site. The ZTV identifies potential visibility for east bound drivers for a distance of 3km. Field observations have confirmed that for a duration of about 1.2km travellers along this carriageway would be afforded a view of the rear-mountings of the proposed panels. The magnitude of change of view would be low for most of this time, rising to medium for a 100m section of road where there would be a moderate and not significant effect due to the changes in view.

10.258 The ZTV identifies potential intermittent visibility for west bound A14 drivers for a distance of 1.8km from the A11/ A14 interchange. Field observations have confirmed that for a duration of about 1km travellers along this carriageway would be afforded a view of the rear-mountings of the proposed panels. The magnitude of change of view would be low for most of this time, where there would be a slight to moderate not significant effect due to the changes in view.

10.259 The A1303 runs in an east-west direction along the north-western side of the site, 250m distant at the nearest point. The ZTV identifies potential visibility for east bound drivers for a distance of over 3km. Field observations have confirmed that for a very short duration of 100m west of Bottisham a low magnitude of view would be afforded by road users creating a slight to moderate effect. East of the connection with Heath Road and the layby a gateway view shows a medium magnitude of view change creating a moderate not significant effect. Farther east there are slight effects from low to medium changes in view glimpsed through the roadside vegetation.

10.260 The ZTV identifies potential intermittent visibility for west bound drivers for a distance of 300m from the A1303 bridge over the A11/A14 interchange. Field observations have confirmed that there would be no changes in view for west bound drivers when looking in the direction of travel.

10.261 The A1304 runs in a north-south direction east of the site. The route has been travelled in both directions and whilst parts of the route are in the ZTV area, the reality is that no views would be afforded by users of this road.

10.262 There are no B roads within view of or the context of this proposed development site.

LOCAL, UNCLASSIFIED ROADS

10.263 Users of unclassified, local roads outside of residential areas are judged to have a medium level of sensitivity to changes in view.

10.264 Within the broader context of the site there is a network of unclassified roads. Almost without exception the minor road network is characterised by hedges with trees or treelines enclosing the roadsides. The exceptions are Wilbraham Road and Little Wilbraham Road south-west of the site where the landscape is more open in character. Views out from the local network away from the highest land and spring heads are not a characteristic other than from gateways. (Viewpoints 1, 2, 3 & 9).

10.265 Three roads are considered in this assessment. Swaffham Heath Road, Wilbraham Road and Little Wilbraham Road.

10.266 Swaffham Heath Road runs in a south-east to north-west direction along the north-eastern side the site, over 1km distant at the nearest point. The ZTV identifies potential visibility for east bound drivers for a distance of over 500m. Field observations have confirmed that the scale of the landscape is vast and that no views would be afforded by users of this route.

10.267 Little Wilbraham Road runs in a north-west to south-east direction along the western side of the site, over 1km distant at the nearest point. Viewpoint 1 is taken from this road. The ZTV identifies potential visibility for east bound drivers for a distance of 2km. Field observations have confirmed that for a very short duration of 100m in the environs of Viewpoint 2 a medium to low magnitude of view

would be afforded by road users creating a slight-moderate/moderate effect. Farther east there are slight to moderate effects from low changes in view glimpsed through the roadside vegetation. There would be no changes in view greater than medium and accordingly no significant changes in view experienced from users of this route.

10.268 Wilbraham Road runs north-west to south-east direction along the western side of the site. Viewpoint 2 is taken from the intersection of this road with the Little Wilbraham Road and Viewpoint 3 is taken from the bridge over the A14 west of the site. The ZTV identifies potential intermittent visibility for north bound drivers for a distance of 1.2km. The view would be of the northern elevations of the panel mounts. The magnitude of change of view would be medium to low for most of the 750m road length approaching the site as a side view for viewers, where there would be a slight to moderate/moderate effect due to the changes in view tempered by the change being a sideways view rather than being in the main direction of view of the road users.

10.269 Through the proposed hedge rejuvenation proposals, the hedges would gradually increase in height by 1m and by year 10 all of the mitigation will be in place. The changes to the views of the landscape from this increase in hedge height would be beneficial but would not fully screen the proposed panels from any road user views.

10.270 There would be no other views afforded that might bring about any significant effects.

RAIL PASSENGERS

10.271 There is no railway in the context of the site, and therefore no effects.

Plate 10.5 - *Sustrans Route*

CYCLISTS

10.272 There are no Sustrans routes in the context of the site, with the nearest being Sustrans Route 51, **Plate 10.5 on page 193**, located to the west and north of Bottisham.

10.273 There would be no other views afforded by cyclists other than those using the local road as described in the paragraphs above, and therefore no additional effects.

USERS OF PUBLIC RIGHTS OF WAY AND PEN ACCESS LAND

10.274 There are a relatively low number of public rights of way in the landscape. The Definitive Map for Cambridgeshire shows only byways within the context of the site, shown in **Plate 10.6 on page 195**.

10.275 The developer has the intention to erect information boards about the Six Oaks Renewable Energy Park, renewable energy and energy storage, wildlife and climate change for viewing from this path. In addition, a bench could be placed along the route to provide further benefits for footpath walkers and any visitors.

10.276 The Renewable Energy Park development proposal will bring about changes in view from the adjacent byway. During the construction stages there would be some temporary signage but no obstruction of the use of the path around and through the site.

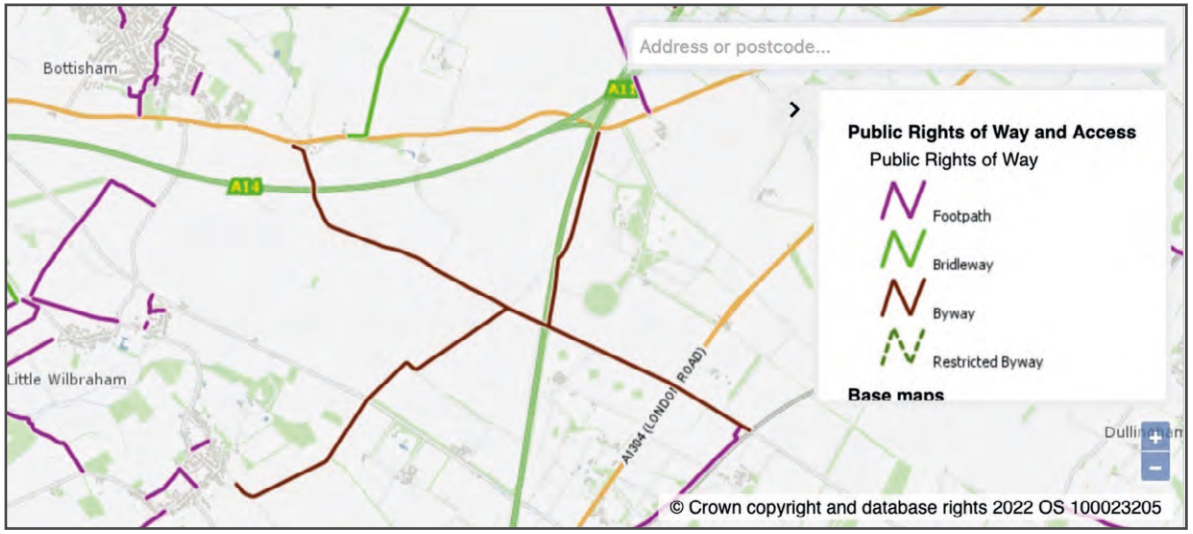
10.277 Viewpoints 4-8 are taken from this route from the most open locations where the view increases to the greatest magnitude of change that would be afforded by a walker, rider or cyclist on this section of the Heath Road and Streetway. The removal of solar arrays from the south-western side of the site has considerably reduced the change in view from Viewpoints 4 & 5 compared to the scoping consultation document plans. This has shortened the duration of view alongside the development by over 400m. The viewer walks parallel to hedges on the southern side of the Renewable Energy Park, reaching a separation distance of only about 20m at Viewpoint 6 where panels would be seen in the adjacent or adjoining field compartment. For the duration of approximately 1.0km the Renewable Energy Park would form a strong presence in views from the byway. There is the potential for glint and glare to be experienced by users of the route. The change would be long-term and of a large scale. The change in view would be of a high magnitude, creating substantial and significant changes in view for high sensitivity byway users who have the time to look around and observe the surrounding landscape. Walkers heading west would experience the sequence of views in reverse.

10.278 The mitigation identified through the bolstering of the existing hedgerow vegetation during years 1-4 would enhance the experience of the landscape but would not reduce the impact to medium to high (moderate to high changes in view over a wide area) from the southern part of the site because the increased hedge height would not conceal views of the panels on the higher land in the middle distance or from Viewpoint 6, particularly for byway users heading north-west facing the panels. The viewer is of high sensitivity to this type of change. The effects will therefore be substantial, and significant. The hedges proposed in the field compartments would take longer than 4 years to fully establish. However, by

years 10-15 they should be sufficiently established to have a beneficial landscape change, but unlikely to drop the magnitude to below the threshold of significance.

10.279 Street Way also runs in a north-south direction between the site and the Wilbraham Road. The Renewable Energy Park development proposal will bring about changes in view from the adjacent footpath. During the construction stages there would be some temporary signage and fencing, the applicant intends to allow movement through the site safely in this period, as articulated in **paragraph 10.82 on page 159**. The public right of way will remain open and the construction traffic will be controlled through a Construction Traffic Management Plan, with banksmen ensuring safety of all users.

Plate 10.6 - *Recreation Areas and Access: Extract from the Definitive Map for Cambridgeshire*



10.280 Viewpoints 7 & 8 are taken from this route.

10.281 The viewer is of high sensitivity to this type of change, the average change in view from this route is between medium to low. The effects will therefore be moderate to substantial and significant for some sections, and moderate and not significant for other parts of the route. The hedges being let up around the site would take 4 years to fully establish and increase 1m in height. However, by years 10-15 they should be sufficiently established and bushed out to further reduce the magnitude of change of view for a short section of this route. In this part of the accessible landscape, significant effects are restricted to Heath Road and the northern 50m of Street Way where it meets Heath Road, where a user will experience a short duration of high magnitude of changes, bringing about substantial, adverse and significant effects. These would reduce to moderate and not significant on establishment of the mitigation.

10.282 More distant views are sporadically and infrequently afforded from within this broader landscape, such as from

the bridleway north of the A1303. The bridleway has an open character, running alongside a field hedge that is tightly trimmed, however, views of the site are concealed by the vegetation alongside the A1303 from most of the route, and where seen the view would be of the rear mountings of the development only.

10.283 There are no other paths where sufficient change of view would be afforded to bring about a significant effect.

CUMULATIVE ASSESSMENT

10.284 The cumulative assessment sets out an assessment of the effects of more than one development being experienced in a given landscape character type or area or view. The methods of assessment are recorded in **Appendix 10.2**.

Introduction

10.285 Developments that are sufficiently advanced in the planning system to be submitted, or consented or constructed are considered in this assessment, as are any other developments that can reasonably be conceived to be likely to bring about cumulative impacts. For significant cumulative effects to occur, a sufficiently significant effect from more than one solar development needs to impact on a viewer or landscape. Wind turbine developments are not considered in this cumulative assessment because they have very different characteristics from solar arrays. Typically, operational and consented developments are treated as being part of the landscape and visual baseline i.e. it is assumed that consented schemes will be built except for occasional exceptions where there is good reason to assume that they will not be constructed. Sites that have been submitted and not determined, are ordinarily considered within a 'future baseline' scenario.

10.286 Within a 10km radius of the proposed development area:

- Sunnica is a Nationally Significant Infrastructure Project application. The scheme is split across separate sites, namely Sunnica East, and Sunnica West. Sunnica West is the nearest to the Proposed Development, being located approximately 10km to the north east of the proposed Six Oaks Renewable Energy Park. A formal application has now been submitted, and the Development Consent Order process is underway.
- Bracks Farm is a proposed, consented, solar farm located north of the A1123 approximately 10km north of the Site of the Proposed Development.
- North Angle Farm is a proposed, consented, solar farm located north of the A1123, immediately north-west of Bracks Farm.
- Goose Hall Farm is an operational solar farm located approximately 5km from the Proposed Development, north-west of Burwell.
- Burwell is a proposed, consented, solar farm located approximately 4km north west of the Proposed Development, west of Burwell.
- Sunclose Farm solar farm is an operational solar farm located approximately 10km north west of the Proposed Development near Milton.

- Heath Road is an operational solar farm, located approximately 6km east of the Proposed Development, along the A14.
- Great Wilbraham Solar Farm is an operational solar farm, located approximately 2.5km south-east of the Proposed Development, near the A11 at Six Mile Bottom.

10.287 A scoping opinion was issued for the proposed New England Farm solar farm; however, an application has not been forthcoming.

10.288 These solar farm developments are considered as part of the LVIA baseline.

10.289 There are no further developments in planning that need to be considered within the Cumulative Assessment.

10.290 The locations of all of these solar farms are shown on **Figure 10.3**. A cumulative ZTV has been generated for the nearest solar developments, the Great Wilbraham Solar Farm and the more distant Heath Road Solar Farm, as set out at **Figure 10.4**.

10.291 The location of the proposed development in relation to the Sunnica Nationally Significant Infrastructure Project application is also shown on **Figure 10.5**. The entirety of this project, apart from the cable route at over 8km away and which would be underground, lies over 10km distant, with the nearest solar panels 10.5km distant. Therefore, there is no potential for any cumulative impacts to be brought about on landscape or visual receptors through the development of both schemes.

10.292 No other developments requiring cumulative assessment were identified in this instance.

10.293 Cumulative effects are assessed on the same groups of landscape and visual receptors as the assessment for the main Six Oaks Renewable Energy Park development proposal.

10.294 Landscape and visual receptors that are assessed to receive moderate and greater effects from the proposed Six Oaks Renewable Energy Park development are then assessed in terms of cumulative effects.

Cumulative Effects

Cumulative Landscape Effects

10.295 A cumulative ZTV was run for the proposed Six Oaks Renewable Energy Park, Great Wilbraham Solar Farm (installed capacity is 38.1Mw) and the Heath Road Solar Farm (installed capacity is 49.9Mw), **Figure 10.4**. This showed almost no overlap in ZTVs between the proposed Six Oaks Renewable Energy Park, and the Heath Road Solar Farm.

10.296 It showed some overlapping between the proposed Six Oaks Renewable Energy Park and the Great Wilbraham Solar Farm. These potential cumulative effects are therefore considered in more detail.

10.297 The closest cumulative site is the Great Wilbraham Solar Farm. More detailed assessment work was undertaken in combination with the proposed Six Oaks scheme.

10.298 Both developments lie within the Chalk Hills. The landscape character type covers a broad area where the scale of the landscape is large to vast with regular very large scale fields

bound by hedges with hedgerow trees and some blocks of woodland and shelterbelts, over undulating land, and long-range views within the type are a key characteristic, but not particularly notable in the context of either developments. The area is sufficiently large for the combination of these two developments being constructed in the landscape character type to have no impact on the appreciation of the character or features that the type is valued for, and therefore no cumulative landscape effects.

10.299 The perception of the landscape should the Proposed Development be consented, would not be of the landscape character changing to a solar farm landscape. The landscape is sufficiently extensive for a number of solar farms to be developed without an impact on the perception of the landscape.

Cumulative Visual Effects

10.300 Cumulative visual effects can be simultaneous or sequential. Having visited the site and surrounding area with the Great Wilbraham Solar Farm LVIA and visualisations (2.5km south-east), I conclude that there is no potential for actual intervisibility between the two schemes due to the nature of the intervening landscape which includes layers of established field boundary and roadside vegetation, as well as woodland blocks, in combination with underlying topographical variations. Accordingly, there would be no simultaneous cumulative visual effects.

10.301 The Great Wilbraham Solar Farm lies south-east of the A11, 3km south of the proposed Six Oaks Renewable Energy Park. For road users travelling north-east they would pass the rear-mountings of the Great Wilbraham development 2.5km, approximately 2-3 minutes, before passing the proposed Six Oaks Renewable Energy Park. The magnitude of change of view would be high for c 350m, as set out in **Table 10.3 on page 200**. The driver would then head a further 6km north-east before views of the Heath Road solar farm would be seen. The layers of landscape in the intervening distance would be seen in sequence, and there would not be a magnitude or scale of effect sufficient to bring about any cumulative effects.

10.302 For road users travelling south-west they would pass the Heath Road solar farm 6km, approximately 5-8minutes travelling time before passing the proposed Six Oaks Renewable Energy Park. They would then travel 2.5km, approximately 2-3 minutes, before seeing the rear-mountings of the Great Wilbraham development. The magnitude of change of view would be high for c 150m, as set out in **Table 10.3 on page 200**. The layers of landscape in the intervening distance would be seen in sequence, and there would not be a magnitude or scale of effect sufficient to bring about any cumulative effects.

10.303 There are no major roads, including the A11, or even local routes where the duration of travel is sufficiently short between solar farms for cumulative effects to be experienced by a visitor to the landscape.

10.304 The proposed development would not bring about any cumulative effects.

Summary of Landscape Effects

10.305 In summary, the baseline landscape and visual context of the proposed project is described, drawing on the Greater Cambridgeshire landscape character assessment that defines the site as falling within the Chalk Hills landscape character type. The key characteristics of the local area within this type are listed. **Table 10.1 on page 184** sets out a summary of effects in a tabular form.

10.306 The main body of the assessment of the effect of the proposed development on the landscape resource is undertaken by way of defining how susceptible and sensitive the landscape is to the proposed development, where that change would be experienced in relation to the key characteristics, and to what degree.

10.307 This analysis is undertaken for each key characteristic in turn, drawing out those characteristics that are sensitive to and likely to be impacted on by the proposed solar farm and battery storage area.

10.308 The landscape is assessed as being of medium to low sensitivity to this type of change.

10.309 The conclusions are that the effects of developing the proposal on the landscape fabric and landscape character would be moderate/moderate to substantial and adverse on completion, and that following the establishment of the mitigation and landscape enhancements set out in the Landscape and Ecological Management Plan (hedges from year 4 onwards and other mitigation measures and landscape enhancements from years 10 onwards), some of the changes to the landscape would become beneficial, with the letting up of the hedges over the first four years and reversion to potentially sheep-grazed grassland, or mown grassland, from arable bringing the greatest short-, and long-term landscape gains. The resulting long-term effect on the landscape character of the area is assessed as being slight to moderate/moderate and adverse, reducing slightly in the longer-term through the beneficial gains in terms of landscape condition and quality changes from the hedge creation and arable reversion, but these are balanced by the adverse changes to the landscape through the solar farm development.

Table 10.3 - *Visual Effects*

	Visual Effects Figure LA5									
Receptor Type	Location (including approx. no. of dwellings where applicable)	Judged Sensitivity of Visual Receptor			Judged Magnitude of Visual Effects		Overall Effect at Construction Phase	Overall Effect Upon Completion	Overall Effect at 15 Years Post Completion	Is the Overall Effect Significant?
		Value **High** **Medium** **Low**	**Susceptibility to Change** **High** **Medium** **Low**	**Overall Sensitivity** **High** **Medium** **Low**	**Distance from Site Boundary (or Built Development where stated)** **(approx. m/km)**	**Size/Scale of Visual Effect (including degree of contrast/ integration) at Stages of Project** **High** **Medium** **Low** **Negligible/ None**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Yes** **No**
Users of / occupiers of settlements	*Great Wilbraham*	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
	Bottisham	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
	Little Wilbraham	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
Occupiers of dwellings	*Spring Hall*	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
	Colville Farm	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
	Council Farm	High	High	High		Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
Tourist and Recreation facilities	*none*	High	High	High	N/A	-	-	-	-	-
Motorists on A/B roads	*Users of A11 north*	Medium	Medium	Medium	350m north	medium	Moderate adverse	Moderate adverse	Moderate adverse	No
	Users of A11 south	Medium	Medium	Medium	150m south	High	Moderate to Substantial adverse	Moderate to Substantial adverse	Moderate to Substantial adverse	Yes
	Users of A14 east	Medium	Medium	Medium	1km	Low	Slight to moderate adverse	Slight to moderate adverse	Slight to moderate adverse	No
	Users of A14 west	Medium	Medium	Medium	100m	medium	Moderate adverse	Moderate adverse	Moderate adverse	No
Receptor Type	Location	Judged Sensitivity of Visual Receptor			Judged Magnitude of Visual Effects		Overall Effect at Construction Phase	Overall Effect Upon Completion	Overall Effect at 15 Years Post Completion	Is the Overall Effect Significant?

	Visual Effects Figure LA5									
	(including approx. no. of dwellings where applicable)	**Value**	**Susceptibility to Change**	**Overall Sensitivity**	**Distance from Site Boundary (or Built Development where stated)** **(approx. m/km)**	**Size/Scale of Visual Effect (including degree of contrast/ integration) at Stages of Project**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Substantial** **Moderate** **Minor** **Negligible** **None** **Adverse or Beneficial**	**Yes** **No**
Motorists on A/B roads	*Users of A1303- east bound*	Medium	Medium	Medium	100m plus gateway glimpses	Low	Slight to moderate adverse	Slight to moderate adverse	Slight to moderate adverse	No
	Users of A1303- west bound	Medium	Medium	Medium	No view	Negligible / none	Negligible / none	Negligible / none	Negligible / none	No
	Users of A1304 either directions	Medium	Medium	Medium	No views	Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
Unclassified local roads	*Swaffham Heath Road*	Medium	Medium	Medium	No views	Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
	Little Wilbraham Road	Medium	Medium	Medium	1.2km distant for short length of road	Medium to low	slight-moderate /moderate adverse	slight-moderate /moderate adverse	slight-moderate /moderate adverse	No
Rail Passengers	*none*	Medium	Medium	Medium	-	-	-	-	-	-
Cyclists	*Sustrans Route 51*	High	High	High	500m	Negligible /None	Negligible / None	Negligible /None	Negligible / None	No
Users of Public Rights of way	*Heath Road Byway*	High	High	High	adjacent	High	Substantial adverse	Substantial adverse	Substantial adverse	Yes
	Street Road	High	High	High	When adjacent for c 50m	High	Substantial adverse	Substantial adverse	Moderate to Substantial adverse	Yes

Summary of Visual Effects

10.310 In the same way an assessment of the effect of the proposed development on the visual resource and visual amenity of viewers and visual receptors is set out. This analysis records the effect on viewers including users of the roads, users of public rights of way, inhabitants of settlements and adjacent individual residential dwellings. **Table 10.3 on page 200** sets out a summary of effects in a tabular form.

10.311 In addition, nine publicly accessible viewpoints are set out in the separately bound volume of visualisations, alongside the ZTV (**Figure 10.1**) (Viewpoints 1-9 (**ES Volume 4**), with locations identified on **Figure 10.2**).

10.312 The conclusions are that the development would have a substantial impact on the appreciation of views from a single adjacent byway, used by cyclists, walkers and horse riders, that crosses the landscape along the southern edge of the site and moderate to substantial changes in view from a second section of this byway to the south-east of the site, and one significant change in view from one section of the A11 road, and where seen the change would be moderate to substantial and significant and adverse.

10.313 Following the establishment of the mitigation and landscape enhancements set out in the Landscape and Ecological Management Plan, the changes to the views of the site in the landscape, would become slightly reduced and some beneficial changes would be observed in terms of improvement of landscape condition and quality, with letting the hedges grow up over the first four years and reversion from arable to grassland bringing the greatest visual amenity benefits. The resulting long-term effect on the views of the landscape character of the area is assessed as being below the threshold of significance but adverse.

10.314 The addition of the proposed Renewable Energy Park in a few middle-distance publicly afforded linear route views in the landscape would not adversely alter the appreciation of the viewer of the view. There would be no significant impacts more broadly on the landscape character or views in the local area.

Cumulative effects

10.315 In the case of the Six Oaks Renewable Energy Park proposal cumulative effects have been assessed because there are a number of other solar developments that are consented or planned in the context of the site or surrounding area, including within the ZTV, and therefore, cumulative effects are part of this assessment. This has been confirmed through reviews of the local authority published planning lists. No significant cumulative effects have been identified.

Conclusions

10.316 In the LVIA the national and local planning policies and guidance documents are introduced. These policies drive the design, and the way the mitigation and landscape enhancement strategies have been formulated. The potential effect of the proposed development is assessed in relation to these areas and policies.

10.317 The National Planning Policy Framework (2021) sets out the overarching policies and guidelines within which the proposed development would sit. Paragraph

174 records that: Planning policies and decisions should contribute to and enhance the natural and local environment, and sets out a list of measures to achieve this to maintain and enhance the objective.

10.318 The proposal will bring about the reversion of 76 ha of heavily improved and cultivated farmland to low-intensity sheep-grazed or mown grassland providing broad-scale landscape enhancement. The mitigation and landscape enhancement proposals set out in the Management Plan to be implemented at the outset of the development, and to reach maturity in the first 10-15 years, including hedge restoration, will further provide landscape enhancement. The addition of new hedges and a line of rowan trees will take the scheme into even broader-scale landscape restoration, meeting the objectives of the district for the landscape as set out in the local plan and neighbouring authorities Greater Cambridgeshire LVA (2021).

10.319 The development has been carefully designed to minimise impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; and remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate through the arable reversion in particular.

Natural England Technical Information Note (TIN101)

10.320 Natural England has published a Technical Note relating to maximising the potential benefits of solar farms. It notes that:

well located and designed solar parks may not only avoid negative environmental impacts, but may also deliver additional benefits to the environment beyond low carbon energy." In the section relating to landscape, the document states that solar parks "… can change the character and visual experience of a given area or landscape, and that they may become an element of the future UK landscape as part of our response to climate change. Careful site selection and design is the best way to avoid or minimise potential adverse landscape and visual impacts.

10.321 The approach taken will meet the objectives of this TIN.

Planning Practice Guidance for Renewable and Low Carbon Energy

10.322 The Government updated (18 June 2015) planning guidance to provide advice on renewable energy developments and this identifies that local authorities should take account of;

the potential impacts on the local environment, including from cumulative impacts.

10.323 The guidance highlights;

The potential to mitigate landscape and visual impacts through, for example, screening with native hedges.

10.324 This approach has been taken across the whole of the site.

10.325 The guidance does recognise that:

With effective screening and appropriate land topography the area of a zone of visual influence could be zero.

10.326 In this scenario it will only be views from the near-distance public rights of way and one glimpse from an unclassified road (Wilbraham Road) that will not be able to be effectively mitigated.

10.327 The guidance also places assessment of cumulative effects of large-scale solar schemes in the same context as for wind turbines and suggests that cumulative effects are best considered separately. This has been done and no cumulative effects are identified.

The Local Plan

10.328 The site and surrounding landscape are located within East Cambridgeshire District Council and this Council's Local Plan and Core Strategy are relevant to the development proposals.

10.329 A number of studies have been undertaken that underpin the Local Plan and the development policies set out within it. These evidence-base studies do not include a current landscape character assessment.

10.330 In the context of the proposed development, the following landscape policies are relevant, have been reviewed and conclusions drawn.

POLICY ENV 1: LANDSCAPE AND SETTLEMENT CHARACTER

10.331 Proposals for development should be informed by, be sympathetic to, and respect the capacity of the distinctive character areas defined in the Cambridgeshire Landscape Guidelines.

10.332 Development proposals should demonstrate that their location, scale, form, design, materials, colour, edge treatment and structural landscaping will create positive, complementary relationships with existing development and will protect, conserve, and where possible enhance:

- The pattern of distinctive historic and traditional landscape features, such as watercourses, characteristic vegetation, individual and woodland trees, field patterns, hedgerows and walls, and their function as ecological corridors for wildlife dispersal.
- The settlement edge, space between settlements, and their wider landscape setting.
- Visually sensitive natural and man-made skylines, hillsides and geological features.
- Key views into and out of settlements; this includes quintessential views of Ely Cathedral and the setting of the City as a historic 'isle' settlement close to the fen edge and the valley of the River Great Ouse.
- The unspoilt nature and tranquillity of the area.
- Public amenity and access; and
- Nocturnal character of rural areas free from light pollution. Suitable compensatory provision must be made in the event of significant harm where necessary.

10.333 The Cambridgeshire Landscape Guidelines (1991) record that the: Landscape criteria for new developments include:

- minimising impact on existing landscape qualities and features including habitats of value;
- contributing positively to landscape quality, the potential for enjoying the countryside, creative nature

conservation and environmental education opportunities; and

- ensuring new landscapes are endowed with sufficient management resources for securing long-term care.

10.334 The principles for landscape improvement and management in the Chalklands also sets out detailed approaches to landscape enhancement that have been taken on board in the landscape enhancement plan forming the 40 year Landscape and Ecology Management Plan strategy.

10.335 In addition, the development respects:

The pattern of distinctive historic and traditional landscape features, such as watercourses, characteristic vegetation, individual and woodland trees, field patterns, hedgerows and walls, and their function as ecological corridors for wildlife dispersal.

The detailed approaches to landscape enhancement that have been taken on board are set out in the mitigation strategy.

10.336 **The settlement edge, space between settlements, and their wider landscape setting**, are noted as being valued. The site is distant from any settlement or the settings of any settlements.

10.337 **Visually sensitive natural and man-made skylines, hillsides and geological features**. Apart from the substation building (see Viewpoint 8), the development sits below the skyline in all publicly afforded views.

10.338 **Key views into and out of settlements; this includes quintessential views of Ely Cathedral and the setting of the City as a historic 'isle' settlement close to the fen edge and the valley of the River Great Ouse**. The site is distant from any settlement or the settings of any settlements and accordingly the development proposals would not impact on this valued landscape attribute.

10.339 **The unspoilt nature and tranquillity of the area**. The site is set between the A11 and A14 corridors, creating the perception of movement, light and sound in the landscape, creating an area of low tranquillity. However, when walking on Heath Road the levels of tranquillity are higher than would be anticipated in such a busy landscape. The proposals include for elements to enhance the visitor experience when using Heath Road. The construction period is short and once built no kinetic movement or disruption to auditory tranquillity is anticipated, despite some auditory changes heard from the battery storage area for byway users walking past this part of the site. However, the presence of movement and sound from the adjacent A11 near the battery storage area will limit the perception of this change. Users of the byway heading east will have the backs of the panels in their view. For west-bound users the full fronts of the panels will be in the direction of travel. Accordingly, whilst some disruption to tranquillity is anticipated, this is very minor and the landscape enhancements will in part mitigate for these effects.

10.340 **Public amenity and access**. The scale of the landscape is large and in places vast. To walk, at a casual pace, along Heath Road and make a circular route along adjoining roads takes in the region of 2-3 hours. The addition of permissive paths has been considered; however, it would be very hard to create a circular

route anywhere other than alongside the busy A11 and A14 edges. Therefore, it is considered better to enhance the experience of users of Heath Road through the addition of interpretation boards and landscape enhancements to the hedges and ditches alongside the route through the 40 year Landscape and Ecology Management Plan.

10.341 **Nocturnal character of rural areas free from light pollution**. Suitable compensatory provision must be made in the event of significant harm where necessary. No lighting is proposed other than for a short duration during the construction phase.

10.342 The objectives of policy ENV 1 have been fully considered and are met by the addition of the long-term reversion of the arable to grassland, reduced intensity of the use of the land, the addition of the new hedges, rowan trees tree lines and the letting up of existing hedges. These landscape maintenance and enhancement details will be set within the Landscape and Ecological Management Plan that will be delivered in detail as a pre-commencement condition study.

REFERENCES

Please refer to **Appendix 10.1, Volume 2b**.

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CHAPTER 11 - AVOIDANCE AND MITIGATION

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AVOIDANCE AND MITIGATION SUMMARY TABLE

11.1 The following tables provide a summary of the measures applied to the proposed Six Oaks Renewable Energy Park to avoid or mitigate identified effects.

11.2 For each environmental assessment undertaken within the EIA there is a summary of:

- avoidance measures (**Table 11.1 on page 212**) (with brief commentary additional to the text in the chapter provided for clarity where viewed of assistance in square brackets "[...]");
- mitigation measures (**Table 11.2 on page 217**); and
- enhancement measures (**Table 11.3 on page 223)**.

11.3 **Chapter 11** goes on to summarise the residual effects of the development.

Table 11.1 - *Proposed Avoidance Measures*

Chapter	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 3 - Site Selection and Design	Direct impact upon designated assets.	There are no national historic, ecological or landscape designations within the site boundary. [Designations within the site have been avoided.]	3.29
	Flood risk.	The Environment Agency Flood Map for Planning shows that the proposed site is within Flood Zone 1. [Impacts on flood risk have been avoided.]	3.40
	Potential for direct impact on designated heritage assets.	There are no Scheduled Monuments, World Heritage Sites, Registered Battlefields or Registered Parks and Gardens within the site. There are no listed buildings within the site area. [Impacts on designations within the site have been avoided.]	3.42-3.43
	Long term impacts on farm land.	Modular units with minimal concrete foundations permit complete removal at the end of the development's life with the site returning to agricultural use. [Long term impacts on farmland have been avoided.]	3.53
	Vegetation loss	Existing farm tracks, field entrances and breaks in hedgerows will be used for the internal site track design to minimise potential environmental impact. [Vegetation loss is avoided.]	3.63
Chapter 5 - Agricultural Land Classification	Use of best and most versatile agricultural land.	The Six Oaks Renewable Energy Park would be located on grade 3 land, 15% grade 3a and 85% grade 3b. The temporary impact the Six Oaks Renewable Energy Park will have on Best and Most Versatile (BMV) agricultural land (ALC grades 1, 2 and 3a) is very limited.	5.12
Chapter 7 - Development Proposal	Habitat disturbance.	The proposed development will be accessed from Wilbraham Road, using existing farm entrances and farm tracks, crossing the Heath Road Byway Open to all Traffic (BOAT). This access point and tracks already take agricultural vehicles and therefore Heavy Goods Vehicles (HGVs). [New hedgebreaks and unnecessary impacts to other agricultural fields are avoided.]	7.11

Chapter	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 7 - Development Proposal (continued)	Flood risk	The track will be permeable and no formal drainage is proposed. Water drainage off the track has also been considered in the track design and layout, and is assessed in the Flood Risk Assessment that accompanies the application.	7.15
	Landscape and visual impact and ongoing land management.	Cables between solar panels in the same row are hung in ducts fixed along the back of panels to the end of the row. All connection cables will be run across the site in underground cable trenches. [Visual impacts from cables mounted overhead are avoided.]	7.24 7.25
	Landscape and visual impact and potential impact on ecological receptors.	A perimeter fence would be installed to protect the panels from theft. The fence will be stock style fencing with wooden posts and open wire mesh up to 1.8m tall. [Panel, cable and equipment damage and theft is avoided.] A 15cm gap at the base of the fence would allow the passage of small animals. Access points for wildlife will be included in the fence line to ensure permeability across habitat. [Restriction of movement of small mammals is avoided.]	7.26 - 6.27
	Landscape and visual impact and potential impact on ecological receptors.	No visible lighting is proposed as part of the Six Oaks Renewable Energy Park for the operational period. Lighting associated with CCTV Cameras will be infrared and not visible to the naked eye. [Potential for light pollution is avoided.]	7.29
Chapter 8 - Construction, Operation and Decommissioning	Increase in traffic during operation	The use of remote monitoring reduces the number of site visits required. [Traffic impacts during operation are avoided.]	8.30
	Impacts upon geology and soils	Potential impacts on geology and soils from the construction of the civil works associated with the renewable energy park (the solar panels and frames, inverter/transformer units and other site containers, foundations, and access track) are avoided through considered design of these elements and in the design of the site layout.	8.59

Chapter	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 8 - Construction, Operation and Decommissioning (continued)	Sourcing and volume of construction materials required	Locally sourced construction materials will be used in construction works as far as possible. The volumes of all footings and foundations are inherently designed to minimise the volumes of stone and concrete required within safe engineering margins. [Both measures avoid importing large volumes of material from a distance.]	8.60 - 8.61
	Surface water drainage at the site entrance	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. [This avoids pollution events.]	8.64
	Degradation of soils	The soils and materials excavated during the construction and decommissioning phases of the Proposal will be stored in accordance with The Site Waste Management Plans Regulations, 2008 (Act of Parliament) [This avoids damage and degradation of stored soils.]	7.67
		Wastes arising will be used wherever possible in the reinstatement of the site. Any excess stored material will be disposed of off-site in full accordance with Environment Agency guidance to minimise the risk of pollution and degradation of habitats. Waste handling procedures will be detailed in a Site Waste Management Plan to be agreed with East Cambridgeshire District Council.	8.67
	Construction personnel injury	All site work for the Six Oaks Renewable Energy Park would comply with the Construction (Design and Management) Regulations 2007, and its associated approved code of practice (HSE, 2007). A transparent reporting process will be in place to monitor on-site safety and potential risks to health. [This avoids injury to construction personnel.]	8.69 - 8.73

Chapter	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 8 - Construction, Operation and Decommissioning (continued)	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 renewable energy park development will be used and disposed of responsibly off site, in accordance with manufacturer's guidance and regulations governing use of the material. Materials with potential to be classified as hazardous are most likely to be coolants, oils, fuels and lubricants. 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. Any hazardous materials stored on site during construction or decommissioning will be stored securely and in accordance to regulations and manufacturer/supplier's guidelines. No hazardous materials will be stored on site during the operational phase of the Proposal. [These measures avoid pollution events and consequential injury to construction personnel.]	8.74 - 8.77
Chapter 9 - Ecology	Habitat change and disturbance	Buffers to the development have been applied to avoid the more ecologically sensitive habitats within the site. This included: • Minimum 30m buffer from any badger setts. • Minimum 5m buffer from all hedgerows. Potential adverse effects on the Heath Road/Street Way Green Lanes CWS have been avoided though site design. The site has also been designed to minimise any loss of hedgerow by using existing breaks and farm tracks, and avoid any tree felling/ damage. There would be no new watercourse crossings.	9.90 - 9.92

Chapter	Potential Impact	Avoidance Measure	Paragraph Reference
Chapter 10 - LVIA	Landscape Character and Visual Effects	The consideration of potential long-term landscape character and visual effects has formed an integral role in the design of the proposed development. The site was visited by Anne Priscott the consultant landscape architect in spring 2022 and constraints and opportunities mapped and discussed with the client team. A number of the suggestions and proposed landscape and visual enhancements were taken on board.	10.61 - 10.62
	Landscape Character and Visual Effects	The proposed development would retain all of the existing tree and hedgerow field boundaries around the site, apart from a 5m section of hedgerow where the access crosses Heath Road to the site, with built development confined to field parcels to ensure the proposed development is well integrated into the landscape, within the context of the existing good levels of inherent screening from the north, east and west. Careful consideration has been given to the access tracks, initially proposed to be located along the public right of way on Heath Road, now proposed along the existing farm tracks. Heath Road will need to be crossed by construction traffic, but this should not harm the use of the public right of way by walkers, riders or cyclists. The number of crossings has been kept to a minimum. A single crossing of Heath Road is needed, and only 2 field boundary breaches are required to this route. The location and width of the access tracks along this corridor has been minimised as far as possible to retain the landscape structure and habitat connectivity and appreciation of the local landscape by users of Heath Road.	10.64 - 10.65

Table 11.2 - *Proposed Mitigation Measures*

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 3 - Site Selection and Design	Visual impact of access	Where sections of new, upgraded or widened access track are required this will have the appearance of typical vernacular farm tracks with a crushed stone running surface grassed over in time.	3.65
	Disturbance to users on Public Rights of Way	Public Rights of Way (PROWs) were avoided by the on-site access tracks as far as possible. Advanced notifications and safety measures such as banksmen will be deployed, when necessary, during construction crossing the restricted byway along the southern boundary of the substation and BESS compound.	3.67
	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.	3.71
Chapter 7 - Development Proposal	Landscape and visual impact of site infrastructure e.g. transformers and site containers.	The external finish will be agreed with the Local Planning Authority prior to construction commencing.	7.20, 7.22, 7.47
	Landscape and visual impact and potential impact on ecological receptors.	During the construction phase, temporary lighting may be required should deliveries be scheduled for after dusk, and security lighting on a sensor is typically utilised for the construction phase whilst machinery and materials are stored on site. Any lighting on site during the construction phase will be kept to a minimum to avoid disturbance to local residents and ecological species as far as practically possible whilst operating a safe site.	7.30

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 8 - Construction, Operation and Decommissioning	Landscape and visual impact.	Where new access tracks are required these will have a running width of typically 4m. As described in Chapter 7 - 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.	8.11
	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 SIx Oaks Renewable Energy Park.	8.58
Chapter 9 - Ecology	Habitat change and disturbance. - Breeding birds.	Four species specially protected under Schedule 1 of the Wildlife and Countryside Act from disturbance during breeding were found during the 2020 surveys (quail, ed kite, hobby and common crossbill), and given the habitat present it is possible that species such as barn owl and peregrine could breed there in the future. It would be important to ensure that no Schedule 1 species are disturbed during the breeding season, particularly during the construction phase of the development. Given the potential to breed within the solar farm site, a Breeding Bird Protection Plan (BBPP) should be developed and implemented. This should include further surveys for Schedule 1 species at fortnightly intervals through the breeding season (March-August) during the construction period to inform the BBPP and ensure compliance with the 1981 Wildlife and Countryside Act.	9.93

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 9 - Ecology (continued)	Habitat change and disturbance. - Breeding birds (continued)	The BBPP should also include measures to ensure the protection of all other nesting birds. Where works affecting habitats that could be used by nesting birds must take place between March and August (inclusive), they should only be carried out following an on-site check for nesting birds by an experienced ecologist, to ensure compliance with the 1981 Wildlife and Countryside Act. It is likely that some breeding birds will be displaced from the site during the operational phase by the presence of the solar panels, particularly open ground species such as grey partridge, skylark, and yellow wagtail. All these species are NERC Act Species of Principal Importance. Measures to deliver benefit for these species have been included as part of the BLMP	9.94 - 9.95
Chapter 9 - Ecology (continued)	Habitat change and disturbance. - Other protected species.	No other protected species are likely to be affected by the development given the results from the ecological surveys, but badgers could move into the impact zone, and for which, therefore, check surveys should be undertaken prior to construction (to inform the need for any mitigation measures). Pre-construction surveys for badgers will therefore be undertaken within 30m of the development footprint. If they were found to be present where they could be affected by the construction works, then further consultation would be needed with Natural England to determine the licensing and mitigation requirement. Best practice construction methods will be followed such as clearing all refuse piles daily, covering nightly or providing exit ramps to any excavations and minimising on site noise.	9.96 - 9.97

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 10 - LVIA	Visual impact of construction and decommissioning	The visual effects of the various aspects of the construction phase will be temporary and intermittent and will be minimised by the short construction programme.	10.81
	Visual impact of operation	The proposals also include for landscape enhancement and mitigation through the creation of new hedgerows, new hedgerow tree planting, a new rowan tree planting area, scrub management and whole-site arable reversion to grassland and the creation of areas of species diverse grassland with wild flowers.	10.77
		During the operational period the landscape character of the site will gradually change through the gradual letting up of the hedges by approximately 1m, the addition of the proposed new hedges, tree planting both within hedges and as stand-alone features and the reversion of the arable parts of the farmland to pasture and low-intensity grassland. The letting up of the hedges will have the greatest impact on limiting the visibility of the solar arrays.	10.84
	Landscape and visual impacts	The following measures will be included to minimise any impacts to features of landscape and ecological interest and ensure that there would be no net loss of biodiversity and connectivity. The following are recommended: • Hedgerows – From the date permission is granted, hedges are to be let up by approximately 25cm per year to an overall increase in height of 1m. By gradually letting the hedges up the resultant hedge will be dense without a single line of woody knots. Once the development has been constructed, the existing hedges around the site should be maintained at this new height. There will be some hedge management including the removal of any dead or poor sections that have been smothered by brambles on the boundaries of the site and the removal of some overhanging limbs;	10.183

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 10 - LVIA (continued)	Landscape and visual impacts	• Woody shrubs and hedge gapping - Once constructed, gaps at site boundaries or areas of landscape screening should be planted with native species to create the effect of hedgerows or semi-natural scrub cover (70-75% Hawthorn (Crataegus monogyna), 25-30% Field Maple (Acer campestre), Hazel (Corylus avellana), Blackthorn (Prunus spinosa) with occasional Purging Blackthorn (Rhamnus cathartica); • Ditches - All ditches in the context of the site are to be maintained in rotation as part of the management plan; • Breeding birds – Clearance of any scrub should be undertaken outside of the nesting season (the breeding season is typically from end of February to end of August); • Species diverse permanent grassland - Grassland within the site should be seeded and maintained to encourage the development of a species diverse and flower-rich habitat over time. This could be achieved through sowing with an appropriate wildflower mix on the margins and permanent grassland with a shade tolerant mix on the main part of the site, allowing growth over the summer months before cutting and potential aftermath grazing with sheep; • Reptiles - Areas of buried rubble should be maintained if at all possible. If this is not possible, they should be removed by hand at a suitable time of year (i.e. outside the hibernation period) to avoid any incidental injury or mortality to reptiles. Reptile hibernacula, such as small piles of stones, piles of wood, should be created along the site boundaries.	10.183

Chapter	Potential Impact	Mitigation Measure	Paragraph Reference
Chapter 10 - LVIA (continued)	Landscape and visual impacts	The proposed solar scheme would provide an opportunity to create an area of species diverse grassland extending across the site. The arrangement and spacing of the solar panels, together with the majority of the panel area having over 0.9m clearance and 3m gaps between the rows mean that grass can be grown beneath. A chalk grassland seed mix incorporating shade tolerant species would establish and provide habitat for a range of protected species.	10.183

Table 11.3 - *Proposed Enhancement Measures*

Reference	Enhancement	Paragraph Reference
Chapter 5 - Agricultural Land Classification	Over the lifetime of the project due to a combination of wildflower meadow and species rich grassland sown below and between the panels, chosen specifically to compliment the local ecology and boost biodiversity, soil health can recover (Defra, 2009).	5.8
Chapter 9 - Ecology	Restoration of lowland species-rich grassland – most of the site is currently arable farmland of low diversity and low ecological value. This will be restored to grassland habitat, will be managed after construction of the renewable energy park by sustainable grazing (or cutting) and to promote the re-establishment of a diverse meadow community, with abundant wildflowers to provide food for pollinators. An area of 76ha. of arable farmland will be enhanced to deliver a more biodiverse neutral grassland wildflower meadow. This will be located under and around the proposed solar panel land within the site. Native hedgerow planting – 1.1km of new native hedgerow will be planted and a further 2.5km of existing hedgerow restored to native species-rich hedgerow. Native tree planting – a line of Rowan will be planted in the south-east corner of the site. Further details of these measures are provided in the Biodiversity Landscaping Management Plan (BLMP).	9.100
	Ongoing management of the grassland will be carried out primarily by grazing stock (sheep). Levels of grazing will be varied through the year to optimise the wildflower meadow diversity, adopting the following regime (though to be refined as the restored grassland becomes established, informed by the monitoring programme): • No grazing March-June; • Heavier grazing (5-10 sheep per ha) July – October; and • Grazing continued at a lower level (3-5 sheep/ha) through the winter (October – February) unless ground conditions too wet (in which case no grazing over-winter). If grazing with sheep were not possible, then an alternative cutting regime would be implemented to achieve a similar effect on the vegetation, with a single cut per year, in August/September.	9.102
	An area of grassland will be set aside for ground nesting birds.	9.104
	Wood piles would be provided for invertebrates.	9.105

Reference	Enhancement	Paragraph Reference
Chapter 9 - Ecology (Continued)	With regard to ongoing management of the new hedgerows, the hedges will be trimmed annually (between January and March) in the first three years after planting to encourage bush growth. Thereafter it will be trimmed once every three years. A target 3m height and 2m width will be maintained through lifetime of the renewable energy park.	9.106
	A range of bird and bat boxes will be installed to improve the availability of nesting and roosting resources, all to be manufactured from high quality long-lasting material such as 'Woodcrete'. This will include: • Barn owl box – one to be erected at a secure location within the site (specific location confidential to avoid disturbance to this species which is specially protected from disturbance under Schedule 1 of the 1981 Wildlife and Countryside Act). • Songbird nest boxes – 20 boxes of mixed type (5 x small hole for tits, 5 x larger hole for sparrows, 5 x larger boxes for starlings and 5 x open-fronted boxes for flycatchers/ robins/thrushes). These will be erected within woodland patches and on trees within the existing hedgerows/field boundaries. • Bat boxes – 10 boxes – same locations as songbird nest boxes.	9.107
Chapter 10 - LVIA	Landscape enhancement is at the heart of the design, with the intention being for the landscape to be in better condition at the end of the 40 year development than it is currently. The elements of enhancement proposed include meaningful green infrastructure (GI) enhancements that provide both ecological connectivity, enhanced landscape features and an enhanced experience for users of the byways in the context of the site in a landscape where landscape features are infrequent. Hedge enhancement is a key aspect of delivering environmental gains in terms of landscape quality, wildlife potential and visual amenity gains. The mitigation also includes the bolstering of existing hedgerows where they are thin/gappy and change in management of all existing hedgerows to enable them to be increased in height by 25cm for four years to establish early in the scheme enhanced visual screening and biodiversity gains. Substantial areas of species diverse grassland are also proposed, extending throughout the site.	10.166 - 10.168

CHAPTER 12 - RESIDUAL IMPACTS

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RESIDUAL IMPACTS

12.1 The following table (**Table 12.1 on page 228**) provides a summary of the residual impacts of the proposed Six Oaks Renewable Energy Park, for each chapter within the EIA.

Table 12.1 - *Residual Impacts*

Chapter	Residual Impact
Chapter 5 - Agricultural Land Classification	The Six Oaks Renewable Energy Park has been designed to avoid impacting upon Grade 2 agricultural land. Only 15% of the development is located on Grade 3A agricultural land, which is in two areas on otherwise Grade 3B agricultural land. Therefore, the impact upon 'Best and Most Versatile' land is very limited. Owing to the beneficial impact of soil health recovery from the temporary fallow period, the de minimise loss of farmed land (alone and cumulatively with other development), and the temporary nature of the impact, the Six Oaks Renewable Energy Park would not have a significant impact upon agricultural production in Cambridgeshire or the rest of England.
Chapter 8 - Construction, Operation and Decommissioning	It is envisaged that the proposed Six Oaks Renewable Energy Park will take around nine months to construct, with multiple teams working in different areas of the site simultaneously. The site is remotely monitored and operated with an automated system alerting an engineer in case of component or system errors or component failures. During normal operations, personnel will visit the site approximately once a month, in a light van or four-wheel drive vehicle.
Chapter 8 - Construction, Operation and Decommissioning Generation	It has been predicted that the proposed solar farm will generate an annual average of approximately 48 700 000kWh (net) of electricity (to 3 S.F.). This would offset the equivalent annual electricity needs of approximately 10 700 East Cambridgeshire homes (based on average domestic consumption per household of 4 540kWh p.a., (DBEIS 2022)), all figures to 3 S.F. The electricity produced by the Six Oaks Renewable Energy Park will offset approximately 9 430 000kgCO2/annum or 9 430 tonnes CO2 per annum (to 3 S.F.). This can be considered a conservative estimate of the carbon dioxide offset by the Six Oaks Renewable Energy Park. This project therefore provides a material contribution to the net zero target by 2050 at both National (through the Climate Change Act) and Local level. The renewable energy and energy storage provided by the Proposal demonstrates supportive action to the 'Climate Emergency' East Cambridgeshire District Council declared in October 2019.
Chapter 9 - Ecology	The proposed development would not have any effect upon statutory protected nature conservation sites, however would result in a non-significant adverse impact to arable farmland habitat and native species-poor hedgerow. Following the implementation of mitigation measures (in the form of a Breeding Bird Protection Plan, pre-construction survey checks for badgers and a Biodiversity Management Plan), there would be no significant residual adverse ecological effects. There would be a gain of 101 habitat units (66% increase) and a gain of 3 hedgerow units (increase of 2%).

Chapter	Residual Impact
Chapter 10 - LVIA Landscape Fabric and Character	On completion, the effects of developing the proposal on the landscape fabric and landscape character would be moderate/ moderate to substantial and adverse and not significant. Following the establishment of the mitigation and landscape enhancements set out in the Landscape and Ecological Management Plan, some of the changes to the landscape would become beneficial, with the letting up of the hedges over the first four years and reversion to potentially sheep-grazed grassland, or mown grassland, from arable bringing the greatest short-, and long-term landscape gains. The resulting long-term effect on the landscape character of the area is assessed as being slight to moderate / moderate and adverse, reducing slightly in the longer-term through the beneficial gains in terms of landscape condition.
Chapter 10 - LVIA: Visual	The development would have a substantial impact on a single adjacent byway (Heath Road), and moderate to substantial changes in view from a second section of the byway (Streetway) to the south of the site, and these impacts would be significant. There would also be a moderate to substantial adverse change in view from one section of the A11, which would also be significant. The mitigation identified through the bolstering of the existing hedgerow vegetation during years 1-4 would enhance the experience of the landscape but would not reduce the impact to medium to high because the increased hedge height would not conceal views of the panels on the higher land in the middle distance. The viewer is of high sensitivity to this type of change. The effects will therefore be substantial, and significant. By years 10-15 the hedges should be sufficiently established to have a beneficial landscape change, but unlikely to drop the magnitude to below the threshold of significance. The addition of the proposed Renewable Energy Park in a few middle-distance publicly afforded linear route views in the landscape would not adversely alter the appreciation of the viewer of the view. There would be no significant impacts more broadly on the landscape character or views in the local area.
Chapter 10 - LVIA: Cumulative	No significant cumulative landscape or visual effects have been identified.

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CHAPTER 13 - GLOSSARY AND ACRONYMS

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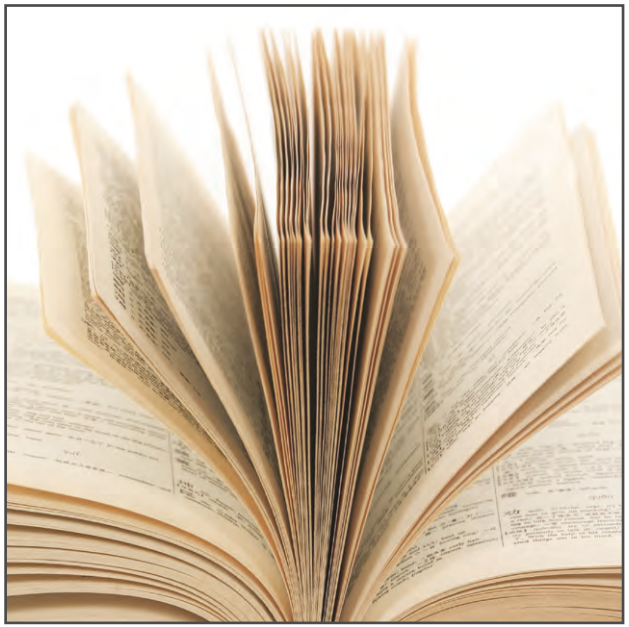

INTRODUCTION

13.1 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
ATC	Automatic Traffic Count
BAP	Biodiversity Action Plan
BESS	Battery Energy Storage System
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
DC	Direct Current
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
FRA	Flood Risk Assessment
GLVIA	Guidelines for LVIA
GRP	Glass Reinforced Plastic
GSP	Grid Supply Point
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
MW	Megawatt
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. 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
Birds of Conservation Concern	The BTO (2002) lists Birds of Conservation Concern (BoCC), which fall into three categories: •Red list (species of high concern); •Amber list (species of medium concern); and •Green list (species of lower concern). 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: Changes to the physical fabric of the landscape; Changes to landscape character; and 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: 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); 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 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 the distribution and movement of water, as well as the impact of human activity on water availability, flows and conditions.
Hydrology	The prediction of rainfall and surface water flows.
Indirect Impacts	Impacts on the environment, which are not a direct result of the development but are often produced away from it or as a result of a complex pathway. Sometimes referred to as secondary impacts. (LI/IEMA 2002).
Intervisibility	Inter-visibility is the visibility between two points. Two points on the ground or two features are described as 'intervisible' when they are visible from each other.
Intra-visibility	Intra-visibility is when two points can be seen/experienced from a third point (in many cases, this is more important 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: •Physical elements – e.g. geology, landform, soils, flora and fauna; •Social elements – e.g. land use, enclosure patterns, and the patterns, form and scale of settlements and other built development; •Aesthetic factors – e.g. colour, form, visual texture and pattern, sounds, smells and touch; and •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 seeks to reduce an impact.

Term	Definition
Natural Areas	Natural Areas have been formally defined as 'biogeographic zones which reflect the geological foundation, the natural systems and processes and the wildlife in different parts of England, and provide a framework for setting objectives for nature conservation' (Biodiversity: The UK Steering Group Report, HMSO, 1995).
Overbearing (with regard to landscape assessments)	Where one or more proposed 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:* 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. 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. 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. 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. 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: No symbol – land open to public with permission of owners. White oak leaf in purple box – National Trust, always open. Purple oak leaf in white box – National Trust limited access. Tree symbols in purple box – Forestry Commission. Single leaf in purple box – Woodland Trust. White 'AL' in purple box – other access land. 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. Theoretically, it is possible for a development(s) to result in a significant change in the view from a particular location without resulting in a significant effect on visual amenity, if the location is not accessible to receptors or the view is acknowledged as having limited value.
Visual Receptor(s)	An individual observer or group of observers who are capable of experiencing a change in the view, for example resident, road user, or public right of way user.
Visualisation	A computer-generated wireframe, photomontage or other technique used to illustrate the location, scale and/or appearance of a proposed development(s). (See definitions for wireframes and photomontages and also later in this appendix for more details).
Wireframe	A computer generated view of the terrain and proposed development from a specified viewpoint location. As with ZTVs (see below), wireframes are usually based on the bare-ground DTM only and do not show movement or the screening effects of surface features.
Zone of Theoretical Visibility (ZTV)	A computer generated intervisibility map showing the zones within which a proposed development may be visible. Most ZTVs for solar farms are based on bare-ground digital terrain models (DTMs) and use viewpoint markers at the height of the panels distributed across the site as the targets. ZTVs do not take into account the screening effects of surface features (e.g. walls, trees, buildings, etc.). The intervisibility map may also indicate the proportion of a site that may be visible through varied shading. Cumulative ZTVs for solar farms are ZTVs as above, but show the zones where one or more solar farms may be visible.

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