THREE OAKS RENEWABLE ENERGY PARK

Environmental Report

PREPARED ON BEHALF OF

Three Oaks Renewable Energy Park Limited

AUGUST 2022

engena

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INTRODUCTION

1 This document, and accompanying figures, form the environmental information supporting a full planning application for the proposed Three Oaks Renewable Energy Park consisting of a solar array and Battery Energy Storage System (BESS), submitted to East Riding of Yorkshire Council ('the Council'), on farmland to the north/north-west of Haisthorpe and north-east of Thornholme ('the Site'). The proposed location of the Site is shown in **Figure 1**.

2 Included in this document are:

- an introduction and description of the proposed development;
- a review of renewable energy in the UK and planning policy context;
- a Design and Access Statement;
- a description of the EIA screening of the project;
- a summary of the findings of the assessments;
- an impacts summary table;
- appendices (providing all assessments and figures in full); and
- figures (provided in A3 format).

3 A separate Planning Statement is also provided, which sets out and reviews the application against national and local planning policy context.

Project Overview

4 The proposed project, north-east of Thornholme, includes:

- an array of ground-mounted solar panels and ancillary infrastructure including inverters (mounted behind the panels), transformer units, electrical infrastructure, switch gear and substation, and temporary construction compounds; and
- a Battery Energy Storage System (BESS) including battery units mounted on skids, power conversion and transformer units.

5 The extent of the Site is identified in **Plate 1 on page 3** and **Figure 1**.

6 It is anticipated that the proposed development would be generating electricity for a period of forty (40) years.

7 The proposed solar farm would have an installed AC capacity of up to 39MW. The panels would be ground-mounted to a maximum height above ground of 3.0m.

8 The BESS would be rated at up to 78MWh and would therefore be capable of providing a 39MW output over a 2 hour period.

9 It is estimated that the solar farm will have an annual yield of approximately 34 700MWh (to 3 significant figures (3 S.F.).

10 In terms of household electricity usage, this would be sufficient to offset the equivalent annual energy needs of 8 620 (3 S.F.) average East Riding of Yorkshire homes (based on average

domestic consumption per household of 4 020kWh (DBEIS, 2021)).

11 From the displacement of electricity generated from fossil fuels, the proposed development would offset the emission of a significant quantity of pollutants, particularly carbon dioxide, into the atmosphere. This reduction in emissions would contribute to the national legislation of achieving zero net carbon emissions by 2050 under the legally binding obligations of the Climate Change Act 2008 and international reductions required under the international Paris Agreement 2016. It also contributes to the reduction of emissions in East Riding of Yorkshire as required through the Council's declaration of a Climate Emergency.

12 Electricity generated using a solar system varies throughout daytime hours according to changes in irradiance (or light levels). The BESS will therefore complement this generation.

13 The battery serves a number of purposes, including stabilising the generation as well as operating independently of the solar farm to provide energy during times of peak demand or system frequency instability.

The Applicant

14 The Applicant is Three Oaks Renewable Energy Park Ltd, a project company owned by Ridge Clean Energy Ltd, a well-funded, UK-based clean energy company whose team have developed, constructed and operated clean energy projects in the UK since 2003.

15 Engena Limited is an independent planning consultancy which has over 1GW of development experience in the renewable energy industry, specialising in project planning, development management and Environmental Impact Assessment (EIA).

SITE LOCATION

16 The proposed development would be located approximately 300m to the north/north-west of the village of Haisthorpe, as shown at **Plate 1 on page 3** and **Figure 1**.

17 The Site lies across two Parish Councils: Carnaby Parish on the eastern half of the Site, and the Parish of Burton Agnes on the western section. The proposed development is located wholly in the jurisdiction of East Riding of Yorkshire Council.

18 In addition to Haisthorpe, the nearest settlements to the Site include: Thornholme, approximately 1.0km south-west; Burton Agnes, approximately 2.0km south-west; Carnaby, approximately 2.0km east; and Rudston, approximately 2.5km north-west.

19 Dispersed dwellings and farms are situated alongside the minor roads and in the farmland surrounding the Site. The nearest residential dwellings and farm buildings along West Back Side are located approximately 125m south/ south-east of the proposed Site.

20 Visual receptors, including nearby residential dwellings, are considered in the Landscape and Visual Appraisal from **Paragraph 225 on page 42**.

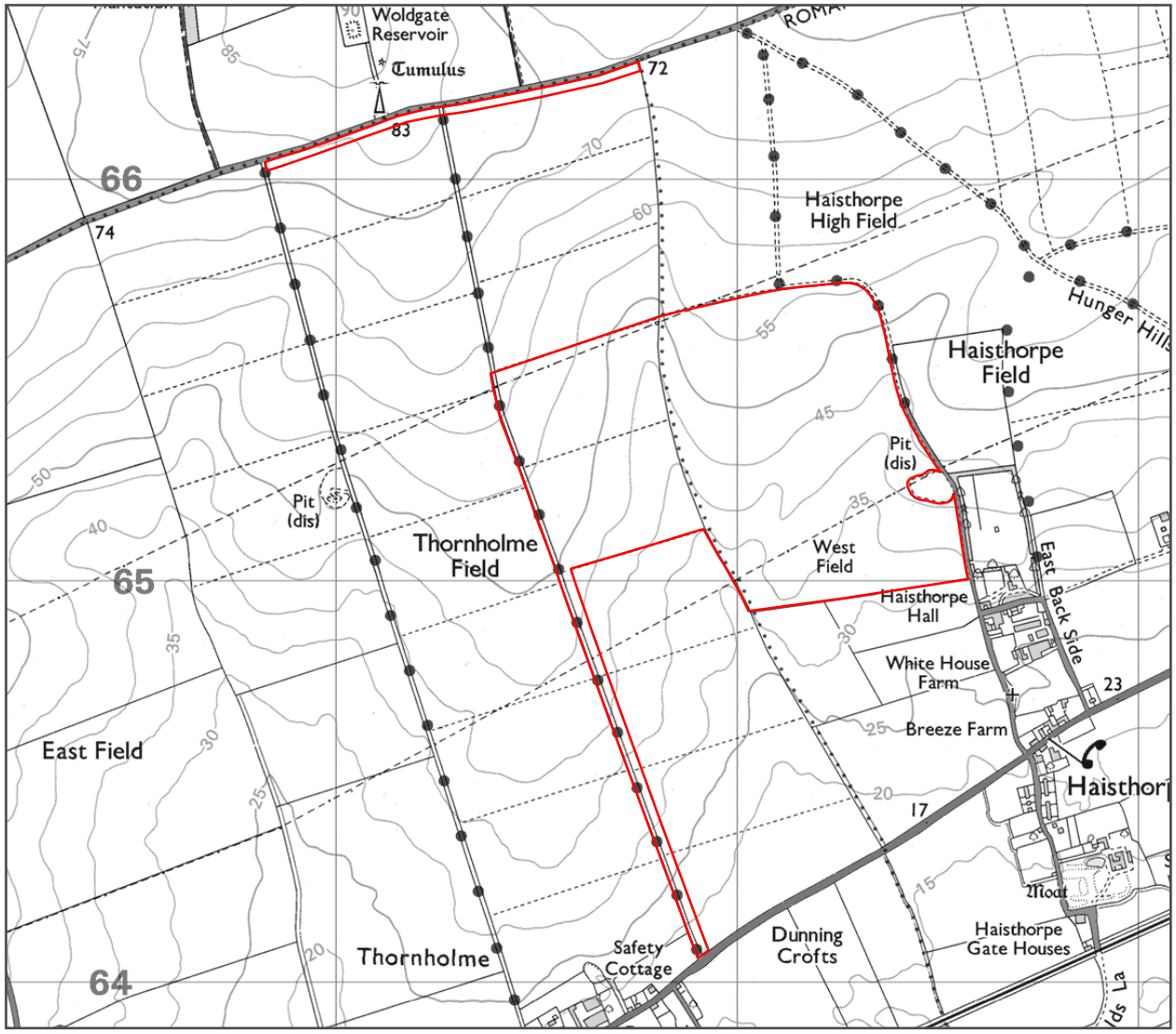


Plate 1 - *Site Location (red line denotes Three Oaks Renewable Energy Park application boundary)*

Highways and Public Rights of Way

21 The A614 runs in an east-west direction to the south of the proposed Site. The Woldgate Roman Road is to the north of the Site.

22 The eastern boundary of the Site follows the West Back Side road heading north from Haisthorpe. The western boundary of the Site follows a minor road (Unique Street Reference Number [USRN]: 45908633) which heads north from Thornholme.

23 Other public highways local to the Site include Rudston Road, approximately 1.4km west, and Church Lane, approximately 1.2km east at the closest point.

24 Access to the Site is achieved via an existing field entrance from the A614 Main Road. The traffic and access matters associated with the proposed development are discussed further from **Paragraph 168 on page 35**.

25 There are no public footpaths crossing the Site. Two restricted byways follow the eastern and western boundaries of the Site, along West Back Side and the unnamed road opposite Dunning Croft, Thornholme (USRN: 45908633), respectively. These Public Rights of Way (PROWs) are bordered by hedgerows on both sides, providing good screening.

26 Other Public Rights of Way are located in the wider area. The Blackpool to Bridlington (Aerospace Way) long distance route follows the Woldgate Roman Road, to the north of the Site. These will be discussed further within the Landscape and Visual Appraisal, **Appendix 6**.

27 Mitigation measures are proposed to minimise impacts to users of the PROWs during the construction phase, as discussed further from **Paragraph 197 on page 40**.

Environmental Baseline

28 The Site is predominantly arable farmland comprising of four medium sized fields. The land slopes southward, with the areas of highest ground (c. 59m Above Ordnance Datum [AOD]) located in the Site's north-western corner, and the lowest ground (c. 30m AOD) along the southern edge of the Site.

29 There are some field boundary hedgerows present in the proposed development area and surrounding fields. Additionally, a well-established treeline borders the West Back Side road along the south-eastern section of the Site.

30 The proposed development is located in a largely rural setting. Existing electricity infrastructure is present within the Site. It comprises two 66kV overhead electricity distribution lines carried on wooden poles: one line crosses the Site in an east-west direction across the southern fields, and the other follows the northern boundary of the Site. A selection of photographs to set the context of the site is shown in **Plate 2 on page 5**.

31 The British Geological Survey (BGS) (2022a) geology records show the Site is underlaid by Flamborough Chalk Formation - Chalk; sedimentary bedrock formed approximately 72 to 86 million years ago in the Cretaceous Period. Superficial deposits at the Site comprise Till, Devensian - Diamicton for all but its north-eastern quarter, where no superficial deposits are mapped. These superficial deposits were formed up to 2 million years ago in the Quaternary Period.

View WSW from Woldgate (512719, 466637)

Looking SE across site from Eastern Green Lane (511298, 465964)

View NW from West Back Side, Haisthorpe (512672, 464747)

View SE from Bridleway at South Side Mount (510632, 466334)

Looking NE from Western Green Lane (511416,464037)

View ESE from junction at Woldgate and Rudston Road (509915, 466581)

Plate 2 - *Site Photographs*

32 Soils at the Site consist of deep 'Glacial Till' with a 'clayey loam, chalky' texture (BGS, 2022b). According to Soilscapes, the Cranfield Soil and Agrifood Institute sponsored by DEFRA, soils at the Site are Type 7, which have high fertility and are described as *'freely draining, slightly acid but base-rich soils' (Soilscapes, 2022).*

33 A detailed survey of the soils across the Site has been undertaken to ascertain the land quality on the site, as described further from **Paragraph 35 on page 6**.

Agricultural Land Classification

34 Paragraph 174 of The National Planning Policy Framework (NPPF, 2021) states that planning policies and decisions should contribute to and enhance the natural local environment by recognising the '*economic and other benefits of the best and most versatile agricultural land [...]*'.

35 At Annex 2 of the NPPF, '*best and most versatile agricultural land*' is defined as '*land in grades 1, 2 and 3a of the Agricultural Land Classification*'.

36 Under the Natural England Agricultural Land Classification (provisional for England) the Site (and surrounding area north of the A614 Main Road) is classed as Grade 2 farmland.

37 To investigate the land grade further, a detailed soil resource and agricultural quality survey was carried out in April 2021 by Daniel Baird Soil Consultancy Limited. It was based on sample points at 100m intervals, giving a sampling density of one observation per hectare.

38 A copy of this report is provided in full at **Appendix 1 - Environmental Baseline**.

39 The soil survey and analysis identified two basic soil profiles within the Site:

- a deep and heavy textured soil with a subsoil that impedes drainage. Chalk is occasionally found at depth below this clayey subsoil. This land is limited to grade by soil wetness and workability; and
- a lighter textured soil profile which may be found directly over the chalk. This land is limited to grade by soil droughtiness, the strongest limitation (Grade 3b) being associated with the shallower soil.

40 Results of the detailed ALC survey of the Site show that Grade 3b land covers the majority of the site (69.6%). Grade 3a land (19.8%) is found on the higher ground to the north of the Site and in a band in the south-west. Two smaller pockets of Grade 2 land (10.6%)can be found on the eastern side of the landholding, but their use is limited by the adjacent Grade 3b land. The distribution of land grades across the site are shown in **Plate 3 on page 7**.

41 Solar farms on agricultural land do not result in any loss of agricultural land. Such land is still conserved for the future. This is confirmed by the National Planning Practice Guidance (PPG) (MHCLG, 2021) which states at Paragraph 13 (Reference ID: 5-013-20150327) 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.'

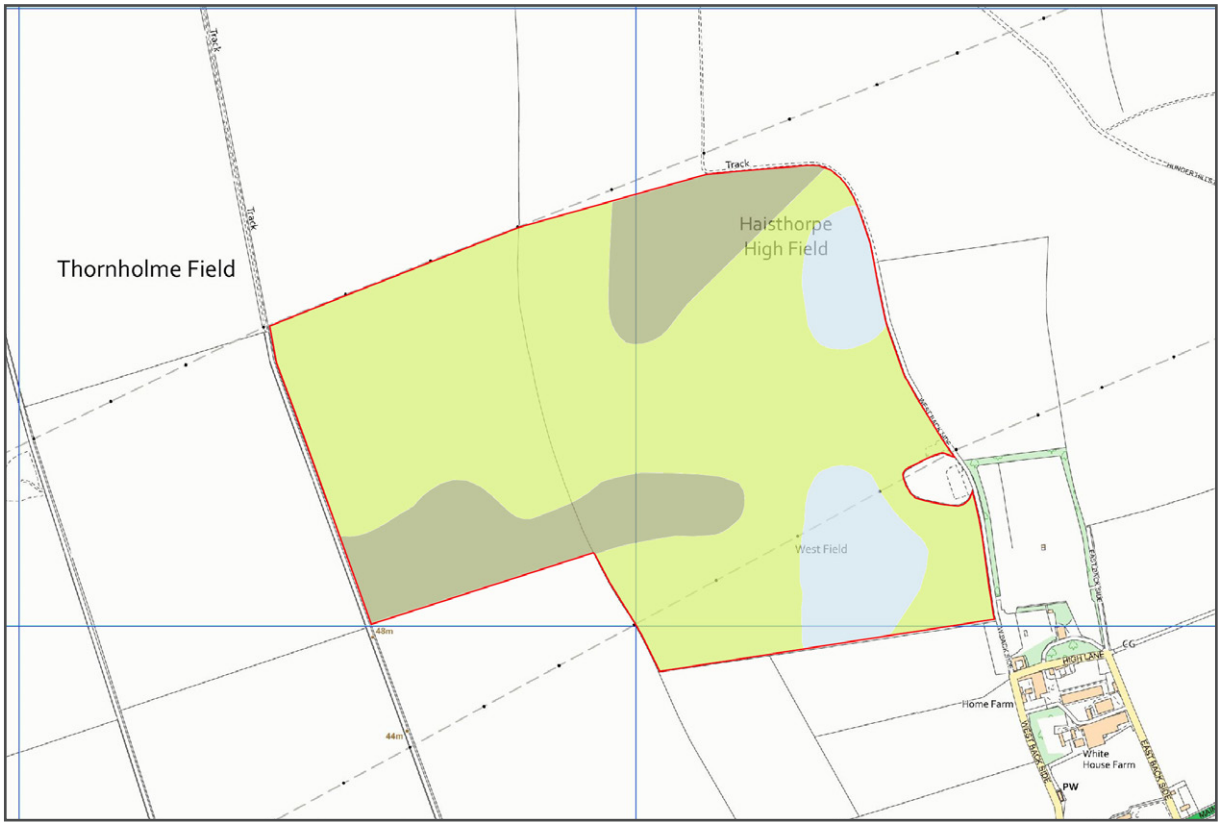
42 In addition it is possible to undertake some farming practices within the solar array itself (such as grazing, poultry or bee keeping), maintaining food production during the life of the solar farm.

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

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

44 The potential value of solar development to rest soils that have previously been under intensive production is increasingly recognised to give agricultural benefits. By not being ploughed, soil organic matter can recover to a higher equilibrium as the aeration from cultivation is the primary driver in soil organic matter decline. In turn the higher levels of organic matter produce a topsoil structure that is more robust - good for water infiltration, reducing erosion and runoff that is consequently good for downstream flood risk and water quality, fertility and seedbed preparation.

45 Further benefits of solar farms on open agricultural land are seen with ecological enhancements. Perennial grass roots get further into the subsoil, loosening this and improving both drainage and crop access to soil moisture. This also has further hydrological benefits.



Survey Area | Grade 3b | Grade 3a | Grade 2

Plate 3 - *Agricultural Land Quality as Determined by Soil Surveys*

46 As discussed further from **Paragraph 128 on page 21** the Climate Change Committee's Sixth Carbon Budget is clear that there should be a shift away from intensive agriculture and mass take up of low carbon energy supply, with agricultural land needed less for food and more for energy and biodiversity re-establishment.

Designations

47 In selecting the potential solar farm Site, the developer considered the proximity to designated sites within the locality. Data for these designations was obtained from the Multi-Agency Geographic Information for the Countryside (MAGIC) database. The search results for the study area are provided at **Appendix 1 - Environmental Baseline**.

48 There are no environmental designations in the site area.

49 The following designations can be found within 2km of the site boundary:

- one Site of Special Scientific Interest (SSSI): Boynton Willow Garth, a wet woodland area approximately 1.7km north-east of the site boundary.
- six Scheduled Monuments:
  - Sands Wood round barrow (c. 1.2km north/north-east);
  - South Side Mount round barrow (c. 1.2km north-west);
  - Earthwork on the Sheepwalk (c. 1.6km north-west);
  - Settlement site at Boynton Hall (c. 1.9km north);
  - Low Caythorpe deserted medieval village, manorial complex and fishponds (c. 1.9km north); and
  - Rudston Beacon and round barrows (c. 1.9km north-west).
- five Listed Buildings, comprising one Grade II* asset (Church of St John the Baptist, c. 2km east) and four Grade II assets. The nearest listed building to the potential site is Haisthorpe Hall (Grade II), which is approximately 120m to the south-east of the Site but is well screened by surrounding woodland.

50 The historic assets are considered further in the Cultural Heritage Assessment from **Paragraph 242 on page 45**. The ecological designations are considered further in the Ecology Assessment from **Paragraph 216 on page 42**.

51 There are no Areas of Outstanding Natural Beauty (AONB); National Nature Reserves (NNR); National Parks; Ramsar sites; Special Areas of Conservation (SAC); Special Protection Areas (SPA); Local Nature Reserves (LNR); World Heritage Sites; Registered Battlefields; Registered Parks and Gardens (RPG); or Green Belt within 2km of the potential site area.

Cumulative Impacts

52 As explored further in Appendix 6 - Landscape and Visual, no other sites, neither operational nor in planning, were proximate to the proposal. Cumulative impacts were not considered further other than within the LVIA where this baseline was established.

THE PROPOSAL

Site Layout

53 The proposed development will consist of solar panels that are ground mounted in rows facing approximately south, and ancillary infrastructure including inverters, transformers, grid connection cabling, a substation cabinet and a temporary construction compound. In addition, a Battery Energy Storage System (BESS) will be located near the Point of Connection, which will be to one of the 66kV overhead lines. The site layout is shown in **Plate 5 on page 10** and **Figure 2** (OS mapping) and **Figure 3** (Aerial Image).

54 The developer, Ridge Clean Energy, has followed a detailed site selection process that considered a range of environmental and technical constraints. The site design considerations are discussed further from **Paragraph 146 on page 23**.

Site Infrastructure

Solar Panels, Frames and Anchors

55 The array of ground-mounted solar photovoltaic panels will occupy a maximum area of approximately 163acres (65.8 ha), and have an installed capacity of up to 39MW.

56 The array is carefully designed to consider the specific ground conditions and to avoid shading from nearby features such as trees and hedges.

57 It is proposed that the rows of solar panels will run in an east/west orientation in order for the panels to tilt south to face the sun. A typical solar panel sizing is provided at **Figure 4** and the proposed row arrangement is shown in **Figure 5**. A typical solar array is shown in **Plate 4**.

Plate 4 - *Typical Solar Array and Panel Frames with Anchors*

58 The solar panels will be mounted at a fixed angle of approximately 20 to 25 degrees and will have maximum height of 3.0m, with a minimum clearance from the ground of 0.9m. This would allow safe sheep grazing under the panels.

59 A space between frames is provided for maintenance access and to avoid shading from neighbouring panels.

60 The panels are grouped in blocks (or 'tables') of 26 or 13 panels that are arranged in two rows in portrait format.

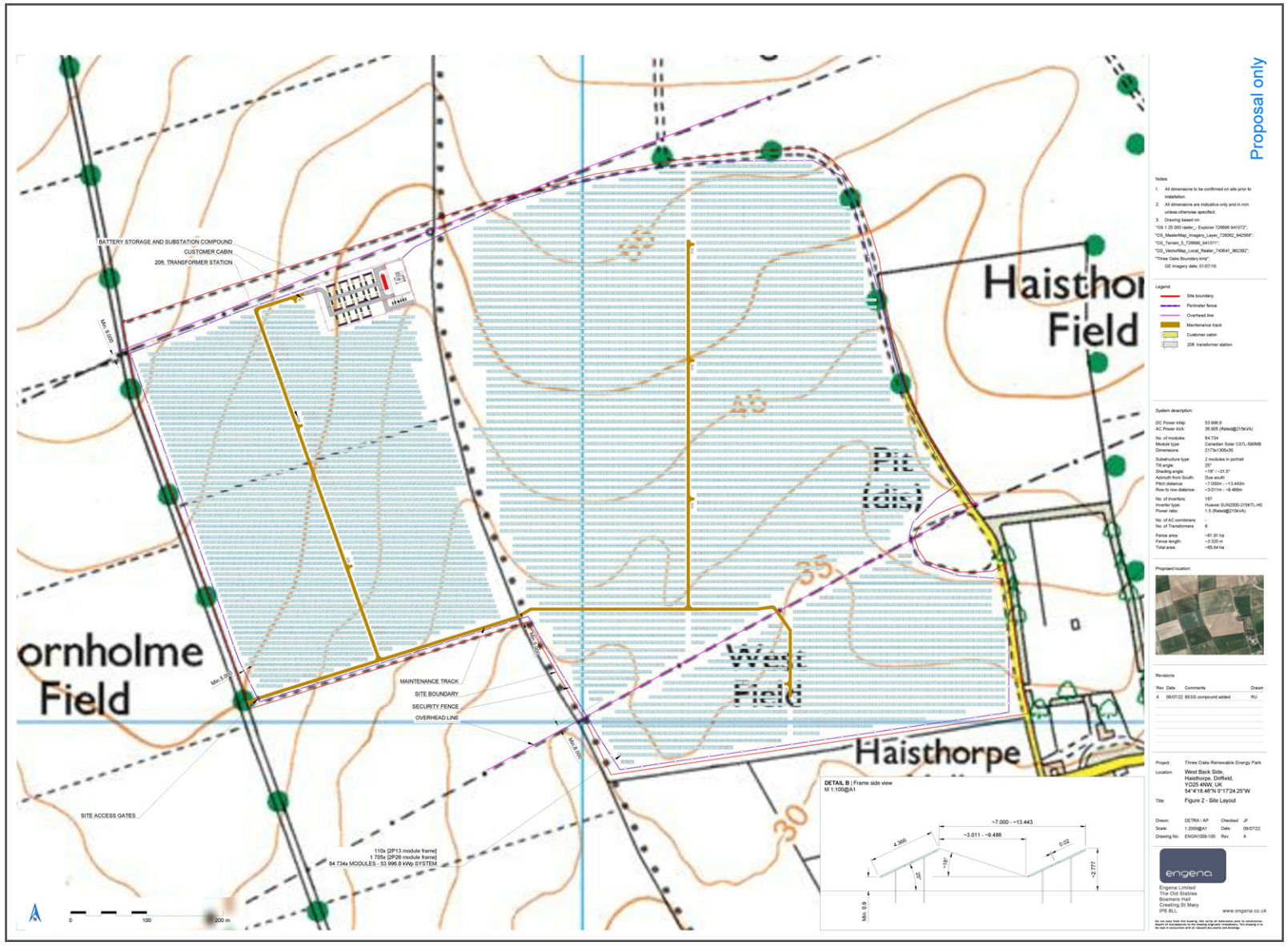


Plate 5 - *Site Layout of Infrastructure (replicated from* **Figure 2***)*

61 Frames that support the panels are typically made of aluminium and they are fixed to the ground with ground anchors. Where less disturbance is required to the subsurface, concrete 'feet' can be used to stabilise the panel frames on the surface. Typical frame and footing details are shown at **Plate 4 on page 9** and **Plate 6 on this page** respectively.

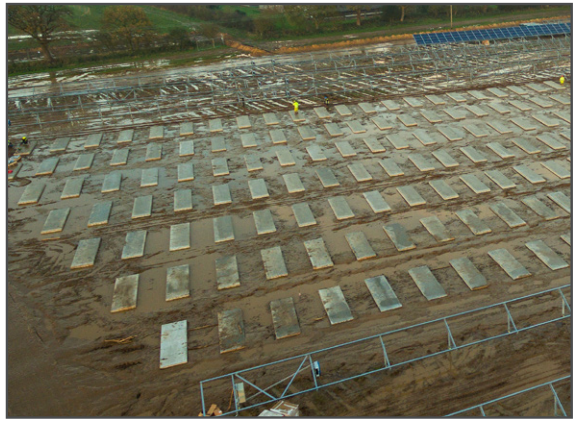


Plate 6 - *Typical Surface Mounted 'Feet'*

Inverters and Transformers

62 The solar panels generate Direct Current (DC) electricity, which must be converted to electricity with an Alternating Current (AC) before it is exported into the local distribution network. This conversion will be undertaken by string inverter units located behind the panels, and mounted onto the frame.

63 Each inverter unit is typically 100cm x 70cm x 37cm and approximately 167 would be required. The panels and inverters are connected via cabling which is mounted onto the panel frames (**Plate 7**) or suspended behind the panels. Underground communications and power cables link the inverters to the transformer units.

Plate 7 - *Typical string-inverter units*

64 Transformers (**Plate 8**) step the generation voltage up to 33kV (which is subsequently stepped up again to 66kV at the substation compound) to the connection voltage of the local electricity distribution network. Approximately six transformer units would be required and each unit would be approximately 6.1m long, 2.4m wide and 2.6m tall.

Plate 8 - *Typical Transformer equipment*

65 The typical cable trench arrangement for all on-site underground cabling is shown at **Figure 7**.

Customer Cabin

66 The customer cabin will contain the security and solar farm control systems, equipment for general maintenance and spare parts should they be needed during the operational phase. It will typically be a steel building

approximately 6.1m long, 2.4m wide and 2.6m tall. One customer cabin is required for the Site. A typical storage container is shown at **Plate 9** and illustrated in **Figure 8**.

Plate 9 - *Typical Customer Cabin*

Access Tracks

67 The delivery route to site and anticipated number of HGV movements is considered in detail from **Paragraph 168 on page 35**.

68 The site entrance uses an existing field entrance off the existing un-metalled unnamed track to the immediate west of the site (USRN: 45908633).

69 Within the Site, existing farm-style tracks will be laid and upgraded where necessary to allow delivery and access to individual segments of the solar array.

70 Where sections of new, upgraded or widened access track are required these will have the appearance of typical vernacular farm tracks with a crushed stone running surface (**Plate 10**), grassed over in time. The running surface (4m wide) is laid over a stone sub-surface which itself is typically constructed upon a geotextile membrane (**Figure 9**).

Plate 10 - *Typical New Site Access Track*

Security Fence

71 A perimeter fence and CCTV system comprising inward-facing cameras would be installed to protect the solar panels and cabling from damage or theft.

72 The security fence will be a stock-proof fence of wooden posts and wire, up to approximately 2m tall as shown in **Plate 11** and **Figure 10**.

73 The fence design includes for a 150mm gap at the base which will allow small mammals to transit across the Site unhindered.

Plate 11 - *Example Fencing*

74 No operational lighting is proposed within the solar farm. The CCTV cameras will operate in infra-red mode at night time, which is not visible to the naked eye.

Temporary Construction Compound

75 For the duration of the construction (and decommissioning) periods, a temporary compound (typically 1 200m^2) will be required to provide secure storage of equipment and construction materials, welfare facilities and office accommodation for site staff. This will have the same appearance as the access tracks and will be removed at the end of the construction period and replaced with solar panels. Temporary safety lighting will be used during construction only as and when needed.

Battery Energy Storage System

76 The BESS will occupy an area of approximately 1.0ha.

77 There are various battery technologies available, each having their own arrangement of battery modules, power conversion systems, and transformers.

78 The proposed BESS would comprise approximately 22 containerised battery modules (**Plate 12**). Rated at approximately 78MWh, the BESS would be able to provide a continuous 39MW output over a 2 hour period.

79 A Power Conversion System (PCS) unit converts the Direct Current (DC) electricity of the battery to the Alternating Current (AC) electricity of the power network - and vice-versa - whilst discharging and charging.

80 A PCS unit is typically required for each battery container units.

81 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, 2.4m wide and 3.2m tall.

Plate 12 - *Typical Battery Energy Storage System*

82 The individual battery module and PCS containers are typically 5.6m long, 2.3m wide and 3.2m tall and 3.7m long, 2.0m wide and 3.0m tall respectively.

83 A detailed typical layout of the BESS with proposed earthworks is provided at **Figure 11**, with earthwork elevations as **Figure 12** and **Figure 13**, illustrative elevations provided as **Figure 14** and as block elevations in **Figure 15**.

84 Each component battery module contains a temperature monitoring system that will shut down the module if a battery overheats. In the unlikely event of a system fire, a fire suppressant system ensures that the fire is self contained within the module, and is quickly extinguished.

Substation Compound

85 To connect to the local electricity distribution network for the export of power 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.

86 The substation compound will be segregated in to an area for the operator's equipment and an area for the DNO's equipment. In this case the DNO is Northern Powergrid. The substation compound and BESS area slopes to the south east, so will require cut and fill to level the area within the compound.

87 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.

88 From the on-site substation compound, the electricity is stepped up to 66kV through the transformer adjacent to the substation and underground cables will connect to the Distribution Network Operator's (DNO's) 66kV overhead line along the northern boundary of the site.

89 The substation compound buildings will be constructed of brick or Glass Reinforced Plastic (GRP) (as shown at **Plate 13)** finished in a colour to match the local vernacular and to be agreed with the Local Planning Authority. A detailed typical layout of the Substation Compound is provided at **Figure 11**, with illustrative elevations provided as **Figure 14**.

90 For safety, the BESS and substation compound will be fenced with palisade fencing (**Figure 16**).

Plate 13 - *Typical Substation Units - examples of brick and GRP finish*

Landscaping

91 An extensive planting plan is proposed alongside the technical infrastructure to provide ecological benefit and landscape mitigation. The planting is discussed in detail within Appendix 5 - Ecology and Appendix 6 - Landscape and Visual Impact Assessment and will include:

- Shelterbelt of trees to the north of the site to help screen the battery storage, substation and HV compound;
- New field boundary hedgerows with hedgerow trees around the northern, eastern and part of the southern boundary of the site;
- New hedgerow planting to replace the short lengths of hedgerow removed along the western boundary to accommodate passing places;
- New hedgerow planting with hedgerow trees to gap up the existing hedgerow along the Parish boundary through the centre of the site;
- New hedgerow to the north, adjacent to Woldgate;

- Species-rich meadow within the perimeter fencing between the solar PV arrays (but not within the battery storage and substation compound.
- Adjusting the hedge cutting regime of the existing hedgerows along the western and part of the southern boundary. These are mainly hawthorn and species poor but by adjusting the maintenance regime, these will grow taller and will be maintained at a height of approx. 3m to provide better screening of the site.

Operational Phase

92 The Site will be remotely monitored and operated with the automated system alerting an engineer in case of component or system issues. Regular checks will be undertaken to ensure the panels, inverters, transformers, storage containers, frames, fittings, BESS equipment and fencing are all in good working order. The panels will be cleaned periodically to ensure maximum production.

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

94 Management and maintenance of the landscaping and habitat mitigation will follow a Landscape and Environmental Management plan, agreed with the Council.

Lifetime of the Proposal

95 The proposal will operate for a period of 40 years. After this period of time, the solar farm and BESS would be decommissioned, unless a fresh planning permission was granted for its retention.

96 Decommissioning would involve the removal of all elements and restoration of the site to its current condition. Access tracks and ancillary infrastructure may remain in place following decommissioning for use by the landowner if required.

Expected Production

97 The proposed development would generate power during daylight hours (not just during times of direct sunlight) throughout the entire year.

98 The benefit of this renewable energy generated without fossil fuels or associated emissions can be equated to the equivalent number of homes which would be supplied with electricity from the solar farm over the year. This is calculated and presented in **Paragraph 102** (calculations presented to 3 Significant Figures (3 S.F.)).

99 The array has been designed using industry standard software PVSyst. This accounts for the Site location and global standard irradiation levels established by Meteonorm to establish an optimal layout in terms of panel positioning, spacing and tilt.

100 Accounting for panel efficiencies and degradation, as well as electrical and thermal losses, it is predicted that the solar array will produce 34 700 000 kWh of electricity per annum.

101 Rated at 78MWh, the BESS would be able to provide a continuous 39MW output over a 2 hour period.

102 Production and carbon offset was calculated on this basis:

Energy Production Statistics

Annual Production from solar array = **34 700 000 kWh per annum**

Equivalent number of homes = Annual average electricity produced, kWh / annual average domestic electricity consumption for East Riding of Yorkshire, kWh[1].

= 34 700 000 / 4 020

= 8 620 typical East Riding of Yorkshire households

[1.] Stated figure taken from 'Regional and Local Authority Electricity Consumption Statistics' published by the Department for Business, Energy & Industrial Strategy (DBEIS, 2021).

The 8 620 households represent **5.43%** of the households within the East Riding of Yorkshire Local Authority (East Riding, 2022).

Carbon Dioxide Offset

On a conservative basis (see **Paragraph 270** onwards) the electricity produced by the solar array will offset:

0.19338 kgCO_2/kWh of electricity associated with generation equating to

= 34 700 000 x 0.19338

= 6 710 TCO_2/annum

RENEWABLE ENERGY TECHNOLOGIES IN THE UK

103 The National Planning Policy Framework (NPPF, 2021) provides the current policy basis for determining planning applications. Paragraph 158 of the NPPF advises that '*when determining planning applications for renewable and low carbon development, local planning authorities should:*

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

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

(Note: Footnote 54 applies to wind energy development only and is not considered further in this application).

Global Climate Change and International Policy

104 It is internationally accepted that global warming and its association with climate change effects are a reality. Scientific opinion has converged on the appreciation that human activity, including the burning of fossil fuels, is rapidly changing the Earth's climate. The latest Intergovernmental Panel on Climate Change (IPCC) report Climate Change 2021: The Physical Science Basis (2021) states at Paragraph A.1:

> *'It is unequivocal that human influence has warmed the atmosphere, ocean and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred.'*

105 It continues at Paragraph A3:

> *'Human-induced climate change is already affecting many weather and climate extremes in every region across the globe. Evidence of observed changes in extremes such as heatwaves, heavy precipitation, droughts, and tropical cyclones, and, in particular, their attribution to human influence, has strengthened since AR5.'*

Note: AR5 refers to the Fifth IPCC Assessment Report (2014); the current report is part of the Sixth Assessment.

106 In 2018 the Intergovernmental Panel on Climate Change (IPCC) was invited by the United Nations Convention on Climate Change to produce a special report on the impacts of global warming of 1.5 degrees above pre-industrial levels contained in the Decision of the 21st Conference of Parties of the United Nations Framework Convention on Climate Change to adopt the Paris Agreement.

107 The IPCC reported that:

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

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

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

- *'Climate change is already affecting every inhabited region of the world'*, be this through hot extremes, heavy rain or drought*;*
- ***'Global surface temperature will continue to increase until at least the mid-century under all emissions scenarios considered. Global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO_2 and other greenhouse gas emissions occur in the coming decades';***
- *'With every increment of global warming, changes get larger in regional mean temperature, precipitation and soil moisture';*
- *'Projected changes in extremes are larger in frequency and intensity with every additional increment of global warming'; and*
- *'Continued global warming is projected to further intensify the global water cycle, including its variability, global monsoon precipitation and the severity of wet and dry events'.*

110 However, the IPCC also report that reaching and sustaining net zero global anthropogenic CO_2 emissions as well as reducing non-CO_2 emissions would halt anthropogenic global warming on multi-decadal timescales in the short term. In the longer term, there is a need to go further and not only sustain net zero emissions but establish net negative CO_2 emissions. This is to prevent further warming from feedback loops caused by the initial warming event (such as the release

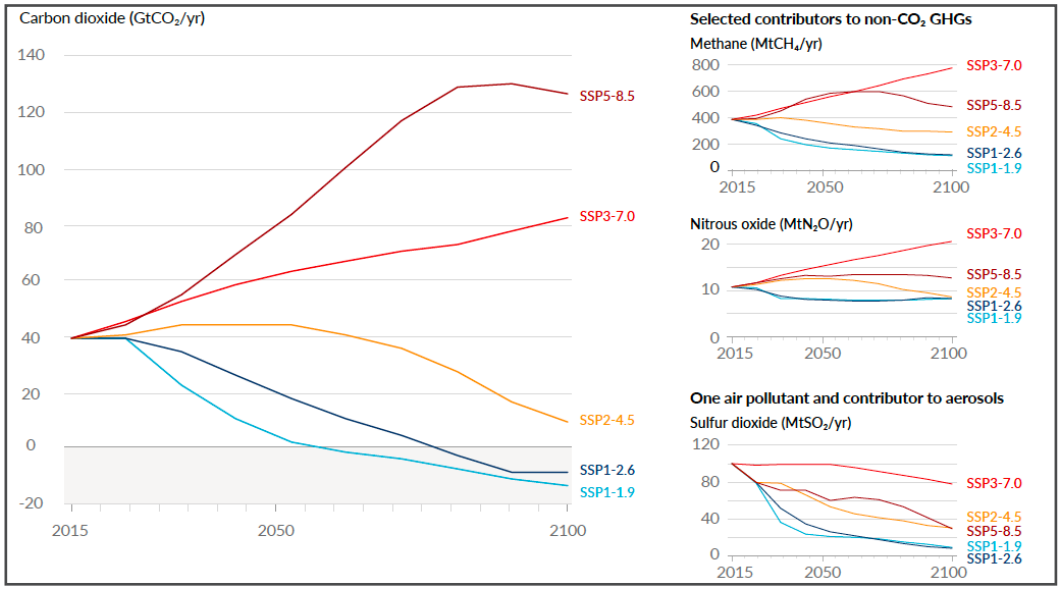
of methane caused by the melting of Arctic permafrost) and to reverse ocean acidification and minimise sea level rise.

111 AR6 reaffirms the conclusions of AR5 that at least net zero CO_2 and strong reductions in other greenhouse gas (GHG) emissions are required in order to stabilise human-induced global warming. Five new possible climate future scenarios have been considered across AR6 to explore the broader range of greenhouse gas, land use and air pollutant futures. These scenarios are illustrated in **Plate 14 on page 18**.

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

113 SSP2-4.5 is the intermediate emissions scenario and SSP3-7.0 and SSP5-8.5 are the high to very high greenhouse gas emissions scenarios.

(a)



(b)

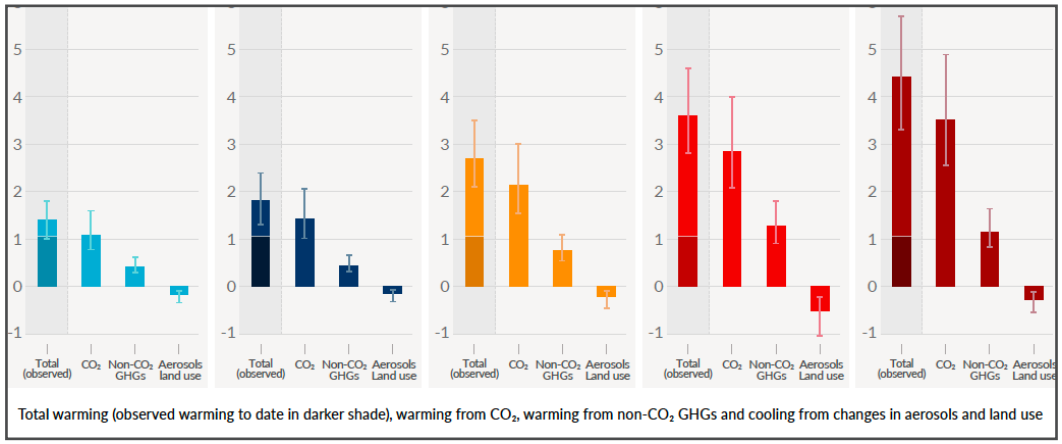


Plate 14 - *(a) Future annual emissions of CO_2 (left) and of a subset of key non-CO_2 drivers (right), across five illustrative scenarios (b) Contribution to global surface temperature increase from different emissions, with a dominant role of CO_2 emissions (IPCC, 2021)*

114 According to the Sixth Assessment (IPCC, 2021), compared to 1850-1900 global surface temperature averaged over 2081-2100 is very likely to be: 1.0-1.8°C higher under the very low greenhouse gas emissions scenario (SSP1-1.9); 2.1-3.5°C higher under the intermediate greenhouse gas emissions scenario (SSP2-4.5); and 3.3-5.7°C higher under the very high greenhouse gas emissions scenario (SSP5-8.5).

115 As shown by **Plate 14**, the scale of the challenge over the next two decades cannot be underestimated. However, this challenge must be achieved. Global warming must be limited to 1.5°C as soon as possible or the effects will become irreversible.

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

117 Against the backdrop of evidence of global warming induced climate change, in 1992 the United Nations (UN) concluded that the impact of climate change was so serious that it was necessary for member nations to agree to a reduction in greenhouse gases. The following key events and international agreements have shaped current climate change policies and targets:

- Rio Earth Summit Treaty (effective 1994);
- The Kyoto Protocol (ratified in 2005);
- Conference of the Parties (COP) 18 - Doha Amendment (effective 31st December 2020); and
- Conference of the Parties (COP) 21 - The Paris Agreement (effective 2016).

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

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

120 In line with the IPCC Special Report discussed from **Paragraph 106 on page 17**, the long-term temperature goal of the Paris Agreement is to limit the global average temperature rise to '*well below 2 degrees Celsius above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 degrees Celsius*'.

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

122 The latest gathering of nations was for the 26th UN Climate Change Conference of the Parties (COP) summit which took place in Glasgow from 31st October to 12th November 2021.

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

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

- *A stronger commitment to limit global temperature rises to 1.5 degrees, and greater acknowledgement of the latest science which reflects the urgent need to take action during this critical decade.*
- *The text includes "phase-down of unabated coal power" and "inefficient fossil fuel subsidies", as well as "mid-century net zero". This*

language has never been included in UN text before.

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

Climate Change in the UK

124 An annual UK weather and climate report entitled '*State of the UK Climate*' is produced every July by the Met Office and published by the Royal Meteorological Society.

125 The latest, published in July 2021 (Kendon, et al., 2021), found that:

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

126 In addition:

- *2020 was the third warmest year for the UK in a series from 1884;*
- *All the top 10 warmest years for the UK in the series from 1884 have occurred since 2002;*

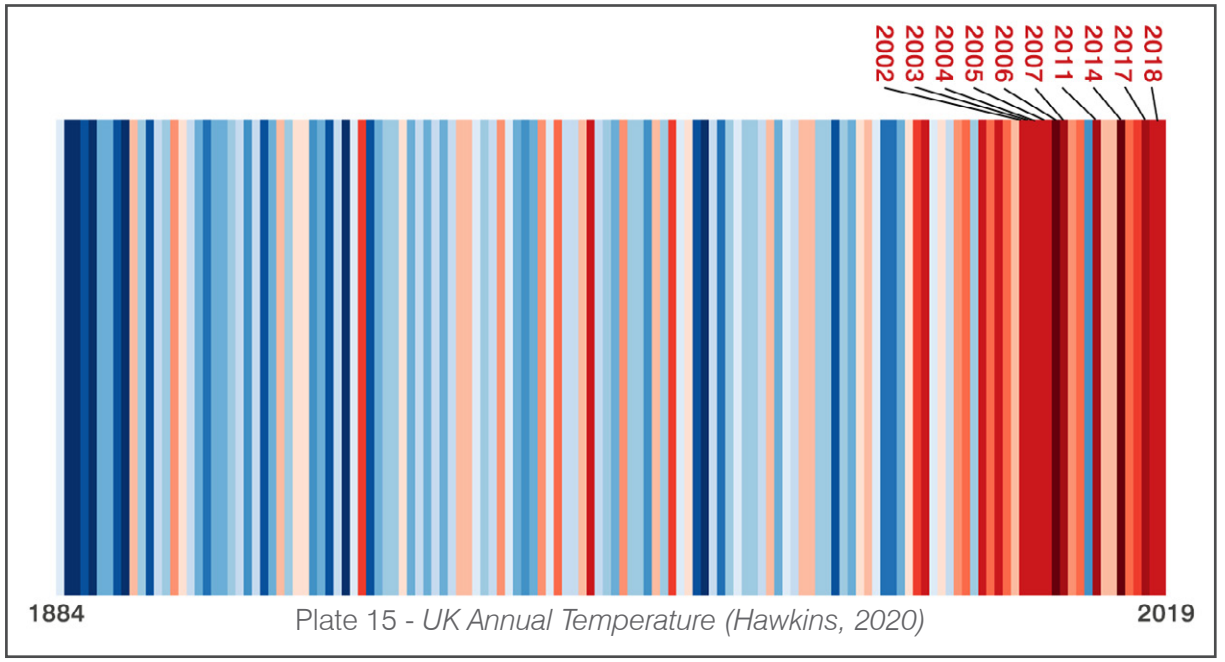


Plate 15 - *UK Annual Temperature (Hawkins, 2020)*

- *2020 was the seventh consecutive year where the number of air and ground frosts was below the 1981-2010 average;*
- *Heating degree days in 2020 were fifth lowest, and cooling and growing degree days equal-ninth/ eighth highest, respectively for the UK in series from 1960;*
- *2020 was the UK's fifth wettest year in a series from 1862 [...]. 2020 also included the fifth wettest winter [and] the fifth driest spring;*
- *Widespread and substantial snow events have occurred in 2018, 2013, 2010 and 2009, but their number and severity have generally declined since the 1960s; and*
- *2020 was the eighth sunniest year for the UK in a series from 1919, with 109% of the 1981–2010 average and 113% of 1961–1990 average sunshine hours.*

127 , produced by the University of Reading (Hawkins, 2020) and using UK Met Office Data, illustrates the average annual UK temperature since

1884. Blues represent cool average temperatures, and reds represent warm average temperatures. The increase in average annual temperature is abundantly clear.

The Climate Change Act and Net Zero

128 The Climate Change Act 2008 originally set a legal duty on the Secretary of State to ensure that greenhouse gas emissions are 80% lower than 1990 levels by 2050.

129 In order to achieve such a target it is vital that reductions are made throughout key areas of pollution: transport, industry, housing and electricity production.

130 Through the Climate Change Act, the UK has made significant progress in the electricity sector. This is illustrated in **Plate 16 on page 21** which compares the most recent fuel mix data (2019) to that of 1990.

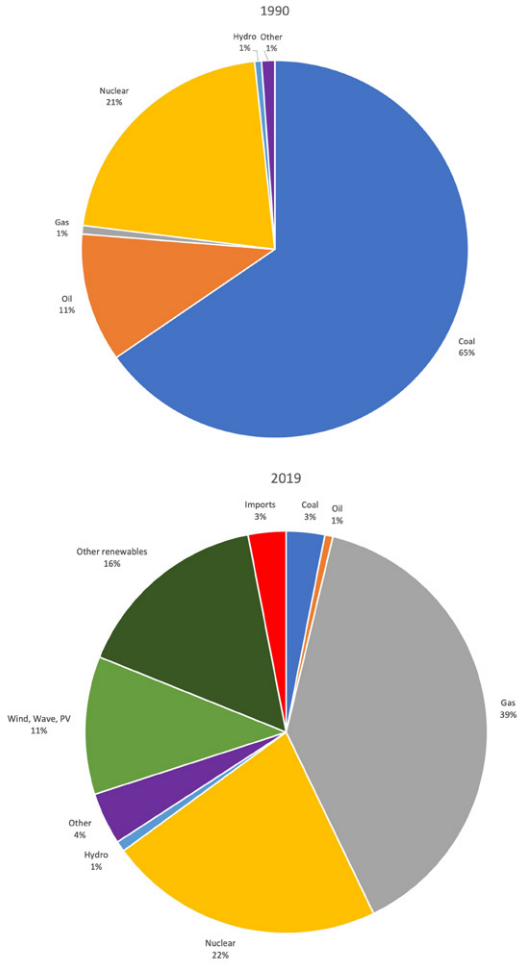


Plate 16 - *1990 Electricity Fuel Mix Compared to 2019 Electricity Fuel Mix (Source: Digest of UK Energy Statistics (DTI, 2000)(DBEIS, 2020b)*

131 This illustrates the significant decline of coal fired generation and the increase of renewable generation from near zero to 24% (10% Wind, Wave, PV; 14% Thermal including Waste). It also demonstrates an increased reliance on natural gas generation from 1% to 38%.

132 On 27th June 2019, the Government formally amended the target within the Climate Change Act as follows:

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

133 The United Kingdom was the first major economy to legislate for net zero emissions.

134 The targets within the Climate Change Act are set to be achieved through a series of rolling five year Carbon Budgets and associated interim targets.

135 The Carbon Budget is established by the Committee on Climate Change, an independent body formed under the Climate Change Act to advise the UK and devolved Governments and Parliaments on tackling and preparing for Climate Change. The advice is

considered by Parliament and, if accepted, the resultant targets are adopted.

136 The Carbon Budget is formed through careful consideration of cross-sector emissions including power, buildings, industry, transport, agriculture, land use, forestry, waste and fluorinated gases. The Sixth Carbon Budget was published in 2020 (CCC, 2020a).

137 To set the path to net zero, the Climate Change Committee published '*Policies for the Sixth Carbon Budget and Net Zero*' in December 2020 (CCC, 2020b). The Committee state that this Sixth Budget is '*the most comprehensive advice we have ever produced*'. The Sixth Budget became law under the Carbon Budget Order 2021 on 24th June 2021, in advance of the UK hosting the 26th Climate Conference, COP26.

138 As well as the most comprehensive, it is also their most ambitious. The recommended pathway requires a 78% reduction in UK territorial emissions between 1990 and 2035 – bringing forward the UK's previous 80% target by almost 15 years.

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

- Reducing demand for carbon-intensive activities (shifting diets away from meat and dairy; reducing waste; slower growth in flights and travel demand; improved efficiency of buildings, vehicles and industry);
- Take up of low-carbon solutions (by the early 2030s all new cars and vans and all boiler replacements in homes and other buildings must be low carbon – largely electric; by the 2040s all HGVs to be electric or hydrogen);
- Expand low carbon energy supplies (low carbon electricity is now cheaper than high-carbon; electricity demand rises 50% to 2035, doubling or even trebling by 2050; low carbon hydrogen scales up);
- Land (and removals) (planting of 440 000ha of mixed woodland; 260 000ha of agricultural land shifts to bioenergy production, including short rotation forestry; peatland restored and low carbon farming adopted. By 2035 bioenergy, using UK biomass, with Carbon Capture Storage will deliver removals of CO_2 at scale).

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

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

'Onshore wind and solar will be key building blocks of the future generation mix, along with offshore wind. We will need sustained growth in the capacity

of these sectors in the next decade to ensure that we are on a pathway that allows us to meet net zero emissions in all demand scenarios'.

142 The United Kingdom were at the forefront of climate change policy with the production of the first IPCC report and the formation of the UN Convention on Climate Change.

143 The UK continues to be world-leading on climate change mitigation with the announcement on 20th April 2021 that the UK Government will set in law the world's most ambitious climate change target, to cut emissions by 78% (compared to 1990 levels) by 2035. For the first time, the UK's Sixth Carbon Budget will incorporate the UK's share of international aviation and shipping emissions (DBEIS, 2021a).

144 To strengthen the UK's response to the effects of climate change, the Climate and Ecological Emergency Bill was tabled by Caroline Lucas MP in September 2020. It aims to reverse the climate and ecological breakdown and actively restore habitats. An Early Day Motion for the Bill was signed by 83 MPs on publish in November 2020. The Bill was re-introduced as a Presentation Bill on 21st June 2021 with support across the House of Commons, although it is yet to be formally incorporated as law.

145 It is critical to support proposals for new low carbon generation projects and, in line with the NPPF, recognise that even small scale projects provide a valuable contribution to cutting greenhouse gas emissions.

SITE LAYOUT AND DESIGN

146 The identification of the Site and evolution of its layout design has taken consideration of Government guidance, technical factors and industry best practice.

Planning Practice Guidance

147 Planning Practice Guidance (DCLG, 2020), published on 6th March 2014 (as updated), provides a summary of particular planning considerations that relate to large scale ground-mounted solar photovoltaic farms. This web-based guide accompanies the NPPF and National Policy Statements (EN-1 and EN-3). Text from the guide has

been quoted below in italics and is taken from Paragraph 013 (Reference ID: 5-013-20150327) unless stated otherwise:

- Land quality - *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.* As stated from **Paragraph 41 on page 6**, the fields selected for development are classified as predominantly Grade 3b. Agricultural Land Classification is a five-point scale with Grade 1 being the best quality. Natural England provide guidance on the protection of valuable agricultural land within TIN049 (Natural England, 2012), and state that the best and most versatile land is defined as Grades 1, 2 and 3a by policy guidance. This is reiterated within Annex 2 of the NPPF. In addition, the agricultural use of the land at the site can be ongoing during the operational phase of the solar farm by sheep grazing the grass surrounding and between the solar array, poultry or bee keeping.
- Temporary structures - *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.* This is reflected in the site design, using modular units, allowing the Site to be decommissioned and removed entirely at the end of its operating life (described in **Paragraph 95 on page 15** as being 40 years);
- Glint/Glare - *the proposal's visual impact, the effect on landscape of glint and glare and on neighbouring uses and aircraft safety.* The Site can be well screened with minimal visual effect. The Site is not located near to any aerodromes. As a ground mounted scheme with panels up to an angle of 25 degrees and screened by hedgerows, glint and glare effects are unlikely;
- Security - *the need for, and impact of, security measures such as lights and fencing.* No lighting is proposed with the solar farm. CCTV cameras operate in infra-red light at nightime, which is not visible to the naked eye as stated in **Paragraph 74 on page 13**. The security fence will be formed of wooden posts and a wire grid to minimise visual impact.
- Cultural Heritage - *great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting. As the significance of a heritage asset derives not only from its physical presence, but also from its setting, careful consideration should be given to the impact of large scale solar farms on such assets. Depending on their scale, design and prominence, a large scale solar farm within the setting of a heritage asset may cause substantial harm to the significance of the asset.* There are no World

Heritage Sites, Registered Parks or Gardens, or Registered Battlefields within 2km of the proposal. Six Scheduled Monuments and five Listed Buildings are within the study area but none are within the Site or directly adjacent. Historic designations are considered further from **Paragraph 242 on page 45**.

- Screening - *the potential to mitigate landscape and visual impacts through, for example, screening with native hedges.* Hedgerow and tree belts are proposed where appropriate to screen views of the solar farm whilst complementing the existing landscape character and enhancing biodiversity.
- Resource - *the energy generating potential, which can vary for a number of reasons including, latitude and aspect.* The site design software PVSyst confirms a good energy generating potential, as discussed in **Paragraph 100 on page 15**.

148 Battery Storage Energy Systems are not specifically covered within the guidance, but most of the points discussed above also apply to the BESS element of the proposal.

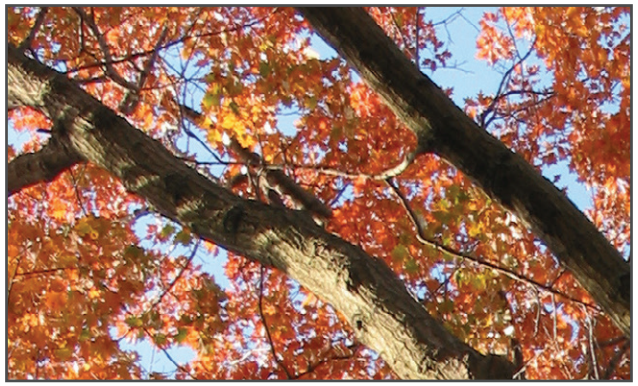
Technical Considerations

149 In addition to the criteria noted within the Planning Practice Guidance, further considerations included the following:

- Flood risk - in line with the NPPF and also as advised within the Overarching National Policy Statement for Energy, EN-1 (DECC, 2011a), all applications for energy projects of 1ha or greater located in flood zone 1, and all proposals in flood zone 2 and 3, should be accompanied by a flood risk assessment. The proposed development covers approximately 65ha, as such a flood risk assessment has been undertaken.
- Road access - there must be adequate access for the delivery vehicles used during construction. Deliveries would be routed to site using the trunk and major road network as far as possible. The un-metalled road to the west of the site (USRN: 45908633) is a straight and suitable road from which to take access through an existing field entrance.
- Proximity to public roads and rights of way - there is no statutory separation distance from a solar farm to either public rights of way or the highway. The adjacent restricted byways that follow the eastern and western boundaries of the Site along West Back Side and the unnamed road (USRN: 45908633), have been a key consideration in the site design and landscaping design. This is discussed further in the LVIA - Appendix 6.
- Location of utilities infrastructure - there are overhead electricity cables on wooden posts crossing the site area in two areas. Appropriate separations from these infrastructure features have been applied, such that the proposed panels, their associated infrastructure and the BESS equipment do not impact upon exiting utilities.
- Proximity to woodland - there is no ancient woodland adjoining or in proximity to the Site.

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

150 **Figure 2** shows the site layout on OS mapping and **Figure 3** show the site layout overlaid on aerial imagery.



DESIGN AND ACCESS STATEMENT

151 The following Design and Access Statement is provided to explain the development location and design process. As recommended by The Commission for Architecture and the Built Environment (CABE) publication 'Design and Access Statements - how to write, read and use them' (CABE, 2006), this statement concentrates on seven Key Design Issues, and answers a set of Key Questions for each one.

152 In 2010, the Town and Country Planning (General Development Procedure) (Amendment) (England) Order 2010 (SI 2010/567) was superseded by The Town and Country Planning (Development Management Procedure) (England) Order 2010, SI 2010 No. 2184, which introduced 'context' to be discussed with respect to the development as a whole, rather than with respect to the sub-components discussed by the CABE guide.

153 Questions shown in square brackets are not considered relevant to the proposed development. For ease of use the statement has been tabulated in **Table 1 on page 27**.

Table 1 - *Design and Access Statement in Tabular Form*

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
The Process	Have the physical characteristics of the scheme been informed by a rigorous process which should include assessment of the site's full context (physical, social and economic characteristics and relevant planning policies); involvement; evaluation; and design?	As stated from **Paragraph 146 on page 23** the suitability of the landholding for a solar array and BESS development and the initial site design, within the boundaries of the landholding, were based on consideration of technical and environmental constraints and best practice. This is described further within the 'Layout' section of this Statement. Ridge Clean Energy considered the potential, if any, for a solar farm and BESS development around Thornholme, in proximity to a secured grid connection. In the first phase of work a desk top study considered factors such as physical landscape constraints and available landholdings. Site visits further investigated other potential environmental constraints such as ecology, drainage and heritage. The planning policy impacts of the development are described in full in the separate Planning Statement submitted by the developer to accompany the application.
Use	What are the buildings and spaces used for? Would the application help to create an appropriate mix of uses in the area? Would different uses work together well, or would they cause unacceptable annoyance?	The proposal is for infrastructure to allow for the generation, storage and export of electricity from renewable energy. The planning application is for a solar array, BESS and those other elements required for their construction, operation and maintenance. Details of the associated infrastructure (including ground anchors, access tracks, substation, inverters, transformers and security fence) are provided from **Paragraph 53 on page 9** and associated **Figure 4** to **Figure 16** inclusive. The Three Oaks Renewable Energy Park would utilise approximately 65.8ha of lower grade land in a location where grid connection is technically feasible. Approximately 1ha would be taken up by the BESS and substation compound. Once constructed the solar farm can operate in parallel to sheep farming on the land. The land will be used to provide biodiversity net gain as a result of the proposed landscaping and ecological enhancements and mitigations provided with the development. The use of renewable energy in the UK is supported through the National Planning Policy Framework (MHCLG, 2021), which states at Paragraph 155 that *'to help increase the use and supply of renewable and low carbon energy and heat,*

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
Use (continued)	-	*plans should provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts).'* The location of the proposal is technically and economically viable and the Site has been designed to minimise environmental and social impacts where possible, with resultant impacts determined in the studies contained within this Environmental Report.
Amount	The planning application will say how much development is being applied for. Why is this the appropriate amount? Is the density appropriate?	The proposed development will be sited within a fenced area of approximately 61.9ha, albeit not all of the ground is covered by panels: approximately half will be over-sailed by panels and only a very small proportion of this area will penetrate the ground by the frame legs and fence posts. A small proportion of the Site (c. 1ha) will be used to accommodate the BESS. The land will also be enhanced with wildflower/ grassland mixes and hedge and tree planting. The solar farm would have an installed AC capacity of 39MW. The energy storage system would have an installed capacity of approximately 78MWh to allow for 39MW export over a 2 hour period. The development is considered to be the appropriate amount for maximising the available grid connection capacity. The Landscape and Visual Appraisal (LVA) provided within this Environmental Report assesses the impact of the proposed development on local landscape and visual receptors. Combined with the Ecological Assessment, the LVA provides landscape mitigation that results in over 69.2% net biodiversity gain.
Layout	How will the buildings and public and private spaces be arranged on the site, and what is the relationship between them and the buildings and spaces around the site?...	As stated from **Paragraph 147 on page 23** the suitability of the landholding for a solar farm and BESS and the initial site design, within the boundaries of the landholding, are based on consideration of technical and environmental constraints as guided by the Planning Practice Guidance for Renewable and Low Carbon Energy.

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
Layout (continued)	How will the buildings and public and private spaces be arranged on the site, and what is the relationship between them and the buildings and spaces around the site?	Such considerations included: land quality; temporary structures; glint/glare; active solar arrays; security; cultural heritage, screening; resource; road access; proximity to public rights of way; proximity to woodland and proximity to shading. Other constraints influencing the layout of the Site included: surface water flood risk; overhead utility lines; proximity to heritage assets, access and proximity to and views from residential dwellings. Existing gaps in hedges and farm tracks were used as far as possible whilst optimising a consistent solar panel layout. Also buffers were put in place to avoid impact on existing ecological features. The inverters will be attached to the panel frames and transformer units and the BESS/substation compound have been located to maximise separation from residential dwellings and reducing the potential visual impact.
	[Will public spaces be practical, safe, overlooked and inclusive?] [Will private spaces be adaptable, secure and inviting?] Do all spaces have a purpose?	The environmental impact of the proposal is examined in this Environmental Report. The elements forming this application are limited to those which are necessary for the generation, storage and transport of electricity or for the access to and maintenance and operation of the solar farm and BESS. The proposed arrangement of these elements is shown by **Figure 2** and **Figure 3**.
Scale	The statement should explain and justify: the height, width and length of [buildings]; the size of spaces in relation to each other and their surroundings; and [the size of parts of a buildings or its details] The statement should provide clear...	Modern solar farms (rather than 'domestic') in the UK, determined by the Local Planning Authority, range from approximately 1MW to 50MW AC capacity. This proposed solar farm has an installed AC capacity of 39MW, with associated available capacity to maximise available generation from the site area and optimise the grid connection. The accompanying battery energy storage system would have a rated capacity of up to 78MWh.

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
Scale (continued)	...evidence that the planned scale has been influenced by the existing character of the local area or, where relevant, opportunities to improve that character.	As mentioned in the Layout section of this Statement, the spacing of the solar farm and battery system relative to its surroundings has been primarily driven by consideration of various constraints such as landholdings, the built environment / existing infrastructure, and ditches / hedgerows. These separations, in combination, minimise potential environmental impacts and maximise output.
	Will the [buildings] sit comfortably with their surroundings? [Will they, and parts like doors and windows, be of a comfortable scale for people?]	Solar farms by nature have a large footprint but the whole area is not covered with panels as spacing is left in between for access, ancillary equipment and also perimeter fencing. The panels are mounted with a maximum height of 3.0m. It is proposed to grass / wild flower seed the areas between and beneath the panels and seasonally graze or mow. The individual battery module containers are approximately 5.6m long by 2.3m wide and 3.2m tall. It is expected that the external finish of the 'buildings' included with the proposal (transformers, substation and battery module containers) will be agreed with the Local Planning Authority prior to construction commencing. The LVA provided in this Environmental Report sets out the specific effects of this proposal in detail.
Landscaping	How open spaces will be treated to enhance and protect the character of a place.	As described in the LVA and Ecology assessments, the existing field boundary hedges will be enhanced, and new hedges and tree belts will be established to create ecological enhancement and landscape screening. Further ecological enhancement of the Site through wild flower / grass meadow will also complement the existing landscape.
Appearance	The statement should explain and justify the appearance of buildings and spaces, and show how they relate to their surroundings. It should cover: architecture, materials, [decoration], lighting, colour and texture...	The appearance of a solar array is largely functional, with materials primarily chosen for their weight, strength and practicality. By their nature, the operating surface of the PV panels and so the active face of the array will be a deep metallic blue / black. The framing system is typically self-coloured aluminium/galvanised steel and normally only visible from below or behind the panels. The BESS equipment will be housed within steel shipping containers. Native species will be selected for the ecological enhancement and landscape mitigation proposals.

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
Appearance (continued)	How will the development visually relate to its surroundings? Will it look attractive?	The perimeter fence will be wire mesh fencing. For safety, the BESS and substation compound are fenced with palisade fencing. Boundary hedgerows and planting will largely screen the development from the surrounding area. Landscape and visual impacts are assessed in detail in the LVA provided in this Environmental Report.
Context	A Design and Access Statement should demonstrate the steps taken to appraise the context of the proposed development. It is important that an applicant should understand the context in which their proposal will sit, and use this understanding to draw up the application.	The immediate and wider context of the Site was evaluated during the site selection and design process, as discussed from **Paragraph 147 on page 23** of this Environmental Report. A description of the Site's context is provided by the Landscape and Visual Appraisal. The social and economic aspects of the proposal are discussed from **Paragraph 264 on page 47**. The effects of climate change are now being experienced at all levels – global, national, regional and local. Similarly the socio-economic effects of the proposal will also have effects at the global, national regional and local level. Consultation with the Local Planning Authority was undertaken throughout the pre-planning assessment phase of the application. This included EIA Screening as described from **Paragraph 154 on page 33**. Also consultation agreed the appropriate scope of landscape and visual appraisal. Feasibility assessment and a detailed site design process was undertaken, and determined the Site suitable against a number of environmental, technical and social constraints. The proposed Three Oaks Renewable Energy Park compliments the current and possible future energy needs of the County. The planning policy impacts of the development are described in full in the separate Planning Statement submitted by the developer to accompany the application.

Key issue	Key Questions (CABE, 2006)/SI 2010-2184	Response
Access	The Design and Access Statement will need to cover two potential aspects of access vehicle and transport links, and [inclusive access...] Will the place be safe and easy for everyone to move around? Will it make the most of the surrounding movement network? Has the applicant clearly described their policy approach and consultation process, whether carried out or planned?	Road access is achieved from the A614 along un-named road USRN 45908633, adjacent to the west of the Site. An existing field entrance will be used to then enter the site. This route was selected following consultation with the general public and local highways. The two public rights of way (PRoW) that are adjacent to the east and west of the Site will remain open during the life of the project. During construction, measures will be in place to ensure the continued safe use of the PRoWs. More detail can be found in the Traffic and Transport section of this documentation from **Paragraph 168 on page 35**. The approach to the consultation process included pre-submission consultation with the Local Planning Authority to seek their initial opinion and to Screen the application (**Paragraph 161 on page 33**) and pre-application consultation with surrounding residents and parish councils. Prior to submission of the application, members of the public from the surrounding settlements were consulted via letter and leaflet sent in the post, inviting residents to join any of two exhibition events where they were offered the opportunity to ask questions and provide pre-planning comment about the proposal (Carnaby on 15th February 2022 and in Burton Agnes on 16th February 2022). A consultation email address was also available to find out more about the proposed development.

LOCAL PLANNING AUTHORITY (LPA) CONSULTATION

Pre-Application Advice

154 During the initial investigations into the possibility of a solar farm and BESS near Thornholme, Ridge Clean Energy initiated discussions with the Council. A request for pre-application advice was submitted to the Council in July 2021 (reference 21/10896/STPREP).

155 The Council provided several consultation responses from its Officers. The pre-application advice request and responses are provided in **Appendix 2 - LPA Correspondence**.

156 Environmental Control responded on the 28th July, 2021 advising the potential for contaminated land issues as a consequence of fly tipping in a former landfill site located at the Old Chalk Pit adjacent to the eastern edge of the proposed site. A watching brief condition was suggested.

157 The Principal Conservation Officer responded on 1st March, 2022. The response referred to legislation protecting heritage assets and National Planning Policy. Key listed buildings in the immediate surroundings were identified as were Scheduled Ancient Monuments (SAMs) advising a Heritage Statement would be required assessing the potential for impacts on these assets. The prospect of mitigating planting was raised.

158 County Highways responded 17th August, 2021 requesting ongoing consultation with specific detail requests to accompany the application including A614 junction design details, construction traffic details, operational traffic details and a Construction Traffic Management Plan (CTMP). Potential concerns were raised regarding the potential for access impacts, but with the advice that dialogue be used during the pre-submission process to ensure these concerns were addressed. Discussions were also recommended with the Council's Streetscene Services (Highways) Area Engineer. Discussions with both parties have been ongoing subsequent to the receipt of this submission.

159 The response from the ERYC Nature Conservation Team (ERYC undated):

- identified applicable legislation, planning policies and guidance;
- identified nationally, and locally designated sites as well as UK BAP Priority Habitats;
- requested a Construction Environmental Management Plan (CEMP);
- specified details required for any mitigation proposals; and
- Provided advice on nesting birds and lighting.

160 The selection of representative Viewpoints for the purposes of the Landscape and Visual Impact Assessment were subsequently discussed and agreed with the Planning Officer (included within **Appendix 2 - LPA Correspondence**).

Project Screening

161 National planning policy for renewable energy projects is guided by the NPPF (MHCLG, 2021), online Planning

Practice Guidance (MHCLG, 2021) and the National Policy Statements (DECC, 2011a and 2011b).

162 The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017 do not include solar energy systems and battery storage developments specifically in Schedule 1 or 2. However large, industrial installations for the production of electricity (where the area of works exceeds 1ha) are listed in Schedule 2 and would therefore require a Screening Opinion.

163 Accordingly, a Screening Opinion was applied for on 5th October 2021 to East Riding of Yorkshire Council, as provided for in the Town and Country Planning Regulations, 2017 (as amended).

164 A response was provided on 17th November 2021, which stated that an Environmental Impact Assessment was not required. As such this Environmental Report has been prepared to consider and summarise the various environmental and built development disciplines associated with the proposed development.

165 A copy of correspondence with the Local Planning Authority is provided at **Appendix 2 - LPA Correspondence.**

THE FINDINGS OF THE ENVIRONMENTAL STUDIES

166 Reports have been produced for the following topics by the following authors:

- Construction, Traffic and Transport - Engena Ltd;
- Flood Risk Assessment and Surface Water Drainage - RAB Consultants;
- Ecology and Ornithology - Ecology Consulting;
- Landscape and Visual Assessment - HBA Environment;
- Cultural Heritage - Orion Heritage;
- Noise - Ion Acoustics;
- Glint and Glare - Neo Environmental; and
- Socio-Economic Effects - Engena Ltd.

167 Where reports are undertaken by an external consultant, the conclusions are presented within this document for convenience. The full external reports are provided as appendices accompanying this Environmental Report. All assessments undertaken by Engena are incorporated into this document.

Construction, Traffic and Transport

168 This assessment discusses the site construction process, the delivery route and traffic movements associated with the construction of the renewable energy park.

Site Construction

169 Construction of a solar farm and BESS is a relatively straight forward process with little ground disturbance.

170 **Plate 17 on page 36** provides an overview of the construction process as a photographic sequence for a solar site of a similar size and scale to the proposed development. Given the construction of a BESS comprises principally of the delivery of preassembled containerised units, a similar photograph series has not been provided.

171 Regarding the solar area, firstly, the Site is prepared for construction by the laying of access tracks. Then the panel frame legs are installed and fencing erected, both fence posts and solar frame legs being simply push-driven into the ground, or surface-mounted gravity foundations laid out across the Site.

172 Concrete pads are poured for the transformer units and customer container which are subsequently delivered in pre-assembled form.

173 The frames are assembled, as a lattice onto which the panels are installed.

174 The panels are then mounted onto the frames, and are wired together in series. The wires are placed behind the panels.

175 Inverter units, to convert the DC electricity to AC electricity, are installed on the backs of the frames.

176 The wiring is then fed back to the substation compound via the transformer containers.

177 The BESS and substation compounds are levelled using cut and fill and surfaced with graded crushed stone over a geotextile and fencing erected. Foundation pads are poured where required or pier foundations set out. Containers comprising the various modules are delivered in pre-assembled form and electrically connected.

Construction Traffic

178 It is expected that there will be a six-nine month construction programme. During construction deliveries will be restricted, wherever possible, to off-peak weekday and Saturday mornings to reduce impacts on local road users. Off-peak is considered to be between 09:00 and 15:00.

179 The anticipated HGV construction traffic for the solar farm, BESS and associated infrastructure deliveries is shown in **Table 2 on page 38**.

Plate 17 - *Solar Farm Construction Process*

180 Deliveries are well spaced throughout the construction period with the construction programme starting with the temporary construction compound and access tracks. Thereafter, a rolling programme will complete areas of the Site with the framing system, panels, BESS equipment, electrical system installation and commissioning. For the purposes of the assessment, a nine-month construction programme has been assessed.

181 Deliveries will be made by standard HGVs. One delivery will be larger than the 18.65m / 44T threshold that constitutes the need for police notifications and permissions. Light vehicles will be used by construction personnel arriving at the Site.

182 The one single exceptional load comprises the site transformer.

183 The decommissioning of the solar farm and BESS at the end of their life will be a reduced reverse version of the construction process with all elements being removed for reuse or recycling. Tracks may remain in place as required by the landowner. Details of the decommissioning programme are anticipated to be agreed in advance with the Council and controlled by a condition on the future planning permission, should it be granted.

184 As per **Table 2 on page 38**, the total number of HGV movements (including for deliveries to and vehicles leaving the Site) is 1 842 across the nine-month construction period, equating to approximately 921 deliveries and an approximate daily average of 9 movements per day. Were a six month construction period to be adopted, this would typically add two extra movements to the daily average.

185 Construction personnel have not been included in this assessment which focusses on HGV movements. It is estimated that the peak number of personnel on site at any one time will be approximately 70. Construction personnel tend to travel to site in groups via minibus.

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

187 There are no traffic count locations in the vicinity of the Site. The nearest count points are located approximately 3.2km west (Ref: 81498), just outside Burton Agnes, and 4.2km east (Ref: 81499), on the outskirts of Bridlington. These count points are located along the A614 and are considered representative for the number of movements passing the Site given the minimal variation between the recorded data at each location and the lack of major junctions between the two locations. The count data for these points are provided in **Table 3 on page 39.**

Table 2 - *Typical Construction Programme and Total Monthly HGV Movements*

Activity	Total Movements	Programme Month									Average Movements per Day
		1	2	3	4	5	6	7	8	9	
Solar panels	322		■	■	■	■	■	■	■		2
Mounting system	36		■	■	■	■	■	■	■		1
Surface mounted foundations	332	■	■	■	■						4
Cabling	10	■	■	■	■	■	■	■	■		1
Cable trench sand	26	■	■	■	■	■	■	■	■		1
Transformers	12			■	■	■					1
Substation	2				■						1
Client container	2				■						1
Security fencing and gates	14	■	■	■	■	■	■				1
Construction compound, including gates, welfare and temporary surfacing.	12	■	■								1
Site tracks & BESS/Substation compound (crushed stone over geogrid base)	936	■	■	■	■	■	■				7
Foundation concrete for inverter/transformer units, customer cabin, welfare unit, store, substation and CCTV posts	14	■	■	■	■	■	■				1
BESS & Substation Components	102				■	■	■	■	■		1
Inverters	4	■	■	■	■	■	■				1
Ecological works (seed, new hedge and woodland), subject to appropriate time of year.	6									■	1
Site commissioning and site clearing	12									■	1
TOTAL MOVEMENTS	**1842**	**261**	**300**	**304**	**328**	**241**	**237**	**76**	**76**	**18**	**-**
Average movements per day, assuming 24-day working month	**-**	**11**	**13**	**13**	**14**	**11**	**10**	**4**	**4**	**1**	**9**
Average movements per hour on working days, assuming off-peak delivery between 9am and 3pm (6 hours)	**-**	**2**	**3**	**3**	**3**	**2**	**2**	**1**	**1**	**1**	**2**

Table 3 - *Annual Average Daily Flow of Vehicles at Nearest Count Points*

Count Point	Year	Cars and Taxis	Light Goods Vehicles	Heavy Goods Vehicles	All Motor Vehicles
81498 A614 (Burton Agnes)	2020 (estimate)	4 929	1 153	473	6 656
	2019 (estimate)	6 750	1 347	529	8 775
	Average	5 839	1 250	501	7 715
81499 A614 (Bridlington)	2020 (estimate)	7 692	1 607	446	9 928
	2019 (estimate)	10 533	1 878	500	13 171
	Average	9 112	1 742	473	11 549

Note: Traffic count estimates at both count points estimated by the Department for Transport using 2018 manual count data (DfT, 2022)

189 The reduced number of movements recorded in 2020 can be attributed to restrictions on travel and altered lifestyles associated with the SARS-CoV-2 pandemic. It is recognised that A614 traffic in and out of Bridlington is highly seasonal with morning east-bound peaks and late afternoon west-bound peaks.

190 The estimated movements associated with the proposed development compared to lowest estimate of traffic flow on the A614 will represent a nominal increase of HGV traffic around 2% for the construction period. Whilst traffic flow data is not available for the un-named USRN 45908633, it is recognised that during the temporary construction period, HGV traffic along this segment from the A614 will represent a marked but short-lived increase over likely existing traffic flows.

191 Mitigation measures will be applied through the CTMP, as discussed from **Paragraph 197 on page 40**.

PROPOSED DELIVERY ROUTE

192 A desktop mapping exercise and driven visual route inspection considered potential routes for construction traffic to the Site from the highway network.

193 The nearest port identified as suitable to facilitate offloading and onward transport of the solar panels and associated components is Goole. The most suitable routes from the identified port of delivery for components would use the A-road network as far as possible. This minimises the potential disruption to local traffic and road users.

194 The route identified for construction deliveries to the Three Oaks Renewable Energy Park from Goole Port is as follows:

- Join the A161 from the port, travelling west before joining the M62 north-east;
- After approximately 4km, at Junction 37, exit the motorway and take the A614 north-east;
- Continuing on the A614 north-east bound towards Bridlington for approximately 58km, following which taking a left turn onto USRN 45908633;
- The site entrance is then approximately 1km on the right.

195 The USRN 45908633 A614 junction achieves visibility in both directions

in excess of the requirements of the Design Manual for Roads and Bridges (DMRB) (Highways England et al., 2020) as shown on **Figure 17**. Advice on visibility splays is also provided in the Department for Transport's Manual for Streets (MfS) (2007). **Figure 18** shows the transition from the highway (unnamed track USRN 45908633).

196 It is proposed that prior to construction commencing, a Construction Transport Management Plan (CTMP) be agreed with East Riding of Yorkshire Council which is controlled via planning condition. This will include the delivery route(s), timing of deliveries and mitigatory provisions.

Construction Phase Mitigation

197 During construction and decommissioning, deliveries will be restricted, wherever possible, to off-peak weekdays to reduce impacts on local road users. Off-peak is considered to be between 09:00 and 15:00. This also minimises impacts on holiday season peak traffic times.

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

199 Banksmen will control potential impacts on users of USRN 45908633 by holding USRN 45908633 traffic for the brief period deliveries transit the route from the A614 into the site entrance and temporary site compound. This will include walkers.

200 All construction vehicles will be required to use the access route identified in the CTMP. This requires the use of the existing HGV capable roads to the Site.

201 It is suggested a scheme for pre-construction and post-construction road surveys to identify then rectify any damage to the verges caused by construction traffic be produced by the developer and agreed with East Riding of Yorkshire Highways in advance of construction commencing.

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

- A drainage scheme should be devised to ensure that no water enters the highway (USRN: 45908633) from the site access or a suitable system is agreed;
- informal passing places along USRN 45908633 (to be agreed with Yorkshire Highways); and
- Wheel wash facilities are to be provided, as appropriate, and sweeping is to be carried out to ensure the road is kept reasonably clear of any deposits from the construction works.

Operations

203 Traffic associated with the operation of the proposed development is extremely limited. During the operational phase, it is expected that the Site will be visited, on average, once a month by a small van.

204 The panels will be cleaned once a year with equipment as shown in **Plate 18**. This involves the transportation of a tractor unit, purified water bowser and cleaning team (generally 3-4 personnel) to site.

205 Inverters are typically replaced as units fail, given an on-site store in the Client Container, and intermittent failures no material increases in operational traffic is anticipated.

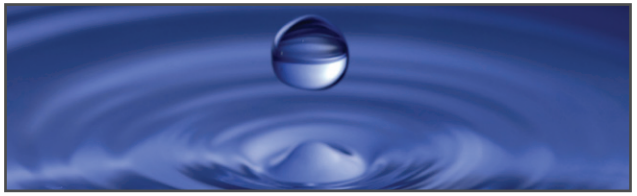
206 Battery units for the BESS are typically replaced at ten year intervals. When

this occurs, there would be associated HGV traffic flows - these would be likely no more than 88 movements at no more than maximum traffic flows during construction (9 movements per day) with deliveries occurring over the equivalent of a ten day working period. Were the replacement programme be over a longer period, traffic flows would be reduced proportionately.

Plate 18 - *Typical Solar Farm Cleaning Unit*

Conclusion

207 Short duration impacts are anticipated on users of the un-named road USRN 45908633 during the construction period, and likewise during decommissioning. During battery replacement, approximately five daily HGV movements may be expected over a period of ten days.



Flood Risk and Surface Water Drainage

208 RAB Consultants (RAB) was commissioned by Engena Ltd to undertake a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework (NPPF).

209 **The full assessment is provided at Appendix 4 - Flood Risk Assessment, with the main conclusions copied below for convenience.**

210 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions to Assessment

211 The site is located in Flood Zone 1 according to the Environment Agency's Flood Map for Planning.

212 The site is not expected to be impacted by flood water in all but the most extreme scenario.

213 Safe, dry access and egress is expected in all but the most extreme flood scenario.

214 The proposal will result in an increase to the impermeable area on the site, however this will comprise of a large number of small panels with drainage gaps, separated by surrounding undeveloped ground. The impact on site runoff will therefore be minimal. Local effects will be managed through the use of planting.

215 It is concluded that the proposed development is appropriate for the flood risk and is not expected to increase the risk of flooding elsewhere.

Ecology

216 The proposal has been subject to an ecological assessment by Ecology Consulting.

217 **The full assessment is provided at Appendix 5 - Ecology and Ornithologycal Assessment, with the main conclusions copied below for convenience.**

218 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions to Assessment

219 The proposed Renewable Energy Park will not have any effect on any statutory protected nature conservation sites. No Local Wildlife Sites would be affected, nor any NERC Act priority habitat.

220 The Renewable Energy Park is located on arable farmland, and this is the only habitat that would be lost to the development (other than a small 5m loss of native species-poor hedgerow). There will be no need for any tree felling, or any watercourse crossings.

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

222 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).

223 A Biodiversity Management Plan will deliver a net gain of 69% in habitat units and 28% hedgerow units.

224 Overall, with the proposed mitigation in place, there would be no significant residual ecological effects from the proposed renewable energy park.

Landscape and Visual Effects

225 HBA Environment was commissioned by Engena Ltd to undertake a Landscape and Visual Appraisal (LVA) of the proposal in accordance with the Landscape Institute Guidelines for Landscape and Visual Impact Assessment, Third Edition (GLVIA3).

226 **The full assessment is provided at Appendix 6 - Landscape and Visual Appraisal, with the main conclusions copied below for convenience.**

227 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions to Assessment

228 The entire footprint of the construction phase would be on land currently used for arable production and there would not be any adverse effects on landscape fabric as a consequence of

the construction or operational phases. The proposed shelterbelt, hedgerows, hedgerow trees and species-rich meadow would establish and mature during the operational phase. These would reinstate the hedgerows which have previously been lost on the site as the result of agricultural operations and would result in long-term beneficial effects on the landscape fabric of the site. There would be some disturbance of the species-rich meadow as the site is dismantled, but this would be restored to agricultural use at the end of the decommissioning phase.

229 The site is located within sub-Landscape Character Area (LCA) 13D and there would be some short and medium-term significant adverse effects on landscape character during the construction and early operational phases within a localised part of this LCA. The existing hedgerows to the south and west of the site would limit these significant adverse effects to the site and up to approximately 300 m from the site to the north and east where there are not any existing boundary hedgerows to contain the views of the construction works, solar PV panels, substation and BESS infrastructure.

230 As the proposed new hedgerows and shelterbelt establish, these will reinstate landscape features which have previously been lost on the site and will progressively screen the proposed development such that, by year 10/11 of the operational phase, these are expected to largely screen the development from the landscape surrounding the site such that the significant adverse long-term effects on landscape character would be limited to within the boundary of the site.

231 Any effects on the character of the site arising from the decommissioning works would be minor and short-term and there would not be any significant adverse effects on the character of the site and surrounding landscape during the decommissioning phase.

232 There would not be any significant effects on landscape character of the other sub-LCAs during the construction, operational and decommissioning phases of the proposed development.

233 The site is located within the Yorkshire Wolds Important Landscape Area and significant adverse effects on the character of the landscape within this designation would occur on the site and up to approximately 300 m from the site to the north and east (where there are not any existing boundary hedgerows to contain the views of the works) during the construction and early operational phase. However, these effects would be very localised, medium-term and reversible and the proposed new hedgerows and shelterbelt would reinstate landscape features which have previously been lost on the site within this designation and result in medium to long-term beneficial effects on landscape fabric and character.

234 There would not be any effects on the visual amenity of residents in Burton Agnes, Carnaby and Thornholme and most of the properties in Haisthorpe and no significant adverse effects on visual amenity for residents in Home Farm, the property on West Back Side or in properties along Lowfield Lane, in Haisthorpe. There would also not be any effects on the visual amenity of residents in the farmsteads on the lower lying farmland in the south of the study area.

235 There would not be any significant adverse effects on the visual amenity of visitors to the visitor attractions in the study area, including Burton

Agnes Hall, manor house, church and gardens, Park Rose Village and Bridlington Animal Park, John Bull World of Rock, Woldgate Trekking and Livery Centre and Carnaby Temple.

236 There would also not be any significant effects on the visual amenity of users of the open spaces in the study area, including the play area, sports field and grounds of Burton Agnes Church of England School in Burton Agnes, the Bridlington Model Boat Society lake just south of Carnaby Industrial Estate and the Churchyard of St John the Baptist Church in Carnaby.

237 There would not be any significant adverse effects on the visual amenity of cyclists, equestrians and walkers on Sustrans NCR 1 and the Way of the Roses cycle routes, on the two bridleways to the north of Woldgate (RUDSB02 and RUDSB03), on the two bridleways to the east of the site (CARNB01 and CARNB02), on the minor roads in the study area (Rudston Road to the west of the site and Church Lane to the east of the site), or on most of the other routes with public access.

238 There would be a significant adverse effect on the visual amenity of users on the other route with public access that extends from Viewpoint 2 and around the eastern boundary of the site to the Old Chalk Pit just north of Viewpoint 1 during the construction and early operational phase (medium-term, reversible) as there are no hedgerows along the northern and eastern boundaries of the site to screen views of the proposed development. However, there will be progressive screening of the site as the proposed hedgerows and shelterbelt establish such that by year 5, the hedgerows will largely screen the site from the part of the route that is alongside the northern and eastern boundary of the site with further screening of parts of the site by years 10/11 of the operational phase when the shelterbelt has established.

239 The terrain would screen views of the proposed development from much of the long-distance paths (Beverley Minster to Bridlington Priory, East Riding Heritage Way and the Rudston Roam) and public footpaths in the study area and where there would be views, these would be distant, partial and intermittent due to screening by intervening buildings and vegetation. Therefore, there would not be any significant adverse effects on the visual amenity of walkers on the long distance paths and public footpaths through the study area.

240 There would also not be any significant adverse effect on the visual amenity of motorists on the main and minor roads in the study area, including the A614, A165, Woldgate, Church Lane, Rudston Road, Station Road, Moor Lane and Horse Carr Lane.

241 All effects on landscape character and visual amenity would be reversed once the site is decommissioned and the proposed shelterbelt, hedgerows and hedgerow trees would result in beneficial effects on landscape fabric, landscape character and visual amenity in the medium to long-term.

Cultural Heritage

242 The proposal has been subject to a heritage assessment by Orion Heritage. The assessment comprised a Desk Based Assessment, Site Walkover and Geophysical survey.

243 **The full report on work to date is provided at Appendix 7 - Cultural Heritage, with the main conclusions copied below for convenience.**

244 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions of Assessment

ARCHAEOLOGICAL ASSETS

245 The impact on the two Scheduled barrows is considered to be less than substantial as there will be no physical impacts and a slight change only to further modernise the agricultural setting of the monuments.

246 A review of the available evidence initially identified that the study site had a low potential to contain finds and features relating to the Roman and medieval periods. There was also a predicted moderate potential for the adjacent Prehistoric cropmarks to extend into the site and for additional post medieval activity relating to the chalk pit and lime kiln to be located within the site boundary.

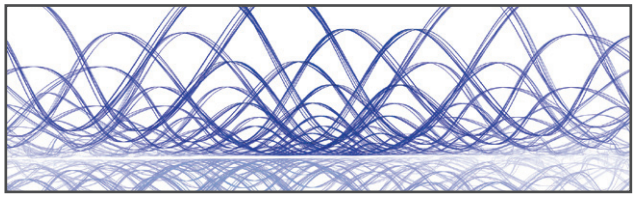
247 The geophysical survey results identified significant enclosures, trackways, circular anomalies and field boundaries that morphologically appear Prehistoric but may also have Roman or medieval elements. This has changed the potential for Prehistoric archaeology to very high and for Roman and medieval archaeology to moderate. The proposed development will have significant physical impacts on this archaeology without mitigation. Mitigation options, such as design solutions to avoid the remains, and/or a programme of archaeological investigation will be developed in consultation with the LPA Archaeologist and in line with the requirements of the NPPF.

BUILT HERITAGE ASSETS

248 An assessment of the significance of designated and non-designated heritage assets in the vicinity has demonstrated that three Listed Buildings and two non-designated heritage assets may experience impacts as a result of the proposed development but that these are less than substantial harm. Two of the Listed Buildings, Manor Farmhouse at Low Fields Lane and Manor Farmhouse, Thornholme, have limited settings and no intervisibility and the impacts are therefore negligible.

249 The Listed Haisthorpe Hall and non-designated White House Farm derive value from their architecture and spatial arrangement, which will not be impacted. Intervisibility is limited and the proposed development is a minor impact on their wider setting.

250 The architectural and historic significance of the Former Primitive Methodist Chapel will not be impacted. The proposed development will not impact the chapel's distinct setting within Haisthorpe but will be a minor change to its less significant wider rural setting.



Noise

251 The proposal has been subject to a noise assessment by Ion Acoustics.

252 **The full assessment is provided at Appendix 8 - Noise, with the main conclusions copied below for convenience.**

253 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions to Assessment

254 A noise impact assessment has been undertaken for a proposed Three Oaks Renewable Energy Park development on land to the north-west of Haisthorpe.

255 Operational noise limits have been established in accordance with BS 4142 to avoid adverse noise impacts. Overall, the calculations indicate that operational noise from the renewable energy park during the likely operating hours would be relatively low in absolute terms and an assessment using the Governments' planning guidance would indicate no observed adverse effect.

256 Given the above, it is considered that there are no noise-related issues associated with the proposed Three Oaks Renewable Energy Park which would prevent the granting of full planning permission.

Glint & Glare

257 The proposal has been subject to a Glint and Glare Assessment by Neo Environmental. Solar panels are designed to absorb as much light as possible and not to reflect it. However, glint can be produced as a reflection of the sun from the surface of the solar PV panel. Glare is significantly less intense in comparison to glint and can be described as a continuous source of bright light, relative to diffused lighting. This is not a direct reflection of the sun, but a reflection of the sky around the sun.

258 **The full assessment is provided at Appendix 9 - Glint & Glare, with the main conclusions copied below for convenience.**

259 Avoidance, mitigation measures and residual impacts are also summarised in **Table 7 on page 59** at the end of this ER.

Conclusions to Assessment

260 Following an initial assessment, rail receptors were scoped out as assets that will be impacted upon from the Proposed Development as no rail receptors fell within the 1km study area. The assessment concludes that:

- Glare is theoretically possible at 18 of the 18 residential receptors assessed within the 1km study area. The initial bald-earth scenario identified potential impacts as High at five receptors, Medium at six receptors, Low at six receptors and None at the remaining receptor. Upon reviewing the actual visibility of the receptors, glint and glare impacts reduce to High at two receptors, Medium at one receptor, Low at four receptors and None at 11 receptors. Once mitigation measures were considered all impacts reduce to None.
- Glare is theoretically possible at five of the eight road receptors assessed within the 1km study area. Upon reviewing the actual visibility of the receptors, glint and glare impacts remain High at one receptor and reduce to None at all remaining receptors. Once mitigation measures were considered all impacts reduce to None.
- No impact on train drivers or railway infrastructure is predicted.
- No glare impacts are predicted on Beverley Airfield. Therefore, the impact on aviation assets is None.

261 Mitigation measures are required to be put in place due to the Medium and High impacts that were found during the visibility analysis at Residential Receptors 13, 14, 16 and 18 and Road Receptor 4. These measures include native hedgerow planting along the southern boundaries and along a southern section of the eastern boundary of the Proposed Development and maintained to a height of 2.5 - 3m.

262 The effects of glint and glare and their impact on local receptors has been analysed in detail and the impact on all receptors is predicted to be None.

263 This Glint and Glare Assessment has shown that the Proposed Development will conform to the policies and objectives of the National Planning Policy Framework (NPPF) and the East Riding of Yorkshire Local Plan.

Socio-Economic Effects

Electricity Production

264 As noted in **Paragraph 100 on page 15** accounting for panel efficiencies and degradation, as well as electrical and thermal losses, it is predicted that the solar farm will produce 34 700 000kWh of electricity per annum.

265 In terms of household electricity usage this would be sufficient to offset the equivalent annual electricity needs of 8 620 households. The 8 620 households represent **5.43%** of the total households within East RIding of Yorkshire Council.

266 Rated at 78MWh, the BESS would be able to provide a continuous 39MW output over a 2 hour period.

Emissions

267 The generation of a significant quantity of electricity from the solar array will offset electricity generated from other sources. As the project is connected to the local electricity distribution network (operated by Northern Powergrid), electricity generated by the Site will be typically consumed within the distribution network. This means that whilst the solar array is generating electricity, the equivalent amount of electricity is not imported into the distribution network from the National Grid. This in turn reduces the demand on the large power stations.

268 As renewable energy is prioritised above fossil generation, demand on traditional coal and gas generators is therefore reduced.

269 Different organisations have historically made differing assumptions for calculating the emissions offset by renewable energy generation, varying in their view of the power generation technology that is actually offset.

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

271 The National Grid itself is dynamic and electricity is sourced from a variety of generators including coal, gas, oil, nuclear and renewable energy. Electricity is also imported from overseas. It would therefore be incorrect to base any emissions offset calculation upon a single source of energy.

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

273 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.

274 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.

275 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 they can be considered conservative as this mix includes for renewable energy sources and renewable energy generation is not used to offset itself

276 The last published (June 2022) conversion factors are for 2022, and provide the most up to date figures as shown in **Table 4**.

Table 4 - *GHG Conversion Factors 2022*

	kgCO_2e/kWh
Electricity Generation	0.19338

277 On this basis, the electricity produced by the Three Oaks Solar Farm will offset 34 700 000kWh x 0.19338kgCO_2e/kWh = **6 710 000 kg CO_2/annum or 6 710 Tonnes CO_2 per annum to 3 S.F**.

Energy Tariffs and Electricity Bills

278 Until 2016 there were three mechanisms for promoting renewable energy in the UK: the Renewables Obligation, Feed-in Tariffs (for small to medium scale schemes) and Contracts for Difference for larger scale projects. These schemes are funded through the electricity retail market and are not supported through the UK Treasury.

279 These mechanisms have successfully stimulated the development of the renewable energy industry without the need for capital development grants.

280 It was announced in March 2020 that onshore wind and solar would be granted access to the Contracts for Difference (CfD) auctions from 2021. However the Three Oaks Renewable Energy Park will be developed without support from the CfD. As a result, the proposed development will be operated on the open market at market rate electricity prices. As such, there will be no impact on electricity bills from this scheme other than to reduce reliance on fossil fuels.

281 It is clearly good news for the bill payer if projects can operate outwith these previous support structures. However, this means that the sites are far more exposed than previously to the wholesale cost of electricity, which across 2021 increased substantially (as shown in **Plate 19 on page 49**), and resulted in the collapse of many energy suppliers. It was reported in November 2021 that 27 UK energy suppliers failed since January 2021 (Guardian, 2021a). The market cost of electricity is continuing to rise in 2022.

282 As stated in **Paragraph 280**, it is very important to note that this development, if approved and when built, will not receive a feed-in tariff, subsidy or public funded support. It is therefore entirely a privately funded scheme to increase the amount of locally generated renewable electricity.

283 The renewable energy park will connect to the local electricity distribution network (i.e 'local grid') at 66kV in the north of the site. This is important to note as it means that the electricity generated by the solar farm will typically offset electricity imported from the National Grid. Therefore, the electricity is helping to reduce the carbon emissions that are associated with electricity consumers on the local distribution network.

284 According to National Grid, 2020 was the greenest year on record for Britain's electricity system. Solar power set records for its highest ever level of generation (9.7GW) and its highest share in the electricity generation mix (34%) – comfortably providing a third of

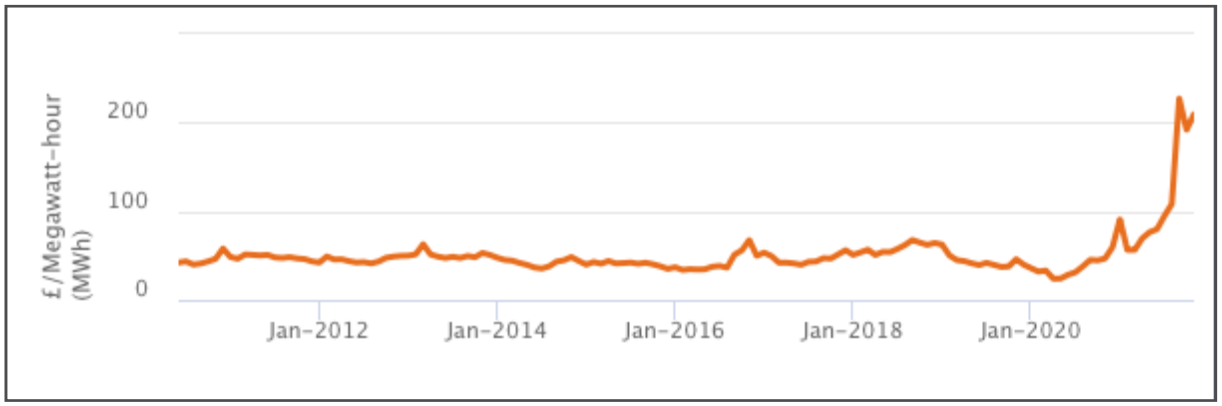


Plate 19 - *Wholesale Electricity Market Prices - June 2010 to November 2021 (Ofgem, 2021a)*

Britain's electricity supplies on several occasions in May (National Grid ESO, 2021).

285 2021 continued to break records with the all-time lowest carbon intensity (the measure of carbon dioxide emissions per unit of electricity consumed) electricity generation being recorded on Monday 5th April 2021. On this day, wind turbines and solar panels were generating 60% of the nation's electricity (The Guardian, 2021b).

286 Wholesale energy costs are at an all-time-high, as shown **on page 46Plate 19 on page 49** with the root cause of the high prices being the cost of gas, set on the international market. This has knock on impacts to the energy price cap (the maximum annual energy cost projected by the Government and calculated by Ofgem), which is at its highest ever level. To move away from reliance on gas and impacts of the market price, alternative energy sources, such as the Three Oaks Renewable Energy Park, are required. The more renewables there are, the less gas would be required, which as a consequence leads to a reduction in wholesale electricity prices.

Public Attitudes

287 Solar energy has been utilised in the UK for several decades, from around the late 1970s. The deployment of solar energy has grown markedly in recent years, particularly in respect of larger scale projects of photovoltaic (PV) solar panels for electricity (rather than heat) generation. This is due to the reduction in costs across the solar PV supply chain, and the changing political climate recognising the need for renewable energy generation in the UK.

288 There is currently over 13 645 MWp of installed solar photovoltaic capacity in the UK (DBEIS, 2022). UK-wide attitude surveys consistently suggest support for solar farms is widespread.

289 Research into public values, attitudes and acceptability by Butler *et al* for the UK Energy Research Council in July 2013 found that 61% agree that promoting renewable energy sources, such as solar and wind power, is a better way of tackling climate change than nuclear power. Also it was found that '*solar energy is highly favourable and positively associated with clean energy futures*'. These findings are part of a wider assessment which gathered information over three phases: firstly stakeholder interviews, then public workshops, followed by a national online survey.

290 Public opinion surveys are consistent with the quarterly Public Attitude Trackers published by the Department for Business, Energy and Industrial Strategy. The latest of these reports from December 2021 (DBEIS, 2021g) found strong support for renewable energy:

'In Autumn 2021, support for using renewable energy such as wind power, solar energy and biomass to provide electricity, fuel and heat was high at 87%, including 54% of people saying they strongly supported this. Just 1% of people said they opposed renewable energy'.

291 The tracker also looked at opinion of individual renewable generation types. Solar received the greatest support with 55% strongly supporting and 35% supporting solar (90% support in total).

292 RenewableUK (2021) commissioned a YouGov Poll to explore public attitudes to renewable energy in light of the Government suggestion of a

'green recovery' from the economic downturn as a result of the Covid-19 pandemic measures. This poll found that people overwhelmingly support the prioritisation of renewable energy investment, considerably more than any other aspect of the 10 Point Plan for a Green Industrial Revolution. Five times as many people support the prioritisation of renewable energy than any other part of the 10 Point Plan (45% v 9%), as shown at **Plate 20 on page 51**.

293 Most recently, Solar Energy UK commissioned Copper consultancy to study public attitudes to solar energy (2022). This study found that the majority of people surveyed support the development of solar farms in their areas. Also, of those whose view has changed since the installation of a solar farm in their local area, significantly more are more supportive (17%) rather than more opposed (2%).

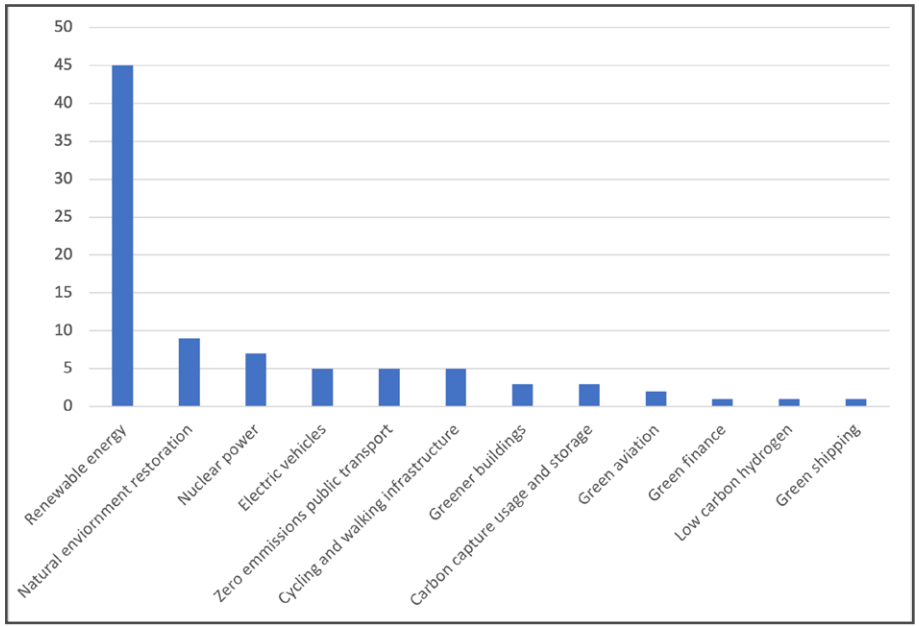


Plate 20 - *Percentage of Public Who Consider Each Respective 'Green Sector' as Their First Priority for Government Investment (RenewableUK, 2021)*

Pre-Application Public Consultation

294 In advance of the planning application submission, consultation was undertaken with the local community. To open public consultation, Ridge Clean Energy set up a website, https://ridgecleanenergy.com/threeoaks/, which detailed the scheme and provided a means of contacting the Developer with questions, throughout the environmental assessment process.

295 Over 600 newsletters were provided to the local residents and businesses nearby the proposed application boundary. The leaflet provided key details of the proposal and invited residents to attend on of two public consultation events where the proposal would be presented and there would

be an opportunity for questions to the development team.

296 A copy of the documents provided to the development neighbours through this process is contained at **Appendix 10 - Public Consultation**.

297 The address data was based upon Royal Mail/Ordnance Survey Addresspoint data, which is based upon the latest mapping combined with Royal Mail Postcode Address File data.

298 The two public exhibitions were held on Tuesday, 15th February, 2022 in the Village of Carnaby and on Wednesday, 16th February in the Village of Burton Agnes.

299 A copy of the exhibition boards available during the online event is provided at **Appendix 10 - Public Consultation**. On leaving the exhibition, attendees were requested to complete an exit survey feedback form and provided with the opportunity to ask further questions or make comments. A tally is provided of the responses to the first question in **Table 5 on page 52**.

300 A summary of the questions raised and responses provided during the events, with cross references to the relevant section where matters raised have been addressed in this Environmental Report, are provided in **Table 6 on page 53**.

Table 5 - *Feedback Form Question Response*

Question	Yes	No	Don't Know	Neutral
Do you support renewable energy development?	8	0	1	0

301 It can be seen from **Table 5 on page 52** that exhibition attendees who expressed an opinion were notably in support of renewable energy development. The comments recorded from those who completed the comments section of the Feedback Form as presented in **Table 6 on page 53** principally focussed on the proposed community benefits. Comments regarding landscape and ecology are addressed within the relevant Appendix. Following comments raised regarding the originally proposed access route using West Backside, the access route was amended to instead follow the unnamed road to the west of the site (USRN: 45908633) to alleviate these concerns.

302 One question was raised regarding radiation, which has not been raised elsewhere within this environmental report - the development and equipment used will comply with statutory standards on electromagnetic emissions. Sources of ionising radiation are not standard in a Renewable Energy Park. Two supportive comments were made regarding the community consultation itself. There are no outstanding comments from the public consultation that have not been addressed in this Environmental Report and accompanying Planning Statement.

Table 6 - *Comments Received from the Exhibition Feedback Forms*

Question	Comment	ER Cross Reference
Do you have any comments or questions?	Just to check about radiation and how many metres does the radiation affect?	-
	Question over access route to West Back Side - we enjoy bike rides, pony rides and dog walk up there with the children.	Construction, Traffic and Transport from paragraph 192 on page 39.
	Access to the site should be via Thornholme and not West Back Side, Haisthorpe. Would cause too many problems.	Construction, Traffic and Transport from paragraph 192 on page 39.
	Microgrid to sustain local energy needs.	Connection arrangements are discussed from paragraph 85 on page 13.
	Could you widen the 3km radius residential area of benefit to include the whole of Rudston village.	Community Benefits - from paragraph 316 on page 56.
Do you have any comments to inform the ES studies and assessments?	Not to disturb the natural flora and fauna.	Appendix 5 - Ecology.
	We think that it would be nice to have a footpath/cyclepath from Haisthorpe to Carnaby to enable to walk to the local restaurant. Resurface of Lowfield Lane.	Community Benefits - from paragraph 316 on page 56.
	We would support a footpath from Haisthorpe to Carnaby.	Community Benefits - from paragraph 316 on page 56.
	Look after the wildlife.	Appendix 5 - Ecology.

Question	Comment	ER Cross Reference
How do you feel our support could benefit the local community?	Recreational place in village (Haisthorpe).	Community Benefits - from paragraph 316 on page 56.
	I think the path would be a good addition to the village, I also think development of the Methodist Church to make it a community hub - craft sessions, pop-up pub/restaurant, meetings.	Community Benefits - from paragraph 316 on page 56.
	Microbrewery in Woldgate Methodist Church.	Community Benefits - from paragraph 316 on page 56.
	Enhancing community facilities and community solar power generation.	Community Benefits - from paragraph 316 on page 56.
	Good idea of annual cheques.	Community Benefits - from paragraph 316 on page 56.
Any other comments:	Would like to keep our village calm and peaceful	Appendix 6 - LVIA & Construction, Traffic and Transport from paragraph 168 on page 35.
	We appreciate the communication and hope this continues through the process	-
	Would be nice to see beehives (Hornsea beekeepers), flower diversity/hedges to allow wildlife in the area	Appendix 5 - Ecology.
	My grandson just hopes that all the wildlife issues are followed through	Appendix 5 - Ecology.
	Solar panels on existing buildings could be supported by your community fund	Community Benefits - from paragraph 316 on page 56.
	Very interesting, informative and a good way forward	-

Rural Diversification

303 Rural diversification has become an important source of support and income for a large proportion of the UK's farms, allowing farmers to continue to manage the countryside.

304 DEFRA figures for 2018/19 show that 46% of farm businesses in England have some diversified activity other than letting buildings (DEFRA, 2019a).

305 A report by the National Farmers Union (NFU) Mutual, 2019, found that approximately 29% of already diversified farms chose renewable energy. The case study provided a common reason for choosing to diversify:

'The main reason for diversifying is because relying on income based purely on agriculture made us too vulnerable so I wanted to spread the risk and bring some financial stability'.

306 The importance of supporting a prosperous rural economy is highlighted within National Planning Policy Framework (MHCLG, 2021) at Paragraph 84:

'Planning policies and decisions should enable:

a)...

b) the development and diversification of agricultural and other land-based rural businesses;

c)...'

307 In providing a source of diversification this proposal will provide a means to maintain the current and develop the future farming practices, and overall diversify the operations of the farm ensuring the long-term viability of the farm and associated benefits for the local rural economy.

308 Income to farms is just one important aspect of farm diversification. Pressure is also coming from the retail sector as suppliers source from low carbon farms to assist with the carbon labelling of their products. Examples of this include Sainsbury's, who have pledged to become carbon neutral by 2040 and as part of this require their suppliers to make their own carbon reductions (Sainsbury's, 2020). Similarly, Tesco has pledged to be a zero-carbon business by 2050. Focusing initially on their own operations this company is also working with their suppliers to do the same. This involves the encouragement of a low carbon strategy down the entire supply chain to the agricultural sector (Tesco, 2020).

309 To diversify into renewable energy is therefore of significant benefit to a farm, through the association of its produce with low carbon energy production.

OPTIMISING LAND USE

310 DEFRA's *'Farming statistics - final crop areas, yields, livestock populations and agricultural workforce at 1 June 2021'* (2021) finds that the total UK utilised agricultural area has remained relatively stable, between 17 and 18 million hectares since 2000. In this period the number and scale of ground mounted solar arrays has increased but it can be seen that this does not significantly affect the useable area for agriculture.

311 Of greater interest is the Building Research Establishment publication 'Agricultural Good Practice Guidance for Solar Farms' (BRE, 2014a). This finds that:

'The developer, landowner and/or agricultural tenant/licensee may choose to graze livestock at higher stocking densities throughout the year over much of the solar farm,

especially where the previous land use suggested higher yields or pasture quality. Between 4 and 8 sheep/hectare may be achievable (or 2-3 sheep/ ha on newly-established pasture), similar to stocking rates on conventional grassland, i.e. between about March and November in the southwest'.

312 The BRE also advocate free-range poultry or beekeeping as productive options and stress that solar farms may actually enhance the agricultural value of land. In the BRE NSC Biodiversity Guidance for Solar Developments (2014b) the benefits of solar farms on land quality are discussed. As the physical impact of solar farms on the ground is very small, resting land around the solar panel frames by setting to grass and possibly grazing can have benefits for soil health, especially where soil has been exhausted of nutrients and compacted by farm machinery. In addition, there may be less carbon released from the land when it is less intensively managed. There is also evidence that soil moisture is better retained on fields with solar panels, and less prone to effects of climate change extremes (Adeh, Selker and Higgins, 2018).

313 As a result of resting the land from intensive agriculture for the life of the proposed solar farm, measurable benefits for biodiversity and soil health could be achieved.

Local Contractors

314 Materials and services for the proposal will be sourced, where practical, from suitably qualified local and regional contractors. This would require services / materials from the following sectors:

- Civil engineering design and construction companies;
- Geotechnical ground investigations;
- Design and construction of on-site contestable electrical networks;
- Quarries and concrete suppliers;
- Road haulage companies;
- Plant hire companies; and
- Ancillary and tertiary impacts relating to supplies, accommodation, catering, etc.

Business Rates

315 From April 2013, business rates income from new renewable energy projects can be retained by the Local Planning Authority.

Community Benefit Fund

316 Whilst not a planning matter, the developer is proposing to set up a Community Benefit Fund for the 40 year lifetime of the Renewable Energy Park.

317 The administration of these funds will be managed locally by local people, as the local community are best placed to decide how this money could be utilised. The fund would primarily be available to the parishes of Carnaby and Burton Agnes.

318 The fund could be used for a range of projects for local benefit, from energy saving measures in local homes or provision of electric car charging points at community buildings, to the provision of play equipment at local parks or funding tree planting. In addition, the development and community fund can facilitate educational sessions

with local schools and site visits to the renewable energy park.

319 Further discussion with the Parish Council and local residents would commence post planning consent, should it be granted.

320 Ridge Clean Energy is fully aware of the impact the current energy crisis is having on people. On completion of the project, funding will be made available to nearby households to contribute to energy bills.

Ridge Clean Energy Community Hub

321 Ridge Clean Energy believes that communities should share the progress and advantages of a renewably-powered future. The company takes an innovative approach to development, with sensitivity and collaboration at the heart of their work.

322 The developer's mission is centred on net zero beginning within the local community, with a core part of their work being the creation of local initiatives that will have an enduring, positive impact.

323 Ridge Clean Energy works with local groups and leaders to identify community needs and opportunities for support. Their focus centres on addressing local needs at a local level, as well as encouraging a community in its path to net zero.

324 A key objective of the Three Oaks Renewable Energy Park proposal will be to engage community voices who will guide their efforts to bring meaningful impact for the local area. Such a project could include the provision of electric minibuses for school and community transport; the enhancement and re-purpose of a community building to support local groups and initiatives; electric vehicle charging points; or any other tangible, environmentally-positive development that aids a local need.

ENVIRONMENTAL IMPACTS SUMMARY TABLE

325 The following table (**Table 7 on page 59**) provides a summary of the findings of the environmental studies undertaken for the application and described in this document. It provides data on any proposed mitigation measures and the residual impacts of the proposal once these measures have been implemented. Where, for clarity, any text has been added to that quoted from the assessment report, this is included in square brackets.

Table 7 - *Environmental Impacts Summary Table*

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Agricultural Land Classification	The presence of the solar PV confers benefits to arable land through an extended fallow period.	The development proposed does not result in loss of agricultural land resource, and agricultural production, though restricted, can continue through the duration of the Solar PV development.
Construction, Traffic and Transport	Construction Transport Management Plan to be agreed with East Riding of Yorkshire Council	The construction movements are anticipated to occur over 9-months. The total number of HGV movements (including for deliveries and vehicles leaving site) is 1 842 across the nine month construction period, equating to an approximate daily average of 9 movements per day.
Flood Risk and Surface Water Drainage	The use of vegetation below the panels will also enhance infiltration, retention, detention and soil erosion protection, while also promoting evapotranspiration. It is also not proposed to formally drain the access tracks that will be constructed around the site. They will be created with permeable materials (e.g. gravel, grass-crete) such that rain falling on these areas will act as greenfield condition. The battery storage area at the north of the site which will also contain customer cabin, customer substation and transformer station will be created using a crushed stone / gravel so that rain falling on this area will act as greenfield condition.	The impact on site runoff will be minimal. Local effects will be managed through the use of planting. It is concluded that the proposed development is appropriate for the flood risk and is not expected to increase the risk of flooding elsewhere.

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Ecology and Ornithology	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. 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. A Breeding Bird Protection Plan (BBPP) should be developed and implemented [to avoid disturbance during the breeding season]. 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. Badger surveys should be undertaken prior to construction (to inform the need for any mitigation measures),	A Biodiversity Management Plan will deliver a net gain of 69% in habitat units and 28% hedgerow units. Overall, with the proposed mitigation in place, there would be no significant residual ecological effects from the proposed solar farm.

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Landscape and Visual	A number of mitigation measures have been incorporated into the site selection, design and construction of this proposed development which will limit the effects on landscape and visual amenity. These include: • Site location – outside any national landscape designations, thereby avoiding the more sensitive and valued landscapes. • Site access - utilising the existing vehicular access track off the A614 to the west of the site (rather than the lane through Haisthorpe), thereby avoiding the routing of construction vehicles close to residential properties and minimising the need to remove existing field boundary and roadside hedgerows and the consequential effects on landscape fabric. • Protection of existing features – using temporary protective fencing to protect hedgerows, trees and other features of ecological, cultural heritage and/or landscape value on the site during the construction phase. • Internal access tracks – crossing the Parish boundary where only 5 m of existing hedgerow will need to be removed.	Please refer to the LVIA Conclusions provided from **Paragraph 228 on page 42**.

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Landscape and Visual (continued)	• Solaar PV arrays – locating these within the existing fields, thereby avoiding the need to remove any hedgerows or disrupt the field pattern. • Substation and BESS compound – locating this adjacent to the existing 66kV overhead electricity line, within a valley in the centre of the site and away from public rights of way and residential properties, keeping the infrastructure to 5 m or below and setting these into the slope, thereby limiting the height and effects of these elements on landscape character and visual amenity. • Services – laying all services underground. • Lighting – no permanent external lighting is proposed, with safety lighting lit only as and when needed, such as to provide lighting for maintenance visits after dark (eg on winter afternoons). • Site restoration – at the end of the construction phase all areas disturbed by the works will be restored which will minimise the footprint of the development and the long-term effects on landscape and visual amenity. • Decommissioning – at the end of the operational phase which will restore the site to agricultural use.	

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Landscape and Visual (continued)	• The landscape and biodiversity mitigation, enhancement and management proposals appropriate for this site [include]: • Shelterbelt of trees to the north of the site, alongside Woldgate and within the site alongside the substation compound to help screen the substation and BESS compound. • New field boundary hedgerows with hedgerow trees around the northern, eastern and part of the southern boundary of the site. • New hedgerow planting to replace the short lengths of hedgerow removed along the western boundary for the site entrance and passing places. • New hedgerow planting with hedgerow trees to gap up the existing hedgerow along the Parish boundary through the centre of the site. • New hedgerow planting around the substation and BESS compound. • Species-rich meadow across the entire site within the perimeter fencing including beneath the solar PV arrays (but not within the substation and BESS compound).	

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Landscape and Visual (continued)	• Adjusting the hedge cutting regime of the existing hedgerows along the western and part of the southern boundary. These are mainly hawthorn and species poor but, by adjusting the maintenance regime, they will grow taller and will be maintained at a height of approximately 3m for the lifetime of the proposed development to better screen the site. • A maintenance regime for the new hedgerow planting that, once established, will be maintained at a height of approximately 3m for the lifetime of the proposed development.	
Cultural Heritage	Mitigation options, such as design solutions to avoid archaeological remains, and/or a programme of archaeological investigation will be developed in consultation with the LPA Archaeologist and in line with the requirements of the NPPF. Maintaining or improving the hedged boundaries between the study site and the built heritage assets, would soften the appearance of the solar panels. These would need to be in keeping with the existing species and style of hedging to avoid drawing further attention to the proposed development.	[The mitigation measures associated with archaeology will be developed to address any potential impacts.] Two of the Listed Buildings, Manor Farmhouse at Low Fields Lane and Manor Farmhouse, Thornholme, have limited settings and no intervisibility and the impacts are therefore negligible. The Listed Haisthorpe Hall and non-designated White House Farm derive value from their architecture and spatial arrangement, which will not be impacted. Intervisibility is limited and the proposed development is a minor impact on their wider setting. The architectural and historic significance of the Former Primitive Methodist Chapel will not be impacted. The proposed development will not impact the chapel's distinct setting within Haisthorpe but will be a minor change to its less significant wider rural setting.

Topic	Mitigation / Improvement Measures Proposed	Residual Impacts Anticipated Post Mitigation
Noise	None.	Overall, the calculations indicate that operational noise from the renewable energy park during the likely operating hours would be relatively low in absolute terms and an assessment using the Governments' planning guidance would indicate no observed adverse effect.
Glint and Glare	Measures include native hedgerow planting along the southern boundaries and along a southern section of the eastern boundary of the Proposed Development and maintained to a height of 2.5 - 3m.	The effects of glint and glare and their impact on local receptors has been analysed in detail and the impact on all receptors is predicted to be None.
Socio-economic		Production of 34 700 000kWh (net) of electricity per annum (to 3 s.f.). Equivalent to 8 620 average East Riding of Yorkshire households. Offsetting equivalent to 6 710 tonnes (to 3 s.f.) of CO_2 per annum, as well as other pollutants associated with fossil fuel power generation. Materials and services for the proposal will be sourced, where practical, from suitably qualified local and regional contractors. All of the business rates income from new renewable energy projects, including solar, can be retained by the local planning authority. A community benefit fund will be made available for the lifetime of the Renewable Energy Park. Funding will be made available to nearby households to contribute to energy bills.

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