



Byers Gill Solar

EIA Scoping Report

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1 Introduction

1.1 Purpose of this report

- 1.1.1 JBM Solar (the Applicant) has commissioned this Environmental Impact Assessment (EIA) Scoping Report (EIA Scoping Report) for Byers Gill Solar Farm (the Proposed Development). The Proposed Development is a renewable energy scheme comprised of solar photovoltaic (PV) modules, on-site energy storage, associated infrastructure as well as underground cable connections between panel areas and to connect to the existing National Grid Substation at Norton. The Proposed Development will have the capacity to generate over 50 Megawatts (MW) alternating current (AC) of electricity.
- 1.1.2 In accordance with Regulation 8(1)(b) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations)¹, the Applicant confirms that an Environmental Statement (ES) will accompany a Development Consent Order (DCO) application to be submitted to the Planning Inspectorate (PINS) for the Proposed Development.
- 1.1.3 This EIA Scoping Report has been prepared to support an application for a Scoping Opinion from the Secretary of State (SoS) for Business, Energy and Industrial Strategy (BEIS), for the purposes of Regulation 10 of the EIA Regulations for the Proposed Development.
- 1.1.4 The purpose of this EIA Scoping Report is to establish the scope, including content and extent of matters which should be covered in an ES to be prepared and submitted for the Proposed Development. It has been prepared in accordance with PINS Advice Note Seven² for all environmental factors (topics) set out in the EIA Regulations.

1.2 The Applicant

- 1.2.1 The Applicant is a leading independent solar and battery energy storage developer with one of the largest development pipelines in the UK. The highly experienced JBM Solar team has been developing projects in the UK since 2012 and have achieved consent for projects delivering over 1.2 Gigawatt (GW) of generating capacity across the UK and Ireland.
- 1.2.2 The Applicant is currently developing a pipeline of solar and solar with storage projects with a potential generating capacity in excess of 4GW in the UK by 2025. In addition to the 800MW consented in the UK in the last 24 months, JBM Solar have an additional 350MW already in the planning system across 11 sites and a programme to submit in excess of 500MW in the coming year.

1.3 Background

- 1.3.1 The Proposed Development is a renewable energy scheme comprising of solar PV modules, underground cables, on-site Battery Energy Storage

¹ Her Majesty's Stationary Office (HMSO) (2017). *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>

² PINS (2018). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

Systems (BESS) and associated infrastructure. The Proposed Development is located in the north-east of England, within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council (see Figure 1.1).

- 1.3.2 The need for the Proposed Development is built upon the contribution of the Proposed Development to meet national policy targets for decarbonisation, including meeting Net Zero targets, safeguarding energy supply and ensuring affordability.
- 1.3.3 The National Policy Statements (NPS) were established against legal obligations made as part of the Climate Change Act 2008³, as amended by the 2050 Target Amendment Order 2019⁴, for the UK to meet Net Zero Greenhouse Gas (GHG) emissions by 2050. The NPS set out a case for the need and urgency of new energy infrastructure, to support government policy on sustainability development.
- 1.3.4 The Energy Security Strategy⁵ produced by the UK Government in April 2022 announced the intent to increase solar capacity in the UK from 14GW to 70GW by 2035. In addition, the Energy White Paper: Powering our Net Zero Future⁶ outlined the need to '*build back greener*' following the impact of Coronavirus, addressing the inter-generational challenge of climate change. The White Paper identifies the UK Government's aim for a fully decarbonised, reliable and low-cost power system by 2050.
- 1.3.5 The overall area of the Proposed Development would be approximately 552 hectares (ha) and it would have the capacity to generate over 50MW of electricity. The solar PV modules would be split across six solar PV module areas of varying sizes, with approximately 15 kilometres (km) of 33 kilovolt (kV) underground cables connecting the solar PV module areas together. The Proposed Development would be connected to the existing National Grid Substation at Norton via approximately 12km of underground 132kV cables. The exact route of the underground cables is to be determined as the design of the Proposed Development develops. The cable routes may run along existing roads or may be installed off-road, however, both options are included within the planning boundary (Site Area) (see Figure 1.2). The solar PV modules would be supported by approximately 41 shipping-style containers located across the Site Area, which would house equipment such as inverters, transformers and battery stations. Each solar PV module area would also have a switchgear and a communications and weather mast up to 5 metres (m) in height.
- 1.3.6 In addition to the solar PV module areas and associated equipment, the Proposed Development would include a substation and on-site BESS. Other supporting infrastructure would be located throughout the Site Area such as fencing and gates, closed-circuit television (CCTV), lighting, access tracks, drainage and container storage. Mitigation and enhancement measures

³ HMSO (2008). *Climate Change Act 2008*. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents>

⁴ HMSO (2019). *The Climate Change Act 2008 (2050 Target Amendment) Order 2019*. Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111187654>

⁵ Department for Business, Energy and Industrial Strategy (2022). *Policy Paper: British energy security strategy*. Available at:

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

⁶ HM Government (2020). *Energy White Paper: Powering our Net Zero Future*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

would be provided throughout the Site Area as necessary and appropriate, with further detail on these to be developed in future iterations of the design of the Proposed Development.

- 1.3.7 A full description of the Proposed Development is provided in Chapter 2 of this EIA Scoping Report.

1.4 The need for EIA

- 1.4.1 As the Proposed Development comprises the construction or extension of a generating station and will have a capacity of more than 50MW, it is considered to be a Nationally Significant Infrastructure Project (NSIP) under Section 14(1)(a) and Section 15(2) of the Planning Act 2008 ('the Act')⁷.
- 1.4.2 Therefore, the Proposed Development requires a DCO to be submitted to the SoS for BEIS for determination.
- 1.4.3 In relation to NSIPs, an EIA is required for certain developments under the EIA Regulations.
- 1.4.4 The EIA Regulations identify which developments are required to undergo EIA, and these are listed under either 'Schedule 1' or 'Schedule 2' of the EIA Regulations. Those developments listed under 'Schedule 1' must always be subject to EIA and 'Schedule 2' developments are only subject to EIA should it be judged, in accordance with Regulation 3 (1), that the development is '*likely to have significant effects on the environment by virtue of factors such as its nature, size or location*'. Schedule 3 of the EIA Regulations provides the selection criteria for screening.
- 1.4.5 The Proposed Development is categorised as 'Schedule 2' development under Paragraph 3(a) of Schedule 2 of the EIA Regulations, as it comprises of '*industrial installations for the production of electricity, steam and hot water*'. It must therefore be considered whether, under the criteria of Schedule 3, the Proposed Development constitutes EIA development.
- 1.4.6 The Applicant considers that due to the size, nature, and location of the Proposed Development, it has the potential to have significant effects on the environment and that an EIA will be required. Accordingly, under Regulation 8(1)(b) of the EIA Regulations the Applicant wishes to confirm to the SoS that an ES will be submitted with the DCO Application.
- 1.4.7 The stages of the DCO EIA process includes:
- Screening (discretionary);
 - Scoping (discretionary) (this stage);
 - Preparation of a Preliminary Environmental Information Report (PEIR)– required for Statutory Consultation; and
 - Preparation of an ES.

⁷ HMSO (2008). *The Planning Act 2008*. Available at: https://www.legislation.gov.uk/ukpga/2008/29/pdfs/ukpga_20080029_en.pdf

1.4.8 Further details on the approach to EIA for the Proposed Development is provided in Chapter 4 of this EIA Scoping Report.

1.5 Planning policy context

National policy

1.5.1 NPS are the primary policy basis for NSIP development and the SoS is directed in the Act to determine a DCO application in accordance with the relevant NPS.

1.5.2 While there is no technology specific energy NPS for solar developments, the Overarching NPS for Energy (EN-1)⁸ is considered of relevance in relation to overall need, assessment principles and generic impacts of the Proposed Development. Given the lack of technology specific NPS, the SoS is directed under Section 105 of the Act to determine such DCO applications with regard to any local impact report and other matters which the SoS considers of relevance and importance to the decision.

1.5.3 In the absence of a technology-specific NPS, the following NPSs will be important contain relevant considerations for the Proposed Development: NPS EN-1 (as mentioned above), NPS EN-3 Renewable Energy Infrastructure⁹, and NPS EN-5 Electricity Networks¹⁰.

1.5.4 These NPS are currently being updated and revised Draft NPS were published in September 2021, followed by a national consultation in November 2021. That consultation confirmed that the original suite of energy NPS remains the primary policy for any DCO application accepted prior to the revised NPS being designated.

1.5.5 In addition, the updated Draft NPS included a significant change to NPS EN-3, which included specific policies for solar development (paragraphs 2.47-2.54).

1.5.6 Given the importance and relevance of these NPS, the EIA approach adopted takes account of these adopted and emerging NPS documents; as well as national and local planning policy, and supplementary guidance.

1.5.7 The National Planning Policy Framework (NPPF) (2021)¹¹ sets out the Government's planning policies for England and how these are expected to be applied. The NPPF does not contain specific policies relating to NSIPs. However, as set out in Section 105 of the Act, the SoS may consider the policies of the NPPF to be material to the determination of the Proposed Development. These policies will be considered where relevant.

⁸ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

⁹ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

¹⁰ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

¹¹ Ministry of Housing, Communities & Local Government (now Department for Levelling Up, Housing and Communities) (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

Local policy

1.5.8 The Proposed Development is located within three Local Planning Authority (LPA) administrative boundaries, Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. The majority of the Proposed Development, including the solar PV module areas, substation and on-site BESS are located within the administrative boundaries of Darlington Borough Council and Stockton-on-Tees Borough Council. However, in the northern extent of the Site Area, part of the cable routes crosses into the administrative boundary of Durham County Council. Therefore, under Section 43 of the Act, all three LPAs would be defined as ‘host’ authorities. The relevant local planning policy from each LPA would be considered, as set out below.

Darlington Borough Council

1.5.9 The Development Plan in Darlington comprises the Local Plan (2016-2036)¹², adopted in February 2022 and the Tees Valley Joint Minerals and Waste Development Plan Documents (DPD), adopted 2011¹³. This is a Joint Plan with four other LPAs grouped as ‘Tees Valley’, which are: Hartlepool; Middlesbrough; Redcar and Cleveland; and Stockton-on-Tees. The Joint Minerals and Waste DPD comprises three documents:

- Tees Valley Joint Minerals and Waste DPD – Core Strategy;
- Tees Valley Joint Minerals and Waste DPD – Policies and Sites; and
- Tees Valley Joint Minerals and Waste DPD– Safeguarding Areas.

1.5.10 The Middleton St George Neighbourhood Plan (2022-2036)¹⁴ was approved via a referendum in August 2022 and has been adopted by Darlington Borough Council to aid in planning application decisions.

1.5.11 There are two Supplementary Planning Documents (SPD)¹⁵ adopted in Darlington which may be of relevance to the Proposed Development, relating to design and planning obligations.

Stockton-on-Tees Borough Council

1.5.12 The Development Plan in Stockton-on-Tees comprises the Local Plan¹⁶ adopted January 2019 and the Tees Valley Joint Minerals and Waste DPD adopted September 2011. As mentioned above, this is a joint plan with four LPAs.

1.5.13 There are two designated Neighborhood Plan Areas in Stockton-on-Tees, however, neither area currently have a recent draft or made plan.

¹² Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

¹³ Tees Valley Joint Council (2011). *Tees Valley Joint Minerals and Waste Development Plan Documents*. Available at: <https://www.middlesbrough.gov.uk/planning-and-housing/planning/planning-policy/tees-valley-joint-minerals-and-waste-dpds>

¹⁴ Middleton St George Parish (2011). *Middleton St George Neighbourhood Plan*. Available at: <https://microsites.darlington.gov.uk/media/1681/oth2-middleton-st-george-neighbourhood-plan-march-2021.pdf>

¹⁵ Darlington Borough Council. *Supplementary planning documents*. Available online at: <https://www.darlington.gov.uk/environment-and-planning/planning/planning-and-environmental-policy/supplementary-planning-documents/>

¹⁶ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

Durham County Council

- 1.5.14 The Development Plan in County Durham comprises the County Durham Plan¹⁷ adopted October 2020. Whilst this plan includes waste policies, there remain 15 ‘saved’ Minerals Local Plan¹⁸ adopted December 2000 policies and 13 ‘saved’ Waste Local Plan¹⁹ adopted April 2005 policies which continue to form part of the Development Plan.
- 1.5.15 A Minerals and Waste Policies and Allocation Document is in development and was most recently consulted upon in September 2021.

1.6 Structure of the EIA Scoping Report

- 1.6.1 The EIA Regulations set out the requirements for an Applicant who proposes to request a Scoping Opinion from the SoS. Regulation 10(3) of the EIA Regulations requires an EIA Scoping Report to include:
- “a plan sufficient to identify the land;
 - a description of the proposed development, including its location and technical capacity;
 - an explanation of the likely significant effects of the development on the environment; and
 - such other information or representations as the person making the request may wish to provide or make.”
- 1.6.2 In accordance with the EIA Regulations, this EIA Scoping Report provides information to identify the location of the Proposed Development, including a plan. It also provides a description of the Proposed Development, its indicative layout and its technical capacity. Where aspects of the Proposed Development design remain subject to further assessment and option selection, this is identified. This EIA Scoping Report provides an explanation of the likely significant effects of the Proposed Development on the environment, setting out the proposed approach and methodology for further assessment. Finally, this EIA Scoping Report provides information and representations from the Applicant in relation to environmental assessment topics that it considers are not necessary to scope into further assessment.
- 1.6.3 This EIA Scoping Report is structured as follows:
- **Chapter 1: Introduction** (this Chapter) – Provides an introduction to the Proposed Development, the need for an EIA, and the purpose and structure of this EIA Scoping Report;

¹⁷ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹⁸ Durham County Council (2000). *County Durham Minerals Local Plan: Adopted Plan*. Available online at: <https://www.durham.gov.uk/media/3430/Minerals-Local-Plan/pdf/MineralsLocalPlan.pdf?m=636736392152370000>

¹⁹ Durham County Council (2005). *County Durham Waste Local Plan*. Available online at: <https://www.durham.gov.uk/media/3432/Waste-Local-Plan/pdf/WasteLocalPlan.pdf?m=636736392450600000>

- **Chapter 2: The Proposed Development** – Provides an overview of the Proposed Development, including construction, operation and decommissioning;
- **Chapter 3: Assessment of alternatives** – Describes the alternatives considered, and provides a narrative on how the Proposed Development has been developed to date’;
- **Chapter 4: Approach to EIA** – Sets out the requirements for scoping and where they are addressed in this report, the general approach to EIA, and provides definitions for some of the key terms used within the EIA process;
- **Chapters 5-9: Topics scoped in** - Sets out those environmental topics proposed to be included in the scope of the EIA, along with the methodologies and approaches to assessment proposed for those topics.
- **Chapter 10: Cumulative effects** - Sets out the proposed approach to the cumulative effects assessment;
- **Chapter 11: Topics scoped out** - Presents the topics proposed to be scoped out of the EIA with a justification provided for each;
- **Chapter 12: Structure and content of the Environmental Statement** - Presents the proposed structure of the ES; and
- **Chapter 13: Conclusion** – Provides a summary of this EIA Scoping Report and the issues to be scoped in/scoped out of the EIA.

1.6.4 Competent experts have prepared this EIA Scoping Report and will undertake the EIA and prepare the ES. The Applicant has engaged Ove Arup and Partners Limited (Arup) to complete the EIA and produce the ES. Arup holds the Institute of Environmental Management and Assessment’s (IEMA) EIA Quality Mark. See Section 4.6 of this EIA Scoping Report for further information.

1.7 Overview of proposed EIA Scope

1.7.1 An overview of the topics considered for the proposed scope of the EIA is presented in Table 1.1. For each topic, the potential for likely significant effects on the environment has been considered for the construction, operation, and decommissioning of the Proposed Development.

1.7.2 Construction effects relate to effects that arise as a result of the construction process. For example, the effects of access from construction vehicles, land take, and the effects of noise and dust from the use of construction plant and machinery. These effects tend to be temporary in nature.

1.7.3 Once constructed, the operational lifespan of the Proposed Development would be at least 40 years. Following the operational phase, the Proposed Development would require decommissioning. The Site Area would be returned to its original use as far as possible.

- 1.7.4 Where significant effects on the environment are likely, an assessment of the environmental effects and recommendations of mitigation measures for the topic will be taken forward for the EIA and presented in the ES.
- 1.7.5 The proposed scope of the EIA is set out in Table 1.1 and within subsequent chapters of this EIA Scoping Report to ensure compliance with government guidance that the ES should “ensure that all aspects of the environment likely to be significantly affected by the development are addressed” and, that “the scoping process is used effectively, ensuring that the EIA process is proportionate”²⁰.

Table 1.1 Summary of the proposed scope of the EIA

Environmental topic	Construction	Operation	Decommissioning	Location in EIA Scoping Report
Climate Change	Scoped in	Scoped in	Scoped in	Chapter 5
Biodiversity	Scoped in	Scoped in	Scoped in	Chapter 6
Landscape and visual	Scoped in	Scoped in	Scoped in	Chapter 7
Cultural heritage	Scoped in	Scoped in	Scoped out	Chapter 8
Land Use and Socio Economics	Scoped in	Scoped in	Scoped out	Chapter 9
Cumulative Effects	Scoped in	Scoped in	Scoped out	Chapter 10
Air quality	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.2
Arboriculture	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.3
Electric, magnetic, and electromagnetic fields	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.4
Glint and glare	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.5

²⁰ PINS (2018). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

Environmental topic	Construction	Operation	Decommissioning	Location in EIA Scoping Report
Ground conditions	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.6
Human health	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.7
Hydrology	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.8
Major accidents and disasters	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.9
Noise and vibration	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.10
Traffic and transport	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.11
Waste	Scoped out	Scoped out	Scoped out	Chapter 11, Section 11.12

2 The Proposed Development

- 2.1.1 This chapter provides a high-level description of the location of the Proposed Development and the surrounding area, as well as an overview of the Proposed Development including a description of its main components and an outline of construction, operational and decommissioning requirements. A detailed description of the existing baseline is provided within the topic chapters (Chapters 5 to 9 and 11).
- 2.1.2 PINS Advice Note Seven²¹ requires a scoping request to explain the approach to addressing uncertainty (where it remains) in relation to elements of the Proposed Development. This EIA Scoping Report is based on a preliminary design of the Proposed Development, which is subject to ongoing design development and will be refined in response to the environmental and technical factors as identified as part of the EIA process, as well as consultation responses.
- 2.1.3 The final proposals for the Proposed Development, for which consent will be sought, will be detailed in the ES and the DCO application.
- 2.1.4 The PINS Advice Note Seven also requires a scoping request to outline the reasonable alternatives considered and the reasons for selecting a preferred option. This information can be found in Chapter 3 of this EIA Scoping Report.

2.2 Site description

- 2.2.1 The Proposed Development is approximately 552 ha and comprises six solar PV module areas, as outlined in Table 2.1 and shown in Figure 2.1, within the administrative areas of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. The majority of the Proposed Development, including the solar PV module areas, substation and on-site BESS are located within the administrative boundaries of Darlington Borough Council and Stockton-on-Tees Borough Council. However, in the northern extent of the Site Area, part of the cable routes crosses into the administrative boundary of Durham County Council.
- 2.2.2 The Site Area includes the maximum extent of land that would be included within the DCO application for Proposed Development and considers land required for the solar PV modules, BESS, underground cables and associated infrastructure, as well as mitigation measures including biodiversity net gain, public rights of way (PRoW) and landscape design. The Site Area for the Proposed Development is shown in Figure 2.2.
- 2.2.3 The six solar PV module areas are described in the following section and presented in Figures 2.3–2.8. Key environmental designations are described below and are presented across Figure 2.9.

²¹ PINS (2018). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

Table 2.1 Overview of solar PV module areas

Solar PV module area	Size
Site A: Brafferton	114.34 ha
Site B: Hauxley Farm	52.51 ha
Site C: Byers Gill Wood	110.72 ha
Site D: Great Stainton	87.90 ha
Site E: West of Bishopton	26.64 ha
Site F: North of Bishopton	104.89 ha
Underground cables	55.19 ha

Site A: Brafferton

- 2.2.4 Site A: Brafferton (Site A) is located 5km to the north of Darlington. Site A lies within the Darlington Borough Council administrative area, with Brafferton village located immediately west. Figure 2.3 presents the location and layout of Site A.
- 2.2.5 The landscape features within Site A consist of agricultural fields interspersed with individual trees, hedgerow and farm access tracks. The hedgerows within Site A are a dominant feature and are mostly made up of thin lines of vegetation with sporadic trees present. The arable fields are of moderate size, some of which are of irregular shape. The landscape features immediately surrounding Site A comprise a number of small rural villages, including Brafferton to the north/west and Newton Ketton to the east and local farmholdings: Lovesome Hill Farm both within 100m north and west, High House 150m north, High Grange 500m north and East Ketton immediately south.
- 2.2.6 The local transport network comprises High House Lane located adjacent to the north-western boundary of Site A. Salters Lane is also adjacent to the eastern boundary. A railway line runs to the west, connecting Darlington and Durham.
- 2.2.7 Site A has a number of PRow running through or in the proximity of the Proposed Development as can be seen on Figures 2.3 and 2.9. This includes Bridleways 1, 4, 11, 13, and 14 and Footpaths 7, 8, 9, 10, 12, 15, 17, all within the Parish of Brafferton.
- 2.2.8 Within a 10km radius of Site A, there are seven Site of Special Scientific Interest (SSSI) and 13 Local Nature Reserves (LNR), the nearest designated sites are Redcar Field SSSI which is approximately 650m to the west of Site

A and Newton Ketton Meadow SSSI located approximately 900m to the east of Site A.

- 2.2.9 There are two Scheduled Monuments within 2km of Site A, the closest of which is Coatham Mundeville medieval village, fishpond and areas of rig and furrow (Ref 1016109). There are two Grade II Listed Buildings within the village of Brafferton, located west of Site A.
- 2.2.10 Site A is located entirely within Flood Zone 1, an area with a low probability of flooding from rivers and the sea.

Site B: Hauxley Farm

- 2.2.11 Site B: Hauxley Farm (Site B) is located 7.5km to the north-east of Darlington. Site B lies directly adjacent to the boundary of County Durham, and in the Darlington Borough Council administrative area. Figure 2.4 presents the location and layout of Site B.
- 2.2.12 The landscape features within Site B consist of agricultural fields and farm access tracks. The field boundaries are a mix of sparse or fenced hedgerows or trees. The arable fields are of moderate size. The landscape features immediately surrounding Site B comprise further agricultural land and local farmholdings: Oat Hill Farm immediately west, Stainton Hill House immediately north, Fir Tree Farm approximately 300m south-west and Hauxley Farm which lies in the centre of Site B.
- 2.2.13 The local transport network comprises Lodge Lane which makes up the northern boundary of Site B. The boundary of Site B encircles W S Hewitson & Son, an agricultural business.
- 2.2.14 PRoW that run in close proximity to the Proposed Development include Bridleways 11 and 13 and Footpath 12 within the Parish of Brafferton, as well as Footpaths 4 and 6 within the Parish of Great Stainton. These can be seen on Figures 2.4 and 2.9.
- 2.2.15 Within a 10km radius of Site B, there are five SSSI and 13 LNR, the nearest site is Newton Ketton Meadow SSSI located approximately 450m to the south of Site B.
- 2.2.16 There is one Scheduled Monument within 2km of Site B, Deserted village (Ref 1002335). There is one Grade II Listed Building adjacent to the northern boundary, Preston Lodge Farmhouse and Outbuilding Attached To Right.
- 2.2.17 Site B is located entirely within Flood Zone 1, an area with a low probability of flooding from rivers and the sea.

Site C: Byers Gill Wood

- 2.2.18 Site C: Byers Gill Wood (Site C) is located 6.6km to the north-east of Darlington. Site C lies within the Darlington Borough Council administrative area. Figure 2.5 presents the location and layout of Site C.

- 2.2.19 The landscape features within Site C consist of agricultural fields interspersed with woodlands. The woodlands are a dominant feature, weaving through the arable fields, including Byers Gill Wood and Square Wood within the centre of Site C, Galloping Hill Plantation located east, with Nova Scotia Plantation and Catkill Lane Plantations to the south. The landscape features immediately surrounding Site C comprise further agricultural land and local farmholdings: The Mount immediately east, Viewley Hill Farm 350m east, Long Pasture Farm 500m south east and Mount Pleasant Farm which lies in the centre of Site B.
- 2.2.20 The local transport network comprises Bishopton Lane which makes up the eastern boundary.
- 2.2.21 PRoW within proximity, or directly crossing the Proposed Development include Bridleways 13 in the Parish of Brafferton, 9 in the Parish of Barmpton and 6 in the Parish of Little Stainton, all of which connect. Footpaths of relevance include Footpaths 1, 2, 3, and 7 within the Parish of Little Stainton, as well as Footpath 7 in the Parish of Barmpton which meets Site C in the south. These can be seen on Figures 2.5 and 2.9.
- 2.2.22 Within a 10km radius of Site C, there are five SSSI and 13 LNR, the nearest site is Newton Ketton Meadow SSSI located approximately 100m to the west of Site C.
- 2.2.23 There is one Grade II Listed Building, Longpasture House With Barn On Left Return, to the south-west of Site C, adjacent to the area required for cable connections along Folly Bank.
- 2.2.24 Site C is located entirely within Flood Zone 1, an area with a low probability of flooding from rivers and the sea.

Site D: Great Stainton

- 2.2.25 Site D: Great Stainton (Site D) is located 6.8km to the north-east of Darlington. Site D lies within the Darlington Borough Council administrative area, with Great Stainton village 10m north-west. Figure 2.6 presents the location and layout of Site D.
- 2.2.26 The landscape features within Site D consist of agricultural fields, bordered by local roads to the west and north, footpaths and Little Stainton Beck watercourse to the south. Field boundaries are a mix of hedgerows and tree lines along watercourses. The landscape features immediately surrounding Site D comprise the small rural village Great Stainton, to the north-west of the Site Area and local farm holdings: Viewley Farm 250m west, Broad Lea farm 400m east, Woodgra Farm 300m east and Mount Pleasant Farm 250m south-west.
- 2.2.27 The local transport network comprises Elstob Lane and an unnamed B road, which make up the western and northern boundary respectively.
- 2.2.28 PRoW which cross or run in close proximity to Site D include Footpaths 3 and 4 in the Parish of Little Stainton, as well as Footpaths 3 and 8 in the Parish of Great Stainton. These can be seen on Figures 2.6 and 2.9.

- 2.2.29 Within a 10km radius of Site D, there are six SSSI and 16 LNR, the nearest site is Newton Ketton Meadow SSSI located approximately 1.5km to Site D.
- 2.2.30 There are four Grade II Listed Buildings within Great Stainton, adjacent to the north-west border of Site D.
- 2.2.31 There is a small area of Flood Zone 3 in the southern extent of Site D resulting from the Little Stainton Beck. The rest of Site D is within Flood Zone 1.
- 2.2.32 Some of the land identified within Site D is subject to agreement with the landowner.

Site E: West of Bishopton

- 2.2.33 Site E: West of Bishopton (Site E) is located 8km to the west of Stockton-on-Tees. Site E lies within the Stockton-on-Tees Borough Council Area. Figure 2.7 presents the location and layout of Site E.
- 2.2.34 The landscape features within Site E consist of agricultural fields interspersed with individual trees and hedgerows at the site boundaries. The landscape features immediately surrounding Site E comprise residential properties immediately north and the small rural village Bishopton, along to the north-west of the site area.
- 2.2.35 The local transport network comprises Folly Bank and an unnamed B road, which are adjacent to the western and northern boundaries respectively.
- 2.2.36 PRoW which cross or run in close proximity to Site E include Footpath 5 in the Parish of Little Stainton, as well as Footpaths 1, 2, 3 and 7 in the Parish of Bishopton. These can be seen on Figures 2.7 and 2.9.
- 2.2.37 Within a 10km radius of Site E, there are six SSSI and 15 LNR, the nearest site is Whitton Bridge Pasture SSSI located approximately 2.5km to the east of Site E.
- 2.2.38 There is one Scheduled Monument within 2km of Site E, motte and bailey castle 400m south-east of Bishopton SAM (Ref 1008668). There are seven Grade II Listed Buildings within Bishopton.
- 2.2.39 Site E is located entirely within Flood Zone 1, an area with a low probability of flooding from rivers and the sea.

Site F: North of Bishopton

- 2.2.40 Site F: North of Bishopton (Site F) is located 7.2km to the west of Stockton-on-Tees. Site F lies within the Stockton-on-Tees Borough Council Area. Bishopton Village lies to the immediate south, with Old Stillington village to the north. Figure 2.8 presents the location and layout of Site F.
- 2.2.41 The landscape features within Site F consist of agricultural fields interspersed with individual trees, hedgerows, footpath and Bishopton Beck watercourse at the southwest boundary. The landscape features immediately surrounding Site F comprise the village of Bishopton, along the southern boundary with local farmholdings: Downland Farm which lies encircled in Site F, Adeux

Lodge 300m east, Glebe Farm 500m south-east and West House Farm immediately east.

- 2.2.42 The local transport network comprises Mill Lane which runs along the southern boundary of Site F.
- 2.2.43 PRoW which cross or run in close proximity to Site E include Footpaths 4 and 6 in the Parish of Bishopton, as well as Bridleway 5 in the Parish of Bishopton which runs to the east of the Site. These can be seen on Figures 2.8 and 2.9.
- 2.2.44 Within a 10km radius of Site F, there are six SSSI and 15 LNR, the nearest SSSI is Whitton Bridge Pasture, located approximately 900m to the east of Site F.
- 2.2.45 There is one Scheduled Monument within 2km of Site F, Motte and bailey castle 400m south-east of Bishopton SAM (Ref 1008668).
- 2.2.46 There is a small area of Flood Zone 3 in the western and northern extent of Site F resulting from Bishopton Beck. The rest of Site F is within Flood Zone 1.
- 2.2.47 Some of the land identified within Site F is subject to agreement with the landowner.

Underground Cable Route Options

- 2.2.48 The Proposed Development would connect to the existing Norton National Grid Substation (approximately 12km). The electrical connection to the Proposed Development would comprise underground cables and is described further in Section 2.3 and shown in Figure 2.1.
- 2.2.49 These underground cables are located within a mix of on-road and off-road routes, starting west to east:

33kV cables

- 2.2.50 The 33kV cables connect the solar PV module areas to the substation which will be located centrally on the Site Area in a location to be determined. These cables will use routes across agricultural land, subject to agreements with the relevant landowners. At this stage, alternative routes that would not require agreements with landowners have been identified along various local roads such as High House Lane, Aycliffe Lane, Lime Lane, Lodge Lane and unnamed road off the Green Road. These cable route options are currently being surveyed and the preferred cable route will be confirmed as part of the ES.

132kV cables

- 2.2.51 There are two proposed cable route options for the 132kV cable: the Road option and the Off-Road option.
- 2.2.52 The Off-Road option is the preferred route for the 132kV cable in terms of engineering feasibility and potential environmental effects. The Applicant is in the process of seeking agreement with landowners for the Off-Road option

for the cable route. The Road option is an alternative option if agreement cannot be reached with landowners and considering responses to the upcoming stages of engagement and consultation.

- 2.2.53 The Road option connects the solar farm substation to the Norton National Grid Substation via an unnamed road off Green Road, the Green Road, the High Street and Redmarshall Road, Kirk Hill, Carlton Village, and Letch Lane.
- 2.2.54 The Off-Road option connects the solar farm substation to the Norton National Grid Substation via cutting across field boundaries and agricultural fields, crossing over Folly Bank Road, run along further field boundaries, through agricultural fields and Bishopton Beck to Redmarshall Road. The cable runs along the fence line of Redmarshall Road until Whitton Road. After which, the cable partially runs along Whitton Road and cuts across an existing field boundary up to Kirk Hill. The cable then cuts through existing field boundaries to Letch Beck watercourse and continues along field boundaries to meet Letch Lane.

2.3 Description of the Proposed Development

- 2.3.1 The Proposed Development is a renewable energy scheme comprised of solar PV modules, on-site BESS, substation, associated infrastructure as well as underground cable connections between solar PV modules and to connect to the existing National Grid Substation at Norton. The Proposed Development comprises six solar PV module areas, as shown in Figure 2.1, which would have the capacity to generate over 50 MW AC of electricity.
- 2.3.2 The Proposed Development would comprise of the following key infrastructure:
- solar PV modules and associated mounting structures;
 - on-site supporting equipment including inverters, transformers, batteries and switchgears;
 - on-site substation to connect the solar PV module areas to the National Grid;
 - BESS;
 - underground cables; 33kV underground cabling within the areas of the solar PV modules and connecting solar PV module areas to the solar farm substation, and a 132kV underground cable connecting this substation to the National Grid substation at Norton; and
 - supporting infrastructure including access tracks, security measures, gates, lighting, and mitigation and enhancement measures.
- 2.3.3 The proposed layout plan for the Proposed Development is shown in Figure 2.2. It has been developed in consultation with specialist EIA topic leads including landscape, ecology and heritage to devise a layout that responds to the environmental context of the site based on the information available at EIA Scoping stage. The detailed design specifications of the Proposed

Development have not yet been finalised and will be reviewed following the outcome of the specialist assessments and consultation undertaken as part of the ES.

2.3.4 Due to rapidly changing and evolving solar and energy storage technology, the Proposed Development parameters are designed to maintain flexibility to allow the latest technology to be installed at the time of construction. However, as outlined in Section 2.6, the ES will assess the reasonable worst-case scenario for key design parameters.

Solar PV modules

2.3.5 Solar PV modules generate electrical power by using a solar PV cell to convert sun light into Direct Current (DC) electricity. Individual solar PV modules, more commonly known as solar panels, contain several PV cells wired and encapsulated by tempered glass. Solar PV modules are sealed for weatherproofing and held together by a metal frame in a mountable unit.

2.3.6 Individual solar PV modules are typically 2m by 1m in width and depth and can vary in height. However, as solar PV modules are rapidly developing due to innovation in technology and processing techniques for the PV cells, the dimensions of the solar PV modules available at the time of construction may vary. The ES will therefore consider a height parameter which represents the worst-case scenario in terms of identifying potential environmental effects.

2.3.7 Solar PV modules are fixed to mounting structures in groups known as ‘strings’. The exact number and arrangement of modules depends on a range of factors including the size of the system, its location, and the direction in which the panels are installed. As technology and equipment is evolving, some flexibility in design will be required to accommodate technology advances.

2.3.8 It is possible to install the solar PV modules as fixed or as tracking which adjust the position of the solar PV modules to track the sun throughout the day. Table 2.2 below presents a summary of the difference between the two types of solar PV modules, and the ES will provide a detailed summary of the proposed approach and assess the worst-case scenario in terms of identifying potential environmental effects.

Table 2.2 Overview of types of solar PV modules

Type of solar PV module	Fixed	Tracking
Description	Rows of Solar PV modules aligned in East-West rows with panels facing South	Rows of Solar PV modules mounted on a metal tracking system aligned in North-South rows with panels rotation East-West
Angle	+/- 10° to 30°	+/- 60°

Type of solar PV module	Fixed	Tracking
Orientation	South	East-west
Separation distance²²	Approximately 4 - 12m between rows	Approximately 4 – 6m between rows when the solar PV modules are at full vertical tilt
Height²³	Maximum height of up to 3m Minimum height of the lowest part of the panel would typically be between 0.8m-1m	Maximum height of 4.35m, which would vary throughout the day Minimum height of the lowest part of the panel would typically be between 0.4m-1m
Mounting structure	The mounting structure for the solar PV modules is a metal frame securely fixed to the ground and supported by galvanized steel poles which are typically driven into the ground to a depth of approximately 1m. Where the assessment has identified the need for archaeological protection, alternative mounting structure designs will be considered.	

On-site supporting equipment

2.3.9 A range of equipment is required to support the solar PV modules in order to convert the power generated, manage this power and export power onto the National Grid. The electrical output from the solar PV modules would be exported by low voltage cabling to shipping container style storage units which would contain an inverter, transformer and battery system. The function of each of these elements are as follows:

- inverters convert the DC generated by the Solar PV modules into grid-compliant AC that can be exported to the National Grid. It is anticipated that approximately 44 inverter containers and 53 hybrid containers (that contain an inverter and BESS) would be required which would be distributed across the Site Area;
- transformers monitor, increase and control the voltage of the electricity produced before it reaches the substation. The transformers would be located adjacent to the inverters; and
- BESS would comprise of containerized battery storage systems, DC-DC converter boxes and ancillary equipment.

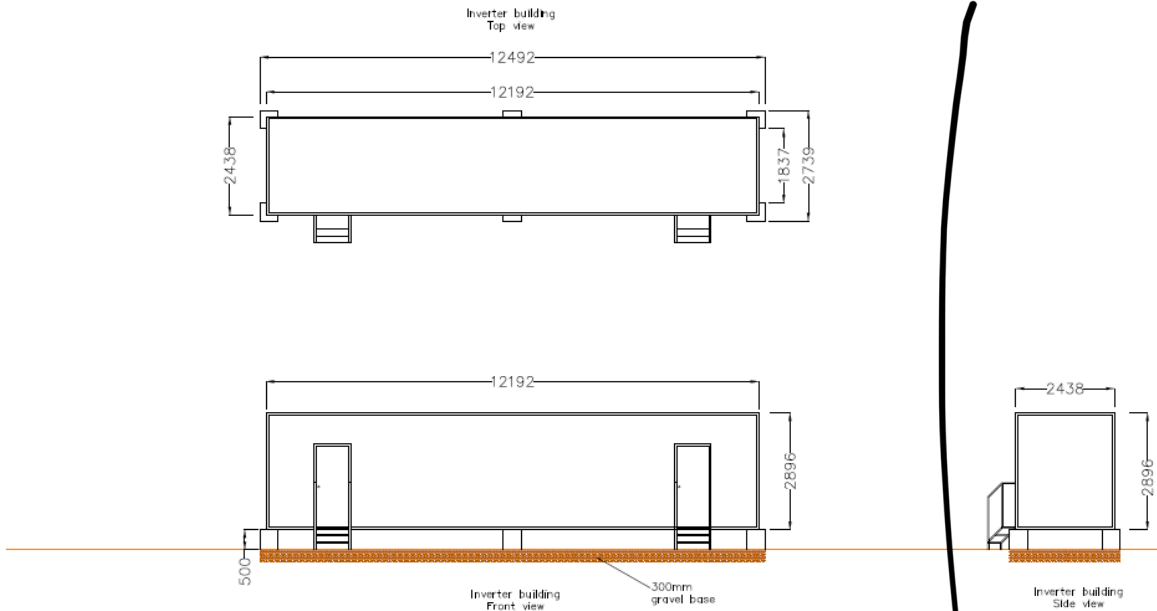
2.3.10 The inverters, transformers and battery stations would be arranged together across the Site Area and housed in shipping style containers. At this stage, it is anticipated that there would be an approximate combination of 53 hybrid containers and 44 inverter containers located across the Proposed Development, placed on a concrete pad foundation, and measuring

²² Separation distance is the space between the back of one row of panels to the front of the next row of panels.

²³ The maximum and minimum height dimensions are indicative at this stage as the final elevation of the solar PV modules will be influenced by design factors such as local topography, configuration and mitigation proposals.

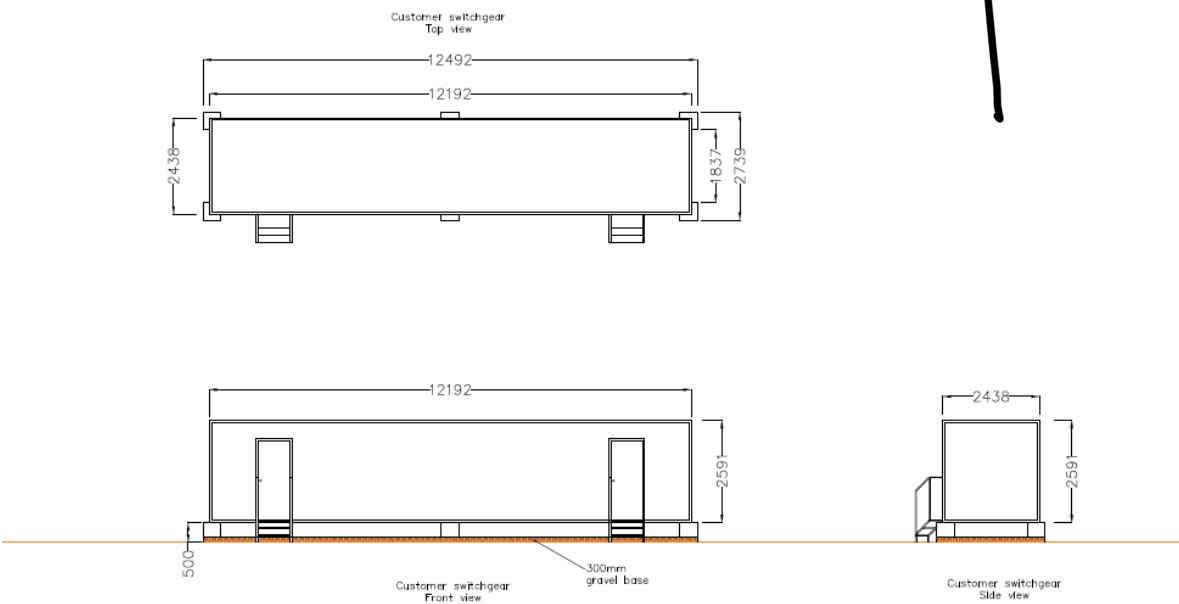
approximately 3m in height, 2.5m in width and 12m in length, as shown in Plate 2.1 below.

Plate 2.1 Typical Supporting Equipment Centrally Arranged



2.3.11 The Proposed Development will utilise five switchgears to control, protect and isolate electrical currents and equipment. Switchgears allow parts of the solar PV system to be de-energised safely, allowing routine maintenance or faults to be identified and work undertaken. A typical switchgear of the style likely to be used on the Proposed Development is shown in Plate 2.2 below.

Plate 2.2 Typical Switchgear



2.3.12 Each solar PV module area would also contain a Communications and Weather Mast, which would be up to 5m in height.

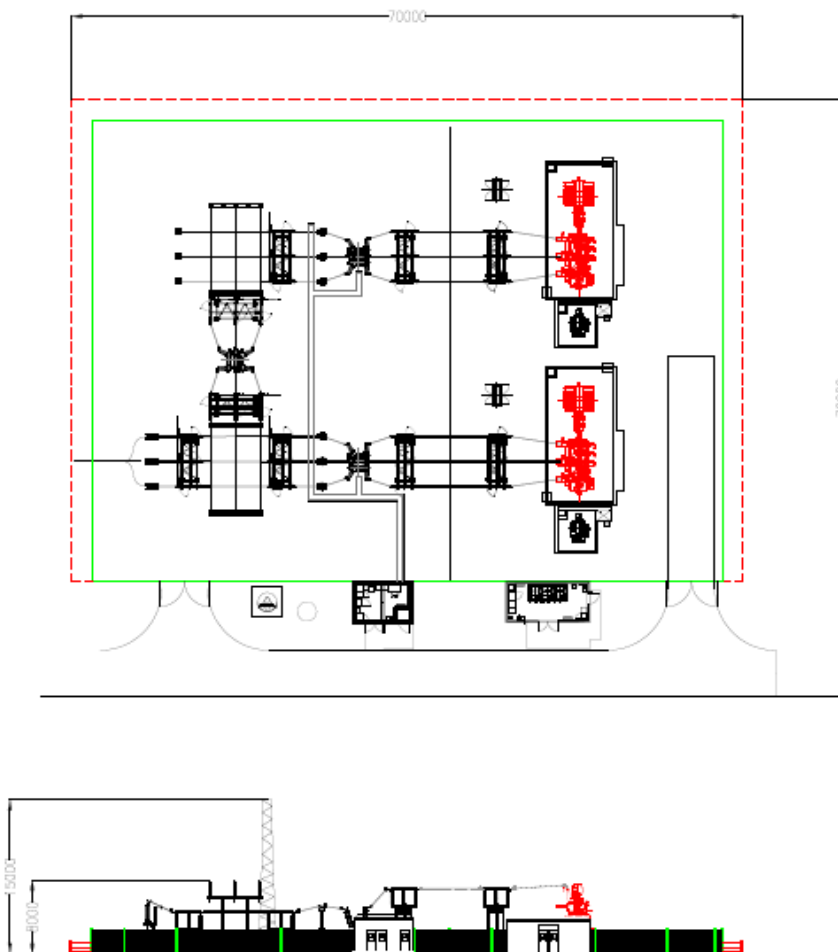
On site substation

2.3.13 A substation would be required for the Proposed Development to connect the solar PV module areas to distribution and transmission networks. The substation would also house other electrical equipment such as transformers, switchgear, and metering equipment.

2.3.14 The purpose of a substation is to convert low voltages from electricity generation to high voltages, or vice versa, using power transformers. The substation would be located centrally within the Site Area, with the location to be confirmed as part of the ES. The substation would be 70m in length, 70m in width with a maximum height of 15m (which would only relate to a communications tower, with the highest electrical equipment being 8m), with a 30m x 70m parking and turning area. The substation compound would have a footprint of approximately 4900 m².

2.3.15 A typical substation is shown in Plate 2.3 below.

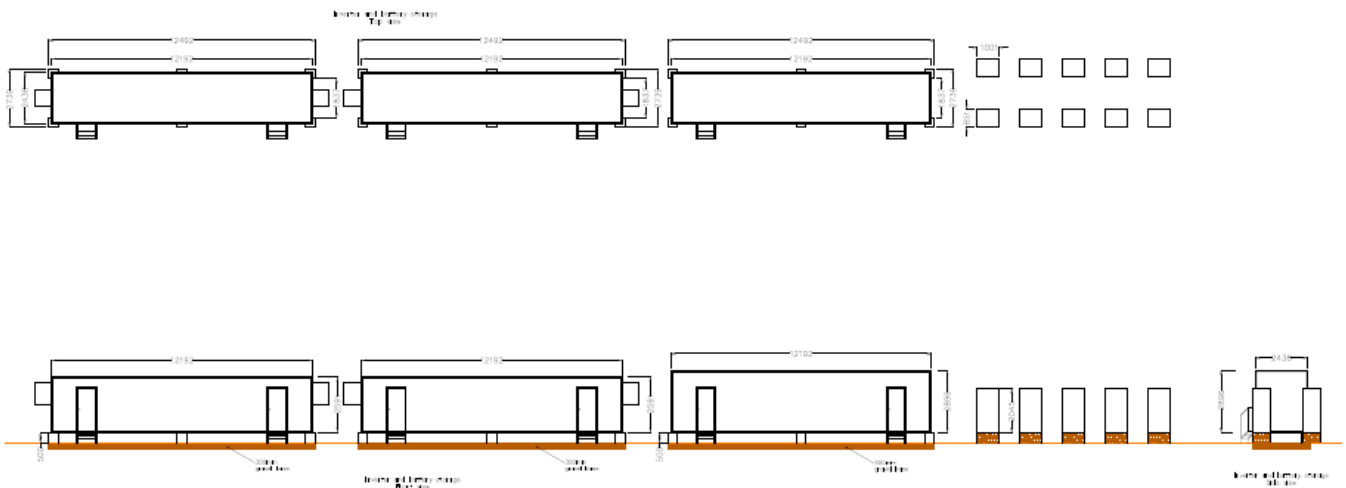
Plate 2.3 Typical substation



Battery Energy Storage System (BESS)

- 2.3.16 The Proposed Development would require BESS which is likely to consist of lithium-ion batteries housed in container style structures. The ability to store energy on site is required to store surplus electricity produced and provide grid balancing services by allowing excess electricity generated from the solar PV modules to be stored and dispatched as required. The BESS would also be capable of importing electricity from the National Grid to store electricity in order to export this electricity to the National Grid at peak times.
- 2.3.17 There are a variety of different design solutions for this type of BESS, and these will be explored as part of ongoing design development. The ES will be based on maximum parameters which will be set for the BESS to ensure that a worst-case scenario is presented and assessed.
- 2.3.18 The facility would require associated heating, ventilation and cooling (HVAC) systems to ensure efficiency of the batteries and these systems would be integrated within the individual containers.
- 2.3.19 A typical BESS is shown in Plate 2.4 below.

Plate 2.4 Typical BESS/Container



Underground cabling within the solar PV module areas

- 2.3.20 Underground cables would be required for connection of the solar PV modules to the National Grid and the BESS.
- 2.3.21 Low voltage cabling within the solar PV module areas would be required to connect solar PV modules and the BESS to inverters and subsequently to the transformers on-site.
- 2.3.22 Higher voltage cables (33kV) are required to connect the transformers and switchgears, and to connect the switchgears to the on-site substation. It is anticipated that approximately 15km of 33kV cables would be required across the Site Area. As it stands, there are currently two proposed cable route

options for the 33kV cable, on-road and off-road. These cable route options are currently being surveyed and the preferred cable route will be confirmed as part of the ES and in advance of statutory consultation.

- 2.3.23 At this stage, it is anticipated that on-site cabling would be installed using a cable plough, where possible. This is considered to be the most efficient and least impactful method of cable installation, causing minimal disruption to the ground, cutting, installing and back-filling in one operation.
- 2.3.24 In instances where the cable plough cannot be used, alternative methods, such as horizontal directional drilling, would be considered and assessed.
- 2.3.25 Cabling from the solar PV modules and the inverters would typically be installed above ground, fixed to the mounting structure of the modules, with a small section placed underground where it leaves the modules and connects to the inverters.

Underground cabling between solar PV module areas

- 2.3.26 The Proposed Development would connect to the existing National Grid substation at Norton, located approximately 3.5km east of the Site Area, by underground cabling. It is anticipated that 12km of underground 132kV cabling would be required to connect the Proposed Development to the substation at Norton. As it stands, there are two proposed cable route options for the 132kV cable as show in Figure 2.1. These cable route options are currently being surveyed and assessment work, and the preferred cable route will be confirmed and assessed as part of the ES.
- 2.3.27 It is anticipated that a cable plough would be used to install the 132kV cables, but it is likely that some horizontal directional drilling would be required in more constrained locations. The method of cable installation will be fully assessed as part of the ES.
- 2.3.28 At the time of writing, the preferred cable route has not been selected. Therefore, the boundary for scoping includes the land required for both proposed cable routes and these cable routes will be evaluated as part of the EIA to determine the most appropriate route. The final cable route option will be confirmed prior to the submission of the DCO application, and the Order Limits will reflect this.

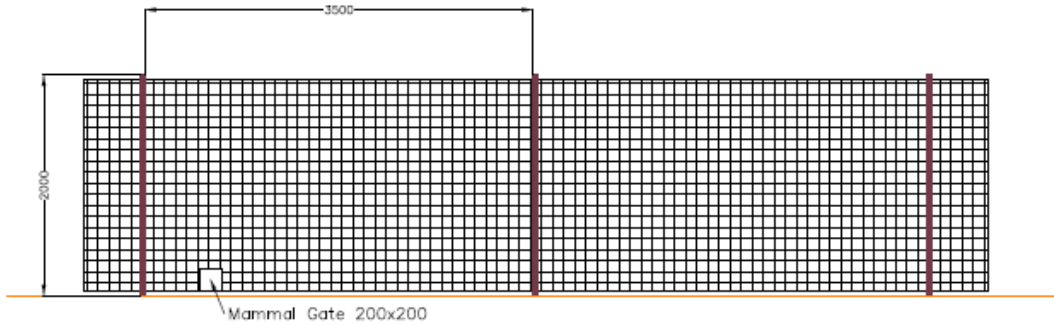
Other infrastructure

- 2.3.29 Additional infrastructure would be required to support the operation of the Proposed Development. The following equipment would be installed across the Site Area as follows:
- **Fencing and Gates** – A perimeter security fence would be installed to enclose the operational areas of the Proposed Development. The fence is likely to be either a wire-mesh or deer fence (if required) and measure between 2m and 3m in height. The fence will be designed in such a way to allow small animals to pass through the Site Area and

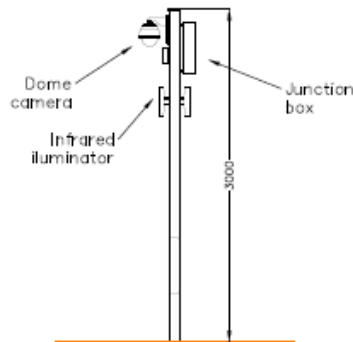
would also be gated to allow access to and from the Site Area. Typical fencing is shown in Plate 2.5 below;

- **CCTV** – Pole-mounted, infra-red security detection cameras would be mounted on poles of approximately 5m in height located within the perimeter fence. It is anticipated that these cameras would have motion detection technology for recording, and would be pointed directly within the Site Area and away from any land outside of the Site Area;
- **Lighting** – In general, it is anticipated that the Proposed Development would not be lit, however, it is anticipated that infrared security lighting would be required around key electrical infrastructure. This lighting would be sensor triggered and therefore not continuous;
- **Access tracks** – Access to the Proposed Development during operation is likely to be required for maintenance, and at the time of writing, the preferred access points are being determined. Further information will be available as part of the ES;
- **Drainage** – The detailed operational drainage design for the Proposed Development will be undertaken prior to construction. It is anticipated that the operational drainage design would ensure that the drainage of the land to the present level is maintained; and
- **Storage Containers** – It is anticipated that nine additional storage containers will be installed on site to contain extra equipment to support on-site maintenance activities.

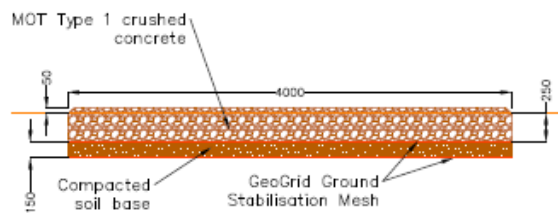
Plate 2.5 Typical Fencing



Timber post & wire fence



CCTV pole



Access track cross section

2.4 Construction methodology

2.4.1 This section of the EIA Scoping Report considers the potential construction methodology that is likely to be applied to the Proposed Development.

Construction Programme

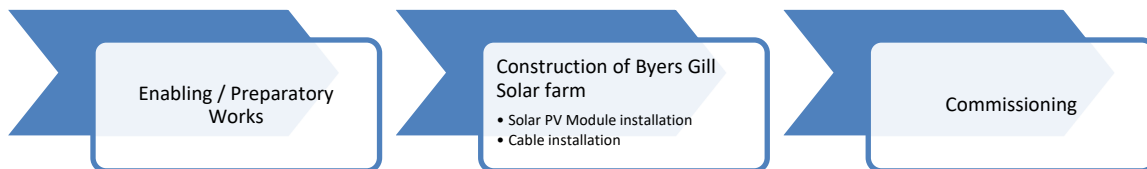
2.4.2 The construction of the Proposed Development is proposed to be over a period of approximately 12 months, and commencement on site is subject to the DCO consenting process. A reasonable worst-case scenario for the construction programme will be assessed and presented in the ES.

- 2.4.3 The final construction programme would be driven by the chosen contractor, although certain assumptions will be made within the ES in relation to the approach to construction which a contractor would then be held to. See paragraphs 2.4.12 to 2.4.15 for information on Construction Environmental Management.
- 2.4.4 The installation of solar PV modules does not involve any complex construction process or practices and therefore risk of delay beyond the programme is to be included within the ES and would largely be driven by adverse weather conditions. Many component parts of the Proposed Development would arrive on-site ready to be installed and it is not anticipated that any Abnormal Indivisible Loads (AILs) would be required to enable construction.

Construction Activities

- 2.4.5 It is anticipated that the construction of the Proposed Development would take place over several key phases, as shown in Plate 2.6. The ES will provide further details of the proposed construction activities for the Proposed Development, including their anticipated duration and a programme of each phase of the work.

Plate 2.6 Phases of Solar Farm construction



Preparatory works

- 2.4.6 Preparatory works would be the first phase of construction and includes activities to enable and prepare the site for the construction of the Proposed Development. At this stage in design, it is anticipated that works undertaken during this phase are likely to include:
- establishment of site access point(s);
 - installation of any temporary / permanent culverts over water courses / ditches;
 - ground clearance activities;
 - construction of any access tracks and laydown areas;
 - establishment of temporary construction compounds on each Solar PV module area, which is anticipated to be 60m in length and 30m in

width. This is likely to utilise a 'Durabase Mat System' or a similar non-ground penetrating mat system;

- establishment of mobilisation areas, running tracks and temporary construction compounds for cable installation;
- erection of security fencing around the site perimeter, as well as access gates;
- installation of security measures such as CCTV;
- delivery of plant and machinery to site; and
- delivery of materials to enable first phases of construction.

2.4.7 The exact location of the temporary construction compounds has not yet been fully established. However, given the size and proposed layout of the Proposed Development, it is envisaged that each solar PV module area would have its own discrete compound within the Site Area, as well as construction compounds for the cable routes. This would mean that construction activities are limited in each solar PV module area and temporary land take for the construction compound is reduced and kept to a shorter period of time.

2.4.8 The temporary construction compounds would contain construction worker welfare facilities, a site office, limited parking, wheel wash area, plant and machinery storage, Heavy Goods Vehicle (HGV) / delivery turning area and waste storage areas.

2.4.9 For security and safety purposes, any live construction areas would be closed to the public throughout the construction phase. Site security staff would patrol the site in addition to hazard warning signs and CCTV.

Construction of Byers Gill Solar

2.4.10 Following the preparatory works, construction of the Proposed Development would commence. The ES will provide further details of the proposed construction activities, their anticipated duration, along with an indicative programme for construction.

2.4.11 At this stage in design development, it is anticipated that the following types of construction activities may be required:

- solar PV module installation;
- installation of Solar PV module support structures;
- mounting of Solar PV modules;
- installation of supporting infrastructure, such as inverters, transformers, battery stations and switchgear;
- installation of the BESS;
- construction of the on-site substation;

- installation of storage containers;
- cable installation;
- site clearance activities such as stripping of topsoil, trenching (if required), storage and capping of soil;
- installation of construction drainage with pumping (if required);
- installation of cabling across the Solar PV module areas and connection to the inverters; and
- installation of cables between inverter platforms, transfer stations and collecting stations and onto the point of connection and the National Grid substation.

Construction Environmental Management

- 2.4.12 An Outline Environmental Management Plan ('EMP') will be produced as part of the DCO application, and will set out the measures, commitments and actions identified in the ES to manage environmental effects during construction. These measures, commitments and actions will be carried forward to a Construction Environmental Management Plan ('CEMP').
- 2.4.13 The CEMP would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. It is expected that the requirements of the DCO would commit to its production prior to the commencement of construction activities.
- 2.4.14 In addition, the Outline EMP produced as part of the DCO application will also include supplementary outline management plans which would later be included in full within the CEMP. These include the following:
- Outline Construction Traffic Management Plan (CTMP);
 - Outline Health and Safety Plan (H&SP);
 - Outline Materials Management Plan (MMP);
 - Outline Pollution Response Plan;
 - Outline Site Waste Management Plan (SWMP);
 - Outline Soil Resources Management Plan (SRMP); and
 - Outline Spillage Emergency Response Plan (SERP).
- 2.4.15 Further information on the Outline EMP, CEMP and these supporting documents can be found in Chapter 12.

Commissioning

- 2.4.16 Following construction, the Proposed Development would go through a stage of testing prior to being commissioned and the first electricity generated and supplied to the National Grid.

2.5 Operational activities

- 2.5.1 During the operational phase of the Proposed Development, on-site activities would be limited and restricted to maintenance activities, replacement of any components that fail, monitoring activities and vegetation management. The solar PV module areas would be surrounded by a 2m to 3m high security fence. In addition, the Proposed Development would be monitored with pole-mounted CCTV cameras along the perimeter fencing.

2.6 Decommissioning

- 2.6.1 For the purposes of the EIA, it will be assumed that the design life of the Proposed Development would be 40 years.
- 2.6.2 Following the operational phase, the Proposed Development would require decommissioning. The process of decommissioning would involve the removal of all solar infrastructure, including the Solar PV modules, cabling and on-site supporting equipment, from the site to be recycled or disposed of in accordance with good practice and processes at that time. Any requirements to leave certain infrastructure, for example access tracks, would be discussed and agreed with landowners as part of the decommissioning process.
- 2.6.3 The Site Area would be returned to its original use as far as possible and practical with areas of established mitigation left in situ where possible and in agreement with the landowner.
- 2.6.4 In addition, up to 99% of materials in a solar PV module are recyclable, with organisations around the UK specialising in solar panel recycling in line with the Waste from Electrical and Electronic Equipment (WEEE) Regulations.
- 2.6.5 Decommissioning is expected to take between of 6 to 12 months and could be undertaken in phases.
- 2.6.6 The effects of decommissioning are often similar to, or to a lesser magnitude, than the construction effects. The assessment undertaken as part the ES will be based on assumptions as to how decommissioning would take place and these assumptions are likely to change over time as practices for decommissioning evolve.
- 2.6.7 A Framework Decommissioning Environmental Management Plan (DEMP), which will set out the general principles to be followed in the decommissioning of the Proposed Development, will also be produced as part of the DCO application. These measures, commitments and actions will be carried forward to a detailed DEMP.
- 2.6.8 The detailed DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning works and would include timescales and methods for transportation of materials. It is expected that the requirements of the DCO would commit to its production.

2.6.9 Further information on the DEMP can be found in Chapter 12.

2.7 The Order Limits

2.7.1 The Site Area for the Proposed Development, which considers the maximum area of land potentially required for the construction, operation and decommissioning of the Proposed Development is shown in Figure 2.2.

2.7.2 As previously outlined, the Proposed Development is subject to ongoing design development and the Site Area will be refined in response to environmental and technical factors as identified as part of the EIA process, as well as consultation responses.

2.7.3 As mentioned in Section 2.2, the preferred cable route option for both the 33kV and 132kV cables are still being assessed and surveyed. The preferred cable route option will be confirmed as part of the ES and in advance of statutory consultation.

Rochdale Envelope

2.7.4 The design of the Proposed Development will evolve throughout the EIA process through the use of iterative design. The iterative design process will take into account comments made during consultation, including in response to this EIA Scoping Report, and the ES will describe how the design of the Proposed Development has been influenced by such comments.

2.7.5 It is therefore the intention of the Applicant to implement the advice within PINS Advice Note Nine: Using the 'Rochdale Envelope'²⁴ regarding the degree of flexibility that may be considered appropriate with an application for development consent under the Act.

2.7.6 In particular, the Advice Note outlines:

- the DCO application documents should explain the need for, and the timescales associated with, the flexibility sought, and this should be established within clearly defined parameters;
- the clearly defined parameters established for the Proposed Development must be sufficiently detailed to enable a proper assessment of the likely significant environmental effects and to allow for the identification of necessary mitigation, if necessary, within a range of possibilities;
- the assessments in the ES should be consistent with the clearly defined parameters and ensure a robust assessment of the likely significant effects;
- the DCO must not permit the Proposed Development to extend beyond the clearly defined parameters which have been requested

²⁴ PINS (2018). *Advice Note Nine: Rochdale Envelope*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/>

and assessed. The SoS may choose to impose requirements to ensure that the Proposed Development is constrained in this way; and

- the more detailed the DCO application is, the easier it will be to ensure compliance with the Regulations.

2.7.7 The Advice Note also acknowledges that there may be aspects of the design that are not yet fixed, resulting in the need for the EIA to assess likely worst-case variations to ensure that all foreseeable significant environmental effects of the Proposed Development are assessed.

2.7.8 This is of particular importance to maintain due to the ever-evolving technology and speed of development within solar PV module and energy storage technology.

3 Assessment of alternatives

3.1 Introduction

3.1.1 This chapter presents an overview of the alternatives considered for the Proposed Development at this scoping stage of the design development process, as well as the proposed approach for the assessment of alternatives as part of the ES.

3.2 Overview of alternatives considered

3.2.1 The PINS Advice Note Seven²⁵ recommends that an EIA Scoping Report outlines the reasonable alternatives considered and the reasons for selecting a preferred option. This section therefore provides an outline of how reasonable alternatives have been considered to date in the siting and design of the Proposed Development as presented within this EIA Scoping Report.

3.2.2 To date, the Applicant has considered reasonable alternatives in relation to three key aspects of design: site selection, solar PV module area layout and cable route options. This process is outlined below.

Site selection

3.2.3 The Applicant has undertaken a staged assessment process to identify the Site Area of the Proposed Development and refine this to the red line boundary as presented in this EIA Scoping Report.

3.2.4 In summary, the stages of assessment comprised of:

- Stage 1: Identifying the area of search;
- Stage 2: Consideration of environmental and planning constraints;
- Stage 3: Land assembly; and
- Stage 4: Initial identification of solar PV module areas.

3.2.5 This staged assessment process defined the location and maximum extent of the Proposed Development, taking into account irradiance and yield, availability of a suitable grid connection, environmental/planning constraints and the availability of land through agreement.

3.2.6 In doing so, the site selection process discounted a wide range of alternatives that would not have resulted in a viable development. A detailed account of the site selection process will be provided in the ES.

Solar PV module layout

3.2.7 Once an initial site location and the Site Area had been defined for the Proposed Development, the Applicant has considered a range of alternatives

²⁵ PINS (2018). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

in determining the proposed layout for the solar PV modules within the Site Area. The solar PV module areas as proposed within this EIA Scoping Report have been developed and refined taking into account the following factors:

- environmental designations, constraints and baseline;
- outcome of initial environmental assessments;
- engagement with landowners and impacts on property;
- capacity required for the Grid Connection Agreement; and
- likely or potential mitigation requirements.

3.2.8 This process has resulted in the preferred option for the layout of solar PV modules, in which areas of land within the Site Area were discounted as a location for solar PV modules due to their assessment against the factors outlined above.

3.2.9 The layout of the solar PV modules and overall design of the Proposed Development will be further developed and refined ahead of DCO application submission. The ES will therefore provide a detailed account of the refinement and design process, identifying how alternatives were considered in selecting the preferred option.

Alternative cable route options

3.2.10 At this stage of the Proposed Development, the Site Area includes options for the cable route options. The options that are currently included within the Proposed Development have been defined taking into account similar factors as those outlined above, primarily:

- environmental and planning constraints;
- construction impacts;
- viability and cost; and
- landowner agreement.

3.2.11 This EIA Scoping Report has been prepared on the basis of including the land required for all cable route options and therefore represents a worst-case scenario in which the red line boundary relating to cable routes is expected to reduce prior to DCO application submission. Further detail on how the initial cable route options were selected will be provided in the ES.

3.2.12 The Applicant is currently undertaking ongoing assessment and refinement of the cable route options. This selection process, alternatives considered, and the rationale for the final selected option will be provided in the ES.

3.3 Approach to alternatives in the ES

3.3.1 Regulation 14(2)(d) of the EIA Regulations states that the ES must include: ‘

“a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment”.

3.3.2 The ES will therefore describe the reasonable alternatives that the Applicant has considered in developing the design of the Proposed Development. It will explain the main reasons for the options selected and how the effects of the development on the environment were taken into account as part of the options selection process.

3.3.3 The analysis of alternatives will focus on the following aspects of option selection:

- site selection;
- layout of the Proposed Development;
- cable route options;
- solar technology;
- siting of substation; and
- location of energy storage facilities and other supporting infrastructure.

3.3.4 A ‘no development’ alternative would not provide the additional electricity generation that would be delivered by the Proposed Development and has therefore not been considered further and will not be assessed in the ES.

3.3.5 In providing an appraisal of reasonable alternatives studied by the Applicant, the ES will demonstrate the rationale for the preferred design of the Proposed Development, taking into account its effects on the environment.

4 Approach to EIA

4.1 Introduction

4.1.1 The requirement for an EIA for NSIPs is transposed into law through the EIA Regulations²⁶.

4.1.2 An EIA involves the assessment of a project's likely significant environmental effects, and presenting this information within an ES for consideration by the determining authority when determining a planning application.

4.1.3 The EIA process includes the following key characteristics:

- systematic – the EIA is comprised of a series of tasks that are defined by regulation, guidance and accepted industry practice;
- analytical – the EIA must be used to inform the decision making rather than promote the project itself;
- consultative – the EIA process must allow for and provide opportunity for interested parties and statutory consultees to provide feedback on the project and assessments undertaken; and
- iterative – the EIA process should allow for environmental concerns to be addressed during the planning and design stages of the project.

4.1.4 This chapter of the EIA Scoping Report outlines the general approach to EIA for the Proposed Development.

4.2 EIA Guidance

4.2.1 The EIA will be carried out in accordance with the requirements of the EIA Regulations. In addition, the approach to the EIA will have regard to the guidance and advice provided within the following:

- Overarching NPS for Energy (EN-1)²⁷;
- Draft Overarching NPS for Energy (EN-1)²⁸;
- NPS for Renewable Energy Infrastructure (EN-3)²⁹;
- Draft NPS for Renewable Energy Infrastructure (EN-3)³⁰;
- NPS for Electricity Networks (EN-5)³¹;

²⁶ Her Majesty's Stationary Office (HMSO) (2017). *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>

²⁷ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²⁸ Department for Business, Energy and Industrial Strategy (2021). *Draft Overarching National Policy Statement for Energy*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf

²⁹ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

³⁰ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Renewable Energy Infrastructure*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

³¹ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

- NPPF³²;
- PINS Advice Note Six: preparation and submission of application documents³³;
- PINS Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping³⁴;
- PINS Advice Note Nine: Rochdale Envelope³⁵;
- PINS Advice Note Seventeen: Cumulative Effects Assessment³⁶; and
- PINS Advice Note Eighteen: The Water Framework Directive³⁷.

4.3 The purpose and process of EIA

Purpose

- 4.3.1 The purpose of the EIA process is to identify, describe and assess the direct, indirect, cumulative, transboundary, temporary, permanent, beneficial and adverse likely significant effects of a project on the environment. This is achieved by establishing the baseline conditions, and undertaking an assessment to identify the significance of the likely environmental effects of the Proposed Development. Mitigation is considered and applied to avoid, prevent or reduce any potential impacts, where appropriate, and an assessment of the residual effects is carried out which considers the magnitude of the impact (degree of change) and the importance, sensitivity or value of the impacted receptor or resource.
- 4.3.2 As the Proposed Development requires a DCO application to be submitted, and the Proposed Development is categories as a ‘Schedule 2’ development under the EIA Regulations, it is considered that an EIA is required, and a Scoping Opinion is being sought from SoS on this basis.
- 4.3.3 Based on information contained in this EIA Scoping Report and taking into account representations made by regulators, the Scoping Opinion will confirm the expected basis upon which an EIA will be undertaken for the Proposed Development. The EIA will identify the likely significant environmental effects (both positive and negative) of the Proposed Development and report these within an ES.

Process

- 4.3.4 The EIA process, as outlined in Regulation 5 of the EIA Regulations and PINS Advice Note Seven, is used to identify the likely significant effects on the

³² Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

³³ PINS (2016). *Advice Note Six: preparation and submission of application documents*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-six-preparation-and-submission-of-application-documents/>

³⁴ PINS (2020). *Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

³⁵ PINS (2018). *Advice Note Nine: Rochdale Envelope*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/>

³⁶ PINS (2019). *Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/>

³⁷ PINS (2017). *Advice Note Eighteen: the Water Framework Directive*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/>

environment that could occur as a result of a Proposed Development. The information gathered through EIA is taken into account by the decision-making body (in this case the SoS) when determining an application for consent.

4.3.5 The main stages of the EIA process are as follows:

- **EIA Screening:** Screening is normally undertaken to determine whether a proposed project constitutes 'EIA development', in cases where it is not clear if a project requires an EIA to be undertaken;
- **EIA Scoping:** The EIA Scoping Report (this document) sets out the proposed scope of the Proposed Development's EIA. It also presents the data collected and the proposed assessment methodology and approach that will be used for the EIA. The EIA Scoping Report is issued to consultees by PINS on behalf of the SoS for comment on the scope, methodology and approach proposed;
- **PEIR:** The PEIR sets out the information that 'is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development' ((Regulation 12(2)(b) of the EIA Regulations) as set out in PINS Advice Note Seven, Section 8.3); and
- **ES:** The ES presents the results of the EIA undertaken for the Proposed Development. It sets out the likely significant effects that would result if the Proposed Development was implemented, and any proposed mitigation to reduce those significant effects. The ES is submitted as part of the application for development consent and is taken into account during the decision-making process.

4.3.6 The EIA process will be undertaken in accordance with the requirements of the EIA Regulations and PINS Advice Note Seven. The ES will provide the following relevant information as outlined in Part 14(2)(a)-(f) EIA Regulations and Schedule 4. A summary is listed below:

- a description of the proposed development comprising information on the site, design, size and other relevant features of the development; a description of the reasonable alternatives;
- a description of the baseline environment and likely evolution without the implementation of the development;
- a description of the factors likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, and landscape;
- a description of the likely significant effects of the development on the environment;
- a description of the forecasting methods or evidence used to identify and assess effects on the environment;

- a description of any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- a description of adverse effects of the development on the environment from added risk of major accidents and/or disasters; and
- a non-technical summary of the information above, and a list of references.

Approach

- 4.3.7 The ES will set out details on the methodology and approach, along with the overall conclusions of the EIA process. It will also outline the main parameters and detailed design aspects of the Proposed Development against which the assessment will be undertaken.
- 4.3.8 Development parameters will be determined and fixed for the purposes of the EIA through an iterative approach taking into account baseline environmental information, the evolving design and any associated technical requirements.
- 4.3.9 The EIA will assess the construction, operational and decommissioning phases of the Proposed Development.

4.4 EIA Scoping

- 4.4.1 This section summarises the key requirements of scoping under the EIA Regulations.
- 4.4.2 Regulation 10(1) of the EIA Regulations provides that any ‘person who proposes to make an application for an order granting development consent may ask the SoS to confirm in writing its opinion as to the scope and level of detail of the information to be provided in the environmental statement’. The request made under Regulation 10(3) must include the following (more information is provided in Table 4.1):
- *“a plan sufficient to identify the land”* (See Figure 1.2);
 - *“a description of the proposed development, including its location and technical capacity”* (see Chapter 2 The Proposed Development);
 - *“an explanation of the likely significant effects of the development on the environment”* (See Chapters 5-9 and 11); and
 - *“such other information or representations as the person making the request may wish to provide or make”*.

Table 4.1 Scoping information required

Recommended information for inclusion in the EIA Scoping Report (Based on ‘Insert 2 – Information to be provided with a scoped request’ of PINS Advice Note Seven)	Relevant Sections in this Scoping
The Proposed Development	
An explanation of the approach to addressing uncertainty where it remains in relation to elements of the Proposed Development e.g., design parameters	Chapter 2 The Proposed Development
Referenced plans presented at an appropriate scale to convey clearly the information and all known features associated with the Proposed Development	Figure 1.2 and Figure 2.2 Figure 2.1 and Figure 2.2
EIA Approach and Topic Areas	
An outline of the reasonable alternatives considered and the reasons for selecting the preferred option	Chapter 2 The Proposed Development
A summary table depicting each of the aspects and matters that are requested to be scoped out allowing for quick identification of issues	Chapter 1 Introduction and Chapter 13 Conclusion
A detailed description of the aspects and matters proposed to be scoped out of further assessment with justification provided	Certain aspects of environmental topics scoped in within Chapters 5 – 10 are scoped out of further assessment within the summary of assessment scopes. Chapter 11 Scoped Out presents topics scoped out of the EIA.
Results of desktop and baseline studies where available and where relevant to the decision to scope in or out aspects or matters	Chapters 5 to 11
Aspects and matters to be scoped in, the report should include details of the methods to be used to assess impacts and to determine significance of effect e.g., Criteria for determining sensitivity and magnitude	Chapters 5 to 9
Any avoidance or mitigation measures proposed, how they may be secured and the anticipated residual effects	Chapters 5 to 9
Information sources	

Recommended information for inclusion in the EIA Scoping Report (Based on ‘Insert 2 – Information to be provided with a scoped request’ of PINS Advice Note Seven)	Relevant Sections in this Scoping
References to any guidance and best practice to be relied upon	Chapters 5 to 9
Evidence of agreements reached with consultation bodies (for example the statutory nature conservation bodies or local authorities)	Chapters 5 to 11
An outline of the structure of the proposed ES	Chapter 12 Structure

4.5 Overview of approach to assessment

4.5.1 This section of the EIA Scoping Report sets out further detail on certain aspects of the assessment methodology that will be adopted in the EIA. The following general methodology will apply to all assessments undertaken unless otherwise specified within the individual topic methodologies.

Baseline Conditions

4.5.2 An important step in the EIA process is to establish a baseline against which to assess the effects of the Proposed Development.

Spatial and temporal scope

4.5.3 Spatially, the area over which effects could occur may be wider than the Site Area. The appropriate study area will be determined for each environmental topic. Specific study areas will be defined in each topic section and will allow for assessment of indirect as well as direct effects, together with off-site factors, such as traffic routes, where relevant.

4.5.4 Specific temporal periods will be defined for the assessment of baseline conditions and the impacts of the proposals. In doing so, consideration will be given to the likely durations of construction and operational activities. Where relevant, consideration will be given to the duration it could take for environmental design measures to become established and effective. Timeframe for which mitigation measures are likely to have achieved their desired outcome will be defined within the ES.

4.5.5 The assessment will consider effects at the construction, operation and decommissioning phases. The definitions of these are presented below and in Table 4.2:

- Construction phase: This relates to all works associated with construction (site preparation and installation);
- Operational phase: This relates to effects once the Proposed Development is installed and in use; and

- Decommissioning phase: This relates to effects at the end of operation as the Proposed Development is shut down.
- 4.5.6 The ES will include within each of the environmental topics a description of the current baseline and the future baseline.
- 4.5.7 The future baseline scenario will describe the changes from the current baseline scenario as far as natural changes can be established, although it is noted without the Proposed Development that the Site Area would continue to be used for agricultural purposes.
- 4.5.8 The potential effects arising as a result of the Proposed Development will be assessed against three baselines as follows:

Table 4.2 Baseline scenarios

Baseline scenarios	Description
Construction phase – current baseline	The construction phase is proposed to be over approximately 12 months, commencing following the granting of the DCO Application.
Operational phase – future baseline	The opening year when the Proposed Development is to become operational, and future year scenario after the opening year when the mitigation measures are likely to be achieved their desired outcome. The Proposed Development is assumed to have a design life of 40 years.
Decommissioning phase – future baseline	The decommissioning year will take place following the operation of the Proposed Development, which is expected to be 40 years from the date of energisation. Decommissioning with take approximately 6 – 12 months.

Identification of receptors

4.5.9 Receptors are defined as the physical resource or ‘user group’ that would experience an effect. The environmental effect would depend on the spatial relationship between the source of the effect and the receptor. Some receptors will be more sensitive to certain environmental effects than others. The baseline studies will identify the potential environmental receptors.

Data collection

- 4.5.10 Information relating to the existing environmental baseline will be collected through field and desktop study, including:
- online/digital resources;
 - data searches, e.g., Local Biological Record Centres, Historic Environment Record, etc.;
 - baseline Site surveys; and

- available environmental information submitted in support of other planning applications for development in the vicinity.

4.5.11 For each environmental topic chapter, the methods of baseline data collection will be discussed with the relevant consultees.

4.6 Assessment of effects

Effect prediction

4.6.1 Much of the predictive exercise will be undertaken on the basis of the expert judgement of the assessment team and initial assessments, taking into account relevant technical advice and guidance. The objective of the predictive approach will be one of presenting a clear justification for the strategy adopted and stating all relevant assumptions to allow independent review. See Section 4.8 of this chapter for information on Competent Experts.

Significance of effect

4.6.2 The EIA will identify the significance of environmental effects (beneficial or adverse) arising from three phases (construction, operation and decommissioning) of the Proposed Development. The significance of residual effects will be determined by reference to the criteria set out for each environmental topic. Residual effects are the effects that remain following the implementation of proposed mitigation measures.

4.6.3 The approach to assessing and assigning significance to an environmental effect is derived from a variety of sources including:

- the relevant NPS relating to energy (noting that there is no specific NPS for solar development, although the new Draft NPS Renewable Energy (EN-3) Sections 2.47 – 2.54 sets out policy requirements specific to solar generation; subject to consultation and implementation thereafter);
- the 2050 Net Zero GHG emissions target by 2050 through the Climate Change Act 2008 (2050 Target Amendment) Order 2019;
- the NPPF,
- local planning policy and relevant planning practice guidance;
- legislative requirements;
- topic specific guidelines, standards and codes of practice;
- the EIA Regulations;
- advice from statutory consultees and other stakeholders; and
- the expert judgement of the team undertaking the EIA.

4.6.4 The likely effect that the Proposed Development may have on identified environmental receptors will be influenced by a combination of the sensitivity

(or importance) of the receptor and the predicted magnitude of impact from the baseline conditions.

4.6.5 Assignment of environmental sensitivity of a receptor will generally depend on the vulnerability, recoverability and value/importance of the receptor. The environmental sensitivity (or importance) will be determined using the categories set out in Table 4.3.

Table 4.3 Indicative environmental sensitivity of a receptor

Sensitivity	Criteria
High	High importance and rarity, international level and very limited potential for substitution
Medium	High or medium importance and rarity, regional level and limited potential for substitution
Low	Low or medium importance and rarity; and local level
Negligible	Very low importance or rarity and local level

4.6.6 Where other categories of sensitivity have been used, this will be set out in the individual environmental topic assessment.

4.6.7 The categorization of the magnitude of impact will take into account the following factors:

- extent;
- duration;
- frequency; and
- reversibility.

4.6.8 Impacts will be defined as either beneficial or adverse. As a guide, the magnitude of impact will be specified in topic chapters and generally be assigned using the categories outlined in Table 4.4.

Table 4.4 Indicative magnitude of impact

Sensitivity	Criteria
High	Total loss or major alteration to key elements/features of the baseline (i.e., pre-development) conditions.
Medium	Partial loss or alteration to one or more key elements/features of the baseline (i.e., pre-development) conditions.
Low	Minor shift away from baseline (i.e., pre-development) conditions.

Sensitivity	Criteria
Negligible	Very slight change from baseline (i.e., pre-development) conditions

- 4.6.9 Further details of the topic-specific methodologies adopted for the EIA will be defined within the methodology section of each of the topic chapter:
- 4.6.10 The overall significance of the effect will be assigned by the interaction of both sensitivity of the receptor and magnitude of impact. The level of significance will be determined in each of the environmental topic assessments and will consider relevant topic-specific legislation, planning policy and guidance. Levels of significance of effects will generally follow the following scale outlined in Table 4.5 and will be either beneficial or adverse.

Table 4.5 Matrix to classify environmental effects

		Magnitude of impact			
		High	Medium	Low	Negligible
Sensitivity of resource	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Minor	Negligible	Negligible	Negligible

- 4.6.11 The evaluation of significance is a product of the likelihood and consequence of each impact as set out in Table 4.6. Significant effects are generally defined as those that are of Moderate or Major significance. Significance conclusions for each impact will incorporate confirmed design and mitigation measures.
- 4.6.12 Professional judgement will be used to assign the most appropriate option where the matrix offers more than one level of significance. The topic assessments will adopt this general approach to assigning significance, unless stated in the individual topic chapters.

Table 4.6 Indicative significance criteria for use within the EIA

Significance	Criteria
Major	These effects are likely to be key factors or important considerations at a regional or district scale but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process. They are generally, but not exclusively associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced or relocated.

Significance	Criteria
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Cumulative effects

- 4.6.13 The EIA Regulations require that the ES includes a description of the cumulation of effects with other existing or approved projects. Cumulative effects are effects that, in combination with each other, may be more (or less) than the sum of the individual effects. These may result from incremental changes caused by other existing or approved projects together with the Proposed Development. In-combination effects will be considered within each relevant environmental topic’s chapter of the ES, for further information see Chapter 10.
- 4.6.14 The purpose of undertaking a cumulative assessment is to identify whether other developments may lead to an elevated effect on the environment during construction, or once a development is built and in use. Other developments need to be of a sufficient scale and/or proximity to the Proposed Development for potential cumulative effects to be likely. Other developments may also precede the development being assessed thereby changing future baseline conditions, or in some cases introducing new sensitive receptors, as noted in PINS Advice Note Seventeen. The zone of influence will vary on a topic-by-topic basis.
- 4.6.15 Chapter 10 provides an overview of the approach to undertaking the cumulative effects assessment.

Limitations and assumptions

- 4.6.16 In accordance with the EIA Regulations, difficulties encountered during assessment work and limitations and assumptions used for individual assessment areas will be set out in the ES.
- 4.6.17 In addition, best practice guidance from the IEMA will inform the assessment. Relevant to this EIA Scoping Report is a growing emphasis on undertaking proportionate assessments which reflect those aspects of the environment with potential to have significant effects and clarify those areas where there is little reasonable potential for this to occur.

4.7 Mitigation measures and monitoring

- 4.7.1 Where adverse effects can be reduced to acceptable levels through incorporation of appropriate design or management measures, these will be identified within the ES along with an explanation as to how such measures will be secured.
- 4.7.2 Where appropriate, monitoring procedures will be identified to address any likely residual significant adverse effects, in order to measure the effectiveness of the mitigation proposed.
- 4.7.3 A list of supporting management plans to secure mitigation in the DCO Application are identified in Chapter 12.

4.8 Competent Experts

- 4.8.1 In accordance with the EIA Regulations, as amended, paragraph (14), a Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.
- 4.8.2 The introductory and summary chapters of this EIA Scoping Report (Chapters 1 to 4, 10 and 12 to 13) have been prepared by Ove Arup and Partners Ltd. (Arup), drawing on material provided by JBM Solar, which includes engineers, designers and external consultants. The design details contained in this document have been approved by JBM Solar.
- 4.8.3 The topic-specific chapters of this EIA Scoping Report (Chapters 5 to 9 and 11) and their corresponding appendices have been prepared by Arup and a number of consultants on the Applicant team, as summarised in Table 4.7.

Table 4.7 Competent Authors

Chapter	Author
Chapter 1 Introduction	Arup
Chapter 2 Project Description	Arup
Chapter 3 Alternatives	Arup
Chapter 4 EIA Methodology	Arup
Chapter 5 Climate Change	Arup
Chapter 6 Biodiversity	RSK Biocensus
Chapter 7 Landscape	Stephenson Halliday
Chapter 8 Cultural Heritage	Wessex Archaeology
Chapter 9 Land Use and Socio Economics	Arup and Reading Agricultural Consultants
Chapter 10 Cumulative effects assessment	Arup

Chapter	Author
Chapter 11	
Section 11.2 Air Quality	Arup
Section 11.3 Arboriculture	Treework Environmental Practice
Section 11.4 Electric, magnetic, and electromagnetic fields	Arup
Section 11.5 Glint and glare	Pager Power
Section 11.6 Ground conditions	Arup
Section 11.7 Human health	Arup
Section 11.8 Hydrology	Wallingford Hydro Solutions Ltd
Section 11.9 Major accidents and disasters	Arup
Section 11.10 Noise and vibration	Arup
Section 11.11 Traffic and Transport	Arup
Section 11.12 Waste	Arup
Chapter 12 Structure	Arup
Chapter 13 Conclusion	Arup

4.8.4 Arup is a corporate member of the IEMA and hold its EIA Quality Mark. The Quality Mark allows organisations that lead the co-ordination of statutory EIA in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

4.9 Consultation

Approach to consultation

4.9.1 Effective and meaningful engagement and consultation with stakeholders is an essential aspect of developing the design of the Proposed Development and of undertaking a comprehensive EIA.

4.9.2 As advised in Department for Communities and Local Government (DCLG) (now Department for Levelling Up, Housing and Communities (DLUHC)) guidance on pre-application consultation³⁸ the Applicant's approach to engagement and consultation will be iterative to enable stakeholders to gain understanding of the proposals early on in the process and to have genuine opportunities for influence.

4.9.3 The Applicant will have regard to the guidance provided in PINS Advice Note Three³⁹ in taking a precautionary approach to identifying relevant consultees for the Proposed Development and ensuring compliance with the

³⁸ Department for Communities and Local Government (DCLG). *Planning Act 2008: Guidance on the Pre-application Process*. London, 2015

³⁹ PINS (2017). *Advice Note Three: EIA Notification and Consultation*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/>

requirements of the EIA Regulations, the Act and the Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2009 (as amended).

- 4.9.4 The Applicant will also ensure that reporting on engagement and consultation activities is carried out in accordance with PINS Advice Note Fourteen⁴⁰, with the submission of a Consultation Report with the DCO application which evidences how consultation has been carried out and how feedback has been taken into account in developing the proposals.
- 4.9.5 Stakeholder engagement for the Proposed Development will seek to achieve the following aims:
- engaging early to allow stakeholders and the public to shape the project's design at a formative stage;
 - committed to understanding local issues that are important for communities;
 - ensure community involvement is central to the project's ongoing design; and
 - creating a project that benefits the local area for the next 40 years (the design life).
- 4.9.6 Consultation with stakeholders will be undertaken throughout the EIA process to gather feedback on the emerging project proposals, baseline survey methodologies and results and assessment methodology. It is intended that non-statutory consultation and engagement activities will be undertaken to inform the design of the Proposed Development and its environmental assessment ahead of commencing pre-application statutory consultation as required under the Act and the EIA Regulations.
- 4.9.7 Compliance with the requirements of the Act and the EIA Regulations will be evidenced in the Consultation Report and ES submitted with the DCO Application, in addition to details of the non-statutory engagement undertaken throughout the design and assessment of the Proposed Development.

Consultation to date

- 4.9.8 Consultation with statutory consultees and stakeholders has already commenced to help inform the content of this EIA Scoping Report and the design of the Proposed Development.
- 4.9.9 A number of meetings have taken place with the following stakeholders to provide an introduction to the Proposed Development and seek initial views:
- Stockton-on-Tees Borough Council;
 - Darlington Borough Council;

⁴⁰ PINS (2021) *Advice Note Fourteen: Compiling the Consultation Report*. Available at: [Advice Note Fourteen: Compiling the Consultation Report | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://www.planninginspectorate.gov.uk/advice-note-fourteen-compiling-the-consultation-report/)

- Durham County Council; and
 - The Planning Inspectorate.
- 4.9.10 Information on the Proposed Development and the approach to environmental assessment has also been shared via email with:
- The Lead Local Flood Authority (LLFA);
 - County Archaeologist;
 - Historic England; and
 - Natural England.
- 4.9.11 In addition to engagement with relevant statutory consultees, the Applicant has been in regular discussions with local landowners affected by the Proposed Development.
- 4.9.12 The Applicant has launched a website (www.byersgillsolarfarm.co.uk) for the Proposed Development prior to the submission of this EIA Scoping Report, which provides information to the wider community and the opportunity to contact the Applicant with any queries or for further information. Non-statutory engagement activities, to include representatives of the local community and relevant interest groups, will be undertaken following the submission of this EIA Scoping Report.

5 Climate Change

5.1 Introduction

5.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the Proposed Development, in respect of Carbon and Climate Change. It sets out climate change receptors of relevance, and the approach to the assessment of the Proposed Development's impacts on, and impacts from, climate change during construction, operation and decommissioning.

5.1.2 Three aspects of climate change assessment have been considered in this chapter:

- an assessment of the effects of the Proposed Development on climate – the Greenhouse Gas (GHG) assessment considers the change in GHG emissions due to the Proposed Development;
- an assessment of the vulnerability of the Proposed Development to climate change – the Climate Change Resilience Assessment (CCRA) considers the resilience of the Proposed Development in the context of projected future changes in climate variables; and
- an assessment of the potential impacts of future climate conditions to act in-combination with the impacts of the Proposed Development on other environmental receptors - the in-combination climate change impact (ICCI) assessment ensures that environmental receptors that are vulnerable to impacts from both the Proposed Development and climatic factors are considered in the context of the changing climate.

5.2 Relevant legislation, policy and guidance

5.2.1 The following sections identify the relevant legislation, planning policy and guidelines which underpin the assessment methodology for climate change and have informed the scope of the assessment.

Legislation

5.2.2 The following legislation underpins any assessment of Climate Change within the planning process:

- The Climate Change Act 2008, as amended by the Climate Change Act (2050 Target Amendment) Order 2019. The amendment in this Order has the effect that the minimum percentage by which the net UK carbon account for the year 2050 must be lower than the 1990 baseline is increased from 80% to 100%.

Policy

National

5.2.3 The following national, local and emerging planning policies of relevance to the Proposed Development and the Climate Change assessments have been considered:

- NPS EN-1⁴¹, with particular reference to paragraphs 2.2.9 and 4.8.2 in relation to climate impacts and adaptation; paragraphs 4.1.3 to 4.1.4 in relation to adverse effects and benefits; paragraphs 4.2.1, 4.2.3, 4.2.4, 4.2.8 to 4.2.10 and 5.1.2 in relation to European (EU) Directive and ES requirements; paragraphs 4.5.3 and 4.8.1 to 4.8.12 in relation to adaptation measures in response to climate projections; and paragraphs 5.7.1 to 5.7.2 in relation to climate projections, flood risk and the importance of relevant mitigation;
- NPS EN-5⁴², paragraph 2.4.1 regarding NPS EN-1 and the importance of climate change resilience, and paragraph 2.4.2 in relation to ES requirements regarding climate change resilience;
- The NPPF⁴³ sets out the government's planning policies for England and how these should be applied. Whilst the policies set may be relevant to the assessment, the NPPF does not form the basis for a decision on an NSIP. The assessment would therefore focus on a number of key sections, including paragraphs 8, 20 and 149 in relation to adaptation, mitigation and climate change resilience; paragraphs 148 and 157 in relation to flood risk and damage to property and people; paragraphs 150 and 153 in relation to reduction of carbon dioxide (CO₂) emissions through design and reduced energy consumption; and paragraphs 155 to 165 in relation to climate projections, associated flood risk and adaptation;
- UK Third Climate Change Risk Assessment (2022)⁴⁴;
- Climate Change: second national adaptation programme (2018 – 2023);
- The UK Clean Growth Strategy; and
- UK Nationally Determined Contribution⁴⁵.

Local

5.2.4 The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham

41 Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

42 Department of Energy and Climate Changes (2021). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

43 Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

44 UK Government (2022) *UK Climate Change Risk Assessment*. Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022>

45 HM Government (2020) *United Kingdom of Great Britain and Northern Ireland's Nationally Determined Contribution*. Available at: <https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc#:~:text=On%2012%20December%202020%2C%20the,2030%2C%20compared%20to%201990%20levels>

County Council. The relevant local planning policy from each LPA would be considered, as set out below:

- Darlington Local Plan (2016–2036)⁴⁶;
- Stockton-on-Tees Borough Council Local Plan⁴⁷;
- County Durham Plan (2020)⁴⁸;
- The Joint Minerals and Waste Plan⁴⁹; and
- Any supplementary or supporting documentation of relevance.

Guidance

5.2.5 The following good practice guidance will be used to assess the impact of GHG emissions from the Proposed Development as part of the EIA:

- IEMA Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance⁵⁰;
- The Publicly Available Specification 2080 (PAS 2080:2016) on carbon management in infrastructure⁵¹;
- Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice (2012)⁵²; and
- RICS Whole life carbon assessment for the built environment⁵³.

5.2.6 The following good practice guidance will be used to assess the vulnerability of the Proposed Development to climate change:

- Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation⁵⁴; and
- National Planning Policy Guidance on climate change⁵⁵.

5.3 Study area

Temporal boundaries

5.3.1 As per the IEMA Guidance, a reference study period for the Proposed Development has been chosen as the basis for the GHG emissions assessment, based on the expected service life of the construction asset. The study period is 12 months for construction and 40 years for operation of the

⁴⁶ Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

⁴⁷ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

⁴⁸ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

⁴⁹ Darlington Borough Council (2011). *Tees Valley Joint Minerals and Waste Development Plan Documents*. Available at: <https://www.darlington.gov.uk/media/2271/minerals-and-waste-core-strategy-dpd.pdf>

⁵⁰ Institute of Environmental Management and Assessment (IEMA) (2022) *Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance*. Available online: <https://www.iema.net>

⁵¹ British Standards Institution (2016). *PAS 2080:2016 Carbon Management in Infrastructure*

⁵² Department of Energy and Climate Change (2012) *Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice*

⁵³ Royal Institution of Chartered Surveyors (2017). *Professional standards and guidance document on Whole life carbon assessment for the built environment*

⁵⁴ IEMA (2020). *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation*. Available at:

<https://www.iema.net/assets/newbuild/Policy%202020/IEMA%20EIA%20Climate%20Change%20Resilience%20June%202020.pdf>

⁵⁵ UK Government (2019) *National Planning Policy Guidance on climate change*. Available at: <https://www.gov.uk/guidance/climate-change>

Proposed Development. The exact start dates on construction are not yet known and depend on the DCO process.

Greenhouse gas emissions

5.3.2 The study area for the lifecycle GHG assessment would consider all GHG emissions arising through the lifecycle of the Proposed Development. This includes direct GHG emissions arising from activities within the Order limits and indirect emissions from activities outside the Order limits (for example, the transportation of materials to the Order limits and embodied carbon within construction materials).

Climate change resilience

5.3.3 The study area for the CCRA will be the Order limits, i.e., it covers all assets and infrastructure which constitute the Proposed Development, for operation and decommissioning.

5.4 Consultation

5.4.1 There are no specific statutory or non-statutory consultation bodies identified for climate change within the EIA process. However, with the growing importance of climate change on political and public agendas, this EIA Scoping Report facilitates consultation with the local authorities (Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council) within which the development is located, providing the opportunity to comment on the scope and methodology of assessment.

5.5 Baseline conditions

Baseline Data Sources

5.5.1 Baseline conditions have been established for the purposes of this EIA Scoping Report with reference to the following sources of information:

Greenhouse gas emissions

- UK local authority and regional CO₂ emissions national statistics: 2005 to 2020.

Climate change resilience

- Current climate data for central England, recorded at Stockton-on-Tees- Met Office UK Climate Averages 1991 - 2020⁵⁶;
- Projected climate data for the North East of England region - UK Climate Projections 2018 (UKCP18), under the high emissions scenario (i.e. Receptor Concentration Pathway 8.5 (RCP8.5)) and for a 50% probability of occurrence⁵⁷;

56 Met Office (2020): *UK Climate Averages (1991-2020)*. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcxc3ykr>
57 Met Office (2020): *UK Climate Projections*. Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/key-results>

- Climate extreme indices - State of the UK Climate 2021: Supplementary Report on Climate Extremes⁵⁸; and
- Potential geological hazards, e.g., landslides - British Geological Survey GeoIndex⁵⁹.

Baseline information

Greenhouse gas emissions

- 5.5.2 The current land use of the Site Area comprises arable land, managed hedgerows and trees, which are likely to have high capacity for carbon sequestration and storage. Baseline agricultural GHG emissions are dependent on soil and vegetation types present, and fuel use for the operation of onsite vehicles and machinery.
- 5.5.3 For the GHG assessment, the baseline is a ‘business as usual’ scenario whereby the Proposed Development is not implemented. The baseline comprises existing carbon stock and sources of GHG emissions within the boundary of the existing activities on-site.
- 5.5.4 Baseline emissions will also include emissions that may be avoided as a result of the Proposed Development, i.e., existing emissions from the generation of grid electricity if the Proposed Development does not go ahead. This will be a cumulative total of all emissions avoided over the lifetime of the Proposed Development, assuming 100% of the energy generated by the Proposed Development is displacing energy generated by fossil fuels.

Climate change resilience and in-combination climate change impacts

- 5.5.5 Baseline conditions for the CCRA and ICCI are determined using the UK climate change projections data.
- 5.5.6 An initial review of UKCP18⁶⁰ data under the high emissions scenario RCP8.5 for the North East England region, within which the Proposed Development is located, suggests that by the 2050s time period (2040- 2059) the region will experience an increase of around 1.9°C in summer mean air temperature and an increase of 1.4°C in winter mean air temperature, compared to a 1981-2010 baseline period. For the same time period, summer mean precipitation is expected to decrease by around 10%, whilst in winter it is expected to increase by 7%.
- 5.5.7 The high emissions scenario was chosen following IEMA guidance⁵⁴ and the 2040-2059 was chosen as this best represents the operational lifetime (40 years) of the Proposed Development.

58 Met Office (2022): *State of the UK Climate 2021: Supplementary Report on Climate Extremes*. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/about/state-of-climate>

59 British Geological Survey (2020) *GeoIndex*. Available at: <http://mapapps2.bgs.ac.uk/geoindex/home.html>

60 UK Climate Impacts programme (UKCIP) (2018) *UK Climate Projections 2018 (UKCP18)*. Available at: <https://www.metoffice.gov.uk/research/collaboration/ukcp>

5.6 Potential effects and mitigation measures

5.6.1 This section provides a summary of the potential effects that could arise from the Proposed Development in respect of change in GHG emissions. In addition, this section summaries the Proposed Development’s climate change resilience in order that the assessment methodology can be presented in more detail in the next section.

Greenhouse gas emissions

5.6.2 For the purposes of this assessment, it is considered that any increase or decrease in GHG emissions compared to the baseline have the potential to have an impact, due to the high sensitivity of the receptor (global climate) to increases in GHG emissions. GHG impacts will be put into context in terms of their impact on the UK’s 5-year carbon budgets, including sub-sectoral budgets for energy generation which set legally binding targets for GHG emissions, and current recorded regional emissions. Table 5.1 outlines the potential sources of GHG emissions to be considered as part of the climate assessment.

Table 5.1 Potential sources of GHG emissions to be considered as part of the climate assessment

Lifecycle stage	Activity	Primary emissions sources
Product Stage	Raw material extraction and manufacturing of products required to build the equipment for the Proposed Development. Due to the complexity of the equipment, this stage is expected to make a significant contribution to overall GHG emissions. Transportation of materials for manufacturing.	Embodied GHG emissions from energy use in extraction of materials and manufacture of components and equipment. Emissions of GHG from transportation of products and materials.
Construction	On-site construction activity including emissions from construction compounds. Transportation of construction materials (where these are not included in product-stage embodied GHG emissions). Travel of construction workers.	Consumption of energy (electricity; other fuels) from plant, vehicles, generators and worker travel. Fuel consumption from transportation of materials to site, where these are not included in product-stage embodied emissions. Due to the nature of the equipment, this could require shipment of certain aspects over significant distances.

Lifecycle stage	Activity	Primary emissions sources
	Disposal of waste materials generated by the construction process. Land use change. Water use.	GHG emissions from transportation and disposal of waste. GHG emissions from net loss of carbon sink. Provision of clean water, and treatment of wastewater.
Operation	Operation and maintenance of the Proposed Development	GHG emissions from energy consumption, provision of clean water and treatment of wastewater. These operational emissions are expected to be negligible in the context of the overall GHG impact. Leakage of potent GHGs, such as SF6, during operation. GHG emissions from energy consumption, material use and waste generation resulting from ongoing site maintenance. Emissions from routine maintenance are expected to be negligible.
Decommissioning	On-site decommissioning activity. Transportation and disposal of waste materials. Worker travel.	Consumption of energy (electricity and other fuels) from plant, vehicles and generators on site. Emissions from the disposal and transportation of waste. This has the potential to be significant given the complexity of the equipment. GHG emissions from transportation of workers to site.

5.6.3 The GHG emissions offset through the production of cleaner electricity compared to grid average emissions during the operational phase will be accounted for within the GHG emissions calculations. The ES will outline how the layout and selection of technologies (e.g., solar PV modules and use of BESS) have been designed to maximise the output of zero emissions energy.

- 5.6.4 For the construction phase, a CEMP will be prepared and implemented by the appointed contractor to include a range of best practice construction measures to minimise emissions, such as:
- specification of alternative materials with lower embodied GHG emissions; and
 - low carbon design specifications such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles.
- 5.6.5 The ES will identify potential measures that could reduce emissions during the decommissioning process. However, as methods and processes for decommissioning of solar PV modules will continue to evolve over time, it is likely that such measures will need to be reviewed at a date that is closer to the end of life for the project, and subsequently secured through a decommissioning plan to be drafted by the contractor and agreed with the relevant stakeholders at a later date.
- 5.6.6 The final selection of any mitigation measures, if required, will be detailed as part of the lifecycle GHG impact assessment in the ES. This may include GHG emission mitigation measures concerning construction, operation and decommissioning of the Proposed Development.

In-combination climate change impact assessment

- 5.6.7 ICCI assessment identifies how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Proposed Development. The climate parameters relevant to the Proposed Development are detailed in Table 5.2 below together with the rationale for scoping.
- 5.6.8 On the basis of the information presented in Table 5.2, an ICCI assessment is proposed to be scoped out.

Table 5.2 Climate parameters for the in-combination climate change impact of the Proposed Development

Parameter	Scoped in / out	Rationale for Scoping Conclusion
Temperature change	Scoped out	Projected temperature increases in combination with the Proposed Development are not expected to have a significant impact upon environmental receptors identified by other topic disciplines.
Sea level rise	Scoped out	The Proposed Development is not located in an area that is susceptible to sea level rise.

Parameter	Scoped in / out	Rationale for Scoping Conclusion
<p>Precipitation change (frequency and magnitude of precipitation events and droughts)</p>	<p>Scoped out</p>	<p>Climate change may lead to an increase in substantial precipitation events that could lead to flash flooding or changes to groundwater levels. However, no significant impacts on surface water or groundwater levels are expected as a result of precipitation changes, in combination with the Proposed Development, as the flow of precipitation to ground will not be significantly hindered as a result of the Proposed Development.</p> <p>The Proposed Development, in combination with projected changes in precipitation, is also not expected to have a significant impact upon receptors identified by other environmental disciplines.</p> <p>There is a potential for drought, in combination with higher temperatures, to increase the risk of fire. Adequate fire safety measures will be incorporated into the design, reducing this risk to non-significant.</p>
<p>Wind</p>	<p>Scoped out</p>	<p>Projected changes in wind patterns in combination with the Proposed Development are not expected to have a significant impact upon environmental receptors identified by other topic disciplines.</p>

Climate change resilience assessment

5.6.9 The Proposed Development is assumed to have a design life of 40 years. Climate conditions are predicted to change considerably over this period with the potential for the Proposed Development to be impacted and therefore a CCRA will be undertaken.

5.6.10 Climate parameters relevant to the CCRA are detailed in Table 5.3 below and will be considered as part of the climate assessment within the EIA.

Table 5.3 Parameters scoped into the Climate Change Resilience Assessment

Parameter	Scoped in / out	Rationale for Scoping Conclusion
Extreme weather events	Scoped in	The Proposed Development may be vulnerable to extreme weather events such as storm damage to structures and assets.
Increased average temperatures and incidence of heatwaves	Scoped in	Extremes in temperatures may result in heat stress of materials and structures.
Increased frequency of heavy precipitation events	Scoped in	The Proposed Development may be vulnerable to changes in precipitation. Heavy rainfall could cause land subsidence and damage to structures or drainage systems during periods of heavy rainfall.
Increase in strong wind events	Scoped in	The Proposed Development may be vulnerable to changing wind patterns. High winds could damage structures or assets or cause damage via falling trees or debris.
Sea level rise	Scoped out	The Proposed Development is not located in an area that is susceptible to sea level rise.

5.6.11 Information will be provided within the ES to describe how the Proposed Development will be designed to improve its resilience to future climate conditions.

5.7 Proposed assessment methodology

GHG emissions

5.7.1 The GHG assessment will follow a project lifecycle approach to calculate estimated GHG emissions arising from the construction, operation and decommissioning of the Proposed Development and to identify GHG ‘hot spots’ (i.e., emissions sources likely to generate the largest amount of GHG emissions). This will enable the identification of priority areas for mitigation in line with the principles set out in IEMA guidance⁵⁰.

5.7.2 In line with the World Business Council for Sustainable Development and World Resources Institute GHG Protocol guidelines⁶¹, the GHG assessment will be reported as tonnes of carbon dioxide equivalent (tCO₂e) and will consider the seven Kyoto Protocol gases:

- Carbon dioxide (CO₂);

61 World Business Council for Sustainable Development and World Resources Institute (2001); *The GHG Protocol, A Corporate Accounting and Reporting Standard*. Available at: <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf>

- Methane (CH₄);
- Nitrous oxide (N₂O);
- Sulphur hexafluoride (SF₆);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF₃).

5.7.3 These GHG calculations will be used to calculate total carbon of the Proposed Development in terms of energy generated. This carbon per energy unit will then be compared with carbon per energy unit of fossil fuel generation. This will demonstrate the impact of the Proposed Development and show at what operational year the Proposed Development becomes carbon negative, compared against a gas fired Combined Cycle Gas Turbine (CCGT) generating facility, currently the most carbon-efficient fossil-fuelled technology available.

5.7.4 Expected GHG emissions arising from the construction activities, embodied carbon in materials, operational emissions and emissions via decommissioning of the Proposed Development, as well as baseline emissions, will be quantified using a calculation-based methodology as per the following equation, and aligned with the GHG Protocol:

- Activity data x GHG emissions factor = GHG emissions or removal

5.7.5 Department for Environment, Food and Rural Affairs (Defra) 2018 emissions factors⁶² and embodied carbon data from the Inventory of Carbon and Energy (ICE)⁶³ will be used as the source data for calculating GHG emissions.

5.7.6 The sensitivity of the receptor (global climate) to increases in GHG emissions is always defined as high as any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future 5 year carbon budgets. The importance of limiting global warming to below 2°C this century is broadly asserted by the International Paris Agreement and the climate science community.

5.7.7 In GHG accounting, it is common practice to consider exclusion of emission sources that are <1% of a given emissions inventory on the basis of a minimal contribution. Both Department of Energy and Climate Change (DECC)⁶⁴ guidance and the PAS 2080⁵¹ allow emissions sources of <1% contribution to be excluded from emission inventories, and these inventories to still be considered complete for verification purposes. Therefore, activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such

⁶² Department for Environment, Food and Rural Affairs (Defra), (2018); *Conversion Factors Database*. Available at: <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting>

⁶³ Inventory of Carbon and Energy (2011). *Inventory of Carbon and Energy Database*. Available at: <http://www.circularecology.com/embodied-energy-and-carbon-footprintdatabase.html#.XDR322nFJhF>

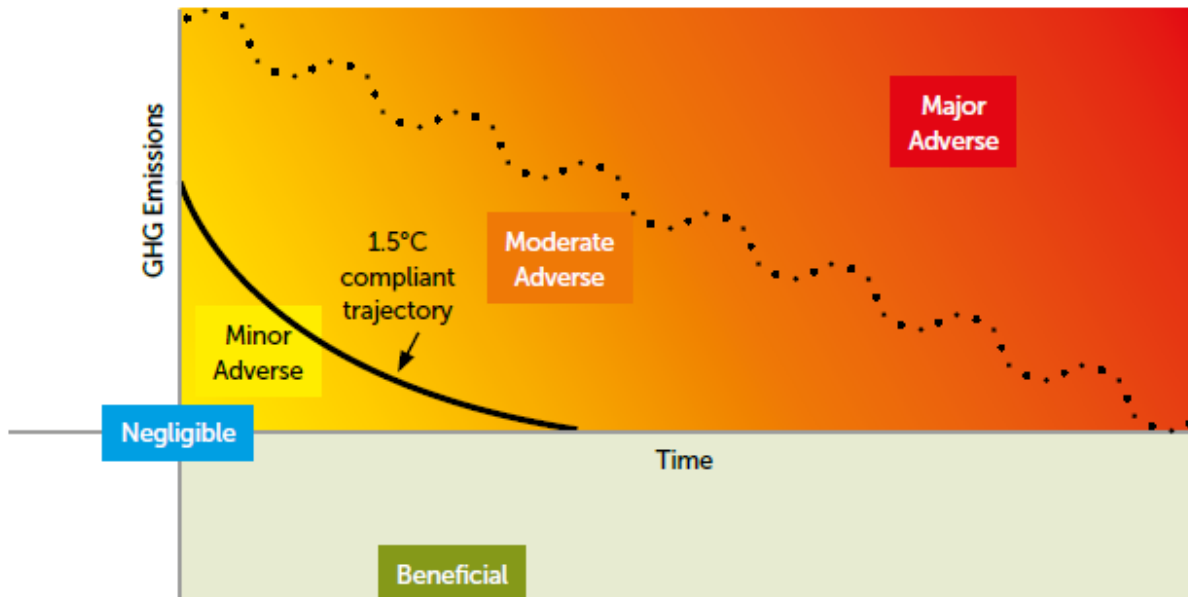
⁶⁴ Department of Energy and Climate Change (DECC) (2013). *Guidance on Annual Verification for emissions from Stationary Installations*.

exclusions total a maximum of 5% of total emissions; all exclusions should be clearly stated.

Criteria for assessing significance in GHG emissions

- 5.7.8 Often a project will cause a change in GHG emissions compared to the baseline which should be assessed. When setting this impact into context to determine significance, it is important to consider the net zero trajectory in line with the Paris Agreement’s 1.5°C pathway.
- 5.7.9 As such, the IEMA guidance for Assessing Greenhouse Gas Emissions and Evaluating their Significance determines significance depending on the project’s whole life GHG emissions and how these align with the UK’s net zero compatible trajectory. This is demonstrated by Plate 5.1 below.

Plate 5.1 Different levels of significance plotted against the UK’s net zero compatible trajectory⁶⁵



- 5.7.10 A project that follows a ‘business-as-usual’ or ‘do minimum’ approach and is not compatible with the UK’s net zero trajectory, or accepted aligned practice or area based transition targets, results in a significant adverse effect. It is down to the practitioner to differentiate between the ‘level’ of significant adverse effects e.g., ‘moderate’ or ‘major’ adverse effects.
- 5.7.11 A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and ‘good practice’ reduction measures to achieve that has a minor adverse effect that is not significant. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario,

⁶⁵ Ideally, the curve will be quantitative, derived from a set of carbon budgets that show the rate of reduction to be achieved; but where this is not available, it will need to be evaluated qualitatively based on policy goals and advice of expert guidance bodies on the actions needed to achieve the necessary rate of reductions.

keeping the UK on track towards net zero by 2050 with at least a 78% reduction by 2035 and thereby potentially avoiding significant adverse effects.

- 5.7.12 A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant. This project is playing a part in achieving the rate of transition required by nationally set policy commitments.
- 5.7.13 A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

Climate change resilience assessment

- 5.7.14 The Proposed Development's resilience to climate change will be considered qualitatively⁵⁴. This will be completed in liaison with the project design team and the other ES technical specialists by considering the climate projections for the geographical location and timeframe of the Proposed Development.
- 5.7.15 A statement will be provided to describe how the Proposed Development will be designed to be as resilient as is reasonably practicable to future climate change across the lifetime of the Proposed Development.
- 5.7.16 The approach and methodology for the CCRA is as follows:
- analysis of relevant climate change and weather data, emissions scenarios and probability levels;
 - assessment of climate hazards;
 - identification of potential risks from these climate hazards to the assets and occupants of the Proposed Development;
 - consideration of the resilience of the Proposed Development within the context of any incorporated mitigation measures, including resilience measures which are embedded within the design due to regulations and design guidelines; and
 - identification of need for any further resilience measures to protect the Proposed Development against the effects of climate change.
- 5.7.17 The CCRA is composed of three main parts:
- the identification of climate hazards and benefits;
 - the assessment of likelihood and consequences;
 - the assessment of sensitivity; and
 - the evaluation of significance.

- 5.7.18 There is no legislative definition of ‘significance’ for a CCRA. IEMA states the conclusion of whether an effect is significant/the level of significance is down to the Applicant in conjunction with the EIA assessment team.
- 5.7.19 The Applicant and EIA assessment team will conduct an assessment based on the methodology set out in this section.
- 5.7.20 The potential likelihood and consequence of impacts on the Proposed Development will be scored by the project designers using a qualitative five-point scale, as set out in Table 5.4 and Table 5.5 respectively.

Table 5.4 Qualitative five-point scale of likelihood of hazard impact⁶⁶

Descriptor	Description
Very unlikely	The event may occur once during the lifetime of the project (60 years).
Unlikely	The event occurs during the lifetime of the project (60 years), e.g., once in 60 years.
As likely as not	The event occurs limited times during the lifetime of the project (60 years), e.g., approximately once every 15 years, typically 2 events.
Likely	The event occurs several times during the lifetime of the project (60 years), e.g., approximately once every five years, typically 3 events.
Very likely	The event occurs multiple times during the lifetime of the project (60 years), e.g., approximately annually, typically 27 events.

Table 5.5 Qualitative five-point scale of consequences of hazard impact⁶⁷

Descriptor	Description
Negligible	<ul style="list-style-type: none"> • Minor cuts/abrasions requiring minimal treatment; • Causing minimal work interruption; • No financial loss or costs; • No environmental consequence.
Slight	<ul style="list-style-type: none"> • Injury requiring first aid treatment; • Causing interruption of work for 3 days or less; • Slight financial loss or cost; • Slight environmental consequence.
Moderate	<ul style="list-style-type: none"> • 4 - 14 day lost-time injury(s). Medical treatment required; • Substantial work interruption; • Considerable financial loss;

⁶⁶ Adapted by Arup from IEMA (2020) *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation*. Available at: <https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020>

⁶⁷ Adapted by Arup from IEMA (2020) *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation*, description text amended to focus on added to include injury to people, financial loss and environmental implications.

Descriptor	Description
	<ul style="list-style-type: none"> Moderate environmental implications.
Major	<ul style="list-style-type: none"> Major injuries, including permanent disabling injuries of over 14 days; Major work interruption; Serious financial loss; Severe environmental implications.
Catastrophic	<ul style="list-style-type: none"> Single or multiple deaths involving any persons; Disastrous work interruption; Huge financial loss; Devastating environmental implications.

- 5.7.21 Issues related to vulnerability to climate change predominantly concern the operational phase and how buildings and infrastructure will be designed and developed to integrate resilience to a changing climate.
- 5.7.22 The vulnerability to climate change in the construction phase will not be included in the assessment as the construction programme is not expected to be long enough to experience any notable changes in the climate. The construction of the Proposed Development is proposed to be over a period of approximately 12 months, and commencement on site is subject to the DCO consenting process.
- 5.7.23 Even so, extreme weather events are a feature of the baseline climate and projected climate at the time of construction and therefore it is expected that a CEMP would be prepared by the appointed contractor and implemented during the construction period. The Outline EMP, which will be submitted with the DCO application, will include measures such as ensuring construction materials are covered when stored, and pro-active planning undertaken that accounts for the possibility of extreme weather events, including the use of extreme weather alert systems.
- 5.7.24 Whilst the impacts of climate change are already being experienced, particularly in terms of increased frequency and severity of extreme weather events such as storms and heatwaves, due to the short term phase of construction, it is considered that good construction practice measures alongside the CEMP will appropriately mitigate climate change risks during the construction phase.
- 5.7.25 Flood risk will be assessed within the Flood Risk Assessment (FRA). This assessment considers climate change; the full assessment with assumptions and methodology can be found in the ES.

Significance criteria for the CCRA

- 5.7.26 The significance of the risks identified in the CCRA will be evaluated based on a qualitative assessment, carried out by the Applicant, of the likelihood of

a hazard having an impact on the Proposed Development and the consequence of the impact as set out in Table 5.6.

Table 5.6 Significance matrix⁶⁸

		Measure of consequence				
		Negligible	Slight	Moderate	Major	Catastrophic
Measure of likelihood	Very likely	Medium	Medium	High	Very high	Very high
	Likely	Low	Medium	Medium	Very high	Very high
	As likely as not	Low	Low	Medium	High	High
	Unlikely	Very low	Very low	Low	Medium	Medium
	Very unlikely	Very low	Very low	Low	Low	Medium

5.7.27 For this assessment, significant risks will be defined as those that are of medium, high or very high. Significant risks for each impact will also be assessed considering the design mitigation known at the time of assessment.

5.8 Summary

5.8.1 Table 5.7 presents a summary of the Climate Change assessment and whether effects can be scoped in or out of the assessment.

⁶⁸ Adapted by Arup from IEMA Guidance, showing items considered Medium or above to be a significant risk. The IEMA guidance has been adapted to mirror terminology used in the wider CCRA to show a scale of very low to very high.

Table 5.7 Summary of Climate Change assessment scope

Assessment scope				
Aspects	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Impact of the Proposed Development on climate (GHG emissions)	Scoped in	Scoped in	Scoped in	The Proposed Development could give rise to significant effects on climate change arising from GHG emissions during construction and operation. This is likely to be a net positive through the operational life of the Proposed Development. This will be assessed within the climate change chapter through a GHG emissions assessment.
Resilience of the Proposed Development to climate change	Scoped out	Scoped in	Scoped out	There is potential for significant effects due to the vulnerability of the Proposed Development to climate change weather related impacts during operation. This will be assessed within the climate change chapter through a CCRA.
In-combination Climate change impacts assessed within topics chapters	Scoped out	Scoped out	Scoped out	The combined effect of the impacts of the Proposed Development and potential climate change impacts on the receiving environment during construction and operation are unlikely to give rise to significant effects, as seen in Table 5.2.

6 Biodiversity

6.1 Introduction

- 6.1.1 This chapter sets out the proposed scope and approach to assessing the potential direct and indirect impacts of the Proposed Development on ecological receptors during construction, operation and decommissioning.
- 6.1.2 The ecological surveys that have been undertaken to date, or are in the process of being undertaken, are presented in this chapter, as well as the potential effects that may arise as a result of the Proposed Development as far as these may be predicted at the EIA scoping stage.

6.2 Relevant legislation, policy and guidance

- 6.2.1 The relevant legislation, planning policy and guidelines which underpin the assessment methodology for ecological assessment (as part of the wider EIA) and inform the scope of the assessment are outlined in this section.

Legislation

- 6.2.2 Ecological impact assessment is governed by both international and national legislation. The key legislation that is of relevance is as follows:

- the Birds Directive in relation to Natura 2000 sites⁶⁹;
- the Habitats Directive in relation to Natura 2000 sites⁷⁰;
- the Conservation of Habitats and Species Regulations 2017 (as amended)⁷¹ and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019⁷²
- the Wildlife and Countryside Act 1981 (as amended)⁷³;
- the Countryside and Rights of Way Act 2000⁷⁴;
- the Environment Act 2021⁷⁵;
- the Natural Environment and Rural Communities Act (NERC) 2006⁷⁶;
- the Hedgerows Regulations 1997; and
- the Protection of Badgers Act 1992.

69 European Commission (2009). *Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (Birds Directive) 2009*. Available at: <https://www.legislation.gov.uk/eudr/2009/147>

70 European Commission (1992). *Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) 1992*. Available at: <https://www.legislation.gov.uk/eudr/1992/43>

71 HMSO (2017). *The Conservation of Habitats and Species Regulations (Habitat Regulations) 2017*. Available at: <https://www.legislation.gov.uk/ukSI/2017/1012> England and Wales

72 HMSO (2019). *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176573/pdfs/ukdsi_978_0111176573_en.pdf

73 HMSO (1981). *The Wildlife and Countryside Act (WCA) 1981*. Available at: <https://www.legislation.gov.uk/ukpga/1981/69>

74 HMSO (2000). *Countryside and Rights of Way Act 2000*. Available at: <https://www.legislation.gov.uk/ukpga/2000/37/contents>

75 HMSO (2021). *The Environment Act 2021*. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

76 HMSO (2006). *The Natural Environment and Rural Communities (NERC) Act 2006*. Available at: <https://www.legislation.gov.uk/ukpga/2006/16>

Policy

6.2.3 The following national and local planning policies of relevance to the Proposed Development and the ecological impact assessment have been considered:

National

- NPS EN-1⁷⁷, with reference to paragraph 4.1.4 which discusses adverse effects and benefits, paragraphs 5.3.3 and 5.3.4 in relation to assessing, conserving and enhancing conservation interests, paragraph 5.3.15 in relation to good design and paragraphs 5.3.18 – 5.3.20 in relation to appropriate mitigation;
- NPS EN-3, Renewable Energy Infrastructure⁷⁸ is currently in the process of being updated. The current NPS does not include specific reference to solar technologies however, the latest Draft NPS EN-3⁷⁹ includes a section on solar photovoltaic generation and this will be considered as the draft progresses;
- The NPPF⁸⁰ sets out the government's planning policies for England and how these should be applied. Whilst the policies set may be relevant to the assessment, the NPPF does not form the basis for a decision on an NSIP. The assessment would therefore focus on a number of key sections, including Conserving and enhancing the natural environment (Section 15), specifically paragraphs 179 - 182;
- Governments 25 Year Environment Plan (2018)⁸¹; and
- Biodiversity 2020: A strategy for England's Wildlife and Ecosystem Services⁸².

Local

6.2.4 The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. Planning policy of relevance to the assessment which would be considered includes:

- Darlington Borough Local Plan (2016-2036)⁸³;
- Stockton on Tees Borough Council Local Plan⁸⁴;

⁷⁷ Department of Energy and Climate Change (DECC) (2011) *National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Date Accessed: 26/09/2022].

⁷⁸ Department of Energy and Climate Change. *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37048/1940-nps-renewable-energy-en3.pdf

⁷⁹ Department of Energy and Climate Change (2021). *Draft National Policy Statement for Renewable Energy Infrastructure*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

⁸⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

⁸¹ HM Government (2018). *A Green Future: Our 25 Year Plan to Improve the Environment*. Available at: <https://www.gov.uk/government/publications/25-year-environment-plan>

⁸² Department for Environment, Food and Rural Affairs (2020). *Biodiversity 2020: A strategy for England's wildlife and ecosystem services*. Available at: <https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services>

⁸³ Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

⁸⁴ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

- County Durham Plan (2020)⁸⁵; and
- Any supplementary or supporting documentation of relevance.

6.2.5 A summary of relevant policies are set out in Table 6.1.

Table 6.1 Summary of relevant local policies

Policy Documents	Policy Reference
Darlington Local Plan (2015-2036)	ENV4: Green and Blue Infrastructure ENV7: Biodiversity and Geodiversity and Development ENV8: Assessing a Development's Impact on Biodiversity
Stockton-on-Tees Borough Council Local Plan	ENV5: Preserve, Protect and Enhance Ecological Networks, Biodiversity and Geodiversity ENV6: Green Infrastructure, Open Space, Green Wedges and Agricultural Land
County Durham Plan	Policy 26: Green Infrastructure

Guidance

6.2.6 The approach used for the ecological assessment will be undertaken in accordance with best practice guidance, namely The Guidelines for Ecological Impact Assessment in the UK and Ireland⁸⁶, issued by the Chartered Institute of Ecology and Environmental Management (CIEEM).

6.3 Study area

6.3.1 The study area denotes the full spatial context used to assess each ecological feature under investigation.

6.3.2 The study area for the ecological surveys is defined by the Site Area, which encompasses the maximum area of land potentially required for the Proposed Development and an appropriate buffer zone around the Site Area, as noted below.

6.3.3 The following study areas have been used to undertake ecological assessment:

- a 10km buffer around the Site Area for the desk-based study for records of international designated sites;
- a 2km buffer around the Site Area for the desk-based study for records of legally protected and otherwise notable species and for statutory and for non-statutory designated sites; and

85 Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>
86 Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland, Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester

- the area for ecological surveys has covered the full extent of the Site Area.

6.4 Consultation

6.4.1 The following stakeholders have been approached regarding ecology in relation to the Proposed Development:

- Natural England about applying for a District Licence for the potential presence of great crested newts;
- Natural England through the Discretionary Advice Service with regards to the scope and approach to the ecological assessment; and
- The Ecological Lead for Darlington Borough Council and Durham County Councils.

6.4.2 At the time of writing, Natural England have allocated a case officer, but no response has been received from the Ecological Lead for Darlington Borough Council and Durham County Councils. Initial Consultation will be via the issue of this EIA Scoping Report, the subsequent scoping opinion received, and subsequent consultation will likely be an iterative process be undertaken as required as the PEIR is produced, and potential mitigation requirements developed in more detail.

6.5 Baseline conditions

6.5.1 The baseline conditions for the scoping assessment of the Proposed Development have been informed by an ecological desk study and survey work that has been undertaken or is in the process of being undertaken. It represents the understanding of the baseline conditions at the time of writing.

6.5.2 An overview of the surveys that have informed the baseline is outlined in Table 6.2, and associated reports outlining the results of these assessments will be included in the ES.

Table 6.2 Outline of baseline surveys

Survey	Methodology	Status	Timing
<p>A preliminary ecological appraisal (PEA) encompassing:</p> <ul style="list-style-type: none"> • UK Habitat survey; • An assessment for the presence of legally protected species, including a survey to locate existing badger (<i>Meles meles</i>) setts; and • Ground level assessment of trees for their potential to support roosting bats. 	<p>PEA undertaken in accordance with the following: The Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (Dec 2017⁸⁷); UK habitat survey guidance⁸⁸; and Bat Conservation Trust Guidance⁸⁹.</p>	Ongoing	April to October 2022
<p>Winter Bird Survey</p>	<p>Methodology based on Bird Monitoring Methods: A Manual of Techniques for Key UK Species⁹⁰ and the British Ornithology Trust Wetland Bird Survey (WeBS) core count methodology.</p>	Complete	Four visits December 2021 to March 2022
<p>Breeding Birds Survey</p>	<p>As per bird Survey Guidance (https://birdsurveyguidelines.org/)</p>	Complete	Six visits between April and June 2022
<p>Bat Activity Survey</p>	<p>Provision of static bat detectors in 20 locations in accordance with Bat Conservation Trust Guidance (BCT 2016).</p>	Ongoing	Five consecutive nights per season (spring/summer/autumn) between May and October 2022.

87 CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal*, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester. Available at: <https://cieem.net/resource/guidance-on-preliminary-ecological-appraisal-gpea/>

88 UK Hab. *UK Habitat Classification*. Available at: <https://ukhab.org/>

89 Collins et al (2016). *Bat surveys for professional Ecologists: Good Practice Guidelines* (3rd edn) The Bat Conservation Trust

90 Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods: A Manual of Techniques for Key UK Species*. RSPB, Sandy.

Designated Sites

Internationally Designated Sites Within 10km

- 6.5.3 There is one internationally designated site located within 10km of the Site Area, which is the Teesmouth and Cleveland Coast Special Protection Area (SPA) and Ramsar site. This site is designated for supporting internationally important breeding populations of avocet (*Recurvirostra avosetta*), common tern (*Sterna hirundo*), and little tern (*Sternula albifrons*), passage populations of sandwich tern (*Thalasseus sandvicensis*), and ruff (*Calidris pugnax*), and wintering populations of knot (*Calidris canutus*) and redshank (*Tringa tetanus*). It is also designated for supporting an assemblage of over 20,000 waterbirds.
- 6.5.4 A map of internationally designated sites within 10km of the Site Area is provided in Figure 6.1.

Nationally Designated Sites Within 2km

- 6.5.5 There are eight nationally designated sites located within 2km of the Site Area, which include four SSSI and two LNR. These are outlined in Table 6.3.

Table 6.3 Nationally Designated Sites within 2km

Site	Description
Whitton Bridge Pasture SSSI	Whitton Bridge Pasture is nationally important for its areas of species-rich unimproved neutral grassland. The relevant National Vegetation Classification (NVC) community is <i>MG5 Cynosurus cristatus - Centaurea nigra</i> , crested dog's tail - common knapweed, grassland.
Redcar Field SSSI	Redcar Field situated just north of Darlington, though small in area, supports a range of fen vegetation types not found at any other site in the historic area of County Durham, including basic flush, fen meadow, tall fen and willow carr. It is one of the few remaining examples of spring fed vegetation on the Magnesian Limestone of County Durham, and the only site known to contain fen meadow.
Briarcroft Pasture SSSI	Briarcroft Pasture is nationally important for its areas of species rich unimproved neutral grassland. The relevant NVC community is <i>MG5 Cynosurus cristatus - Centaurea nigra</i> , crested dog's tail - common knapweed, grassland.
Newton Ketton Meadow SSSI	Newton Ketton Meadow is important as one of the very few surviving unimproved hay meadows in the coastal plain between the Rivers Tyne and Tees. Although once widespread such species-rich grasslands are now severely restricted in distribution because of agricultural intensification. A small area of fen vegetation adds diversity to the site.

Site	Description
Stillington Forest Park LNR	A former slag heap that was reclaimed and developed to benefit both wildlife and visitors. It is managed at a wildflower meadow, several ponds and wetland areas, and a dense jungle of mature hawthorn and ash trees.
Hardwick Dene and Elm Tree Woods LNR	The site consists of four distinct sections – two steep sided wooded valleys, separated by a roughly triangular area of grassland, and a further area of herb-rich, unimproved grassland.

6.5.6 A map of nationally designated sites within 2km of the Site Area is provided in Figure 6.1.

Non-Statutorily Designated Sites Within 2 km

6.5.7 There are two non-statutory designated sites located within 2km of the Site Area. These are two Local Wildlife Sites, Carr House Pond (located directly adjacent to the Site Area), designated due to pond and wetland vegetation and Wynyard woodland (located approximately 400m east of the Site Area) designated for supporting woodland habitat.

6.5.8 A map of non-statutory designated sites within 2km of the Site Area is provided in Figure 6.2.

Habitats

6.5.9 The Proposed Development is located within an area of undulating mixed farmland that is mainly arable but with some improved pasture used for rearing sheep and occasionally cattle. Fields are separated by sparse species-poor hedgerows and small blocks of woodland are dotted across the landscape.

6.5.10 The PEA survey undertaken has not identified any habitat of significant ecological value other than small blocks of deciduous woodland, which will be retained, and the network of hedgerows, which were in the main species-poor and degraded through intensive flailing.

Species

6.5.11 The PEA survey has identified that the following legally protected species are likely to be present:

- great crested newts (*Triturus cristatus*);
- a number of red and amber listed birds of conservation concern (Stanbury et al 2021⁹¹) such as curlew (*Numenius arquata*) and barn owl (*Tyto alba*);
- badgers (*Meles meles*);

91 Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. 2021. *The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain*. British Birds 114: 723-747. Available at <https://britishbirds.co.uk/content/status-our-bird-populations>.

- bat species; and
 - brown hare (*Lepus europeus*).
- 6.5.12 There are a number of ponds present potentially suitable to support populations of great crested newts, and many of the mature trees in boundary hedgerows have the potential to support roosting bats identified from a ground level preliminary roost assessment and a number of active badger setts have been identified. In addition, a population of brown hare is present, and there are some areas of habitat, such as grass margins, which could potentially support a small population of common reptiles. However, the majority of habitat was considered suboptimal habitat for reptiles. A number of mature trees have the potential to support nesting barn owl.
- 6.5.13 The breeding bird survey has identified a limited number of breeding bird species, which were mainly associated with the hedgerow network. A number of red and amber listed birds of conservation concern have been identified including a small breeding population of curlew (*Numenius arquata*) and lapwing (*Vanellus vanellus*). Other farmland bird species include, yellow wagtail (*Motacilla flava*), skylark (*Alauda arvensis*), tree sparrow (*Passer montanus*), yellowhammer (*Emberiza citrinella*) and grey partridge (*Perdix perdix*).
- 6.5.14 The wintering bird survey recorded a combined total of 50 species. Based on the species recorded, the wintering bird assemblage was assessed as being of county importance. Regarding individual species, wintering populations of five species were assessed as being of county importance: specifically great crested grebe (*Podiceps cristatus*), grey partridge (*Perdix perdix*), herring gull (*Larus argentatus*), pink-footed goose (*Anser brachyrhynchus*) and wigeon (*Mareca penelope*). A further five species were potentially present in numbers of district importance.
- 6.5.15 These wintering bird populations were using a range of habitats within and adjacent to the Site Area, including a mixture of field types such as pasture, winter wheat, winter stubble and oilseed rape, as well as adjoining hedgerows. In one location, standing water adjacent to the Site Area was of particular value to wintering waterbirds.
- 6.5.16 Given the aggregations of waterfowl recorded, in particular pink footed geese (flocks numbering at least 1,500 individuals) and wigeon (2,000 individuals), it is considered that fields within the Site Area are potentially used by wintering birds associated with the Teesmouth and Cleveland Coast SPA. Therefore, these fields could potentially be functionally linked to the SPA, this will be determined at the PEIR stage.
- 6.5.17 If land is determined to be functionally linked, then the Proposed Development may require a Habitats Regulation Assessment (HRA) to assess the potential for effects on the Teesmouth and Cleveland Coast SPA. Given the discrete nature of the Proposed Development and that wintering wildfowl move widely in the winter as food sources are dependent on farm cropping patterns, it is considered unlikely that the loss of farmland under the Proposed Development would have a significant effect on the integrity of the SPA, given

the availability of farmland in the wider landscape. This requirement will be determined as part of the PEIR.

- 6.5.18 At the time of writing, survey work carried out to date is considered robust to inform the likely impacts of the Proposed Development. No additional surveys are envisaged to be required.

6.6 Potential effects and mitigation measures

Construction

- 6.6.1 There is the potential for the following impacts on ecological features during the construction phase of the Proposed Development:

- indirect impacts on statutory and non-statutory designated sites located in close proximity to Proposed Development;
- permanent loss of habitat to accommodate the substation and other infrastructure related to the Proposed Development;
- temporary loss of habitat to accommodate cable routes, for example hedgerow crossings;
- loss of habitat used by foraging great crested newts and incidental harm and mortality to great crested newts;
- loss of habitat used by foraging and hibernating reptiles and incidental harm and mortality of reptiles;
- loss of breeding habitat for ground-nesting bird species including curlew, lapwing and skylark and disturbance and displacement of such species;
- loss of foraging habitat used by farmland birds (including ground-nesting species) and disturbance and displacement of such species;
- disturbance and loss of foraging habitat used by wintering bird species;
- potential disturbance and displacement to any roosting bats occupying retained trees;
- disturbance to occupied badger setts and incidental harm and injury to badgers; and
- fragmentation of habitat by security fencing not being permeable to species such as brown hare and badger.

Mitigation

- 6.6.2 In order to address the potential effects of the Proposed Development during construction, a number of mitigation measures are likely to be required, which are outlined in this section.

- 6.6.3 An Outline EMP will be produced as part of the DCO application and will outline the environmental and ecological mitigation measures to be implemented during the construction phase. This will likely include the appointment of an Ecological Clerk of Works to advise and supervise the mitigation measures during construction. As described in Chapter 2, the measures outlined in the Outline EMP will be carried forward to a CEMP which will be produced by the appointed construction contractor and agreed with local planning authorities prior to construction.
- 6.6.4 The ecological constraints identified from the survey work described above will inform the design and layout of the Proposed Development. A Landscape and Ecology Management Plan (LEMP) will be prepared and submitted as a standalone document as part of the DCO application. The LEMP will highlight how the long-term management of the land within and adjacent to the Proposed Development will deliver a substantial net gain in biodiversity, and this will be demonstrated through the appropriate use of the Defra Biodiversity Metric⁹².
- 6.6.5 As the Proposed Development does not require land from any designated site, direct effects on designated sites are considered unlikely. It is considered that alterations to the design and layout of the Proposed Development and standard pollution prevention control measures outlined in the CEMP would reduce the likelihood of indirect effects.
- 6.6.6 Indirect effects due to potential disturbance and the loss of foraging habitat if determined to be functionally linked to the Teesmouth and Cleveland Coast SPA.
- 6.6.7 The design of the Proposed Development will ensure that high quality habitats, such as existing areas of woodland are retained, and other habitat features such as hedgerows, mature trees and watercourses are retained and enhanced where possible. Where temporary habitat loss will occur, such as the removal of sections of hedgerow to accommodate cable routes, these features will be reinstated following construction.
- 6.6.8 The Proposed Development lies within a District Level License (DLL) Zone for great crested newts. Therefore, no survey work to confirm the presence of great crested newts will be undertaken. However, an application to the DLL scheme will be submitted and an appropriate financial contribution will be made to support the conservation of great crested newts in the wider landscape. In addition, as a best practice measure to further reduce the potential to harm great crested newts, the removal of habitat features likely to support great crested newts will be subject to a destructive search, removing any newts encountered to a safe location. The design of the Proposed Development will also ensure that existing habitat features of benefit to great crested newts, such as ponds and connecting hedgerows, are retained and enhanced, where possible;
- 6.6.9 It is considered that due to the majority of habitat present within the Site Area being suboptimal for reptiles, the potential for significant effects on reptiles is

⁹² Natural England (2022). *The Biodiversity Metric 2.1* (JP039). Available at: <http://publications.naturalengland.org.uk/publication/6049804846366720>

unlikely. Where habitat suitable for reptiles cannot be retained, vegetation removal will occur in accordance with a precautionary working method to safeguard any reptiles potentially present. The final landscape master plan would include habitat creation and enhancement suitable for reptile species.

- 6.6.10 Given the presence of breeding curlew and lapwing, bespoke mitigation is likely to be required to ensure that sufficient habitat within the Site Area remains and is managed appropriately to continue to offer suitable nesting and foraging habitat for lapwing and curlew. Additional measures would also be required to ensure suitable foraging habitat and food source remains for red-listed species of conservation concern, such as tree sparrow and yellow wagtail. Where vegetation clearance or other site works needs to occur in areas likely to support nesting birds, this will be programmed to occur outside of the nesting bird season (March to August inclusive). Failing this, site clearance works will not proceed until a nesting bird check has occurred and the absence of nesting birds confirmed. Habitat creation and enhancement measures to deliver a gain in biodiversity will also benefit farmland birds.
- 6.6.11 The design of the Proposed Development would ensure that trees which have been identified with the potential to support roosting bats, would be retained. Surveys would be undertaken in areas where this is not possible to confirm the presence of roosting bats. If the presence of roosting bats is identified, a license with an appropriate mitigation package will be submitted to Natural England. Habitat creation and enhancement measures to deliver a net gain in biodiversity will ensure continued availability of suitable foraging habitat for bat species.
- 6.6.12 The design and layout of the Proposed Development would retain existing badger setts and ensure a standoff distance (likely to be a minimum of 30m) to minimise the potential for disturbance. Any security fencing would have mammal gates in appropriate locations to ensure the Site Area is permeable to species such as brown hare and badger. Habitat creation and enhancement measures to deliver a net gain in biodiversity will also benefit mammal species such as badger and brown hare.

Operation

- 6.6.13 There is the potential for the following impacts on ecological features during the operational phase of the Proposed Development:
- continued loss of nesting habitat used by ground-nesting farmland birds;
 - potential continued loss of foraging habitat for wintering bird species; and
 - potential increase in floral and insect species-richness due to managing the area under the solar array and enhancing the adjacent field boundaries for the benefit of biodiversity.

Mitigation

- 6.6.14 In order to address the potential effects of the Proposed Development during operation, a number of mitigation measures are likely to be required, which are outlined in this section.
- 6.6.15 Bespoke mitigation is likely to be required to ensure that sufficient habitat within the Site Area remains and is managed appropriately to allow for continued nesting and foraging habitat for lapwing and curlew. Mitigation will also be required to ensure suitable foraging habitat and food source remains for red-listed species of conservation concern, such as tree sparrow and yellow wagtail.
- 6.6.16 A detailed landscape masterplan would be prepared highlighting how the long-term management of the land within and adjacent to the Proposed Development will deliver a substantial net gain in biodiversity, and this will be demonstrated through the appropriate use of the Defra Biodiversity Metric.

Decommissioning

- 6.6.17 The Proposed Development will be decommissioned and removed at the end of its operational life. Potential impacts are likely to be similar to those outlined for the construction phase and are therefore scoped into further assessment.

6.7 Proposed assessment methodology

- 6.7.1 The ecological impact assessment will be based on the Guidelines for Ecological Impact Assessment in the UK and Ireland⁹³ produced by the CIEEM.
- 6.7.2 The ecological assessment will contain a detailed ecology baseline, which will be produced following the completion of the ecology field surveys. In addition, information provided by relevant statutory bodies and interested parties during the consultation process for the Proposed Development will be reviewed and included in the ecological assessment where appropriate. It will document the habitats, species and sites of nature conservation interest recorded on and around the site and provide an assessment of the ecological value of these within the context of the Site Area.
- 6.7.3 Potential effects resulting from the construction, operation and decommissioning of the Proposed Development will be assessed and reported in terms of their significance for the integrity and conservation status of ecological receptors. A summary of the assessment methodology is outlined below.

Assigning value

- 6.7.4 The first stage of the assessment is 'determining value' of the ecological features or 'receptors'. CIEEM places the emphasis on identifying different aspects of ecological value including designations, biodiversity value,

⁹³ CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester

potential value, secondary or supporting value, social value, economic value, legal protection and multi-functional features. These values are applied to the receptors within a defined geographical from international to local.

Assigning magnitude of impact

6.7.5 The next stage of an ecological impact assessment is to predict and characterise the likely change and impact on the ecological receptors identified. The following parameters are taken into account:

- whether the change is positive or negative;
- the magnitude or severity of the change;
- the extent of the area subject to a predicted impact;
- the duration the impact is expected to last prior to recovery or replacement of the resource or feature;
- whether the impacts are reversible, with recovery through natural or spontaneous regeneration, or through the implementation of mitigation measures or irreversible, when no recovery is possible within a reasonable timescale or there is no intention to reverse the impact; and
- the timing and frequency of the impact, i.e., conflicting with critical seasons or increasing impact through repetition.

6.7.6 The CIEEM Guidelines also stress consideration of the likelihood that ‘a change/activity will occur and also the degree of confidence in the assessment of the impact on ecological structure and function’. Likelihood is then specified using the following terms;

- certain (95% probability or higher);
- probable (50-94% probability);
- unlikely (5-49% probability); or
- extremely unlikely (less than 5% probability).

6.7.7 The assessment of potential impacts will be undertaken with the inclusion of embedded mitigation for the Proposed Development. Residual impacts will consider any additional mitigation measures required. An assessment will be made of the significance of residual effects, i.e., the significance of the effects that are predicted to remain after the implementation of all committed mitigation measures.

Identifying significance of effects

6.7.8 Significance will be assessed solely on an ecological basis. There are two key aspects to this. Firstly, what constitutes a significant ecological effect is determined in relation to the concept of ‘integrity’. Integrity is defined as ‘the coherence of its ecological structure and function, across its whole area,

which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified’.

- 6.7.9 Secondly, it is always stated in relation to a geographical context. Thus, an impact is described as significant at the level at which the integrity of the ecological receptor is affected. An impact may still be significant at some geographical level below that at which the receptor was deemed to be valuable, e.g., loss of common plant species may not affect the integrity of a SSSI valued at national level, but it may still be a significant impact at the local or site level.

Habitats Regulations Assessment (HRA)

- 6.7.10 If land within the Site Area is determined to be functionally linked, then a HRA is likely to be undertaken to accompany the ES. The HRA will include a screening assessment to determine whether the Proposed Development is likely to have a significant effect on Teesmouth and Cleveland Coast SPA
- 6.7.11 If likely significant effects cannot be ruled out, the HRA will also include an Appropriate Assessment. The Appropriate Assessment will provide detailed consideration of potential effects of the Proposed Development in relation to the conservation objectives of relevant sites to determine if there is likely to be an adverse effect on the integrity and detail appropriate avoidance and mitigation measures where required. The HRA will follow best practice guidance and case law.

6.8 Summary

- 6.8.1 Table 6.4 presents a summary of the likely ecological scope of the assessment and whether effects can be scoped in or out of the assessment.

Table 6.4 Summary of biodiversity assessment scope

Assessment scope				
Aspects	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Impacts on national and non-statutory designated sites	Scoped out	Scoped out	Scoped out	The Proposed Development will be designed to ensure that there will be no direct land take from designated sites. Mitigation measures such as pollution prevention and control measures outlined within the CEMP will be implemented during construction to avoid potential for indirect effects.
Permanent loss of habitat	Scoped in	Scoped out	Scoped out	The operational and decommissioning phase of the Proposed Development will involve no additional permanent habitat loss.
Temporary loss of habitat	Scoped in	Scoped out	Scoped in	The operational phase of the Proposed Development will involve no additional temporary habitat loss. There is likely temporary loss of habitat whilst construction and decommissioning occurs.
Loss of habitat and incidental harm and mortality of great crested newts	Scoped out	Scoped out	Scoped out	An application will be made to Natural England, who manage the DLL for great crested newts. During the construction phase, a destructive search will be used and the final landscape design for the Proposed Development which will enhance habitat connectivity for newts across Site Area.
Loss of habitat and incidental harm and mortality of reptiles	Scoped out	Scoped out	Scoped out	The construction of the Proposed Development will proceed with a destructive search moving any reptiles out of harm's way

Assessment scope				
Aspects	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
				and the final landscape design will enhance habitat and connectivity for reptiles across the scheme.
Loss of breeding and foraging for ground-nesting bird species	Scoped in	Scoped in	Scoped in	Bespoke mitigation will be included within the final landscape design for the Proposed Development to ensure continued availability of nesting and foraging habitat for the duration of the operational phase.
Loss of foraging habitat for farmland birds	Scoped in	Scoped in	Scoped in	Mitigation will be included within the final landscape design for the Proposed Development to ensure continued availability of nesting and foraging habitat for the duration of the operational phase.
Loss of trees supporting roosting bats	Scoped out	Scoped out	Scoped out	The design of the Proposed Development will aim to ensure retention of trees with bat roosting potential.
Loss of bat foraging habitat	Scoped out	Scoped out	Scoped out	Woodlands and the majority of hedgerows suitable for use by foraging bats will be retained. Temporary loss of hedgerow sections during the construction phase to accommodate cable routes will be reinstated. The final landscape design for the Proposed Development will include measures to enhance boundary features such as hedgerows and watercourses for the benefit of foraging bats.

Assessment scope				
Aspects	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Disturbance to badger setts	Scoped out	Scoped out	Scoped out	The design of the Proposed Development can be amended to retain existing badger setts and ensure no disturbance to setts. The operation and decommissioning of the Proposed Development is unlikely to cause any disturbance to badger setts.
Fragmentation of habitat due to security fencing	Scoped out	Scoped out	Scoped out	During both the construction, operational and decommissioning phases of the Proposed Development, security fencing will be designed to incorporate appropriate gates to allow access across the fence by mammals such as badgers and brown hare.

7 Landscape and visual

7.1 Introduction

- 7.1.1 This chapter outlines the proposed scope of the landscape and visual impact assessment (LVIA).
- 7.1.2 The LVIA will consider direct and indirect effects of the Proposed Development on landscape resources, landscape character and designated landscapes. It will examine the nature and extent of effects on existing views and visual amenity. The effects will be assessed during the construction, operation and decommissioning phases of the Proposed Development. The LVIA will also consider cumulative effects i.e., the incremental effects of the Proposed Development in combination with other developments and projects.
- 7.1.3 The LVIA will inform modifications and refinements to the layout design of the Proposed Development and will be undertaken following the approach set out in Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3)⁹⁴. The assessment will also draw upon current good practice guidance issued by Natural England and the Landscape Institute.
- 7.1.4 This section of the EIA Scoping Report should be read in conjunction with the following figures:
- Figure 7.1 Landscape Context; and
 - Figures 7.2-7.8 Zone of Theoretical Visibility (ZTV) Studies.

7.2 Relevant legislation, policy and guidance

- 7.2.1 The relevant legislation, planning policy and guidelines which underpin the assessment methodology for the LVIA and inform the scope of the assessment are outlined in this section.

Legislation

- 7.2.2 The following legislation underpins the LVIA:
- The Environment Act 2021⁹⁵; and
 - Infrastructure Planning (Environmental Impact Assessment) Regulations 2017⁹⁶.

Policy

- 7.2.3 The following national and local planning policies of relevance to the Proposed Development and the LVIA have and have been considered:

⁹⁴ Landscape Institute and Institute of Environmental Management and Assessment (2013). Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3)

⁹⁵ HMSO (2021). *Environment Act 2021*. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

⁹⁶ HMSO (2017). *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>

National

- NPS EN-1⁹⁷ with reference to paragraph 4.1.4 which discusses adverse effects and benefits, paragraph 5.9.16 in relation to the scale and longevity of anticipated visual impacts and paragraph 5.9.22 in relation to the appropriateness of materials and visual screening;
- NPS NE-3, Renewable Energy Infrastructure⁹⁸ is currently in the process of being updated. The current NPS does not include specific reference to solar technologies, however, the latest Draft NPS⁹⁹ includes a section on solar photovoltaic generation and this will be considered as the draft progresses; and
- The NPPF¹⁰⁰ sets out the government's planning policies for England and how these should be applied. Whilst the policies set may be relevant to the assessment, the NPPF does not form the basis for a decision on an NSIP. The assessment would therefore focus on a number of key sections, including Achieving well designed places (Section 12).

Local

7.2.4 The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. The relevant local planning policy from each LPA would be considered, as set out below:

- Darlington Local Plan (2016-2036)¹⁰¹;
- Stockton-on-Tees Borough Council Local Plan¹⁰²; and
- County Durham Plan (2020)¹⁰³.

Guidance

7.2.5 The following industry guidance will inform the LVIA:

Planning Guidance

- Planning Practice Guidance for Design: process and tools¹⁰⁴;
- Planning Practice Guidance: Renewable and Low Carbon Energy¹⁰⁵; and

⁹⁷ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

⁹⁸ Department of Energy and Climate Change (2021). *Draft National Policy Statement for Renewable Energy Infrastructure*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

⁹⁹ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

¹⁰⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

¹⁰¹ Darlington Borough Council (2022). *Darlington Borough Local Plan 2016 - 2036 - Adopted February 2022*. Available at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

¹⁰² Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan 2019*. Available at: https://stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

¹⁰³ County Durham (2020). *County Durham Plan*. Available at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹⁰⁴ Department for Levelling Up, Housing and Communities (2014) (as amended). *Planning Practice Guidance for Design: process and tools*. Available at: <https://www.gov.uk/guidance/design>

¹⁰⁵ Department for Levelling Up, Housing and Communities (2015). *Planning Practice Guidance: renewable and low carbon energy*. Available at: <https://www.gov.uk/guidance/renewable-and-low-carbon-energy>

- National Design Guide¹⁰⁶;

Local Guidance and Baseline Studies

- Darlington – Revised Design of New Development SPD¹⁰⁷ (2011);
- NCA 23 Tees Lowlands, Natural England (2014)¹⁰⁸;
- Darlington Landscape Character Assessment (2015)¹⁰⁹;
- Stockton on Tees Landscape Character Assessment (2011)¹¹⁰;
- Stockton on Tees Landscape Capacity Study (2011)¹¹¹;
- County Durham Landscape Character Assessment (2019)¹¹²;
- County Durham Local Landscape Designation Review (2019)¹¹³; and
- County Durham Landscape Value assessment (2019)¹¹⁴;

Methodology Guidance

- Guidelines for Landscape and Visual Impact Assessment, (Third Edition), published jointly by the Landscape Institute and the Institute of Environmental Assessment (GLVIA 3)¹¹⁵;
- Technical Guidance Note 06/19: Visual Representation of Development Proposals¹¹⁶;
- An Approach to Landscape Character Assessment.¹¹⁷;
- An Approach to Landscape Sensitivity Assessment.¹¹⁸
- Technical Guidance Note 2/19 Residential Visual Amenity Assessment.¹¹⁹;
- Technical Guidance Note 02/21 Assessing landscape value outside national designations.¹²⁰; and
- Advice Note Seventeen: Cumulative Effects Assessment.¹²¹.

¹⁰⁶ Department for Levelling Up, Housing and Communities (2019) (as amended). *Planning Practice Guidance: national design guide*. Available at: <https://www.gov.uk/government/publications/national-design-guide>

¹⁰⁷ Darlington Borough Council (2011). *Revised Design of New Development Supplementary Planning Document*. Available at: [design-spd-2011.pdf \(darlington.gov.uk\)](#)

¹⁰⁸ Natural England (2014). *NCA Profile: 23 Tees Lowlands (NE439)*. Available at: [NCA Profile: 23 Tees Lowlands - NE439 \(naturalengland.org.uk\)](#)

¹⁰⁹ LUC on behalf of Darlington Borough Council (2015). *Darlington Landscape Character Assessment*. Available at: [Darlington Landscape Character Assessment](#)

¹¹⁰ Stockton-on-Tees Borough Council (2011). *Stockton on Tees Landscape Character Assessment*. Available at: [Landscape Character Assessment report with appendices \(stockton.gov.uk\)](#)

¹¹¹ Stockton-on-Tees Borough Council (2011). *Stockton on Tees Landscape Capacity Study*. Available at: [Landscape Capacity Study \(stockton.gov.uk\)](#)

¹¹² County Durham (2019). *County Durham Landscape Character Assessment*.

¹¹³ County Durham (2019). *County Durham Local Landscape Designation Review*

¹¹⁴ County Durham (2019). *County Durham Landscape Value Assessment*

¹¹⁵ Landscape Institute and Institute of Environmental Management and Assessment (2013). *Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3)*

¹¹⁶ Landscape Institute (2019). *Technical Guidance Note 06/19: Visual Representation of Development Proposals*, Landscape Institute. Available at: [TGN-06-19-Visual Representation \(windows.net\)](#)

¹¹⁷ Natural England (2014). *An Approach to Landscape Character Assessment*. Available at: [landscape-character-assessment.pdf \(publishing.service.gov.uk\)](#)

¹¹⁸ Natural England (2019). *An Approach to Landscape Sensitivity Assessment*. Available at: [An approach to landscape sensitivity \(publishing.service.gov.uk\)](#)

¹¹⁹ Landscape Institute (2019). *Technical Guidance Note 2/19 Residential Visual Amenity Assessment*. Available at: [tgn-02-2019-rvaa.pdf \(windows.net\)](#)

¹²⁰ Landscape Institute (2021). *Technical Guidance Note 02/21 Assessing landscape value outside national designations*. Available at: [tgn-02-21-assessing-landscape-value-outside-national-designations.pdf \(windows.net\)](#)

¹²¹ PINS (2019). *Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/>

7.3 Study area

- 7.3.1 Best practice guidance (GLVIA 3) indicates that “*the study area should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner.*” For solar farms, a study area radius of 1-5km is typical (based on other applications), depending on the likely extent of visibility.
- 7.3.2 Initial ZTV Studies (Figures 7.2-7.7) have been prepared to identify the theoretical visibility within 5km of the Proposed Development. The areas of visibility identified have been verified during site visits and it was noted that local hedgerow and tree cover markedly reduces the extent of visibility from that shown on the ZTV studies, with visibility generally extending in practice to no more than 1-1.5km from Sites A-F.
- 7.3.3 Taking account of the extent of the proposed Site Area and the need to also consider the effects arising from the proposed grid connection cable routes, the following study area is proposed:
- 2km from the solar PV module areas (Sites A-F) as shown on Figures 7.1 and 7.2; and
 - a small extension of this area to the east to encompass the area within 200m of the proposed grid connection route as shown by Figure 7.1.

7.4 Consultation

- 7.4.1 The following stakeholders have recently been approached regarding LVIA in relation to the Proposed Development:
- Darlington Borough Council;
 - Stockton-on-Tees Borough Council; and
 - Durham County Council.
- 7.4.2 At the time of writing no response has been received. Consultation will be via the issue of this EIA Scoping Report and the subsequent Scoping Opinion received.

7.5 Baseline conditions

- 7.5.1 The Site Area is located between Darlington, Stockton-on-Tees and Newton Aycliffe in an area of undulating mixed farmland with a network of local roads and rights of way and a mix of dispersed settlement and small villages and hamlets.
- 7.5.2 Figure 7.1 illustrates the landscape context for the Proposed Development. The Site Area does not coincide with any national or local landscape designations. The nearest national landscape designations are Registered Parks and Gardens located approximately 5km from Sites A-F PV Modules, with the nearest Areas of Outstanding Natural Beauty (AONB) and National Parks located more than 20km from the Proposed Development.

- 7.5.3 The only landscape designations within the study area are two areas of Higher Landscape Value (AHLV) within County Durham which are located to the north of the Site Area. The Elstob AHLV is located approximately 30m north of Site B: Hauxley Farm ('Site B') and the Bradbury, Preston and Mordon Carrs AHLV is located approximately 1.1km north of Site A: Brafferton ('Site A') as shown by Figure 7.1.
- 7.5.4 As shown by Figure 7.1 Site Areas A-F which will host the solar PV modules lie within two local landscape character areas (6: *Great Stainton Farmland* and 7: *Bishopton Vale*) with a more undulating wooded, pastoral landscape to the west. Woodland, hedgerows and hedgerow trees are relatively frequent in this area and along with the undulating landform serves to constrain visibility, though there are some more elevated and open locations with wider views. The lower lying and flatter area to the east has more arable farming and is less vegetated, leading to more open views.
- 7.5.5 The potential cable route options also pass through character areas within the Stockton-on-Tees Borough Council Area: S1 West Stockton Rural Fringe and S3 Billingham and Thorpe Becks.
- 7.5.6 Other character areas within the proposed 2km study area include:
- Darlington: D4 Whessoe and Dene Beck;
 - Darlington: D5 Upper Skerne Valley;
 - Durham: Newton Aycliffe Urban area;
 - Durham: Sedgely, Windlestone and Aycliffe;
 - Durham: Butterwick and Shotton; and
 - Stockton-on-Tees: S5 Wynyard.
- 7.5.7 Visual receptors within the proposed 2km study area include residents, visitors and those travelling who make use of or live/stay at:
- a relatively dense network of PRow including within the Site Area and either passing through or adjacent to Sites A-F;
 - a relatively sparse network of local roads which are typically hedge-lined and some of which pass close to proposed panel areas and/or are proposed to potentially have cable routes running under the road or road verge;
 - the villages and hamlets of Coatham Mundeville, Brafferton, Preston-le-Skerne, Great Stainton, Little Stainton, Bishopton, Old Stillington, Stillington, Whitton, Redmarsh and Carlton;
 - the edges of urban/suburban areas at Darlington (Beaumont Hill), Newton Aycliffe (including Aycliffe Village) and Stockton-on-Tees (Letch Lane);
 - farms and rural properties outside of the settlements; and

- longer distance routes through the study area which include the A1(M), A167 and East Coast railway to the west of the Site Area, and the rail route between Stockton-on-Tees and Durham to the northeast of the Site Area. National Cycle Route 1 also passes through the study area for the grid connection route as it heads northwards from Stockton-on-Tees. There are no long-distance footpaths or National Trails within the study area.

7.6 Potential effects and mitigation measures

Construction

7.6.1 The construction phase of the Proposed Development is likely to give rise to some temporary landscape and visual effects. The period of construction will involve ground works and the movement of vehicles, plant and personnel within the Site Area to construct and install components, as well as excavations to install the grid connection cables outside of the solar panel areas.

Mitigation

7.6.2 In order to address the potential effects of the Proposed Development during construction, the following mitigation measures are likely to be required.

- an Outline EMP will be produced as part of the DCO application and will outline the environmental and landscape mitigation measures to be implemented during the construction phase.). As described in Chapter 2, the Outline EMP will be carried forward to a CEMP to be produced by the appointed construction contractor and agreed with local planning authorities prior to construction;
- A LEMP, which will detail the landscape and ecological mitigation, will be prepared and submitted as a standalone document as part of the DCO application;
- diversion of the Public Right of Way (PRoW) network (temporary and/or permanent depending on the circumstances);
- root protection zones for existing vegetation to be retained; and
- new planting proposed as part of the Proposed Development.

Operation

7.6.3 The Proposed Development would comprise of six solar PV module areas of varying size and scale, as described in Chapter 2 of this EIA Scoping Report, for the duration of the operational phase. During operation, there would be no effects from the underground cables and effects would arise from the physical presence of the solar PV modules (and to a lesser degree the smaller scale associated infrastructure) and their influence on character and views.

Mitigation

7.6.4 During operation, mitigation measures are likely to include:

- management of new planting and existing vegetation around and within the Proposed Development to improve and maintain visual screening and biodiversity;
- potential diversion of PRow routes to improve amenity and connectivity with the wider network; and
- a detailed LEMP will be prepared which will highlight how the long-term management of the land within and adjacent to the Proposed Development will deliver a substantial net gain in biodiversity, and this will be demonstrated through the appropriate use of the Defra Biodiversity Metric¹²²;

Decommissioning

7.6.5 The Proposed Development would be fully reversible on decommissioning. Effects during decommissioning would be short-term and similar to those for the construction stage.

7.7 Proposed assessment methodology

7.7.1 The LVIA will consider the potential effects upon:

- landscape fabric;
- landscape character;
- the special qualities of any landscape designations; and
- visual receptors including local residents, transport, recreational receptors and effects from glint and glare.

7.7.2 The assessment will be informed by a combination of desk study, modelling (including as ZTV studies and visualisations) and site visits to the study area.

7.7.3 Effects on the setting of any heritage assets will be dealt with as part of a separate cultural heritage assessment, as outlined in Chapter 8 of this EIA Scoping Report. The presence of Conservation Areas (and detail provided within any Conservation Area Statements) will be taken account of where relevant in considering landscape/townscape value and the value of views.

7.7.4 The detailed methodology and assessment criteria to be adopted will be set out in the LVIA. The significance of landscape and visual effects will be assessed through a consideration of both landscape/visual sensitivity (with reference to susceptibility and value) and magnitude of change (with reference to the scale of the effect, the extent, duration and reversibility of the effects).

¹²² Natural England (2022). *The Biodiversity Metric 2.1 (JP039)*. Available at: <http://publications.naturalengland.org.uk/publication/6049804846366720>

- 7.7.5 The key terms used above are defined within the glossary to this EIA Scoping Report.

Landscape fabric

- 7.7.6 Effects on landscape fabric will be described in detail, and mitigation measures will be identified and described as appropriate. Where new mitigation planting is proposed, the establishment period will be taken into account in assessing effects.

Landscape and townscape character

- 7.7.7 The assessment of effects on character will be based on the local landscape character areas as identified by the local baseline studies listed in Section 7.2 above. The national landscape character assessment (NCA 23 Tees Lowlands) will be used to supplement the local studies where it identifies additional information.

Designations

- 7.7.8 Effects on the Durham Areas of Higher Landscape Value will take account of the policy purposes and identified valued qualities of the designated areas as set out in Durham Local Plan Policy 39 and the Local Plan Designations Review (2019).

Visual effects

- 7.7.9 Effects on visual receptors will be informed by the assessment of the scale and nature of effects at viewpoints and will take account of the views people experience (including glint and glare) both in specific locations and as they travel through the landscape. The LVIA will focus on effects on people in public places. Private amenity will be considered separately within the Residential Visual Amenity Assessment (RVAA), as outlined at 7.7.18-7.7.20 below.

ZTV study and Proposed Viewpoints

- 7.7.10 A ZTV showing the theoretical extent of visibility of the Proposed Development is presented in Figures 7.2-7.8. The ZTV takes account of the screening effect provided by blocks of woodland and buildings but not hedgerows or individual trees. The actual zone of visibility would be further constrained by hedgerows and hedgerow trees which are frequent and mature in this landscape.
- 7.7.11 Based on the ZTV analysis, the viewpoints shown on Figures 7.2-7.8 and detailed in Table 7.1 are proposed to inform the landscape and visual effects. These have been selected to represent a range of distances, directions and receptor types in relation to the individual solar PV module areas, with some viewpoints selected to have visibility of more than one of the solar PV module areas.

Table 7.1 Proposed Assessment Viewpoints

Viewpoint	Location	Viewpoint	Location
1	Lime Lane (near A1)	16	Footpath northwest of Viewley Hill Farm
2	Brafferton	17	Footpath east of Great Stainton
3	Footpath west of High House	18	Great Stainton, Elstob Lane
4	Lime Lane (near Ricknall Lane)	19	Elstob Lane / footpath near Mount Pleasant Farm
5	Bridleway near East Ketton	20	Catkill Lane
6	Bridleway near Ketton Hall	21	Local Road west of Bishopton
7	Beaumont Hill	22	Footpath, Folly Bank
8	Footpath near Moor House	23	Footpath southwest of Bishopton
9	Newton Ketton	24	Bishopton Recreation Ground
10	Salters Lane / Catkill Lane	25	Old Stillington
11	Salters Lane	26	Mill Lane
12	Footpath near Stainton Hill House	27	Bridleway between Stillington and Whitton
13	Footpath near Hauxley Farm	28	Footpath near Redmarshall
14	Footpath northeast of Hauxley Farm	29	Local Road south of Bishopton
15	Lodge Lane		

Visualisations

- 7.7.12 Visualisations will be provided to the standards set out within ‘Technical Guidance Note 06/19: Visual Representation of Development Proposals’.
- 7.7.13 For the PEIR, annotated photopanel (Type 1) will be prepared for all of the viewpoints. Annotated photopanel is deemed appropriate for the PEIR stage given that design and mitigation proposals will still be developing at that stage of the Proposed Development.
- 7.7.14 For the ES, photomontage visualisations (Type 3 / 4) will be prepared to illustrate the scale, extent and appearance of the solar PV modules for 10 key viewpoints. The Applicant will seek to agree these 10 viewpoints as part of

the consultation process following the publication of the PEIR. It is assumed at that stage all parties will have had the opportunity to see the viewpoint locations and photography and have a better understanding of the Proposed Development and its likely position and visibility.

Cumulative effects

- 7.7.15 Cumulative assessment relates to the assessment of the effects of more than one development. The approach taken within the assessment will take account of the advice provided within PINS Advice Note Seventeen. See also Chapter 10 of this EIA Scoping Report.
- 7.7.16 The Applicant is aware of a number of other proposed solar farm developments within 3-5km of the Proposed Development. This situation is likely to change before the DCO application is submitted and it is considered prudent to agree some future-proof criteria for the inclusion of sites rather than a list of sites at this stage and have done that below.
- 7.7.17 Table 7.2 outlines the proposed approach and criteria for including projects in the assessment of cumulative effects for LVIA.

Table 7.2 Criteria for the assessment of cumulative effects for LVIA

Criteria	Rationale
All <u>existing</u> development within the study area	Forms part of the baseline for the main LVIA.
<u>Consented</u> development within the study area	Included within the future baseline for the main LVIA unless there is good reason to believe it will not be constructed (or that it will not be constructed before the proposed development). Where consented development is not included within the future baseline, it will be considered within the assessment of cumulative effects.
Development in <u>planning</u> within the study area	Considered within the assessment of cumulative effects.
Developments in <u>scoping</u> within the study area	Generally presumed to be excluded but will be agreed on a case-by-case basis with consultees.
Site <u>allocations</u> in the local plan (without applications)	Generally presumed to be excluded but will be agreed on a case-by-case basis with consultees.
All EIA development within <u>3km</u> of the Site Area	Any EIA scale project within 3km may interact with the Proposed Development in terms of landscape and visual effects on receptors within the 2km LVIA study area.
Non-EIA linear or area-based development within <u>2km</u> of the Site Area	Development within 2km which does not have significant landscape and visual effects in its own right may interact with the proposed development in terms of landscape and visual effects on

Criteria	Rationale
	receptors within the 2km LVIA study area. (This category would include e.g., developments of new residential or commercial properties, smaller solar farms, phone masts and/or local electricity transmission lines).
All smaller scale planning applications and changes	Exclude - smaller scale changes are unlikely to generate significant cumulative effects with the Proposed Development.

Residential Visual Amenity Assessment (RVAA)

- 7.7.18 A number of residential properties may have views of the Proposed Development. This will be taken account of, with appropriate mitigation provided via the layout planting proposals.
- 7.7.19 It is not anticipated that the effects on any individual property would exceed the threshold which would necessitate detailed residential visual amenity assessment as described in Landscape Institute Technical Guidance Note 2/19: Residential Visual Amenity Assessment (15 March 2019), however, this will be considered within the RVAA. The assessment will include both existing properties and consented and proposed dwellings (whether new-build or conversion) within 100m of the solar PV module areas (i.e., excluding the underground cable routes and grid connection).
- 7.7.20 The RVAA does not form part of the ES and will be provided as a separate technical assessment to inform the planning statement which will draw together the RVAA and all other effects on private residential amenity.

7.8 Summary

- 7.8.1 Table 7.3 presents a summary of the LVIA and whether effects can be scoped in or out of the assessment.

Table 7.3 Summary of LVIA scope

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Effects on landscape fabric	Scoped in	Scoped in	Scoped in	The Proposed Development will involve changes to landscape fabric.
Effects on national landscape designations	Scoped out	Scoped out	Scoped out	There are no national landscape designations within 5km of the Site Area.
Effects on local landscape designations (Durham AHLV) within 2km	Scoped in	Scoped in	Scoped in	This is judged to be an appropriate scale and extent of assessment given expected visibility.
Effects on local landscape designations beyond 2km	Scoped out	Scoped out	Scoped out	Effects on these receptors are expected to be negligible given expected visibility.
Effects on national landscape character areas	Scoped out	Scoped out	Scoped out	Given the scale of the development and the broad nature of the national character areas this is judged to be an inappropriate scale of assessment.
Effects on local landscape character areas within 2km	Scoped in	Scoped in	Scoped in	This is judged to be an appropriate scale and extent of assessment given expected visibility.
Effects on local landscape character areas beyond 2km	Scoped out	Scoped out	Scoped out	Effects on these receptors are expected to be negligible given expected visibility.

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Effects on views and visual amenity within 2km	Scoped in	Scoped in	Scoped in	This is judged to be an appropriate scale and extent of assessment given expected visibility.
Effects on views and visual amenity beyond 2km	Scoped out	Scoped out	Scoped out	Effects on these receptors are expected to be negligible given expected visibility
Cumulative effects	Scoped in	Scoped in	Scoped in	Cumulative effects may arise with developments meeting the criteria set out in Table 7.2 above.
RVAA for dwellings within 100m of the Site Areas	To be provided separately with the DCO application.	To be provided separately with the DCO application.	To be provided separately with the DCO application.	On a precautionary basis – note that this does not form part of the EIA scope.

8 Cultural heritage

8.1 Introduction

8.1.1 This chapter sets out cultural heritage receptors of relevance to the Proposed Development and provides details of the proposed approach to the assessment of potential impacts on cultural heritage during construction, operation and decommissioning.

8.1.2 The cultural heritage assessments and surveys that have been undertaken to date, or are in the process of being undertaken, are presented in this chapter, as well as the potential effects that may arise as a result of the Proposed Development.

8.2 Relevant legislation, policy and guidance

8.2.1 The relevant legislation, planning policy and guidelines which underpin the assessment methodology for cultural heritage are outlined below.

Legislation

8.2.2 The following legislation underpins the assessment of cultural heritage within the planning process:

- Ancient Monuments and Archaeological Areas Act 1979¹²³ (amended by the National Heritage Act 1983¹²⁴ and 2002¹²⁵; and
- Protection of Military Remains Act 1986¹²⁶; and
- Planning (Listed Buildings and Conservation Areas) Act, 1990¹²⁷.

Policy

8.2.3 The following national and local planning policies of relevance to the Proposed Development and the cultural heritage assessment have been considered:

National

- NPS EN-1¹²⁸, with reference to paragraph 4.1.4 which discusses adverse impacts and benefits, and Historic Environment (Section 5.8);
- NPS EN-3, Renewable Energy Infrastructure¹²⁹ is currently in the process of being updated. The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses; and

¹²³ HMSO (1979) *Ancient Monument and Archaeological Areas Act*. Available at: <https://www.legislation.gov.uk/ukpga/1979/46>

¹²⁴ HMSO (1983) *National Heritage Act*. Available at: <https://www.legislation.gov.uk/ukpga/1983/47/contents>

¹²⁵ HMSO (2002). *National Heritage Act (as amended)*. Available at: <https://www.legislation.gov.uk/ukpga/2002/14/contents>

¹²⁶ HMSO (1986). *Protection of Military Remains Act*. Available at: <https://www.legislation.gov.uk/ukpga/1986/35/contents>

¹²⁷ HMSO (1990) *Planning (Listed Buildings and Conservation Areas) Act (1990)*. Available at: <https://www.legislation.gov.uk/ukpga/1990/9/contents>

¹²⁸ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹²⁹ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

- The NPPF)¹³⁰ sets out the government’s planning policies for England and how these should be applied. Whilst the policies set may be relevant to the assessment, the NPPF does not form the basis for a decision on an NSIP. The assessment would therefore focus on a number of key sections, including Conserving and enhancing the historic environment (Section 16).

Local

8.2.4 The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. The relevant local planning policy from each LPA would be considered, as set out below:

- Darlington Local Plan (2016–2036)¹³¹; and
- Stockton-on-Tees Borough Council Local Plan¹³²;
- County Durham Plan (2020)¹³³; and
- Any supplementary or supporting documentation of relevance.

Guidance

8.2.5 The following industry guidance will be used for the cultural heritage assessment:

- Standard and guidance for historic environment desk-based assessment¹³⁴;
- Managing Significance in Decision Taking in the Historic Environment: Historic Environment Good Practice in Planning Advice Note 2¹³⁵; and
- The Setting of Heritage Assets: Historic Environment Good Practice in Planning Note 3¹³⁶.

8.3 Study area

8.3.1 The following study areas are proposed to conduct the desk-based elements of cultural heritage assessment which have been set out in line with industry best practice and with regard to the nature of the known evidence base. The use of these study areas will be subject to agreement from the relevant stakeholders:

- a 2 km buffer around the Site Area to provide adequate context to sufficiently assess the potential for impacts to archaeological remains

¹³⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

¹³¹ Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

¹³² Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

¹³³ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹³⁴ Chartered Institute for Archaeologists (2017). *Standard and guidance for historic environment desk-based assessment*.

¹³⁵ Historic England (2015). *Managing Significance in Decision Taking in the Historic Environment: Historic Environment Good Practice in Planning Advice Note 2*

¹³⁶ Historic England (2017). *The Setting of Heritage Assets: Historic Environment Good Practice in Planning Note 3*

(known and unknown) during the construction of the Proposed Development;

- a 2 km buffer around the Site Area of the final design to capture any designated or non-designated heritage assets for which there is a potential for likely significant effects (upon their Heritage Significance) caused by a change in their setting; and
- a 5 km buffer around the Site Area of the final design to capture any highly designated heritage assets for which there is a potential for likely significant effect (upon their Heritage Significance) through a change in their setting. For this assessment, taking into consideration the nature of the Proposed Development, these asset categories have been deemed to comprise Grade I and Grade II* listed buildings and Grade I and Grade II* registered parks and gardens.

8.4 Consultation

8.4.1 The following stakeholders will be consulted regarding cultural heritage and archaeology:

- Historic England with regard to the scope of the assessment pertaining to the setting of designated heritage assets;
- The Archaeology Officer for Tees Archaeology who provides archaeological advice to Stockton-on-Tees Borough Council and the Principal Archaeologist for Durham County Council who provides archaeological advice to Darlington Borough Council and Durham County Council;
- The Conservation Officers for Stockton-on-Tees Borough Council and Darlington Borough Council regarding the assessment of the built historic environment including designated heritage assets, non-designated heritage assets and Conservation Areas; and
- Any additional stakeholders identified following the review of the EIA Scoping Report.

8.4.2 In addition, engagement with the Archaeological Advisors to Stockton-on-Tees Borough Council and Darlington Borough Council has been undertaken which related to the submission of a Written Scheme of Investigation (WSI) for a geophysical survey to support the Environmental assessment. Durham County Council were not engaged for the WSI as there are currently no geophysical surveys being undertaken within their boundary area, but they will be consulted on future activities.

8.5 Baseline conditions

8.5.1 The baseline conditions for the scoping assessment of the Proposed Development have been informed by an initial review of the Historic Environment Record (HER) and National Heritage List for England (NHLE) data, site walkovers and other sources available online. In addition, further

baseline information is being gathered from a geophysical survey of the Site Area.

- 8.5.2 A Desk-Based Assessment (DBA) and Historic Environment Settings Assessments (See Section 8.7) will be produced as part of the ES.
- 8.5.3 The data used to compile the assessment consists of information derived from a variety of sources, only some of which were directly examined for the purposes of the assessment. It is assumed that this data, as well as data derived from other secondary sources, is reasonably accurate.
- 8.5.4 In addition, it is worth noting that the HER is not a record of all surviving heritage assets. It is a record of the discovery of a wide range of archaeological and historic components of the historic environment. The information held within it is not complete and does not preclude the subsequent discovery of further elements of the historic environment that are, at present, unknown.

Archaeological and historical background

- 8.5.5 The study area has been occupied since at least the Bronze Age period with evidence for earlier activity scarce and restricted to dispersed lithic scatters. However, the general flat topography coupled with the River Skerne and Thorpe Beck bisecting the Site Area provide ideal conditions for resource exploitation and therefore there is potential for prehistoric remains.
- 8.5.6 The most substantial evidence for early occupation dates to the Iron Age and Romano-British period. The Site Area is located close to known areas of Roman activity limestone associated with the Cadeby Formation (formerly known as the Magnesian Limestone). The free draining soils which overlay the limestone bedrock provide favourable conditions for settlement and for the identification of potential archaeological remains from aerial imagery.
- 8.5.7 Settlement in the study area increased during the medieval period with many of the current villages tracing their origins to this period. This includes Bishopton which retains a motte and bailey castle, a scheduled monument (See Paragraph 8.5.15). In addition, there are a number of parish churches in the study area which date to the medieval period, as well as evidence for agricultural activity in the form of large areas of ridge and furrow.
- 8.5.8 The character of the study area remains relatively unchanged into the post-medieval period with the primary activities being agricultural in nature. The most noticeable change was the establishment of regular fields through the enclosure process and the expansion of the settlement centres, with many buildings in the historic cores tracing their origins to this period.
- 8.5.9 Further change occurred in the 19th century with the establishment of the railway network. This led to widespread industrialisation in the towns and cities, as well as affecting rural areas through the establishment of large-scale landscape change. There are also connections to some of the most significant events of the early 20th century in the area, as evidenced by the presence of

war memorials in many of the settlements and a former First World War airfield located just outside Bishopton.

Background summary

- 8.5.10 In consideration of the known historic environment records within the study area, there is potential for as yet unknown archaeological remains to be present within the Site Area.
- 8.5.11 Given the information currently available, there is a potential for archaeological remains to be present which from the early prehistoric periods of the Mesolithic to the Bronze Age (c.12,000 BC to around 600 BC).
- 8.5.12 The highest potential for encountering archaeological remains is those associated with the Iron Age, the Romano British period, and the Medieval period (around 600 BC to AD 1540). Such remains could have a high heritage significance, depending on several factors including their preservation.
- 8.5.13 There is also a potential for remains from the post-Medieval period and later (1540 to present) which are likely to be agricultural in nature alongside those associated with the aforementioned First World War airfield.

Summary of identified receptors

Within the Site Area

- 8.5.14 The following receptors located within the Site Area have been identified as susceptible to receiving a direct impact, and a potential likely significant effect, during the construction phase of the Proposed Development:
- Possible remains of the purported route of the Roman road to Chester-Le-Street (H3245);
 - Possible remains of the Bishopton Landing Ground, a First World War airfield (H44096);
 - The remains of the medieval Bishopton Cross (H334);
 - A series of post-medieval farm buildings, likely constructed from reused stone from the nearby castle (H62330);
 - Remains associated with possible rectangular cropmark of unknown date (H69180);
 - Remains associated with the route of the former Castle Eden Branch Railway (4216);
 - An area of medieval ridge and furrow associated with the settlement at Carlton (6867);
 - An area of medieval ridge and furrow located close to Woodside Farm (1445); and
 - as yet unknown archaeological remains.

Outside the Site Area

8.5.15 The following receptors located outside the Site Area have been identified as susceptible to receiving an indirect impact, and a potential likely significant effect and are scoped in for further assessment, during the operation period of the Proposed Development:

- Five Scheduled Monuments all located within the 2 km Study Area comprising:
 - Deserted Village (1002335);
 - Ketton Bridge (1002345);
 - Motte and Bailey castle 400m south east of Bishopton (1008668);
 - Shrunken medieval village at Sadberge (1011073); and
 - Coatham Mundeville medieval village, fishpond and areas of rig and furrow (1016109).
- Two Grade I listed buildings comprising
 - Church of St Cuthbert, Redmarshall (1140001) located within the 2 km Study Area; and
 - Ruins of a Church of St Thomas A Becket, Grindon (1329821) located within the 5 km Study Area.
- One Grade II* listed building comprising:
 - Church of St John the Baptist, Elton (1139261) located within the 5 km Study Area.
- Three Conservation Areas located within the 2 km Study Area comprising:
 - Coatham Mundeville;
 - Bishopton;
 - Sadberge; and
- Sixty-Seven Grade II listed buildings which all lie within the 2 km Study Area and are set out within Table 8.1.

Table 8.1 Grade II listed buildings scoped into assessment

Grade II listed buildings		
Favell Rose Farmhouse, Redmarshall (1083591)	The Ship Inn, Redmarshall (1139958)	Ketton Hall, Brafferton (1186119)

Grade II listed buildings

Poplars Farmhouse, Carlton (1086963)	Grassy Nook Farmhouse, Bishopsgarth and Elm Tree (1140007)	Peartree House, Brafferton (1186119)
Stable 30 Metres North of High Beaumont Hill Farmhouse, Whessoe (1087005)	Preston Lodge Farmhouse and Outbuilding Attached to Right, Mordon (1159779)	Deer House South of Hall Garth, Coatham Mundeville (1186127)
4 and 5 Chapel Row, Sadberge (1116202)	Skerningham Farmhouse, Barmpton (1185895)	Curved Wall to South East of Coatham Hall, Coatham Mundeville (1186144)
Lych Gate and Churchyard Wall of Church of St Andrew, Sadberge (1116208)	Manor Farmhouse, Bishopton (1185896)	Foresters Arms, Coatham Mundeville (1241145)
Thorn Cottage, Sadberge (1116220)	Church of St Peter, Bishopton (1185897)	The Old Rectory and Adjoining Balustrade, Redmarshall (1248170)
Longpasture House with Barn on Left Return, Little Stainton (1116414)	Musgrave Headstone 7 Metres West of Church of St Peter, Bishopton (1185898)	Farmbuildings to the North West of Coatham Hall Farmhouse, Coatham Mundeville (1299334)
Railway Cottage at Norton West Junction, Norton (1120865)	Remains of Village Cross 15 Metres West of Church of St Peter, Bishopton (1185899)	Hall Garth, Coatham Mundeville (1299345)
White House Farmhouse, Grindon (1120897)	Springfield House with Farm Building on Right Return, Bishopton (1185900)	The Three Tuns Public House, Sadberge (1299425)
Mill Bridge, Coatham Mundeville (1121231)	St John's House, Bishopton (1185901)	U Plan Farmbuildings and Gin Gang North of Peartree House, Brafferton (1299443)
Coatham Mill, Coatham Mundeville (1121232)	Mill Bridge, Coatham Mundeville (1185902)	Stainton Grange, Great Stainton (1299447)
The Stables Bar and Restaurant, Front Wall and Piers to East of Hall Garth, Coatham Mundeville (1121233)	Manor Farmhouse and Adjoining Farmbuilding, Brafferton (1185903)	The King's Arms Public House, Great Stainton (1299448)

Grade II listed buildings		
Coatham Hall, Coatham Mundeville (1121234)	Ketton Packhorse Bridge, Brafferton (1185904)	Low Skerningham, Barmpton (1299482)
Coatham Hall Farmhouse, Coatham Mundeville (1121235)	Church of All Saints, Great Stainton (1185908)	Elstob Hall, Mordon (1310873)
Glebe Farmhouse and Front Garden Wall, Coatham Mundeville (1121237)	Water Pump at Rear of Stainton Grange, Great Stainton (1185909)	Threshing Barn and Gin Gang, 40 Metres North of Elstob Hall, Mordon (1322810)
Accommodation Bridge, 640 Metres East of Elstob Crossing, Morton (1121511)	The Old Rectory, Great Stainton (1185910)	Cart Shed With Loose Box And Pigsty 5 Metres North of High Beaumont Hill Farmhouse, Whessesoe (1323002)
Windmill, 500 Metres East of Holme Mill House, Mordon (1121512)	Water Pump and Railings About 5 Metres North of Meridian House, Great Stainton (1185911)	Howdon House, Grindon (1329425)
The Hamilton Russell Arms, Grindon (1139220)	Raby House, Sadberge (1185941)	Holme Farmhouse, Carlton (1329798)
Church of St James, Grindon (1139224)	White House, Sadberge (1185942)	The Vane Arms Public House, Grindon (1329822)
Glen Cottage, Carlton (1139246)	Church of St Andrew, Sadberge (1185943)	Larberry Pasture Farmhouse, Longnewton (1329829)
Rectory Cottage, Redmarshall (1139858)	Thithe House, Sadberge (1185944)	Church of St John the Baptist, Stillington and Whitton (1356589)
Manor Farmhouse, Stillington and Whitton (1139920)	Threshing Barn and Gin Gang 10 Metres West of Number 24 (Manor Farmhouse), Brafferton (1186094)	Bishopton War Memorial, Bishopton (1433639)
Stillington War Memorial, Stillington (1440565)		

8.5.16 Assets that have been identified within the study area, as set out within Section 8.3, but not included within the list above, are not considered to be susceptible to potential likely significant effects. These assets have been scoped out of further assessment. Table 8.4 sets out the justification for this conclusion which is based on initial site visits, data gathered and professional

judgement. A more detailed rationale undertaken in line with industry standard guidance (GPA3 assessment) will be set out within the PEIR and ES.

- 8.5.17 Further refinement of the list of assets above will be undertaken within the Historic Environment Settings Assessment, which will be included as a technical appendix to the ES. Assets may also be added to this list following consultation with the relevant stakeholders.

8.6 Potential effects and mitigation measures

- 8.6.1 Potential effects on heritage assets can occur during construction, operation and decommissioning and through direct, and indirect impacts, which are outlined below. The methodology by which the significance of an effect is calculated is set out in Section 8.8.

Construction

- 8.6.2 Direct impacts are those caused by physical disturbance associated with the Proposed Development and generally occur during the construction phase through activities including, but not limited to:

- ground reduction;
- topsoil stripping;
- establishment of compounds and haul roads;
- construction of foundations;
- piling;
- hard and soft landscaping;
- establishment of ecological mitigation areas; and
- general construction activities which require excavation.

- 8.6.3 Indirect impacts are caused by the introduction of development into the landscape where that development can alter the way that landscape is understood and where it can alter how heritage assets are appreciated and understood.

Mitigation

- 8.6.4 For effects derived from direct impacts, the primary mitigation measure is avoidance of physical disturbance through design.
- 8.6.5 Where avoidance is not possible, mitigation measures may include set piece archaeological excavations where remains of sufficient heritage significance are present.

Operation

- 8.6.6 Indirect impacts are caused by the presence of the completed development within the landscape, and impacts are often through a visual alteration. However, these impacts can also be through the alteration of a non-visual relationship which is deemed important to the heritage significance of an asset.
- 8.6.7 It is important to note that the mere presence of a development within the visual range of an asset is not sufficient on its own to have an impact on the heritage significance of an asset. This must be determined in relation to the heritage significance of that asset and how that visual relationship is important to that heritage significance.

Mitigation

- 8.6.8 Where the Proposed Development is predicted to have an effect on the heritage significance of a heritage asset, mitigation can be applied to lessen or remove that effect entirely.
- 8.6.9 Mitigation measures for indirect impacts during operation are exclusively set out in the design for the Proposed Development by way of the placement of the constituent elements and through the provision of screening either through mature vegetation or other means. No additional mitigation measures can be applied to limit indirect impacts once construction is complete.

Decommissioning

- 8.6.10 Impacts to heritage assets during the decommissioning phase of the Proposed Development are not anticipated. It is anticipated that all impacts will have occurred during the construction phase (direct) and operation phase (indirect).
- 8.6.11 This is predicated upon:
- the assumption that no further land take will be required for decommissioning, and therefore no additional physical disturbance can be caused to any heritage assets through intrusive works; and
 - the understanding that decommissioning will remove all elements of the Proposed Development and thus return the landscape to its previous state (as it is now) therefore removing any ongoing impact on heritage assets through a change in setting.
- 8.6.12 Therefore, there will be no likely significant effects on the significance of any heritage assets from the decommissioning process and it proposed to be scoped out the ES.

Mitigation

- 8.6.13 No mitigation is required as no likely significant effects are anticipated during decommissioning.

8.7 Proposed assessment methodology

8.7.1 The cultural heritage assessment will be undertaken in line with industry standards and guidance, in accordance with national and local planning policy and using professional judgement throughout.

8.7.2 The methodology listed below takes account of the elements noted above to provide a robust and proportionate assessment and will be supported by a range of technical appendices setting out an extensive baseline which will underpin the assessment.

Sources of information

8.7.3 The following data sources will be consulted as part of the assessment to characterise the existing historic environment with respect to cultural heritage and archaeology:

- The NHLE;
- The Durham Historic Environment Record (DHER);
- The Tees Archaeology Sites and Monuments Record (TASMR);
- records of locally important buildings held by Darlington Borough Council and Stockton-on-Tees Council or within the DHER and/or TASMR;
- records of Conservation Areas held by Darlington Borough Council and Stockton-on-Tees Council;
- historic maps including those produced by the Ordnance Survey, Tithe Maps, Estate Maps and any others deemed relevant;
- LiDAR data available online from the Environment Agency (EA);
- archaeological reports from previous work; and
- any additional sources agreed during consultation.

8.7.4 The surveys that will be undertaken to inform the assessment, in accordance with industry guidelines and in consultation with historic environment stakeholders, include:

- site walkovers;
- dedicated settings assessment visits; and
- geophysical survey (currently underway in accordance with the WSI noted in paragraph 8.4.2).

Supporting technical documents

8.7.5 The cultural heritage assessment will be supported by the following technical appendices:

- an Archaeological DBA;
 - a Historic Environment Settings Assessment; and
 - the results of a geophysical survey.
- 8.7.6 The data gathered during the DBA and the assessment made of the potential for impacts to any known or unknown archaeological remains will be used during the design process to inform the location of solar farm infrastructure, including associated cable routes.
- 8.7.7 The geophysical survey will be undertaken across as much of the Site Area as possible in order to identify any anomalies which could potentially represent buried archaeological remains. A WSI setting out the proposed methodology for the geophysical survey has been submitted to and agreed by the archaeological advisors for the LPAs with the survey currently underway.

Criteria for determining sensitivity of receptor

- 8.7.8 Significance in relation to the value of a heritage asset will be referred to throughout this EIA Scoping Report and the cultural heritage assessment as 'heritage significance'.
- 8.7.9 The value of a heritage asset is determined through the sum of its interests (archaeological, architectural, artistic or historic), as defined in the NPPF (NPS EN1 which defers to PPS5 or its successors, i.e., NPPF) and expanded on in Historic Environment Good Practice Advice in Planning 2 (Historic England 2015).
- 8.7.10 For the purposes of the cultural heritage assessment, designation status is used as a proxy for heritage significance as these hold an inherent heritage significance which justified its designation.
- 8.7.11 This determination is further justified through the legal protection afforded to the designations and their meaning in terms of the application of planning policy.
- 8.7.12 Using this proxy criteria in addition to national planning policy and guidance and through professional judgment. Table 8.2 has been amended and adapted to encompass both designated heritage and non-designated heritage assets.
- 8.7.13 With regard to heritage significance there is an explicit distinction between that heritage significance and its 'sensitivity to change'. Some assets of the highest designation will not be sensitive to the types of changes proposed, whilst others will be more so. This will be assessed on a case-by-case basis in the assessment text for each asset, as appropriate.

Table 8.2 Levels of heritage significance

Heritage significance	Description
High	<ul style="list-style-type: none"> World Heritage Sites Scheduled Monuments Grade I and II* listed buildings Grade II listed buildings which can be shown to have exceptional qualities in their fabric or historical association Registered Battlefields Grade I and II* Registered Parks and Gardens Non-designated assets of equivalent heritage significance which are potentially nationally important.
Medium	<ul style="list-style-type: none"> Grade II listed buildings Regionally important archaeological features and areas (as defined in the HER) Conservation Areas, which are considered regionally important.
Low	<ul style="list-style-type: none"> Sites and features noted as locally important in the HER, other non-designated features of heritage significance.
Negligible	<ul style="list-style-type: none"> Assets compromised by poor preservation and/or poor contextual association, or very common archaeological features/buildings of little or no value at local or other scale

8.7.14 While the categorisation of listed buildings by Historic England implies different levels of heritage significance, as reflected in the table above, all listed buildings are afforded the same level of legal protection.

8.7.15 Table 8.2 nominally sets out heritage significance levels, professional judgement will be used in determining heritage significance. Where assets are placed in a different category to those set out above, a rationale and justification will be made explicit in the assessment text, where relevant.

Criteria for assessing magnitude of change

8.7.16 Magnitude of change will be assessed through the nature of a predicted impact, which is broken down in Table 8.3.

8.7.17 Direct impacts are permanent, as the loss of archaeological assets or historic buildings cannot be replaced or recreated while damage to archaeological assets cannot be repaired.

8.7.18 Indirect impacts can occur through changes in setting (arising from visual intrusion, alteration of townscape etc.). This may cause a reduction in the contribution that setting makes to an asset's heritage significance, which in turn may diminish that asset's overall heritage significance, and/or affect the ability to experience and appreciate that heritage significance.

Table 8.3 Magnitude of change

Level of impact	Description
High	<ul style="list-style-type: none"> • Total loss of or major physical damage to or significant alteration to a site, building or other feature. • Extensive change (e.g., loss of dominance, intrusion on key view or sightline) to the setting of a scheduled monument, listed building or other feature registered as nationally important, which may lead to a major reduction in the contribution of that setting to the heritage significance of the asset so that the asset loses heritage significance, and a major reduction in the ability to experience and/or appreciate that heritage significance.
Medium	<ul style="list-style-type: none"> • Damage or alteration to a site, building or other feature. Encroachment on an area considered to have a high archaeological potential. • Change in setting (e.g., intrusion on designed sight-lines and vistas) to monuments / buildings and other features, which may lead to a moderate reduction in the contribution of that setting to the heritage significance of the asset. Change/reduction in the ability to experience/appreciate that heritage significance.
Low	<ul style="list-style-type: none"> • Minor damage or alteration to a site, building or other feature. Encroachment on an area where it is considered that low archaeological potential exists. • Minor change in setting (e.g., above historic skylines or in designed vistas) of Monuments, Listed Buildings, sites and other features, which may lead to a small reduction in the contribution the setting makes to the heritage significance of the heritage asset, and limited loss of heritage significance. Limited change in or reduction of the ability to experience or appreciate the heritage significance of an asset.
Negligible	<ul style="list-style-type: none"> • No physical effect. • No change in setting with no change in the contribution that setting makes to the heritage significance of the asset. No change in the ability to experience or appreciate the heritage significance of the asset.

Criteria for assessing significance

- 8.7.19 The predicted significance of effect will be determined through a standard method of assessment based on professional judgement, considering both the heritage significance of the asset and the magnitude of change as detailed in Table 8.4 below.

- 8.7.20 Major and moderate effects are considered significant in the context of the EIA Regulations, while minor and negligible effects are considered not significant.
- 8.7.21 Effects can be beneficial or adverse, and the duration of an effect can be permanent or temporary in nature. Temporary effects generally make reference to effects limited to the construction phase of the Proposed Development.
- 8.7.22 All effects derived from direct impacts are permanent. Effects which are derived from indirect impacts are long term, but fully reversible upon decommissioning (see Paragraph 8.6.7).

Table 8.4 Significance of effect

Receptor sensitivity	Magnitude of change			
	High	Moderate	Low	Negligible
High	Major	Major	Moderate	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

8.8 Summary

- 8.8.1 Table 8.5 presents a summary of the scope of the cultural heritage assessment and whether effects can be scoped in or out of the assessment.
- 8.8.2 As set out above in Paragraph 8.6.12, no effects on heritage assets from the decommissioning of the Proposed Development are anticipated. It is also assumed all impacts will have occurred during construction (direct) and operation (indirect). Therefore, decommissioning this has been scoped out of the assessment, with effects from the construction and operation phases scoped in.

Table 8.5 Summary of cultural heritage assessment scope

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Direct impacts to known and unknown archaeological remains	Scoped in	Scoped out	Scoped out	Any potential impacts to both known and unknown archaeological remains will occur during construction.
Direct impacts to designated heritage assets	Scoped out	Scoped out	Scoped out	No works associated with the Proposed Development are planned to take place which would lead to any physical impact, up to and including complete removal, on any designated heritage asset.
Direct impacts to any heritage assets beyond the development footprint	Scoped out	Scoped out	Scoped out	Physical impacts can only occur through intrusive works associated with the Proposed Development. Where no intrusive works are to be undertaken, no impact can occur
Indirect impacts to designated heritage assets within the Site Area	Scoped out	Scoped in	Scoped out	Indirect impacts can occur from a change of setting brought about through the finished built form of the Proposed Development. Any potential impacts brought about in this way are therefore considered as operational.
Indirect impacts to non-designated heritage assets within the Site Area	Scoped out	Scoped in	Scoped out	Indirect impacts can occur from a change of setting brought about through the finished built form of the Proposed Development. Any potential impacts brought about in this way are therefore

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
				considered to be from the operational phase.
Indirect impacts to designated heritage assets within the 2 km study area	Scoped out	Scoped in	Scoped out	Indirect impacts can occur from a change of setting brought about through the finished built form of the Proposed Development. Any potential impacts brought about in this way are therefore considered to be from the operational phase. A 2 km study area for such effects has been deemed proportionate for this assessment due to the nature of the development and the topographical form of the Site Area.
Indirect impacts to non-designated heritage assets within the 2 km study area	Scoped out	Scoped in	Scoped out	Indirect impacts can occur from a change of setting brought about through the finished built form of the Proposed Development. Any potential impacts brought about in this way are therefore considered to be from the operational phase. A 2 km study area for such effects has been deemed proportionate for this assessment due to the nature of the development and the topographical form of the Site.
Indirect impacts to highly designated heritage assets	Scoped out	Scoped in	Scoped out	Indirect impacts can occur from a change of setting brought about through the

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
(as determined in Paragraph 8.3.1) within the 5 km study area				finished built form of the Proposed Development. Any potential impacts brought about in this way are therefore considered to be from the operational phase. A 5 km study area for such effects on these highly has been deemed proportionate for this assessment due to the nature of the development and the likely potential for these assets to share any relationship with the Site Area.
Specific heritage assets scoped out of further assessment				
The Grade II* listed Wynyard Hall (1139221), Grade II* registered Wynyard Park (1000372), the Grade II* listed Lion Bridge to East of Wynyard Hall (1139222), the Grade II* listed Wellington Obelisk to South East of Wynward Hall (1329823)	Scoped out	Scoped out	Scoped out	These assets are all contained within the boundaries of the Grade II* registered Wynyard Park. Site visits undertaken for the production of the Historic Environment Settings Assessment have determined that the Site Area is not within the setting of these assets which contributes to their heritage significance. Therefore, there can be no impact to their heritage significance and no likely significant effect
The Grade II listed Hodgson Chest Tomb, 5m South of South Porch of Church of St Andrew (1121507), the Grade II listed 3, The Green	Scoped out	Scoped out	Scoped out	These assets are all located within the built-up environment of Aylcliffe and are located in very close proximity to the A1(M). These assets share no relationship with the Site Area, and their settings are

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
(1121508), The Grade II listed Oakles Farmhouse (1121509), The Grade II listed 14, High Street (1159681), Lamp Post 7 Metres East of Number 7, The Green (1310948), the Grade II listed Church of St Andrew (1322806), the Grade II listed Headstone to John Gibson, 7 Metres South of South of South Port of Church of St Andrew (1322806) and the Grade II listed Aycliffe War Memorial (1433531)				defined primarily through their relationship with other assets in the broader Conservation Area. In addition, the Proposed Development would cause no further alteration to the setting of any assets than has already been caused by the three-lane motorway to their east. This has been determined through initial site visits and for the production of the Historic Environment Settings Assessment. Therefore, there can be no impact to their heritage significance and no likely significant effect
The Grade II* listed Heighington Hall (1121240) and the Grade I listed Church of St Michael (1322953)	Scoped out	Scoped out	Scoped out	These assets are located within the settlement of Heighington and are located approximately 4.1 km west of the Site Area. These assets are visually separated by a large number of buildings and vegetation from the southern extent of the settlement at Newton Aycliffe. The Site Area and these assets share no relationship. Therefore, there can be no impact to their heritage significance and no likely significant effect.

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
The Grade II* listed Goods Shed East South East of North Road Station (1121262), The Grade I listed Butler House and the Rectory (1121301), The Grade I listed Church of St Andrew (1160229), the North Road Railway Station (Now Railway Museum) (1322962) and the Grade I listed Skerne Bridge (1475481)	Scoped out	Scoped out	Scoped out	These assets are all located within the urban and sub-urban environment of Darlington approximately 5.4 km to the south-west of the Site Area. These assets share no relationship with the Site Area, rather any significance from their setting is derived through their relationship with other assets within the urban environment. This has been determined through initial site visits and for the production of the Historic Environment Settings Assessment. Therefore, there can be no impact to their heritage significance and no likely significant effect
The Grade II* listed Church of St Mary (1139238) and the Grade II* listed Manor House (1329830)	Scoped out	Scoped out	Scoped out	These assets are located within the settlement of Longnewington, approximately 3km to the south of the Site Area. The setting of the assets is defined by their immediate rural settlement surroundings and the Site Area is located in the distant landscape with which the assets have no relationship. This has been determined through initial site visits and for the production of the Historic Environment Settings Assessment. Therefore, there can be no impact to their

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
				heritage significance and no likely significant effect
<p>The Grade II* listed Gloucester House (1084341), The Grade II* listed 108, High Street (1101477), The Grade I listed Church of St Cuthbert (1139241), The Grade II* listed St Cuthbert’s Vicarage (1139272), The Grade II* listed Church of St Peter (1139916), The Grade II* listed 48, Bridge Road (1139963), The Grade II* listed 74 and 76, Church Road (1139966), The Grade II* listed Town Hall (1139975), The Grade II* listed Market Cross (1139976), The Grade I listed Stockton Parish Church (1139977), The Grade II* listed War Memorial (1139979), The Grade I listed Parish Church of St Mary the Virgin (1140012), The Grade II* listed The Manor House</p>	Scoped out	Scoped out	Scoped out	<p>These assets are all located within the urban and sub-urban environment of Stockton-on-Tees approximately 4.5 km to the east of the Site Area. These assets share no relationship with the Site Area, rather deriving any significance from their setting through the urban environment. This has been determined through initial site visits and for the production of the Historic Environment Settings Assessment.</p> <p>Therefore, there can be no impact to their heritage significance and no likely significant effect</p>

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
(1325975), The Grade II* listed Columbia House (1329447), The Grade II* listed 32, Dovecot Street (1329448), The Grade II* listed Church of St Michael and All Angels (1329478), The Grade II* listed Church of the Holy Trinity (1329480), The Grade II* listed 80, Church Road (1338865), the Grade II* listed 9, Finkle Street (1356182), The Grade II* listed Friends Meeting House (1356201) and the Grade II* Registered Ropner Park (1001628)				

9 Land use and Socio-economics

9.1 Introduction

9.1.1 This chapter sets out the proposed scope and approach to assessing the potential direct and indirect impacts of the Proposed Development on socio-economic and land use receptors, including:

- employment opportunities during construction, operation and decommissioning;
- agricultural land and soil resources receptors during construction and operational phases; and
- other land uses potentially affected by the Proposed Development such as recreational or community facilities, PRow and development land.

9.1.2 The assessment would be informed by a detailed Agricultural Land Classification (ALC) and soil resource survey, as well as a range of secondary data and desk based / site analysis to support the ES.

9.2 Relevant legislation, policy and guidance

9.2.1 There is no legislation specific to the assessment of socio-economic effects. Therefore, the assessment would draw on guidance within policy documents and wider publications, utilising a methodology and approach which has been developed and tested on other schemes across the UK.

9.2.2 The relevant planning policy and guidelines which would underpin the assessment methodology for socio-economics and land use are outlined in this section.

Legislation

9.2.3 As described above, there is no legislation specific to the assessment of socio-economic or land use effects arising as part of the Proposed Development. Where relevant, legislation specific to elements of the assessment such as the Countryside and Rights of Way Act (2000) and the Climate Change Act (2008) will be referenced.

9.2.4 Planning Policy and guidance of most relevance to the assessment is summarised below.

Policy

9.2.5 The following national and local planning policies are relevant to the Proposed Development when considering the assessment of socio-economic and land use effects.

National

- NPS EN-1¹³⁷, with reference to paragraph 4.1.4 which discusses adverse effects and benefits, paragraph 4.2.1, paragraph 4.2.2 in relation to socio-economics, paragraph 5.10.8 in relation to impacts on best and most versatile (BMV) agricultural land, and paragraph 5.12.2 in relation to socio-economics;
- NPS EN-3, Renewable Energy Infrastructure¹³⁸ is currently in the process of being updated. The current NPS does not include specific reference to solar technologies however, the latest Draft NPS¹³⁹ includes a section on solar photovoltaic generation and this will be considered as the draft progresses;
- The NPPF¹⁴⁰ sets out the government's planning policies for England and how these should be applied. Whilst the policies set may be relevant to the assessment, the NPPF does not form the basis for a decision on an NSIP. The assessment would therefore focus on a number of key sections, including Building a strong, competitive economy (Section 6), paragraphs 80,82 and 83, Achieving well designed places (Section 12), paragraphs 127 and 128, and Conserving and enhancing the natural environment (Section 15), paragraphs 170b, 174 and 175, and footnote 58;
- National Economic Development Policy and in particular the Government's Industrial Strategy¹⁴¹;
- Planning Practice Guidance¹⁴² – Natural Environment paragraphs 001 and 002; and
- Planning Practice Guidance¹⁴³ – Renewable and Low Carbon Energy paragraph 013.

Local

9.2.6 The Proposed Development lies within the administrative boundaries of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council. Planning policy of relevance to the assessment which would be considered includes:

- Darlington Local Plan (2016-2036)¹⁴⁴;
- Stockton-on-Tees Borough Council Local Plan¹⁴⁵;

¹³⁷ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹³⁸ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

¹³⁹ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

¹⁴⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework* Available online at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹⁴¹ HM Government (2017). *Industrial Strategy: Building a Britain fit for the future*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/664563/industrial-strategy-white-paper-web-ready-version.pdf

¹⁴² Department for Levelling Up, Housing and Communities (2019). *Planning Practice Guidance: Agricultural land, soil and brownfield land of environmental value*. Available online at: <https://www.gov.uk/guidance/natural-environment#agricultural-land-soil-and-brownfield-land-of-environmental-value>

¹⁴³ Department for Levelling Up, Housing and Communities (2015). *Planning Practice guidance: Renewable and Low Carbon Energy*. Available at: <https://www.gov.uk/guidance/renewable-and-low-carbon-energy>

¹⁴⁴ Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

¹⁴⁵ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

- County Durham Plan (2020)¹⁴⁶;
- The Joint Minerals and Waste Plan¹⁴⁷; and
- Any supplementary or supporting documentation of relevance.

Guidance

9.2.7 The following industry guidance will be used for the agricultural land and soil resources assessment:

- Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites¹⁴⁸;
- Ministry of Agriculture, Fisheries and Food (MAFF) (1988), Agricultural Land Classification of England and Wales - Revised guidelines and criteria for the grading of the quality of agricultural land;
- Natural England (2010), North East Region 1:250,000 Series Agricultural Land Classification;
- Soil Survey of England and Wales (1984), Soils of Northern England (1:250,000), Sheet 1; and
- Jarvis et al (1984), *Soils and Their Use in Northern England*. Soil Survey of England and Wales Bulletin 10, Harpenden.

9.2.8 In addition, guidance published through the Design Manual for Roads and Bridges (DMRB) in relation to the assessment of potential impacts on Population and Human Health (LA112) would be used where relevant to the scope of the assessment.

9.3 Study area

9.3.1 The study area to be used for the assessment of socio-economic and land use effects would vary dependent on the geographical area associated with a given receptor. This depends on both the nature and type of receptor, as well as the nature of the potential effect(s). Further detail in relation to the relevant study areas will be provided within the ES, however the following are recommended as part of this EIA Scoping Report:

- potential employment effects may be felt over a wide area given the somewhat specialist nature of some of the construction and operational tasks. The study area for consideration of economic effects would therefore be the immediate authority areas of Darlington, Stockton-on-Tees and Durham, as well as the wider North East Region;

¹⁴⁶ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹⁴⁷ Tees Valley Joint Council (2011). *Tees Valley Joint Minerals and Waste Development Plan Documents*. Available at: <https://www.middlesbrough.gov.uk/planning-and-housing/planning/planning-policy/tees-valley-joint-minerals-and-waste-dpds>

¹⁴⁸ Department for Environment, Food and Rural Affairs (Defra) (2009). *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites*. Available online at: <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>

- potential impacts on agricultural land and soil resources would extend to the Order Limits;
- potential effects on the PRoW network would focus on the Order Limits but extend beyond the site where indirect effects are identified; and
- potential effects on other land uses including community facilities and development land would focus on the areas immediately adjacent to the Proposed Development, within 500m of the Order Limits.

9.3.2 Should key receptors beyond these initial geographical areas be identified through assessment work or through consultation with key stakeholders, these study areas would be reviewed.

9.4 Consultation

9.4.1 It is envisaged that the following stakeholders would be consulted in relation to the assessment:

- **Natural England** regarding the scope of the agricultural land and soil resources assessment;
- **Landowners** who have an interest in the scheme who are already engaged with the Applicant;
- **Local Authorities** in relation to PRoW;
- **Access or recreation groups** as identified in relation to ProW and permissive trails; and
- **Local Business Groups** in respect of job creation and supply chain opportunities.

9.5 Baseline conditions

9.5.1 Baseline conditions for the scoping assessment of the Proposed Development have been informed by an initial desk study and review of published data. This has included:

- review of aerial imagery and mapping of the Proposed Development and surrounding areas;
- internet based searches for key receptors;
- Census data sourced from Nomis and ONS;
- PRoW data from published sources; and
- Natural England datasets in relation to ALC.

9.5.2 As outlined in Chapter 2, the Proposed Development is located within the administrative area of Darlington Borough Council, Stockton-on-Tees Borough Council and Durham County Council.

- 9.5.3 The Site Area is approximately 552ha and is collectively formed of a number of solar PV module areas that can be roughly grouped into six blocks as follows:
- Site A: Brafferton;
 - Site B: Hauxley Farm;
 - Site C: Byers Gill Wood;
 - Site D: Great Stainton;
 - Site E: West Newbiggin; and
 - Site F: North of Bishopton.
- 9.5.4 Land uses within the Site Area and surrounding the Proposed Development are focused on agricultural activities with a number of dispersed settlements which support local services.
- 9.5.5 The area is supported by a network of PRow and permissive trails with other recreational and community land uses, such as golf clubs and woodland areas within the surrounding areas.

Socio-economics and land use

- 9.5.6 From a socio-economic perspective, it is proposed that the baseline focusses on the local economy, with potential socio-economic effects anticipated to relate to employment and supply chain opportunities, particularly during construction of the Proposed Development.
- 9.5.7 The profile of the study area, including Darlington and Stockton-on-Tees supports a resident population of approximately 304,800 people, with 107,400 located in Darlington and 197,400 in Stockton-on-Tees. Economic activity rates in Darlington are above the regional and national averages with rates in Stockton-on-Tees broadly in line with those figures¹⁴⁹. Key sectors within the study area include manufacturing, wholesale and retail trades, transportation and storage, information and communication, administrative and support service activities, public administration and defence and human health and social work activities.
- 9.5.8 The wider North East region has a resident population in the region of 2.68 million people, based on latest population estimates. The region has a slightly lower proportion of people who are economically active when compared to the United Kingdom as a whole. Sectors supporting the highest proportion of those in employment include manufacturing, wholesale and retail trade, accommodation and food service activities, public administration and defence, education and human health and social work activities. Employment in agriculture, forestry and fishing is also higher when compared to the wider UK.

¹⁴⁹ Nomis. *Labour Market Profiles for Darlington and Stockton-On-Tees* (September 2022). Available at: <https://www.nomisweb.co.uk/reports/lmp/la/1946157063/report.aspx?town=Stockton>

9.5.9 In relation to the PRow in the local area, the routes identified in Table 9.1 have been identified through a desktop search:

Table 9.1 PRow within the study area

Footpaths	Bridleways
Parish of Brafferton	
Footpath No. 2 (397m)	Bridleway No. 1 (2,010m)
Footpath No. 7 (1,199m)	Bridleway No. 4 (2,183m)
Footpath No. 8 (1,857m)	Bridleway No. 11 (2,452m)
Footpath No. 9 (1,619m)	Bridleway No. 13 (1,773m)
Footpath No. 10 (1,847m)	Bridleway No. 14 (1,822m)
Footpath No. 12 (1,154m)	Bridleway No. 19 (750m)
Footpath No. 15 (1,286m)	
Footpath No. 17 (931m)	
Footpath No. 20 (545m)	
Parish of Barmpton	
Footpath No. 7 (711m)	Bridleway No. 8 (1,122m)
	Bridleway No. 9 (818m)
	Bridleway No. 13 (428m)
Parish of Great Stainton	
Footpath No. 3 (874m)	
Footpath No. 4 (1,576m)	
Footpath No. 5 (438m)	
Footpath No. 6 (1,437m)	
Footpath No. 7 (615m)	
Footpath No. 8 (877m)	
Parish of Little Stainton	
Footpath No. 1 (1,526m)	Bridleway No. 6 (855m)
Footpath No. 2 (794m)	
Footpath No. 3 (589m)	
Footpath No. 4 (614m)	
Footpath No. 5 (1,205m)	
Footpath No. 5a (407m)	

Footpaths	Bridleways
Parish of Bishopton	
Footpath No. 1 (1,581m)	Bridleway No. 5 (1,181m)
Footpath No. 2 (499m)	
Footpath No. 4 (1,098m)	
Footpath No. 3 (729m)	
Footpath No. 6 (528m)	
Footpath No. 7 (1,812m)	

- 9.5.10 There are also a number of footpaths along the potential cable route into Stockton-on-Tees within the vicinity of the settlements of Redmarshall and Carlton. When the cable route is fixed, a definitive list of PRoW potentially affected would be defined and potential impacts during construction considered. The location of these PRoW can be seen on Figure 2.9.
- 9.5.11 There are no National Cycle Network routes through the study area, but the local road network is known to be used for recreational cycling.
- 9.5.12 Wider land uses in the study area focus on the dispersed settlements with no formal allocations identified in relation to development land which may be affected by the Proposed Development. Parts of the Proposed Development are located within Darlington Borough Council's Minerals Safeguarding zones for limestone (Shallow) as identified through the Joint Minerals and Waste Plan.

Agricultural and soil resources

- 9.5.13 The land within the Site Area is provisionally mapped as undifferentiated Grade 3¹⁵⁰. Detailed survey data is available in the locality, however, there is none available for any part of the Site Area. The detailed survey data (Post 1988 Agricultural Land Classification) that is available¹⁵¹ shows a prevalence of Subgrade 3b quality land, with small amounts of Subgrade 3a and limited occurrences of Grade 2.
- 9.5.14 The mapped soil information¹⁵² shows a prevalence of the Crewe and Clifton associations across the Site Area and locality, with alluvial Hollington association soils also mapped at West Newbiggin. The Crewe association is characterised by reddish clayey and fine loamy over clayey soils which are slowly permeable and seasonally waterlogged, in Wetness Class (WC) IV. The Clifton association includes reddish fine and coarse loamy soils which are also slowly permeable and in WC IV. The Hollington association develops

¹⁵⁰ Natural England (2010), *North East Region 1:250,000 Series Agricultural Land Classification*. Available online at: <http://publications.naturalengland.org.uk/publication/142039?category=5954148537204736>

¹⁵¹ Natural England (2021), *Agricultural Land Classification (ALC) Grades - Post 1988 Survey (polygons)*. Available at: <https://www.data.gov.uk/dataset/c002ceea-d650-4408-b302-939e9b88eb0b/agricultural-land-classification-alc-grades-post-1988-survey-polygons>

¹⁵² Soil Survey of England and Wales (1984), *Soils of Northern England* (1:250,000), Sheet 1.

in river alluvium and is affected by groundwater such that profiles are in WC IV or V¹⁵³.

- 9.5.15 Detailed ALC and soil surveys are being undertaken in accordance with the established ALC guidelines and criteria for classifying the quality of agricultural land, issued by the former MAFF in 1988¹⁵⁴. Ordinarily surveys are undertaken at an observation density of one per ha, however, given the scale of the Site Area there may be scope to reduce this to one per four ha.

9.6 Potential effects and mitigation measures

- 9.6.1 The Proposed Development has the potential to generate a range of socio-economic and land use effects, many of which would be temporary and focused on the construction phase.

Construction

- 9.6.2 It is proposed that the following receptors and potential effects would be considered as part of the socio-economic and land use assessment during construction:

- temporary construction employment;
- potential supply chain opportunities during construction;
- effects on recreational resources, including ProW;
- effects on wider land uses;
- potential effects on agricultural land; and
- potential effects on the soil resources across the Site Area as a result changes in land management.

- 9.6.3 Where necessary, mitigation proposals would be developed in order to attempt to reduce the magnitude of impact on certain receptors. This could include, for example, provision of new or upgraded ProW or proposals to enable continued agriculture across the Proposed Development.

- 9.6.4 Given the potential effects on soil resources, which is anticipated to be variable with the most significant disturbance due to the installation of access tracks, substations, compounds etc. rather than the panels, it is proposed that an Outline SRMP would accompany the DCO application and support the soil resources assessment.

- 9.6.5 Parts of the Proposed Development are located within Darlington Borough Councils Minerals Safeguarding zones for limestone (Shallow). However, mineral deposits within Safeguarding Areas will not be permanently sterilised by the Proposed Development and the minerals and waste policies do not currently identify proposals for mineral extraction in the area. Following

¹⁵³ Jarvis et al (1984), *Soils and Their Use in Northern England*. Soil Survey of England and Wales Bulletin 10, Harpenden.

¹⁵⁴ Ministry of Agriculture, Fisheries and Food (1988), *Agricultural Land Classification of England and Wales - Revised guidelines and criteria for the grading of the quality of agricultural land*. Available at: <http://publications.naturalengland.org.uk/file/5526580165083136>

decommissioning of the Proposed Development, the mineral resource could be extracted, if required at that time.

Operation

- 9.6.6 Many of the impacts generated by the Proposed Development would be experienced during the construction phase and where possible, mitigation measures developed for construction effects (e.g., impacts on PRow) would be designed in such a way that they provide the permanent design solution. These measures would also seek to bring about enhancements to receptors and some of these enhancements (e.g., new sections of PRow) may be implemented post construction and therefore available into the operational phase of the Proposed Development.
- 9.6.7 All effects on agricultural land and soils are anticipated to occur during the construction phase of the Proposed Development. The Applicant is currently exploring the potential for continued agricultural uses within the solar PV module areas and these proposals will be further developed as part of future phases. Maintenance visits to the Site Area during operation would be minimal (circa 1 per month) and would involve staff accessing the Proposed Development in a SUV style vehicle. Therefore, it is proposed that operational effects on land use are scoped out of the ES.
- 9.6.8 The operational assessment would therefore focus on any employment opportunities during that phase of the Proposed Development, as well as outlining any effects where they differ from the construction phase, in addition to any changes to, or additional mitigation measures as required.

Decommissioning

- 9.6.9 It is anticipated that the potential effects of the decommissioning of the Proposed Development would be similar to those identified for construction in relation to job creation and supply chain opportunities. This phase of the Proposed Development would also revert the land to agricultural use and could alter any changes made to PRow where this brings beneficial effects. There would however be small losses in terms of operational staff.

9.7 Proposed assessment methodology

- 9.7.1 An assessment of potential effects would be undertaken to consider the potential impact of the Proposed Development against the established baseline environment.
- 9.7.2 The significance of an effect is a function of the value or 'sensitivity' of the receptor and the 'magnitude' or 'scale' of the impact. The sections below describe the proposed approach to reaching a significance conclusion and is split between socio-economic and land use effects, where there is no published guidance in relation to determining significance, and agricultural land / soil resources where significance criteria is established.

Socio-economic and land use

- 9.7.3 Given the lack of published significance criteria for the assessment of socio-economic effects, the assessment would use an industry accepted methodology and significance criteria which has been used and tested on a number of other schemes and subject to examination. Our proposed approach would include:
- an assessment of the likely scale, permanence and significance of effects associated with socio-economic receptors; and
 - an assessment of the potential cumulative effects with other schemes within the surrounding area.
- 9.7.4 In line with EIA guidance, the assessment of socio-economic and land use effects would be undertaken in line with the framework set out in Chapter 4 of this EIA Scoping Report, taking account of the value of the receptor, the magnitude of the potential effect, the timescales and the sensitivity of the receptor. Appropriate quantitative and qualitative significance criteria would be defined, based on professional judgement and accepted industry best practice.

Agricultural land and soil resources

- 9.7.5 Considering the scale of the Proposed Development, the prevalence of Grade 3/Subgrade 3b quality land in the vicinity and the slowly permeable mapped soil types, it is anticipated that the presence of BMV quality agricultural land will be limited. It is suggested that an observation density of one per four ha is adopted in general, but that if any BMV quality land is identified, or suspected, then the density will be increased to one per ha in the applicable location.
- 9.7.6 The survey methodology would otherwise follow the well-established guidelines and criteria for classifying the quality of agricultural land¹⁵⁴. The data collection would first involve an interpretation of published geological, topographical, soil and agro-climatic information, followed by the site surveys examining soil profiles using hand-held augers and spades at the agreed observation density.
- 9.7.7 The following characteristics would be assessed for each soil horizon up to a maximum depth of 120cm or any impenetrable layer:
- soil texture;
 - stone content;
 - soil colour (including local gley and mottle colours);
 - consistency;
 - structural condition;
 - free carbonate; and

- depth.

- 9.7.8 Topsoil samples will be submitted for laboratory analysis of particle size distribution, pH, organic matter content and nutrient content.
- 9.7.9 The soil characteristics will then be described and analysed in terms of the MAFF guidelines to establish the grade of agricultural land within the site.
- 9.7.10 The assessment methodology is based on determining the sensitivity and magnitude of change on the relevant receptors of agricultural land and soil resources. Table 9.2 presents the sensitivity of the agricultural land and soil receptors.

Table 9.2 Criteria for determining sensitivity

Sensitivity	Agricultural Land	Soil Resources
High	Grade 1	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams)
Medium	Grade 2 and Subgrade 3a	Silty loams, medium silty clay loams, medium clay loams and sandy clay loams
Low	Subgrade 3b and Grade 4	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams)
Negligible	Grade 5	N/A

- 9.7.11 The magnitude of change is determined using the criteria outlined in Table 9.3.

Table 9.3 Criteria for determining magnitude of change

Magnitude	Agricultural Land	Soil Resources
High	Development would directly lead to the loss of over 50ha of agricultural land	The soil displaced from development is unable to fulfil one or more of the primary soils functions
Medium	Development would directly lead to the loss of between 20ha and 50ha of agricultural land	The soil displaced from development mostly fulfils the primary soil functions off-site or has a reduced capacity to fulfil the primary functions on site
Low	Development would directly lead to the loss of between 5ha and 20ha of agricultural land	The soil displaced from development mostly fulfils the primary soil functions on-site

Magnitude	Agricultural Land	Soil Resources
Negligible	Development would directly lead to the loss of less than 5ha of agricultural land	The soil retains its existing functions on-site

9.7.12 The overall significance of effect is then determined according to the standard significance criteria as set in Chapter 4, Table 4.4.

9.8 Summary

9.8.1 Having considered the potential effects that may arise as a result of the Proposed Development, it is proposed that the following socio-economic and land use receptors are scoped into the assessment:

- local economy – employment and supply chain opportunities during construction, operation and decommissioning;
- land use - land uses potentially affected by the Proposed Development such as recreational or community facilities, PRoW and development land; and
- agricultural land and soil resources receptors during construction and operational phases.

9.8.2 The following topics are proposed to be scoped out of the assessment with further explanation provided in Table 9.4:

- agricultural holdings / farm businesses – the landowners involved in the Proposed Development have signed up by voluntary agreement and have therefore considered the potential effects on the overall viability of the farm holdings; and
- minerals safeguarding – potential effects in relation to sterilisation of mineral resources.

Table 9.4 Summary of Land use assessment scope

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Socio-economic and land use				
Employment and supply chain effects	Scoped in	Scoped in	Scoped in	The construction of the Proposed Development will generate employment and supply chain opportunities, as well as opportunities for training and skills development.
All other potential socio-economic effects related to the local population	Scoped out	Scoped out	Scoped out	Potential effects on the local population would focus on employment opportunities. Indirect effects such as visual amenity and other amenity impacts would be dealt with by other assessment chapters and mitigated through management plans and therefore it is not necessary to consider such amenity effects as part of this assessment.
Land use - Potential effects on land uses including PRow, recreational receptors, community facilities and development land	Scoped in.	Scoped in.	Scoped in.	The construction and operation of the Proposed Development has the potential to bring direct and indirect effects on these land use receptors. This will consider access and use of recreational resources and open space.

Assessment scope				
Aspect	Construction	Operation	Decommissioning	Rationale for scoping sub-topics in or out
Minerals	Scoped out	Scoped out	Scoped out	The mineral resource identified would not be permanently sterilised by the Proposed Development and could be extracted, if required once the Proposed Development has been decommissioned.
Agricultural and soil resources				
Agricultural Land	Loss of agricultural land - Scoped in Wider impact on farm holdings – Scoped out	Scoped out	Scoped in	There is a potential for BMV quality agricultural land to be present across the Site Area. The scale of the Proposed Development is likely to result in the temporary loss of agricultural land. Farm holdings that form part of the Proposed Development have signed up by voluntary negotiation and therefore have considered the potential impacts on the holding as a whole.
Soil resources	Scoped in	Scoped out	Scoped in	The soil resources at the Site Area are anticipated to be of medium and/or high sensitivity: the specific textures will determine the significance of the effect.

10 Cumulative effects assessment

10.1 Introduction

10.1.1 This chapter outlines the proposed methodology for the assessment of cumulative and in-combination effects arising from the construction and operation of the Proposed Development.

10.1.2 Cumulative effects are the result of multiple actions on environmental receptors or resources over time and are generally additive or interactive (synergistic) in nature. Two categories of cumulative effects are typically considered within the cumulative effects chapter of an ES:

- **In-combination effects** from the interrelationship between different environmental effects of the Proposed Development (intra-project); and
- **Cumulative effects** from the interrelationship between different projects along with the Proposed Development (inter-project).

10.1.3 In-combination effects, or intra-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by noise and dust effects resulting from the construction phase activities of a single development.

10.1.4 Cumulative effects, or inter-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development (using the same geographical area at the same time) may result in significant cumulative effects on the surrounding highway network.

10.2 Legislation, Policy and Guidance

Legislation

10.2.1 The information required for an ES, in relation to the assessment of cumulative effects, is set out in Schedule 4 paragraph 5 of the EIA Regulations and requires:

10.2.2 “A description of the likely significant effects of the development on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources”.

Policy

10.2.3 The requirement to consider cumulative effects is outlined in national planning policy.

10.2.4 NPS EN-1¹⁵⁵ paragraph 4.2.5 states that:

“When considering cumulative effects, the ES should provide information on how the effects of the applicant’s proposal would combine and interact with the effects of other development (including projects for which consent has been sought or granted, as well as those already in existence)”

10.2.5 Draft NPS EN-3¹⁵⁶ paragraph 2.23.3 states that:

“All assessment of environmental effects of cabling infrastructure and any proposed offshore or onshore substations should assess effects both alone and cumulatively with other existing and proposed infrastructure”

10.2.6 Draft NPS EN-3 paragraph 2.48.12 states that: “consideration should be given to the cumulative impacts of situating a solar farm in proximity to other energy generating stations and infrastructure.”

Guidance

10.2.7 There is currently no standard methodology for a Cumulative Effects Assessment (CEA), however, there is a range of public sector and industry-led guidance available.

10.2.8 The assessment will be consistent with PINS Advice Note Seventeen¹⁵⁷ which provides advice regarding a staged approach for documenting the CEA within an ES, relevant to NSIPs. The Advice Note highlights the need to consider the potential for cumulative effects arising due to the interactions between different components of the development, as well as with other existing development and/or approved development.

10.3 Proposed methodology

10.3.1 This section is split into two parts, as outlined in Section 11.1:

- **In-combination effects assessment:** comprising an assessment of the combined effects resulting from a number of different effects from the Proposed Development upon a single resource/receptor; and
- **Cumulative effects assessment:** comprising an assessment of cumulative effects of a number of different projects within the vicinity, in combination with the environmental impact of the Proposed Development on a range of different resources/receptors.

In-combination effects assessment

10.3.2 PINS Advice Note Seventeen notes that the assessment of interrelationships between environmental topics of a proposed NSIP, such as between ecology and hydrology, are typically assessed as part of the specialist environmental

¹⁵⁵ Department of Energy and Climate Change (DECC) (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Date Accessed: 26/09/2022].

¹⁵⁶ Department for Business, Energy & Industrial Strategy (2021). *Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

¹⁵⁷ PINS (2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/>

chapters of an ES. In accordance with this guidance, in-combination effects will be considered within each environmental topic’s chapter of the ES and will not form part of the scope within the Cumulative Effects Assessment chapter.

Cumulative effects assessment

- 10.3.3 PINS Advice Note Seventeen provides a systematic approach to CEA which can be split into four distinct phases (see Table 10.1), which will be applied in the development of the ES.
- 10.3.4 Paragraph 2.5 of the Advice Note notes that the recommended process focuses cumulative effects with ‘other existing development and/or approved development’. This assessment will be iterative and may need to be repeated a number of times during the preparation of a DCO application.

Table 10.1 Stages of Cumulative Assessment


CEA Stage	Key Activities
Stage 1: Establish the Zone of Influence (Zol) and establish the long list of ‘other existing development and/or approved development’	<ul style="list-style-type: none"> • identify the Zol (study area) for each environmental aspect considered within the ES; • identify a long list of other developments in the vicinity of the Proposed Development which may have cumulative effects in consultation with the relevant local authority; and • undertake desktop review of available environmental information for identified cumulative developments.
Stage 2: Establish the short list of ‘other existing development and/or approved development’	<ul style="list-style-type: none"> • identify which of the identified other developments from Stage 1 has the potential to give rise to significant cumulative effects by virtue of overlaps in temporal scope, due to the scale and nature of the other development/receiving environment; or any other relevant factors.
Stage 3: Information gathering	<ul style="list-style-type: none"> • information relating to each of the other developments is gathered and reviewed.
Stage 4: Assessment	<ul style="list-style-type: none"> • an assessment of the cumulative effects is undertaken. Each individual other development is reviewed in turn to identify whether there is potential for significant cumulative effects; and • mitigation measures are identified.

10.4 Establishing the long list of ‘other developments’

- 10.4.1 The PINS Advice Note Seventeen recommends that a wide range of future projects is included within the CEA which can be tiered (from Tier 1 – 3)

according to how far advanced the development is within the planning system and to the level of detail that is likely to be available for each tier (see Table 10.2).

Table 10.2 Project tiering for the purpose of CEA

CEA Tier	Description	
Tier 1	<ul style="list-style-type: none"> • projects under construction; • permitted application(s) but not yet implemented; and • submitted application(s) but not yet determined. 	Decreasing level of detail likely to be available 
Tier 2	<ul style="list-style-type: none"> • projects on the PINS Programme of Projects where an EIA Scoping Report has been submitted • projects on the PINS Programme of Projects where an EIA Scoping Report has not been submitted; 	
Tier 3	<ul style="list-style-type: none"> • identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals; and • identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward. 	

10.4.2 The less information that is available for the future projects (for example environmental effects predicted and project definition), the less likely that the CEA will be able to make any robust assessment in relation to these projects. Reasonable steps will be taken to review publicly available information when conducting the CEA.

10.4.3 For the Proposed Development, relevant other existing development and/or approved developments’ will be identified through a desk-based review of published sources on relevant planning authority websites. Searches will be conducted online, using the websites of the relevant local planning authorities and the PINS website.

10.5 Proposed consultation

10.5.1 Relevant statutory consultation bodies, and particularly the local planning authorities will be consulted on the shortlisted ‘other existing development and/or approved developments’ proposed to be included in the CEA during the pre-application stage.

10.5.2 This will provide an opportunity to identify and discuss issues and should also assist with identifying a robust suite of mitigation measures that might otherwise remain unresolved and require exploration during examination. Details of any identified mitigation measures will be submitted with the

application for development consent. The process may need to be repeated during the pre-application stage and will be based on the most up to date list of developments available. The CEA will also include a summary of any consultation undertaken and evidence of any agreements reached.

11 Topics scoped out

11.1 Introduction

- 11.1.1 This Chapter outlines environmental topics which we propose to scope out of the ES. A summary of the scope of the ES is provided in Table 1.1 of Chapter 1.
- 11.1.2 However, some of the topics below would inform wider assessment chapters and outputs are likely to form appendices to the ES or standalone supporting documents. Where this is the case, the supporting information is made clear below and summarised in Chapter 12.

11.2 Air quality

Introduction

- 11.2.1 This section of the EIA Scoping Report describes the baseline conditions for the Site Area relating to air quality and sets out the potential impacts that could occur during both construction, operation and decommissioning. It then gives a description of the measures that will be included in the Proposed Development design to mitigate or minimise these impacts.
- 11.2.2 Air quality emissions from the Proposed Development are likely to be restricted to the construction and decommissioning phases, with limited emissions anticipated during the operational phase due to the low number of anticipated vehicle movements and the nature of the Proposed Development.
- 11.2.3 The proposed method of assessment for identifying likely significant environmental effects from air quality associated with construction, operation and decommissioning phases of the Proposed Development is described in this section of the EIA Scoping Report.
- 11.2.4 An Outline EMP and Framework DEMP will accompany the DCO application, which will include construction and decommissioning dust mitigation measures and follow the best practice measures set out in the Institute of Air Quality Management (IAQM) guidance¹⁵⁸. Operational traffic changes will not likely exceed the Environment Protection UK (EPUK)/IAQM criteria¹⁵⁹. Mitigation measures including travel planning and HGV management during the construction stage will be incorporated into an Outline CTMP.
- 11.2.5 In addition, the principles agreed to minimise disruption during construction will be reviewed and applied during decommissioning. These measures will be outlined in the Framework DEMP, which will accompany the DCO application, and will be carried forward to a detailed DEMP. The detailed DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.

¹⁵⁸ IAQM (2014) *Guidance on the Assessment of Dust from Demolition and Construction* (Version 1.1). Available at: <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

¹⁵⁹ EPUK/IAQM. (2017) *Land Use Planning and Development Control: Planning for Air Quality*. Available at: <https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

11.2.6 Due to the proposed implementation of mitigation and with development traffic flows anticipated to be below relevant screening criteria, air quality is scoped out of the assessment.

11.2.7 For further information on traffic flows, see Section 11.10 Traffic and transport.

Relevant legislation, policy and guidance

11.2.8 The scoping review has considered the following appropriate policy, legislation and guidance for air quality:

- Environment Act 2021¹⁶⁰;
- Air Quality (Amendment of Domestic Regulation) (EU Exit) Regulations 2019¹⁶¹;
- Climate Change Act 2008 (2050 target amendments) Order 2019¹⁶²;
- Overarching NPS for Energy (EN-1): Section 5.2 (Air Quality and Emissions)¹⁶³;
- NPS for Renewable Energy Infrastructure (EN-3)¹⁶⁴, (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses;
- NPPF 2021¹⁶⁵;
- Defra's LAQM.PG(22)¹⁶⁶ and TG(22)¹⁶⁷;
- EPUK/IAQM's Land Use Planning and Development Control: Planning for Air Quality; and
- IAQM's Guidance on the Assessment of Dust from Demolition and Construction;
- Durham County Plan¹⁶⁸, Policy 31 Amenity and Pollution; and
- Stockton-on-Tees Borough Council Local Plan, Policy ENV7: Ground, Air, Water, Noise and Light Pollution¹⁶⁹

Baseline conditions

11.2.9 The following sources for baseline data have been used:

¹⁶⁰ HMSO (2021). *Environment Act 2021*. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

¹⁶¹ HMSO (2019). *The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019*. Available at: <https://www.legislation.gov.uk/uksi/2019/74/made>

¹⁶² HMSO (2019). *The Climate Change Act 2008 (2050 Target Amendment) Order 2019*. Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111187654>

¹⁶³ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹⁶⁴ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

¹⁶⁵ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

¹⁶⁶ Defra (2022). *Local Air Quality Management Policy Guidance (PG22)*. Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-Policy-Guidance-2022.pdf>

¹⁶⁷ Defra (2022) *Local Air Quality Management Technical Guidance (TG22)*. Available at: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1_0.pdf

¹⁶⁸ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹⁶⁹ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

- LPA assessment reports (as detailed below);
- Defra Local Air Quality Management website ¹⁷⁰;
- Defra UK Air Quality Limits: National air quality objectives website¹⁷¹ and
- EA website ¹⁷².

11.2.10 The Site Area is not located within an Air Quality Management Area (AQMA), which infers that the Proposed Development is located in an area where National air quality objectives are being met and concentrations of pollutants such as, nitrogen dioxide (NO₂) or fine particulate matter (PM₁₀), are not exceeding their annual mean air quality objective.

11.2.11 The nearest AQMA to the Proposed Development is in Durham, approximately 20km to the south of the Site Area, and it has been declared for exceedances of the annual NO₂ air quality objective (AQO).

11.2.12 Darlington Borough Council's Local Air Quality Management (LAQM) Annual Status Report (2021)¹⁷³ reports the air quality monitoring results for measured pollutants (NO₂, PM₁₀ and PM_{2.5}). Sulphur Dioxide is no longer monitored by Darlington Borough Council due to absence of industrial sources. There have been no exceedances of the annual mean objective (40µg/m³) or 1 hour mean for NO₂ at any monitoring location. No exceedances of the annual mean or daily mean objective in areas of relevant public exposure for PM₁₀, although variations at St Cuthbert's Way due to weather conditions. Levels of PM_{2.5}, although varied, are generally declining. The annual mean for St. Cuthbert's has declined from 20.4 µg/m³ (2011) to 16.0 µg/m³ (2014). However, monitored levels at Middlesbrough and Stockton AURN sites range between 10.1 µg/m³ and 13.1 µg/m³ (2011-2014) and 7.5 µg/m³ and 10.7 µg/m³ (2015-2022).

11.2.13 Similarly, the Stockton-on-Tees LAQM Annual Status Report (2021)¹⁷⁴ states that there were no exceedances of NO₂ over the annual mean objective at any monitoring location across the borough.

Defra Predicted Concentrations

11.2.14 Background concentrations for the Site Area have been obtained from the national maps published by Defra. These estimated concentrations are produced on a 1km by 1km grid basis for the whole of the UK. The Site Area falls into multiple grid squares and grid square X 435500 Y 521500 has been used as it covers most of the Site Area. Predicted concentrations for this grid square for NO₂, PM₁₀ and PM_{2.5} for 2022 are provided in Table 11.1.

¹⁷⁰ Defra. *Local Air Quality Management*. Available at: <https://laqm.defra.gov.uk/>

¹⁷¹ Defra (2022). *UK Air Quality Limits: National air quality objectives*. Available at: https://uk-air.defra.gov.uk/assets/documents/Air_Quality_Objectives_Update.pdf

¹⁷² Environment Agency. *Environmental Permitting Regulations – Installation*. Available at: <https://environment.data.gov.uk/public-register/view/search-industrial-installations>

¹⁷³ Darlington Borough Council (2021). *2021 Air Quality Annual Status Report*. Available at: <https://www.darlington.gov.uk/media/14359/darlington-asr-2021.pdf>

¹⁷⁴ Stockton-on-Tees Borough Council (2021). *Stockton-on-Tees LAQM Annual Status Report*

Table 11.1 Estimated Annual Mean Background Concentrations in 2022 in $\mu\text{g}/\text{m}^3$

Background		
NO ₂	PM ₁₀	PM _{2.5}
6.2	10.7	6.3

11.2.15 Based on the results outlined in Table 11.1, the modelled background concentrations for the Site Area are below the relevant annual mean objective levels for NO₂, PM₁₀ (40 $\mu\text{g}/\text{m}^3$) and PM_{2.5} (25 $\mu\text{g}/\text{m}^3$).

Potential for effects and mitigation measures

Construction

Potential effects

11.2.16 The potential effects of the Proposed Development on local air quality during construction are:

- construction dust both from construction activities, including the potential for dust generating activities, and exhaust emissions from Non-Road Mobile Machinery (NRMM) associated with the construction phase; and
- construction traffic emissions.

Construction dust and exhaust emissions

11.2.17 There is likely to be construction and potential dust generating activities, and exhaust emissions from NRMM associated with the construction of the Proposed Development.

Mitigation

11.2.18 An Outline EMP will be produced as part of the DCO application, which will include construction dust assessment and mitigation measures and follow the best practice measures set out in the IAQM guidance. As outlined in Chapter 2, these measures, commitments and actions will be carried forward to a CEMP which will be produced by appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

11.2.19 With the implementation of recommended mitigation measures to sensitive receptors through the CEMP, the effects of construction dust and exhaust emissions from NRMM would be negligible, and any significant adverse effects would be avoided, resulting in no residual effects. Example measures could include:

- pan site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable;

- ensuring all vehicles switch off engines when stationary – no idling vehicles; and
- avoiding the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.

11.2.20 Therefore, through the application of the CEMP, no significant air quality impacts from dust generating activities and exhaust emissions are anticipated, and it is proposed that the assessment of dust generation and exhaust emissions from the construction of the Proposed Development is scoped out.

Construction traffic emissions

11.2.21 The predicted construction traffic generated by the proposed development has been compared to the screening criteria detailed in the EPUK/IAQM planning guidance. The guidance states that the indicative criteria for requiring an air quality assessment in an area without AQMAs includes:

- “A change of LDV [*Light Duty Vehicles*] flows of: more than 500 AADT [*Annual Average Daily Traffic*] elsewhere”; and
- “a change of HDV [*Heavy Duty Vehicle*] flows of: more than 100 AADT elsewhere”.

11.2.22 The traffic flows from construction are predicted to be well below 500 LDV or 100 HGV movements per day on an annual (and peak) basis. Therefore, construction traffic emissions are scoped out of the assessment. For further information, see paragraphs 11.11.13 to 11.11.18 in the Traffic and Transport section.

11.2.23 The predicted construction traffic is anticipated to be below the criteria and are not expected to affect air quality. On this basis, it proposed that the assessment of effects on air quality from construction traffic is scoped out of the ES.

Mitigation

11.2.24 Mitigation measures including travel planning and HGV management during the construction stage will be incorporated into an Outline CTMP.

Operation

Potential effects

11.2.25 There is a low likelihood of emissions resulting from the operational phase of the Proposed Development, which are unlikely to give rise to significant air quality effects.

11.2.26 It is anticipated that the vehicle trips associated with management and maintenance will be low and below the EPUK screening thresholds. Therefore, air quality is scoped out of the assessment.

Mitigation

11.2.27 No mitigation is required as no likely significant effects are anticipated from operation.

Decommissioning

Potential effects

11.2.28 The decommissioning phase of the Proposed Development will comprise activities similar to the construction phase and are not expected to result in any greater effects on air quality.

11.2.29 The potential limited effects of the Proposed Development on local air quality during decommissioning are associated with dust and traffic associated with movement of materials. Decommissioning is likely to give rise to the same level of trip forecast as the construction phase.

Mitigation

11.2.30 Vehicle access and traffic management to minimise disruption, and dust mitigation will be included in the Framework DEMP. These measures will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.

Summary

11.2.31 Based on the nature of the construction, operation and decommissioning of the Proposed Development, it is anticipated that there would be limited impacts on air quality during the construction and operation of the Proposed Development. Any potential effects and mitigation will be covered elsewhere in the ES and in supporting documentation, such as the Outline EMP.

11.2.32 Therefore, a separate Air Quality ES chapter is not considered to be required.

11.2.33 Table 11.2 summarises each of the air quality aspects and whether they should be scoped in or scoped out of the assessment in relation to the construction, operation and decommissioning phases of the Proposed Development.

Table 11.2 Summary of Air quality assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Construction dust and exhaust emissions	Scoped out	Scoped out	Scoped out	Construction dust assessment will inform mitigation in the Outline EMP, reducing impact to not significant
Road emissions	Scoped out	Scoped out	Scoped out	It is not expected that construction traffic flows will exceed the screening criterion for either sensitive human or ecological receptors

11.3 Arboriculture

Introduction

- 11.3.1 This section of the EIA Scoping Report describes the baseline condition of trees, woodlands and hedges on or within influencing¹⁷⁵ distance of the Proposed Development and sets out the potential impacts that could occur during construction, operation and decommissioning. It then gives a description of the measures that will be included in the Proposed Development design to mitigate or minimise these impacts.
- 11.3.2 An Arboricultural Impact Assessment (AIA) will accompany the DCO application that will set out the impacts on trees, woodlands and hedges and set out the protection measures to be implemented during the construction phase, including activity supervision by a suitably qualified arboriculturist where appropriate. The effects of the Proposed Development on the landscape value and the habitat value of trees, woodland and hedges will be discussed within the landscape and visual and biodiversity chapters, respectively, of the ES.
- 11.3.3 As such, it is considered that the AIA and Arboricultural Method Statement (AMS), in conjunction with the landscape and visual and biodiversity ES Chapters, Outline EMP, LEMP and Framework DEMP, will sufficiently mitigate any significant effects. Therefore, a chapter on the arboricultural impacts of construction, operation and decommissioning within the ES is not considered to be required.

Relevant legislation, policy and guidance

- 11.3.4 The scoping review has considered the following appropriate policy, legislation and guidance for arboriculture:
- Overarching NPS for Energy (EN-1): Paragraph 5.3.15 (Ancient Woodland and Veteran Trees)¹⁷⁶;
 - NPPF 2021¹⁷⁷;
 - County Durham Plan, Policy 40: Trees, Woodlands and Hedges¹⁷⁸;
 - Planning Policy Guidance, Tree Preservation Orders and trees in conservation areas¹⁷⁹;
 - British Standard (BS) 5837:2012 Trees in Relation to Design, Demolition and Construction; and

¹⁷⁵ 'Influencing distance' signifies trees that overhang the site or are located beyond the site boundaries within a distance of up to 12 times their estimated stem diameter, as per BS5837: 2012 (see footnote 3).

¹⁷⁶ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹⁷⁷ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

¹⁷⁸ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

¹⁷⁹ Department for Levelling Up, Housing and Communities (2014). *Tree Preservation Orders and trees in conservation areas*. Available at: <https://www.gov.uk/guidance/tree-preservation-orders-and-trees-in-conservation-areas>

- Natural England and Forestry Commission, Ancient woodland, ancient trees and veteran trees: advice for making planning decisions¹⁸⁰.

Baseline conditions

- 11.3.5 The baseline conditions have been derived from a survey of trees, woodlands and hedges within the Site Area and within influencing distance¹⁸¹ of it, the majority of which was carried out in in April 2022, with completion scheduled for October 2022. The survey is being undertaken in accordance with BS 5837: 2012 Trees in Relation to Design, Demolition and Construction¹⁸² and represents our understanding of the baseline at the time of writing.
- 11.3.6 The Proposed Development is located within an area of agricultural land that is used for livestock grazing and arable farming. As is typical of agricultural fields, trees are located around the field boundaries either singly, within hedges or within woodland blocks. The tree population is broadly similar across the Site Area.

Individual Trees

- 11.3.7 Individual, open-grown trees are mostly located within hedges, and are early mature or mature. There are relatively few young or semi-mature trees. Species are predominantly ash (*Fraxinus excelsior*), occasional specimens of oak (*Quercus robur*), sycamore (*Acer pseudoplatanus*), crack willow (*Salix fragilis*), and rare specimens of other native and exotic species. Many of the trees, particularly in the more exposed upland parts of the Site Area, have suffered significant recent and historic storm damage and, in the non-arable fields, livestock damage. This has deteriorated the condition and commensurately the life expectancy of some trees, but has also created veteran features (e.g., rot holes, deadwood) of habitat value. However, few trees are true veterans in the sense defined by current guidance¹⁸³.
- 11.3.8 Ash dieback is present within the Site Area and surrounding countryside, but is not particularly widespread, and where observed currently seems to be in the early stages; however, the disease progression can change quite rapidly, and it can be anticipated that a proportion of the surveyed ash trees will succumb to the disease and eventually need to be removed.

Ancient and Veteran Trees

- 11.3.9 There are rare occurrences of veteran trees that have a stem girth that falls within the threshold for true veteran status and have three or more key veteran features as defined by the current guidance¹⁸⁴. They are predominantly ash, with rare willow (*Salix* sp.) and oak. There are no ancient trees within the Site Area.

¹⁸⁰ Natural England and Forestry Commission (2022). *Ancient woodland, ancient trees and veteran trees: advice for making planning decisions*. Available at <https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions>

¹⁸¹ Ibid.

¹⁸² British Standards Institute. (2012). *BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations*. London: BSI.

¹⁸³ Lonsdale D. (ed.). 2013. *Ancient and other veteran trees: further guidance on management*. The Tree Council: London.

¹⁸⁴ Ibid.

11.3.10 Veteran and ancient trees have a special protected status the Overarching NPS for Energy (EN-1)¹⁸⁵, and removal of these trees to facilitate development requires strong justification. Further, the recommended extent of protection in terms of distance from development activities is greater than that for non-ancient and veteran trees (a buffer zone of 15 times the stem diameter rather than a root protection area of 12 times, or 5 metres from the edge of the tree's canopy, whichever is greater¹⁸⁶). A number of candidate veterans were also identified, meaning trees that are becoming veteran but have not achieved this status yet according to the definition used.

Woodlands

11.3.11 In the central portion of the Site Area, south-west of Great Stainton (Site C Byers Gill Wood), there are three areas of plantation broadleaf woodland (Square Wood, Galloping Hill Plantation and Nova Scotia Plantation) and a sinuous area of natural broadleaf woodland growing on the slopes of Byers Gill (Byers Gill Wood). To the east of Bishopton Beck there is a thin strip of remnant woodland that comprises early mature ash and wild cherry (*Prunus avium*), with an understory of predominantly hawthorn and hazel (*Corylus avellana*) and occasional plantings of exotic specimens. All woodland areas are located outside of the Site Area, but edge trees extend into the peripheries of the Site Area both aboveground (crowns) and belowground (roots) and have therefore been surveyed as being within influencing distance of the Site Area.

11.3.12 The plantation woodlands are a mixture of semi- and early mature broadleaves of ash and oak, with occasional other broadleaved natives and hawthorn (*Crataegus monogyna*) as the main understory species. All of these areas of woodland are Deciduous Woodland Priority Habitat, designated under section 41 of the Natural Environment and Rural Communities Act (2006) as habitats of principal importance (HPIs).

11.3.13 There are no ancient woodlands on or adjacent to the Site Area¹⁸⁷.

Hedges

11.3.14 Field boundary hedges are predominantly either single-species or dual-species mix of hawthorn (*Crataegus monogyna*) and blackthorn (*Prunus spinosa*) typical of post-Enclosure field systems, with occasional hedges of greater diversity in terms of species. Hedges are mostly early mature or mature, and differ significantly in condition. Some have been largely unmanaged and have grown tall and dense, others have been periodically trimmed but are intact and thick, others have been neglected and allowed to grow but then aggressively pruned and have declined as a result due to lack of growth from mature wood and livestock browsing.

11.3.15 The better condition hedges are of moderate quality and have some habitat and landscape value; the poorer condition hedges are of low quality and have

¹⁸⁵ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹⁸⁶ Natural England and Forestry Commission. 2022. *Ancient woodland, ancient trees and veteran trees: advice for making planning decisions*. Available at <https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions>

¹⁸⁷ Defra (2022). *Magic Map Application*. Available at: <https://magic.defra.gov.uk/>

lower habitat or landscape value. None of the hedges have been assessed as Important under the Hedgerow Regulations 1997¹⁸⁸ (see section 6.5.9 and 5.5.10).

Potential for effects and mitigation measures

Construction

Potential Effects

- 11.3.16 Most of the trees (including ancient and veteran trees), woodlands and hedges are located around the field edges, and the design of the solar PV module arrangements will by necessity include generous offsets to avoid shading of the solar PV modules from sunlight; therefore, it is likely that very few trees would need to be removed to facilitate construction. Small numbers of trees, either individual or in woodland edges, and sections of hedges may need to be removed to facilitate the construction of access tracks and the installation of cables and ancillary equipment.
- 11.3.17 Encroachment into the Root Protection Areas (RPAs) of trees and hedges that can be retained may be required for construction access, security fence installation, and cable and ancillary equipment installation. Such encroachment may comprise localised excavation, soil stripping, and the passage of heavy plant and machinery. If not appropriately mitigated, these activities carry a risk of root damage either directly through severance or crushing, or indirectly through soil compaction. Root damage and soil compaction can impair the physiological condition and structural stability of trees. Encroachment into the RPAs of ancient and veteran trees will be avoided.
- 11.3.18 There is a risk of tree crown conflicts with high-sided vehicles and other plant and materials on access routes during construction, and also conflicts with the solar PV modules and their housing where tree crowns hang low over the solar PV modules.
- 11.3.19 There is a risk of accidental impact damage to retained trees and hedges from vehicles, plant and machinery, particularly where construction access tracks pass close to trees.

Mitigation

- 11.3.20 The need to remove higher quality trees or sections of hedges or woodland (i.e., those assigned a BS5837 category of A or B) will be minimised by the placement of solar PV modules to avoid trees, woodlands and hedges. The design of the cable route and ancillary equipment can be altered locally where there is the flexibility to do so.
- 11.3.21 The risk of tree and hedge root damage and soil compaction from construction and from the access tracks in particular will be minimised by using ground protection where access tracks cross RPAs, either permanent (e.g., a buildup

¹⁸⁸ HMSO (1997) *The Hedgerows Regulations 1997*. Available at: <https://www.legislation.gov.uk/uksi/1997/1160/made>

comprising a cellular confinement system infilled with angular gravel laid at existing grade) or temporary (e.g., steel trackway).

- 11.3.22 The risk of tree and hedge root damage from the installation of underground structures (e.g., cables, equipment, fenceposts) will be minimised by designing cable routes and locating equipment to avoid RPAs, and by the use of alternative construction techniques such as directional drill installation or similar where re-routing or redesign is not feasible. Minor incursions into the peripheries of RPAs may be acceptable without mitigation where trees and hedges are in good physiological condition and have undisturbed rooting opportunities elsewhere. The risk of damage to ancient and veteran trees will be minimised by setting a buffer additional to the RPA in which construction activity will be excluded, as per the Natural England Standing Advice¹⁸⁹.
- 11.3.23 The risk of tree crown and hedge conflicts will be minimised by minor access facilitation pruning (e.g., crown raising, removal of low hanging branches, hedge trimming), completed prior to the arrival of vehicles, plant and machinery on site. This would have a minimal effect on the health, longevity or appearance of trees, woodlands and hedges.
- 11.3.24 Accidental damage to trees, woodlands and hedges will be mitigated by the installation of tree protection fencing and other forms of tree protection (e.g., stem crates, ground protection), installed to the specifications recommended in BS5837:2012 prior to the commencement of construction, and the maintenance of this protection for the duration of construction. In places, it may be appropriate for security fencing to act as the tree protection fencing, provided that all construction activities will take place inside of the fencing and the fencing installation will be the first activity on site, before the arrival of any vehicles, plant or machinery.
- 11.3.25 All mitigation and tree, woodland and hedge protection measures will be specified in an AIA that will support the DCO application. Details of measures to be applied during construction to avoid tree, woodland and hedge damage will be specified in an AMS and provisions will be set out in the Outline EMP, which will guide all phases of construction, with key activities where the risk of tree damage is elevated supervised by a suitably qualified arboriculturist. These provisions will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

Operation

Potential Effects

- 11.3.26 There is a risk of root damage and harm to the physiological functioning of trees (including ancient and veteran trees), woodlands and hedges from soil compaction along the permanent access routes, where these run across the rooting areas of trees.

¹⁸⁹ Natural England and Forestry Commission (2022). *Ancient woodland, ancient trees and veteran trees: advice for making planning decisions*. Available at <https://www.gov.uk/guidance/ancient-woodland-ancient-trees-and-veteran-trees-advice-for-making-planning-decisions>

- 11.3.27 There is a risk of crown conflicts of trees and hedges with maintenance vehicles where permanent access tracks pass close to trees and hedges.
- 11.3.28 There is a low risk of solar PV modules being shaded out as trees grow; the risk is low because the solar PV modules have been positioned with a generous offset from existing trees.
- 11.3.29 There is a risk of falling trees or parts thereof striking the solar PV modules or equipment. There will therefore be a requirement for access through the Site Area to reach trees, hedges and woodlands to carry out routine maintenance (e.g., the removal of dead or dying trees, particularly in the context of ash dieback disease, clearing up storm damage and hedge trimming). Such access would need to be sufficient to allow the passage of arboricultural plant and machinery.
- 11.3.30 There is a low risk of changes in hydrology due to altered infiltration from the presence of hardstanding, the solar PV modules and other infrastructure and soil compaction that could affect the movement of soil water into the rooting zones of trees and therefore their ability to secure sufficient water; however, these changes are difficult to assess or quantify.

Mitigation

- 11.3.31 Soil compaction along permanent access routes within RPAs will be mitigated by a construction design that avoids compaction.
- 11.3.32 The risk of crown conflicts will be mitigated by facilitation pruning throughout operation to ensure that sufficient clearance is available for the type of maintenance vehicles that will service the equipment.
- 11.3.33 The issue of shade to solar PV modules will largely be designed out by allowing suitable offsets between solar PV modules and trees, as most of the peripheral trees are at or near their maximum crown size.
- 11.3.34 The requirement for access to trees, woodlands and hedges for maintenance will be achieved by designing maintenance access routes to ensure that the majority of trees, hedges and woodland edges remain accessible. In practice, it is likely that the access tracks would adequately serve this purpose. The risk of falling trees or parts thereof damaging the equipment will be reduced by undertaking proactive cyclical tree inspections and mitigating tree works (e.g., tree removal or pruning) where the risk is elevated to an unacceptable level.
- 11.3.35 Changes in available soil water for trees due to changes in hydrology will be mitigated by design, for example, by the use of permeable access tracks and vegetation to reduce soil compaction, and by the use of Sustainable Drainage Systems (SuDS) techniques to increase infiltration (see the Hydrology chapter at Section 11.8 for details).

Decommissioning

Potential effects

- 11.3.36 No additional trees or hedges above those removed for construction would need to be removed to facilitate decommissioning, as the existing operation access tracks would be used to remove equipment from the Site Area, and the decommissioning would operate within the construction footprint.
- 11.3.37 Encroachment into the RPAs of retained trees and hedges may be required for decommissioning access, including security fence removal, and cable and ancillary equipment removal. Such encroachment may comprise localised excavation and the passage of heavy plant and machinery. If not appropriately mitigated, these activities carry a risk of root damage either directly through severance or crushing, or indirectly through soil compaction. Root damage and soil compaction can impair the physiological condition and structural stability of trees. Encroachment into the RPAs of ancient and veteran trees will be avoided as equipment will not have been installed within their buffer zones.
- 11.3.38 There is a risk of tree crown conflicts with high-sided vehicles and other plant and materials on access routes during decommissioning.
- 11.3.39 There is a risk of accidental impact damage to retained trees, woodlands and hedges from vehicles, plant and machinery, particularly where access tracks used for decommissioning pass close to trees.

Mitigation

- 11.3.40 The risk of tree and hedge root damage and soil compaction from decommissioning will be minimised by using the existing operation access tracks wherever possible. Where vehicles may need to deviate from these tracks and cross the RPAs of retained trees or hedges, temporary ground protection (e.g., a buildup comprising a cellular confinement system infilled with angular gravel laid at existing grade; steel trackway) will be laid to avoid compaction.
- 11.3.41 The risk of tree and hedge root damage from the removal of underground structures (e.g., cables, equipment, fenceposts) will have been minimised by the designing of cable routes and locating equipment to avoid tree and hedge RPAs and the buffer zones of ancient and veteran trees. If cables and equipment that need to be removed have been installed with minor incursions into the peripheries of RPAs, their removal will be carried out with the minimum possible excavation and disturbance.
- 11.3.42 The risk of tree crown and hedge conflicts will be minimised by minor access facilitation pruning (e.g., crown raising, removal of low hanging branches, hedge trimming), completed prior to the arrival of decommissioning vehicles, plant and machinery on site. This will have a minimal effect on the health, longevity or appearance of trees, woodland and hedges.
- 11.3.43 Accidental damage to trees, woodland and hedges will be mitigated by the installation of tree protection fencing and other forms of tree protection (e.g.,

stem crates, ground protection), installed to the specifications recommended in BS5837:2012 prior to the commencement of decommissioning activity, and the maintenance of this protection for the duration of decommissioning.

- 11.3.44 Mitigation and management measures relating to tree, woodland and hedge protection will be outlined in the Framework DEMP. These measures will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning. It is expected that key activities where the risk of tree damage is elevated would be supervised by a suitably qualified arboriculturist.

Summary

- 11.3.45 Table 11.3 summarises each of the arboriculture aspects and whether they should be scoped in or scoped out of the assessment in relation to both the construction and operation of the Proposed Development.

Table 11.3 Summary of Arboriculture scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Tree Removal and a Reduction in Canopy Cover	Scoped out	Scoped out	Scoped out	<p>Due to the nature of the Proposed Development and the location of trees around field edges, the requirement to remove trees, woodlands and hedges would be minimal. Impacts and mitigation will be detailed in the AIA, Outline EMP and LEMP, which will be submitted alongside the ES.</p> <p>Impacts during decommissioning would be unlikely to require the removal of trees.</p>
Tree Damage	Scoped out	Scoped out	Scoped out	<p>Construction activities will largely be well away from trees, woodlands and hedges where incursions would be unlikely. Best practice mitigation will be implemented to ensure that no damage occurs. Impacts and mitigation will be detailed in the AIA and Outline EMP, which will support the Landscape and Visual and Biodiversity ES chapters. An AMS to avoid damage to retained trees will be produced prior to construction to guide operatives in sensitive construction works near trees.</p> <p>Operational activities will take place well away from trees, woodlands and hedges by design; the Proposed Development will be designed so that solar PV modules and ancillary equipment will be located with generous offsets from retained trees, woodlands and hedges. Minor pruning and tree maintenance will minimise conflicts with retained trees, hedges and woodlands along operational access routes where these are closer to trees and hedges.</p>

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
				<p>Decommissioning activities would take place well away from trees, woodlands and hedges, where incursions would be unlikely. Best practice mitigation would be implemented to ensure that no damage occurs. Mitigation and management measures relating to tree, woodland and hedge protection would be outlined in the Framework DEMP. These measures will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.</p> <p>It is expected that this document would guide operatives undertaking decommissioning activities in sensitive environments near trees and include measures to avoid damage to retained trees, woodlands and hedges.</p>
<p>Ancient and Veteran Trees</p>	<p>Scoped out</p>	<p>Scoped out</p>	<p>Scoped out</p>	<p>Construction and operational activities will be excluded from the influencing distance of ancient and veteran trees by the creation and maintenance of a buffer around ancient and veteran trees.</p>

11.4 Electric, magnetic, and electromagnetic fields

Introduction

- 11.4.1 This section of the EIA Scoping Report describes the baseline conditions for the Site Area relating to Electric, magnetic and electromagnetic fields (EMFs), and sets out the potential impacts that could occur during the construction, operation and decommissioning of the Proposed Development. It also gives a description of the measures that will be included in the design of the Proposed Development to mitigate or minimise these impacts.
- 11.4.2 EMFs are produced both naturally and as a result of certain human activities. EMFs generally arise wherever electricity is produced, transmitted, distributed and used, and this includes electrical substations, powerlines, as well as domestic, office or industrial equipment that uses electricity.
- 11.4.3 Electric fields are produced by voltage, which is the pressure behind the flow of electricity, and depends on the operating voltage of the equipment.
- 11.4.4 Magnetic fields are produced by current, which is a measure of the flow of electricity and depends on the electrical currents flowing. Generally, the higher the current, the greater the magnetic field.
- 11.4.5 Electric fields can be blocked by fences, shrubs and buildings, whereas most materials do not block magnetic fields. The intensity of both electric and magnetic fields decreases with increasing distance from the source. In addition, ground-level magnetic fields from underground cables fall much more rapidly with distance than those from a corresponding overhead line but can be higher at small distances from the cable.
- 11.4.6 The 1998 guidelines published by International Commission on Non – Ionizing Radiation Protection (ICNIRP)¹⁹⁰ state that underground cables at voltages up to and including 132 kV are not capable of exceeding the ICNIRP exposure guidelines. The operation of the Proposed Development will use up to 132kV underground cables.
- 11.4.7 The Outline EMP will be submitted with the DCO application and will include mitigation measures to protect against any interference with below ground utilities during construction. These measures will be carried forward to a CEMP which will be produced by the appointed contractor and agreed with the relevant local planning authorities prior to construction phase.
- 11.4.8 In addition, any construction mitigation measures will be reviewed and applied during decommissioning. These measures will be outlined in the Framework DEMP, which will accompany the DCO application, and will be carried forward to a detailed DEMP. The detailed DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.
- 11.4.9 Therefore, electric, magnetic, and electromagnetic fields is scoped out of the assessment.

¹⁹⁰ ICNIRP (1998). *Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)*. Health Phys, 74(4), 494-522.

Relevant legislation, policy and guidance

11.4.10 Whilst there is no direct provision in planning legislation, policy or guidance relating to protection from EMFs, guidance published by the Department for Business, Energy & Industrial Strategy suggest that guidelines for exposure published by the ICNIRP should be taken into account, as outlined above.

Baseline conditions

11.4.11 In order to understand the existing sources of potential EMFs within the Site Area, a desk study will be undertaken to identify any existing infrastructure constraints. There are various unknown electrical systems, along with high-voltage overhead and high voltage underground electrical systems. In addition, there is presence of underground Zayo and BT Openreach telecom systems across the study area.

11.4.12 Consultation with relevant telecommunication and utility providers will be undertaken to support this assessment, as appropriate and reported within the Land Use and Socio-economics assessment.

Potential for effects and mitigation measures

Construction

Potential effects

11.4.13 The construction of the Proposed Development has the potential to affect existing below ground utilities, for example when excavating the cable trenches through 'cable strike'. However, it is not anticipated that the construction of the Proposed Development would interfere with any above ground utilities, such as above ground transmission lines, given the height of the infrastructure.

Mitigation

11.4.14 Information obtained from the desk study and consultation will be used to inform any mitigation measures required during construction, and these will be outlined in the Outline EMP for the Proposed Development.

11.4.15 As outlined in Chapter 2, these measures, commitments and actions will be carried forward to a CEMP which will be produced by appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

Operation

Potential effects

11.4.16 Whilst there is no statutory provision in the planning system regarding protection from EMFs, DECC (2012)¹⁹¹ suggests that guidelines published by ICNIRP in 1998 for both occupational and public exposure should be

¹⁹¹ DECC (2012) *Power Lines: Demonstrating compliance with EMF public exposure guidelines, A Voluntary Code of Practice*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48308/1256-code-practice-emf-public-exp-guidelines.pdf

considered. It states that 'overhead power lines at voltages up to and including 132kV, underground cables at voltages up to and including 132kV and substations at and beyond the publicly accessible perimeter' are not capable of exceeding the ICNIRP exposure guidelines.

11.4.17 As the maximum voltages of the cables being installed as part of the Proposed Development do not exceed 132kV, the Proposed Development is not anticipated to exceed the ICNIRP exposure guidelines. As such, no assessment is required for the infrastructure and cables forming the Proposed Development, which are limited to up to 132kV.

11.4.18 In addition, information obtained from the desk study and consultation will be used to inform the design of the Proposed Development to ensure the avoidance of any identified infrastructure constraints and the protection of any existing telecommunication equipment.

Mitigation

11.4.19 No mitigation is required as no likely significant effects are anticipated from operation.

Decommissioning

Potential effects

11.4.20 The process of decommissioning will include the removal of all solar infrastructure, including any below and above ground equipment. Decommissioning effects are expected to be similar to, or of a lesser magnitude than, construction effects.

Mitigation

11.4.21 Information obtained from the desk study and consultation will be used to inform any mitigation measures required during decommissioning which will be set out in the Framework DEMP. Therefore, decommissioning is scoped out of further assessment.

Summary

11.4.22 It is anticipated that there would be limited interactions with EMFs during construction of the Proposed Development. Information obtained from the desk review and consultation will be used to inform the Proposed Development design, and mitigation measures will be included in the Outline EMP to ensure the protection of infrastructure. Given that the Proposed Development is not anticipated to exceed the ICNIRP exposure guidelines, and the design of the Proposed Development will consider any infrastructure constraints, a separate Electric, Magnetic and Electromagnetic Fields ES chapter is not considered to be required.

11.4.23 Table 11.4 summarises the scope of the EMFs assessment and whether it should be scoped in or scoped out of the assessment in relation to the construction, operation and decommissioning phases of the Proposed Development.

Table 11.4 Summary of Electric, magnetic, and electromagnetic fields assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Electric, magnetic, and electromagnetic fields assessment	Scoped out	Scoped out	Scoped out	The Proposed Development installed electrical infrastructure is not rated at a level which would warrant a full assessment. The Outline EMP will include any mitigation measures that may be required during construction. The ES will, however, detail any design measures taken to avoid any potential for EMF on receptors.

11.5 Glint and glare

Introduction

- 11.5.1 This section of the EIA Scoping Report describes the baseline conditions in relation to ground-based, railway, and aviation receptors and sets out the potential impacts that could occur during both construction and operation. It then describes potential measures that could be included in the Proposed Development design, if required, to mitigate or minimise these impacts.
- 11.5.2 Solar panels (solar PV modules) are designed to absorb as much of the sunlight that illuminates them as possible. Notwithstanding this, a proportion of the incoming sunlight is reflected by the solar PV modules. These reflections are often referred to in more technical terms as “glint”, which is a momentary flash of bright light, and “glare”, which is a continuous source of bright light.
- 11.5.3 Reflected sunlight from solar PV modules can, under certain circumstances, be directed towards a location that will make it noticeable to an observer. This effect can be a nuisance, e.g., if it is experienced within a residential dwelling, or a safety hazard, e.g., if it presents a distraction to the driver of a motor vehicle on a busy road.
- 11.5.4 A separate Solar Photovoltaic Glint and Glare Assessment will accompany the DCO application, which will include detailed modelling of the solar PV modules to quantify potential effects on receptors and, if required, any proposed mitigation. The results of the assessment, along with any recommendations for mitigation, such as screening, will be considered in the design of the Proposed Development.
- 11.5.5 A chapter on effects from the Proposed Development on the Landscape (i.e., visual receptors) will also be included within the ES, which will consider the effect of glint and glare. As such, it is considered that the Solar Photovoltaic Glint and Glare Assessment, in conjunction with the landscape and visual ES Chapter and Outline EMP, will sufficiently mitigate any significant effects. Therefore, a separate chapter on glint and glare within the ES is not considered to be required.

Relevant legislation, policy and guidance

- 11.5.6 The scoping review has considered the following appropriate policy, legislation and guidance for glint and glare:
- NPS for Renewable Energy Infrastructure (EN-3)¹⁹², (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses;
 - NPPF 2021¹⁹³;

¹⁹² Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

¹⁹³ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

- Planning Practice Guidance for Renewable and low carbon energy¹⁹⁴;
- Pager Power (2022) Glint and Glare Guidance¹⁹⁵
- SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy)¹⁹⁶

Baseline conditions

11.5.7 A Glint and Glare Receptor Screening Opinion (Appendix 11.1) and a Glint and Glare Receptor Scoping Assessment (Appendix 11.2) have been undertaken, which provide a desktop review of the Site Area and an overview of baseline conditions.

11.5.8 The Proposed Development is rurally located with:

- National, regional, and local roads located within 1km of the Site Area;
- a number of dwellings located within 1km of the Site Area;
- a section of railway line located within 500m of the Site Area; and
- Teesside International Airport located within 15km of the Site Area.

11.5.9 The solar PV modules will be located in areas that are currently open fields / arable land. There are currently no significant reflectors in situ within most or all of the Site Area. However, the reflective characteristics of modern solar PV modules are similar to commonly encountered sources within an outdoor environment including still water, greenhouses and windows on buildings.

Potential for effects and mitigation measures

Construction and Decommissioning

Potential effects

11.5.10 An Outline EMP will be produced as part of the DCO application, and will set out the measures, commitments and actions identified in the ES to manage environmental effects during construction. These measures, commitments and actions will be carried forward to a CEMP, which would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

11.5.11 Similarly, a Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development, will also be produced as part of the DCO application. These measures, commitments and actions will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning works.

¹⁹⁴ Department for Levelling Up, Housing and Communities (2015). *Planning Practice Guidance: Renewable and low carbon energy*. Available at: <https://www.gov.uk/guidance/renewable-and-low-carbon-energy>

¹⁹⁵ Pager Power (2022). *Pager Power Glint and Glare Guidance*. Available online at: <https://www.pagerpower.com/wp-content/uploads/2022/09/Solar-Photovoltaic-Glint-and-Glare-Guidance-Fourth-Edition.pdf>

¹⁹⁶ SunPower (2009). *SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy)*

- 11.5.12 Construction and decommissioning activities are expected to be undertaken in accordance with the aforementioned CEMP and DEMP. These documents will include information on how reflective surfaces are to be treated during construction and decommissioning phases with a view toward their final placement across the Site Area. It is expected that avoidance of the effects of glint and glare will be considered as part of construction and decommissioning planning.
- 11.5.13 Further, the scale of the Site Area is such that the full areas will not be occupied for the duration of these phase activities and the movement of reflective surfaces will be temporarily localised to smaller areas on a rolling basis until works are complete. Based on the nature of the activities and the use of a CEMP and DEMP, any glint and glare effects during construction and decommissioning are expected to be less significant than during operation, and will be scoped out of the ES.

Mitigation

- 11.5.14 No mitigation is required as no likely significant effects are anticipated during construction and decommissioning.

Operation

Potential effects

- 11.5.15 During operation, specular reflection¹⁹⁷ of the sun from the solar PV modules is possible on the identified receptors and could include:
- Glint – a momentary flash of bright light (typically experienced by moving receptors); and
 - Glare – a continuous source of bright light (typically experienced by static receptors).
- 11.5.16 The measured intensity of a reflection can vary depending on the angle of incidence. Published guidance shows that the intensity of solar reflections from solar PV modules are equal to or less than those from water and similar to those from glass. It also shows that reflections from solar PV modules are significantly less intense than many other reflective surfaces, which are common in an outdoor environment.

Mitigation

- 11.5.17 A Solar Photovoltaic Glint and Glare Assessment will be prepared and submitted with the DCO application. The assessment will include detailed modelling of the solar PV modules relative to:
- surrounding roads and dwellings with potential views of the Proposed Development;

¹⁹⁷ A specular reflection has a reflection characteristic similar to that of a mirror; a diffuse reflection will reflect the incoming light and scatter it in many directions. Solar panels are flat and have a smooth surface. Therefore, most of the light reflected is specular, which means that incident light from a specific direction is reradiated in a specific direction.

- the railway section to the west; and
 - the 2-mile approach paths and Air Traffic Control (ATC) Tower at Teesside International Airport.
- 11.5.18 The results and recommendations of the Solar Photovoltaic Glint and Glare Assessment will be embedded into the design to ensure to mitigate any identified 'significant detrimental impacts'. Common mitigation strategies are:
- Site surveys to inform visibility (and landscaping plans) more accurately; and
 - Provision of screening (planting or opaque fence) in the Site Area or in areas outside the Site Area between the observer and the reflecting areas. Mitigation located in areas outside of the Site Area would be secured by agreement with landowners or other mechanisms.
- 11.5.19 Changes to the site configuration. The most common mitigation solution for ground-based receptors is the provision of screening around the perimeter of the Proposed Development. A screening solution that sufficiently obstructs the visibility of the potentially reflecting panels will mitigate impacts. The most common mitigation solution for aviation receptors is changes to the site configuration.
- 11.5.20 Technical mitigation for approaching pilots or ATC personnel at Teesside International Airport is unlikely to be required due to the distances and orientation of each runway.
- 11.5.21 In addition, the effect of glint and glare on the landscape (i.e., visual receptors) will be considered in the ES and presented within the landscape and visual ES chapter.
- 11.5.22 Following the incorporation of the results and recommendations of the Solar Photovoltaic Glint and Glare Assessment and the implementation of mitigation, no significant effects are anticipated for glint and glare. Therefore, it is considered that a separate chapter on glint and glare within the ES would not be required.

Summary

- 11.5.23 Table 11.5 presents summary of the approach to glint and glare and whether it should be scoped in or scoped out of the assessment in relation to construction, operation and decommissioning of the Proposed Development.

Table 11.5 Summary of the Glint and glare assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Glint and glare	Scoped out	Scoped out	Scoped out	<p>No likely significant effects are anticipated during construction and decommissioning.</p> <p>The Solar Photovoltaic Glint and Glare Assessment, in conjunction with the landscape and visual ES Chapter, Outline EMP and design of the Proposed Development will sufficiently mitigate any significant effects.</p>

11.6 Ground conditions

Introduction

- 11.6.1 This section of this EIA Scoping Report describes the baseline environment in relation to geological and hydrological characteristics and ground contamination, which could occur as a result of the Proposed Development. A description of mitigation measures that will be included as part of the design of the Proposed Development have also been set out.
- 11.6.2 A combined FRA and Outline Surface Water Drainage Strategy, and a land quality focused preliminary risk assessment (PRA - Desk Top Study) will accompany the DCO Application which will provide a review of the existing baseline, assessment of potential effects on receptors and proposed mitigation.
- 11.6.3 Construction and decommissioning activities will be undertaken in accordance with best practice measures and in line with the CEMP and DEMP, which would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. The CEMP and DEMP will be in line with the Outline EMP and Framework DEMP that will be submitted with the DCO Application. The Outline EMP would also be supported by management plans including an Outline SRMP.
- 11.6.4 As such, a separate chapter on ground conditions within the ES is not considered to be required.

Relevant legislation, policy and guidance

- 11.6.5 The scoping review has considered the following appropriate policy, legislation and guidance for ground conditions:
- Environmental Protection Act 1990¹⁹⁸;
 - NPPF 2021¹⁹⁹;
 - EA's Land Contamination Risk Management (LRCM) Guidance²⁰⁰;
 - Planning Practice Guidance, Land stability²⁰¹;
 - Stockton-on-Tees Borough Council Local Plan, Policy ENV4 – Reducing and Mitigating Flood Risk²⁰²;
 - Defra Contaminated Land Statutory Guidance²⁰³;
 - CIRIA C552 Guidance on contaminated land risk assessment²⁰⁴; and

¹⁹⁸ HMSO (1990). *Environmental Protection Act 1990*. Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>

¹⁹⁹ Department for Levelling Up, Housing and Communities (2021) *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²⁰⁰ Environment Agency (2020) (as amended). *Land contamination risk management (LRCM)*. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>

²⁰¹ Department for Levelling Up, Housing and Communities (2014) (as amended). *Planning Practice Guidance: Land stability*. Available at: <https://www.gov.uk/guidance/land-stability>

²⁰² Stockton-on-Tees (2019). *Stockton-on-Tees Borough Council Local Plan 2019*. Available at: https://stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

²⁰³ Department for Environment, Food and Rural Affairs (Defra) (2012): *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*.

²⁰⁴ CIRIA (2001): *Contaminated land risk assessment- A guide to good practice (C552)*

- The Water Framework Directive (England and Wales) 2015²⁰⁵.

Baseline conditions

- 11.6.6 The study area includes all potential contaminated land sites that intersect the Proposed Development and those sites that have plausible pollutant linkages that may impact the Proposed Development, typically within 250m of the Site Area. However, contamination pollution linkages are considered on a case-by-case basis.
- 11.6.7 The study area used to assess the potential impacts on geology and hydrogeology considers features within the Site Area, as well as hydrogeological features and sensitive receptors (including controlled water receptors or water abstraction points as detailed in the Water resources chapter) within 500m of the Site Area.
- 11.6.8 The baseline conditions presented below are based on findings of a preliminary desk-based review of available information as summarized below:
- British Geological Survey (BGS) GeoIndex online viewer²⁰⁶;
 - Defra MAGIC Map application²⁰⁷;
 - National Library of Scotland historical map²⁰⁸;
 - Groundsure free online environmental data viewer²⁰⁹;
 - The Coal Authority interactive map²¹⁰;
 - Zetica Unexploded Ordnance (UXO) Risk maps²¹¹;
 - Bing maps - ordnance survey map²¹²; and
 - Google earth aerial imagery.
- 11.6.9 Based on a review of available historical maps, the Site Area has been used as agricultural land with local farm holdings off-site, some of which are shown in the earliest available maps (1885-1900). Other more recent local farm holdings are also noted (Carr House immediately south east off-site in Site C: 1949-1971 map, Mount Pleasant Farm immediately north east off-site in Site C: 1985 – earliest available google earth imagery). Further details on the farm holding are presented in Chapter 2. Other notable features are a brick and tile works, noted in the earliest available map (1885-1900) immediately to the south east off-site in Site C. This is no longer noted in the 1940-1947 map. Smithies are noted in 1885–1888 maps in proximity to Sites A, D and F off-site (adjacent to western boundary, 190m north west and 150m south respectively). These smithies are no longer noted in the 1937 map. No other

²⁰⁵ Defra (2015). *The Water Framework Directive (Standards & Classification) Directions (England and Wales)*

²⁰⁶ British Geological Society. *BGS GeoIndex online viewer*. Available at: <https://mapapps2.bgs.ac.uk/geoindex/home.html>

²⁰⁷ Defra (2022). *Magic Map Application*. Available at: <https://magic.defra.gov.uk/>

²⁰⁸ National Library of Scotland. *National Library of Scotland historical maps*. Available at: <https://maps.nls.uk/geo/explore/side-by-side/#zoom=5.0&lat=56.00000&lon=-4.00000&layers=1&right=ESRIWorld>

²⁰⁹ Groundsure. *Groundsure free online environmental data viewer*. Available at: <https://www.groundsure.io/>

²¹⁰ The Coal Authority. *The Coal Authority interactive map*. Available at: <https://mapapps2.bgs.ac.uk/coalauthority/home.html>

²¹¹ Zetica UXO. *Risk maps*. Available at: <https://zeticauxo.com/downloads-and-resources/risk-maps/>

²¹² Bing. *Bing maps (Ordnance Survey map layer)*. Available at: <https://www.bing.com/maps/>

notable changes have been noted on the Site Area since the earliest available map.

- 11.6.10 The geological map does not indicate the presence of made/artificial ground within the Site Area. The geological map shows the majority of the Site Area to be underlain with Devensian Till – diamicton (heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape). Glaciofluvial deposits (sand and gravel) are shown to be locally present (Sites A, C, D, E, F). Lacustrine deposits (clay and silt) are also shown to be locally present (Sites A, C). There is a very limited presence of head deposits (silt, sand and gravel) in Sites B and F and alluvium (compressible silty clay, but can contain layers of silt, sand, peat and basal gravel) in Sites A, B and F.
- 11.6.11 The solid geology beneath the Site Area comprises three main bedrock formations including:
- Ford formation - dolostone (dolomite) (Sites A, B, C and D);
 - Edlington Formation comprising calcareous mudstone with subordinate siltstone and sandstone, greenish-grey sandstone, also dolostone and gypsum/anhydrite locally common (Sites B – F);
 - Seaham Formation comprising dolomitic limestone (Sites B – F); and
 - Roxby Formation comprising calcareous mudstone (Site C, Site F).
- 11.6.12 There is a fault shown to run across the central part of the Site Area in a west to east direction.
- 11.6.13 Available BGS logs within the Site Area indicate the following:
- Drift Deposits (around 52 – 60m thick): Clay and boulder clay (stiff sandy silty clay with occasional fine pebbles of sandstone, limestone, pebbles of dolomite and coal fragments);
 - Upper Magnesian Limestone (Zechstein Group) (around 10 - 20m thick): Partially to completely disaggregated dolomite forming a very fine sand becoming dolomite and limestone;
 - Middle Magnesian Limestone (around 30m thick): Mudstone and dolomite with some breccia; and
 - Lower Magnesian Limestone (around 30m thick – proven thickness): Fine grained gypsiferous silty mudstone and siltstone turning to breccia, shaly limestone and dolomite at depth.
- 11.6.14 Within a 10km radius of the Site Area, there are five SSSI and 13 LNR. The nearest designated site is Newton Ketton Meadow SSSI located approximately 100m to the west of the Site Area. None of the SSSIs within 2km are designated for geological features.
- 11.6.15 The majority of the Site Area is made up of slowly permeable seasonally wet, slightly acid but base-rich loamy and clayey soils, with scattered areas of Loamy and clayey floodplain soils with naturally high groundwater.

- 11.6.16 The underlying bedrock (Zechstein Group) is a highly productive aquifer (significant regional dolomitised limestone aquifer up to 300m thick near Durham, locally yielding up to 50 L/s of very hard water). Groundwater flow is virtually all through fractures and other discontinuities. Based on information provided by the EA, the central part of the Site Area is within a Source Protection Zone II (Sites B – D) and the western part within a Source Protection Zone III (Site A).
- 11.6.17 No major surface water courses are located within the Site Area. The western land parcels of the Site Area, near Newton Ketton and Bafferton, are located in the headwaters of the Newton Beck and a number of unnamed water courses. The remaining land parcels generally drain to the east via a number of tributaries including Little Stainton Beck, Newbiggin Beck and Bishopton Beck, draining ultimately to Whitton Beck and on to Thorpe Beck/Billingham Beck. As with the western parcels, these areas exhibit undulating and varied topography, resulting in a number of small tributaries and drainage channels. The Site Area is located mostly within Flood Zone 1, with two areas located within Flood Zone 3 associated with Little Station Beck and Bishopton Beck. For further information on Flood Zones, see Section 11.8 Hydrology.
- 11.6.18 Historically, minerals extraction in the Tees Valley was focused on iron ore and alum in the East Cleveland areas, coal extraction around the present boundary with County Durham and the extraction of salt and gypsum around Billingham and the Tees Estuary. In Darlington Borough, the Permian Magnesian Limestone outcrop provided a source of building stone for the local area and clay was extracted for brickmaking. However, the extraction of all these minerals has gradually declined over the years and current extraction is limited to sand and gravel extraction at North Gare in Hartlepool and Stockton Quarry near Thorpe Thewles, crushed rock at Hart Quarry in Hartlepool, brine extraction from Seal Sands and minor clay extraction at Cowpen Bewley.
- 11.6.19 The Site Area is partially located within Mineral Safeguarding Areas (MSAs) for limestone (shallow) and sand and gravel (shallow), as designated within the Joint Minerals and Waste Plan.
- 11.6.20 The Site Area is not within a Coal Authority reporting area nor has any historic landfills within the Site Area.
- 11.6.21 There are two historic landfills within 50m of the Site Area (Site F): Stillington Refuse Tip (EAHLD31673 – first waste input – 12/06/1967) and Cobby Castle Land Bishopton (EAHLD06523).
- 11.6.22 The Zetica UXO map indicates that the Site Area is within a low bomb risk area (areas indicated as having fifteen bombs per 1000acre or less).
- 11.6.23 As the Site Area is currently used for agricultural practices, there is very low potential for contamination (limited to land contamination associated with agricultural activities on-site and the presence of the local farm holdings off-site). Any potential risk from leachate contamination in relation to the identified landfills off-site is low considering the low permeability superficial deposits underlying the Site Area. In addition, any potential risk from ground gas

generated from the landfill sites is low, as the Proposed Development will not include any enclosed spaces (no receptors present).

- 11.6.24 With regards to the former brick and tile works and smithies noted in proximity to the Site Area off-site, any potential for contamination is very low considering their age (no longer noted in the 1940-1947 map) and the fact that the sites have been redeveloped.

Potential for effects and mitigation measures

Construction

Potential Effects

- 11.6.25 The Site Area is located outside of any area of geological interest. The sensitivity of the receptors is low, the magnitude of impact from the construction of the Proposed Development is expected to be negligible and it is unlikely to result in significant effects on geology/mineral resources. As such, it is proposed that ground conditions (geology/mineral resources) are scoped out of the ES.
- 11.6.26 Mineral deposits within MSAs will not be permanently sterilised by the Proposed Development and the minerals and waste policies do not currently identify proposals for mineral extraction in the area. Following decommissioning of the Proposed Development, the mineral resource could be extracted, if required at that time.
- 11.6.27 There is very low potential for contamination of the Site Area. Potential effects in relation to contamination include pollution linkages that may exist during the construction, which include but are not limited to:
- construction workers encountering potentially contaminated soils/materials, including unexpected contamination;
 - site neighbours being exposed to dust generated from potentially contaminated materials during construction works;
 - leaching of contaminants into the groundwater during the construction through rainwater infiltration;
 - discharge of contaminated groundwater or surface run-off into surface water as a result of open excavations and uncovered stockpiles during construction;
 - infiltration and / or runoff into the local drainage / sewerage network - pollution of drainage and sewerage network and any adjacent surface water features;
 - contamination of natural soils, driving of contamination into an aquifer during piling, contamination of groundwater with concrete, paste or grout;

- introduction of new sources of contamination, such as fuels and oils used in construction plant; and
- use of site own or imported contaminated materials during construction.

11.6.28 Following the implementation of best practice construction mitigation measures, no significant effects are expected in relation to contaminated land during construction. As such, it is proposed that contaminated land is scoped out of the ES.

Mitigation

11.6.29 A land quality focused preliminary risk assessment (PRA - Desk Top Study) will be prepared and submitted with the ES as a supporting document. A desk-based assessment of ground conditions will be undertaken to determine the baseline conditions within the Site Area. This will consider the following:

- published geological maps and memoirs;
- topographic maps and information;
- current and historical land use information; and
- review of available ground investigations information.

11.6.30 The above information will be used to develop a conceptual site model (CSM) for the Site Area. This shall be developed in accordance with EA's advice on Land contamination: risk management (replacing the now withdrawn CLR11 Model Procedures for the Management of Land Contamination)²¹³.

11.6.31 The CSM will be used to establish the risks posed by the viable pollution linkages and to inform the construction management approach. The Desk Top Study will recommend appropriate mitigation measures that can be incorporated within the design of the solar park, to ensure that it minimises potential risk to site users and the wider environment (to be recorded in the outline EMP as presented below). Following these, no significant effects are expected in relation to contaminated land during construction.

11.6.32 The Desk Top Study will be carried out in accordance with EA's advice on Land contamination: risk management, CIRIA C552²¹⁴ and Defra Contaminated Land Statutory Guidance²¹⁵.

11.6.33 Work will be carried out in accordance with relevant Construction Design Management Regulations 2015²¹⁶, details of these measures will be presented within Outline EMP, which will include supporting plans such as an Outline H&SP.

11.6.34 As outlined in Chapter 2, an Outline EMP will be produced as part of the DCO application, and will set out the measures, commitments and actions identified

²¹³ Environment Agency (2020). *Guidance on Land contamination risk management (LCMR)*. Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcmr>

²¹⁴ CIRIA C552 (2001). *Contaminated Land Risk Assessment, A guide to good practice*

²¹⁵ Defra (2012). *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*.

²¹⁶ HMSO (2015). *The Construction (Design and Management) Regulations 2015*. Available at: http://www.legislation.gov.uk/uk/si/2015/51/pdfs/ukSI_20150051_en.pdf

in the ES to manage environmental effects during construction. These measures, commitments and actions will be carried forward to a CEMP, and will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction

- 11.6.35 In order to reduce the likelihood of contamination and protect human health and controlled waters from effects related to ground conditions, the Outline EMP will include mitigation measures such as those presented below.
- 11.6.36 The Outline EMP will also include an Outline Pollution Response Plan will be drafted prior to the commencement of works on-site. The plan will outline key pollution mitigation measures including a Control of Substances Hazardous to Health (COSHH) / fuel inventory and key contacts to be notified in the event of a significant pollution incident, which may subsequently lead to the contamination of controlled waters. Any fuel and COSHH chemicals will be stored in accordance with the relevant EA Pollution Prevention Guidance (PPG) notes (while these guidance notes have been withdrawn, they are still considered to provide a useful data source). Tanks and dispensing pumps will be locked when not in use to prevent unauthorised access, with refueling occurring off-site Information regarding spill prevention and disposal of COSHH items will be provided as part of the standard site induction presentations and during regular toolbox talks and the works progress.

Mitigation measures included in the outline EMP

- 11.6.37 The following mitigation measures are anticipated to be included in the Outline EMP:
- oils and hydrocarbons will be stored in designated locations with specific measures to prevent leakage and release of their contents, include the siting of storage area away from surface water drains, on an impermeable base with an impermeable bund that has no outflow and is of adequate capacity to contain 110% of the contents. Valves and trigger guns will be protected from vandalism and kept locked up when not in use. Details of appropriate storage and handling measures will be presented within the Outline EMP;
 - vehicles will be well maintained to prevent accidental pollution from leaks. Static machinery and plant will include drip trays beneath oil tanks / engines / gearboxes / hydraulics, which will be checked and emptied regularly via a licensed waste disposal operator;
 - the LLFA and the appropriate utility company will be consulted on the potential requirement for an oil interceptor and sediment trap at the point where site surface water runoff enters any sewerage network;
 - an Outline SERP will be produced (and could form part of the Outline EMP), which site staff will be required to have read and understood. On-site provisions will be made to contain a serious spill or leak through the use of booms, bunding and absorbent material;

- appropriate handling and disposal of pile arisings, concrete, pastes and/or grouts during the laying of foundations;
- during the enabling and construction stage of work, the contractor(s) will employ dust suppression measures when necessary to prevent the potential mobilisation of contaminated dust particles and their migration off-site;
- stockpiles and material handling areas will be kept as clean as practicable to avoid nuisance from dust. Dusty materials will be dampened down using water sprays in dry weather or covered;
- the length of time materials are stockpiled on-site before being removed for re-use, recycling or disposal is to be kept to a minimum and stockpiles are to be covered with tarpaulins prior to disposal;
- dust generating equipment (e.g., mobile crushing) and screening equipment will be located to minimise potential nuisance impacts to receptors, as far as practicable;
- complaints about dust will be investigated at the earliest opportunity and appropriate action taken to control the source or remedy the impact as appropriate;
- access roads will be regularly cleaned and damped down with water;
- all vehicles entering and leaving the site during the construction period will pass through a wheel washing facility. Vehicles used to transport materials and aggregates will be enclosed or covered in a tarpaulin. Vehicle movements will be kept to a minimum and vehicle speeds within the site will be limited;
- appropriate use of personal protective equipment (PPE) and implementation and adherence to Health & Safety Protocols, Plans and Procedures. Construction workers will remain vigilant of ground conditions at all times and will report to the Principal Contractor any suspect areas of potential contamination;
- potentially contaminated made ground will be removed from excavations; and
- advice should be sought by an environmental specialist should materials suspected of being contaminated be uncovered.

Operation

Potential Effects

11.6.38 The Proposed Development will comprise a large number of solar PV modules, plus access tracks and shipping style containers to house inverters and transformers. Solar PV modules are typically fixed to the ground using steel piles, driven into the ground and supported by metal frames. Small metal enclosures will house transformers and larger storage containers will be

located around the Site Area. These, together with the substation and BESS, require areas of impermeable surface. Potential drainage issues will be mitigated by returning water falling on these areas to ground via soakaways or swales.

- 11.6.39 Considering the Proposed Development setting is within greenfield area with a very low potential for contamination, the operation of the Proposed Development with implementation of the design and mitigation measures is unlikely to result in significant effects on sensitive receptors (geology/mineral resources, maintenance workers, surface water features and groundwater). As such, it is proposed that ground conditions and contaminated land are scoped out of the ES

Mitigation

- 11.6.40 To prevent on-site pollution, regular maintenance will be carried out to ensure the health of the solar PV modules are maintained and that the on-site vegetation is continuing to protect the soil layer. Best practice mitigation methods will be in place such as disposal of solid and liquid waste off-site, the cleaning of vehicles to be carried out off-site and the use of spill kits and absorbent mats to ensure any pollution from maintenance vehicles is minimised.

- 11.6.41 Operational activities are proposed to be scoped out of the assessment.

Decommissioning

Potential Effects

- 11.6.42 Decommissioning of the Proposed Development is likely to require some minor ground works to remove the below-ground cables however these are not expected to result in any likely significant effects on ground conditions or contaminated land following the implementation of mitigation measures.
- 11.6.43 Management and mitigation measures will be presented in the Framework DEMP, which will be produced as part of the DCO application. These measures, commitments and actions will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.

Summary

- 11.6.44 Table 11.6 summarises each of the ground conditions aspects whether they should be scoped in or scoped out of the assessment in relation to both the construction and operation of the Proposed Development.

Table 11.6 Summary of Ground conditions assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Ground conditions (geology/mineral resources)	Scoped out	Scoped out	Scoped out	<p>The Site Area is located outside of any area of geological interest. The magnitude of impact from the construction and operation of the Proposed Development is expected to be negligible and it is unlikely to result in significant effects on geology/mineral resources.</p> <p>A desktop study will outline what mitigation is required in design. It is expected that the desktop study, will confirm that the significant effects would be unlikely.</p> <p>There is very low potential for contamination on the Site Area. In the event of disturbance of any potentially locally contaminated soils or groundwater during construction, there is a potential for human or controlled water receptors to be affected.</p>
Contaminated land	Scoped out	Scoped out	Scoped out	<p>The results and recommendations of the desktop study will be used to inform the design of the Proposed Development. The findings will also be used to define management and mitigation measures for the construction, operation and decommissioning phases.</p> <p>It is considered that with the results of the desktop study, inputs into design as well as the Outline EMP and Framework DEMP, significant effects in relation to contaminated land are considered to be unlikely.</p>

11.7 Human health

Introduction

11.7.1 Human health assessments consider impacts on population health as a result of changes to health determinants such as access to health, social care and other social infrastructure, access to open space and nature, neighbourhood amenity, accessibility and active travel, community safety, access to work and training, social cohesion and climate change.

11.7.2 A health and wellbeing assessment applies a broad definition of health, encompassing physical and mental wellbeing and quality of life. This understanding of health is captured in the World Health Organisation (WHO) definition:

“Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity”²¹⁷.

11.7.3 The key determinants of health can be characterised as:

- pre-determined factors such as age, genetic make-up and gender are fixed and strongly influence a person’s health status;
- social and economic circumstances such as poverty, unemployment and other forms of social exclusion strongly influence health, and improving them can significantly improve health;
- how the environment in which people live, work and play is managed – its air quality, built environment, water quality – can damage health, or provide opportunities for health improvement;
- lifestyle factors such as physical activity, smoking, diet, alcohol consumption and sexual behaviour, can have significant impacts on health; and
- accessibility of services such as the National Health Service (NHS), education, social services, transport (especially public transport) and leisure facilities influence the health of the population.

11.7.4 Solar farms are designed and maintained to be safe and minimise any risk to human health. The Proposed Development, including the solar infrastructure, will be designed with inbuilt control systems to avoid risks.

11.7.5 It is anticipated that there would be limited impacts on human health during the construction and operation of the Proposed Development. Any potential effects will be covered elsewhere in the ES, such as landscape and visual and land use and socio-economics ES chapters, and in supporting documentation, such as the Outline EMP, LEMP and Outline CTMP. The measures, commitments and actions outlined in the Outline EMP, LEMP and Outline CTMP will be carried forward to the CEMP, which would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. Therefore, a separate human health

²¹⁷ Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York: World Health Organization, 19-22 June 1946.

ES chapter is not considered to be required and is scoped out of the assessment.

Relevant legislation, policy and guidance

11.7.6 The scoping review has considered the following appropriate policy, legislation and guidance for human health:

- Infrastructure Planning (Environmental Impact Assessment) Regulations 2017²¹⁸;
- Overarching NPS for Energy (EN-1): Paragraphs 4.13.1 – 4.13.5²¹⁹;
- NPPF 2021²²⁰; and
- Planning Practice Guidance: Healthy and safe communities, Paragraphs 53-001-20190722 to 53-012-20190722²²¹.

Baseline conditions

11.7.7 Darlington has a population of 304,800 people, with 197,400 people in Stockton-on-Tees. Land uses on, and in the areas surrounding the Proposed Development are focused on agricultural activities with a number of dispersed settlements which support local services.

11.7.8 For further baseline conditions relating to human health, see the following sections of this EIA Scoping Report:

- Chapter 5 Climate change;
- Chapter 7 Landscape and visual;
- Chapter 9 Land use;
- Section 11.2 Air quality;
- Section 11.4 Electric, magnetic, and electromagnetic fields;
- Section 11.5 Glint and glare;
- Section 11.6 Ground conditions;
- Section 11.9 Major accidents and disasters;
- Section 11.10 Noise and vibration; and
- Section 11.11 Traffic and transport.

Potential for effects and mitigation measures

²¹⁸ HMSO (2017) *The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>

²¹⁹ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²²⁰ Department for Levelling Up, Housing and Communities (2021) *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²²¹ Department for Levelling Up, Housing and Communities (2014) (as amended). *Planning Policy Guidance: Healthy and safe communities*. Available at: <https://www.gov.uk/guidance/health-and-wellbeing>

Construction

Potential effects and mitigation

11.7.9 The construction of the Proposed Development has the potential for limited impacts on human health. These impacts are likely to principally relate to the following construction effects:

- potential impacts on neighborhood quality and residential amenity, air quality and noise due to construction activity and traffic;
- employment opportunities from construction.

11.7.10 Assessment of these effects and inclusion of appropriate mitigation measures will be covered elsewhere in the ES and within supporting documentation, including:

- Landscape and visual ES Chapter;
- Land use and socio-economics ES Chapter;
- PRoW Management Plan;
- Outline EMP;
- LEMP;
- Outline CTMP.

11.7.11 Therefore, as it is not anticipated that the construction of the Proposed Development would result in significant effects of human health, and the assessment and mitigation of construction effects will be considered elsewhere in the ES, a separate human health ES chapter is not considered to be required.

Operation

Potential effects and mitigation

11.7.12 The design and operation of the Proposed Development has the potential for limited impacts with human health. These impacts are likely to principally relate to the following effects:

- neighbourhood quality and residential amenity, air quality, noise and lighting impacts due to operational activity and traffic; and
- potential impacts to access of open space and nature, community safety and climate change.

11.7.13 The ES will include an assessment of climate change, landscape and visual and land use in the respective chapters which will include impacts relevant to health determinants. Any mitigation measures required during the operation of the Proposed Development would be reported within these assessments or supporting documentation.

- 11.7.14 This scoping exercise has identified that any likely air quality and noise impacts could be mitigated and would not be significant and are therefore scoped out of the ES (EIA Scoping Report Section 11.2 and Section 11.10 respectively).
- 11.7.15 This scoping exercise has also identified that operational traffic will be minimal with occasional maintenance visits taking place which would have limited impacts on the local road network. Operational traffic has therefore been scoped out of the EIA (EIA Scoping Report Section 11.11).
- 11.7.16 Information obtained from these assessments will be used to inform the design of the Proposed Development to ensure the avoidance of any effects on human health during the operational phase. In addition, the design of the Proposed Development, and its supporting infrastructure, would be maintained to operate safely so as not to present a risk to human health.
- 11.7.17 Therefore, as the assessment and mitigation of operational effects will be considered elsewhere in the ES or supporting assessments, and it is not anticipated that the operation of the Proposed Development would result in significant effects of human health, a separate human health ES chapter is not considered to be required.

Decommissioning

Potential effects and mitigation

- 11.7.18 The decommissioning of the Proposed Development has the potential for limited impacts on human health. These impacts are likely to principally relate to the effects of decommissioning activity and traffic. Appropriate mitigation will be set out in the Framework DEMP, where considered necessary.

Summary

- 11.7.19 It is anticipated that there would be limited impacts on human health during the construction and operation of the Proposed Development. Any potential effects will be covered elsewhere in the ES, such as landscape and visual and land use and socio-economics ES chapters, and in supporting documentation, such as the Outline EMP, LEMP and CTMP.
- 11.7.20 In addition, as outlined in Section 11.4, the assessment of EMFs is proposed to be scoped out of the ES. Therefore, a separate human health ES chapter is not considered to be required.
- 11.7.21 Table 11.7 summarises the scoping of the human health assessment in relation to both the construction and operation of the Proposed Development.

Table 11.7 Summary of Human health assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Human health assessment	Scoped out	Scoped out	Scoped out	Mitigation in relation to air quality, noise, EMF, transport, climate change and effects on residential amenity will be covered in other chapters and/or the Outline EMP LEMP and CTMP and would therefore result in no residual significant effects on population health.

11.8 Hydrology

Introduction

- 11.8.1 This section of the EIA Scoping Report describes the baseline environment in relation to hydrology and flood risk and sets out the potential effects which could occur as a result of the Proposed Development. A description of mitigation measures that will be included as part of the design of the Proposed Development have also been set out.
- 11.8.2 A combined FRA and an outline surface water drainage strategy and a Water Framework Directive (WFD) assessment will accompany the ES which will provide a review of the existing baseline, assessment of potential effects on receptors and proposed mitigation. In addition, construction activities will be undertaken in accordance with best practice measures and in line with the CEMP, which would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.
- 11.8.3 As outlined in Chapter 2, the CEMP will be in line with the Outline EMP that will be and submitted with the DCO Application. This section describes the baseline conditions and the potential effects in relation to hydrology and flood risk. It is considered that there would be no significant effects on the water environment and as such, a separate chapter on hydrology and flood risk within the ES is not considered to be required.

Relevant legislation, policy and guidance

- 11.8.4 The scoping review has considered the following appropriate policy, legislation and guidance for hydrology:
- Environment Act 2021²²²;
 - Water Act 2014²²³;
 - Floods and Water Management Act 2010²²⁴;
 - Land Drainage Act 1991 (as amended)²²⁵;
 - Water Resources Act 1991 (as amended)²²⁶;
 - Overarching NPS for Energy (EN-1): Section 5.2 (Air Quality and Emissions)²²⁷;
 - NPS for Renewable Energy Infrastructure (EN-3)²²⁸, (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS²²⁹ includes a section on solar

²²² HMSO (2021). *Environment Act 2021*. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

²²³ HMSO (2014) *Water Act*. Available at: http://www.legislation.gov.uk/ukpga/2014/21/pdfs/ukpga_20140021_en.pdf

²²⁴ HMSO (2010). *Flood and Water management Act 2010*. Available at: https://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf

²²⁵ HMSO (1991) *Land Drainage Act 1991*. Available at: https://www.legislation.gov.uk/ukpga/1991/59/pdfs/ukpga_19910059_en.pdf

²²⁶ HMSO (1991). *Water Resources Act 1991*. Available at: https://www.legislation.gov.uk/ukpga/1991/57/pdfs/ukpga_19910057_en.pdf

²²⁷ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²²⁸ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

²²⁹ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Renewable Energy Infrastructure*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015236/en-3-draft-for-consultation.pdf

photovoltaic generation and this will be considered as the draft progresses;

- NPPF 2021²³⁰;
- Water Environment (WFD) (England and Wales) Regulations 2017²³¹;
- Groundwater (England and Wales) Regulations 2009²³²;
- Planning Policy Guidance, Flood Risk and Coastal Change²³³;
- Darlington Local Plan 2016 – 2036²³⁴, Policy DC2 Flood Risk & Water Management;
- Stockton-on-Tees Borough Council Local Plan²³⁵, Policy ENV4 Reducing and Mitigating Flood Risk, Policy ENV7 Ground, Water, Noise and Light Pollution; and
- Durham County Plan²³⁶, Policy 35 Water Management and Policy 36 Water Infrastructure.

Baseline conditions

- 11.8.5 The Proposed Development is located within the Tees catchment in North-East England within an area of undulating mixed farmland that is mainly arable but with some improved pasture used for rearing sheep and occasionally cattle. As the Site Area covers quite a wide geographical area it drains to the River Tees through two main river systems; via the River Skerne to the west and the Newton Beck to the east. The topography in this area is fairly undulating, meaning the land drains to the north, south and west.
- 11.8.6 Site A, Brafferton (Site A), is located 5km to the north of Darlington and is located in the headwaters of the Newton Beck and a number of unnamed watercourses. The Proposed Development is located within the Skerne from Demons Beck to Tees WFD water body catchment. This water body is categorised as a heavily modified water body with a moderate ecological status and forms part of the River Skerne operational catchment. Located within this catchment and 900m east of the Proposed Development is the Newton Ketton Meadow SSSI, which is designated due to it being one of the few remaining unimproved traditional hay meadows on the coastal plains between the River Tees and the River Tyne.
- 11.8.7 The remaining solar PV module areas (Site B – F) within the Site Area generally drain to the east via a number of tributaries including Little Stainton Beck, Newbiggin Beck and Bishopton Beck, draining ultimately to Whitton Beck and on to Thorpe Beck/Billingham Beck. As with Site A, these areas

²³⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²³¹ HMSO (2017). *The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017*. Available at: <https://www.legislation.gov.uk/uksi/2017/407/contents/made>

²³² HMSO (2009). *Groundwater (England and Wales) Regulations 2009*. Available at: <https://www.legislation.gov.uk/ukdsi/2009/9780111480816>

²³³ Department for Levelling Up, Housing and Communities (2014) (as amended). *Planning Policy Guidance: Flood Risk and Coastal Change*. Available at: <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

²³⁴ Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

²³⁵ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: <https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local-Plan-2019.pdf?m=637810468860870000>

²³⁶ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-1/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>

exhibit undulating and varied topography, resulting in a number of small tributaries and drainage channels. The WFD water body for this area is Bishopton Beck from Source to Billingham Beck Water Body. The river has not been heavily modified and has an ecological rating of poor. This forms part of the Tees Lower and Estuary operational catchment. This watercourse runs through the Teesmouth and Cleveland Coast Ramsar site, which is located approximately 10km east of the Proposed Development. The collective sites cover 1,247 ha and are home to a variety of rare species of invertebrates and birds.

- 11.8.8 The location of the Proposed Development in relation to hydrological features is presented in Figure 11.1.
- 11.8.9 The EA flood maps²³⁷ indicate that the Site Area is largely situated within Flood Zone 1 and is therefore considered to not be at a significant risk of river flooding – see Figure 11.2. Flood Zone 1 is defined as an area having less than a 1 in 1000 annual exceedance probability (AEP) of flooding from main rivers. Two areas within the Proposed Development site are located within Flood Zone 3 associated with Little Station Beck (NGR: 434159, 521023) and Bishopton Beck (NGR: 436070, 521592) respectively. Flood Zone 3 is defined as an area having less than a 1 in 100 AEP of flooding from main rivers. The flood extent associated with the Bishopton Beck is immediately adjacent to the proposed solar PV modules but conservatively has been assumed to encroach upon the solar PV modules. The Flood Zone for Little Stainton Brook indicates the flooding occurs at a sharp turn in the watercourse. A request for flood risk data at these locations will be submitted to the EA to acquire flood levels prior to submission of the application for development consent. A full review of the risk of flooding to the Site Area will be included within the FRA which will be appended to the ES.
- 11.8.10 A review of the EA surface water flood risk map indicates that the majority of the Proposed Development is at low risk of surface water flooding, with a chance of flooding of less than 0.1% (1 in 1,000 year) across the majority of the Site Area (Figure 11.3). Flooding with a 3.3% AEP occurs at several locations on-site, close to Newton Ketton at NGR: 43100, 520900 and at seven sites surrounding Square Wood at NGR: 432900, 520700. It also occurs along the Little Stainton Beck and Bishopton Beck. Flooding correlating to lower return periods are located at the same locations as the 3.3% AEP event although cover a larger area.
- 11.8.11 Surrounding the Proposed Development there are several small reservoirs and lakes (Figure 11.1). Runoff from the Proposed Development may drain into Bishopton Lake. According to data from the EA²³⁸ the area is at significant risk of flooding from reservoir failing. However, it should be noted that reservoir flooding is a rare event with a very low probability of occurrence. Current reservoir regulation, which has been further enhanced by the Flood and Water Management Act 2010, aims to make sure that all reservoirs are

²³⁷ Environment Agency (2022) *Flood Map for Planning*. Available online at: <https://flood-map-for-planning.service.gov.uk/>

²³⁸ Environment Agency (2021) *Reservoir Flood Extents-Wet Dry (National)*. Available at <https://environment.data.gov.uk/dataset/d81646cf-37e5-4e71-bbcf-b7d5b9ca3a1c>

properly maintained and monitored to detect and repair any problem. Therefore, the risk of reservoir flooding is not thought to be high in this area.

- 11.8.12 The Proposed Development is situated within a moderate Countryside Stewardship Water Quality Priority Area, meaning incentives are offered to adopt less pollutive agricultural practices. The Proposed Development is also located in Nitrate Vulnerable Zones (NVZ) S245 and S243. NVZ are designated in areas where high levels of nitrates are measured in watercourses, which generally originate from agricultural practices and industrial pollution.

Potential for effects and mitigation measures

Construction

Potential Effects

- 11.8.13 There is a risk of soil compaction across the whole of the Site Area through operation of machinery and plant to install the solar PV modules. This is most likely to occur along the access tracks which would be the most heavily trafficked area on-site. This could lead to a minor increase in run-off as the soil compaction could reduce the soil's permeability. This, combined with the increase in impermeable areas due to on-site hardstandings (for shipping containers) and the other infrastructure, could lead to increased surface water runoff. This has the potential to increase the 'flashiness' of the catchment during high rainfall events and to temporarily reduce groundwater recharge. This could subsequently increase downstream flood risk.
- 11.8.14 There is a risk of surface water flooding of construction areas. This is most likely to occur during heavy rainfall events which exceed the capacity of any installed drainage system or due to ground conditions resulting in standing water. Impacts associated with flood risk can also occur due to construction activities such as ground reprofiling which have the potential to alter drainage pathways.
- 11.8.15 Excavation of the topsoil would likely be required to lay the proposed access tracks and underground cables. If not appropriately mitigated, this can have a direct impact on the exposed subsoil or rock due to increased risk of erosion. This poses a risk during high rainfall events due to increased siltation of runoff which has the potential to pollute surrounding watercourses. Construction activities across the Site Area that could expose surface soils, such as soil stockpiles, could occur adjacent to the natural land drainage ditches or watercourses that are located within various parts of the Site Area. Therefore, there is the potential for sediment laden run-off to enter these watercourses directly.
- 11.8.16 Alongside siltation pollution, there is a low risk of chemical spillages/leakages from construction activities or vehicles. If this were to occur, it would have the potential to soak through the subsoil and into the groundwater leading to changes in the in-stream hydrochemistry. Alternatively, it could be entrained with surface water runoff into the watercourses surrounding the Site Area. These risks are considered low, providing that refueling occurs off-site and

appropriate emergency plans are put in place to deal with potential spill events.

- 11.8.17 As the Site Area drains overland through Newton Ketton Meadow (SSSI) and passes through Teesmouth and Cleveland Coast (Ramsar Site), any flood risk increase or water quality decrease carries the risk of harming protected areas of rare biodiversity. Decreased water quality also has the risk of damaging the biodiversity of Bishopton Lake.

Mitigation

- 11.8.18 An Outline EMP will be produced as part of the DCO application which will outline the environmental mitigation measures to be implemented during the construction phase. The measures, outlined in the Outline EMP will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. The Outline EMP will include supplementary outline management plans which would later be included in full within the CEMP including an Outline CTMP.
- 11.8.19 To reduce soil compaction during the construction phase, a CTMP will be adopted to minimise the volume and number of journeys required. This would reduce the concentration and distribution of soil compaction which would help minimise any loss of groundwater recharge.
- 11.8.20 An FRA will be prepared for the Proposed Development and will be appended to the ES. The FRA will outline the existing flood risk and any necessary mitigation. This would include locating critical infrastructure, such as the solar PV modules and the substation, outside of the flood zone and ensuring that solar PV modules are raised above the predicted maximum flood depth for the 100 year plus climate change scenario. Where it is proposed that low risk infrastructure (solar PV modules) are located in the Flood Zones, the potential risk and proposed mitigation measures will be discussed and agreed with the LLFA during engagement with statutory bodies. To mitigate this risk, we will seek to define the flood level using existing flood risk data and ensure that the lowest point of electrical risk is raised above this design flood level, including a suitable freeboard. In addition to this, the supports to the Solar PV modules will be designed to minimise any potential impact on flood flow regimes, whilst at the same time having the structural integrity to prevent a failure during a flood event. The FRA will include a review of fluvial, pluvial, groundwater and reservoir flooding using publicly available mapping and other resources online. The EA and LLFA will be consulted to acquire any historic information or modelling data where relevant.
- 11.8.21 An Outline Surface Water Drainage Strategy will be included as part of the FRA which will be appended to the ES to manage any increase in surface water runoff which will likely consist of landscaping to intercept runoff and perimeter swales to store any excess runoff predicted. The LLFA will be consulted on standards and requirements, and as well to present and confirm the approach taken for the Proposed Development. The swales will provide a safeguard to manage the runoff volume during both the construction and

operational phases of the Proposed Development. The combined use of permeable access tracks and vegetation to reduce soil compaction and increase infiltration combined with SuDS techniques to control the rates of overland flow aims to mitigate the risk of increased downstream flooding.

- 11.8.22 When constructing the access tracks, the lengths of open excavations would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion/siltation. These would be constructed on existing farm tracks that are already compacted and using existing field access points, where possible. Gravel material will be used as opposed to tarmac to allow a level of infiltration through the tracks, better representing the baseline soil conditions. If scour or siltation could occur on steeper sections of the site, silt traps, soil bunds and grass filter strips would be used to capture any sediment, preventing polluted runoff from entering any watercourses draining the site. These management measures will be detailed in the Outline Surface Water Management Plan which will be appended to the ES.
- 11.8.23 Underground cable routes would be designed and installed to ensure a low risk of pollution from this activity. As outlined in Chapter 2, it is anticipated that a cable plough would be used to install the 132kV cables, but it is likely that some horizontal directional drilling would be required in more constrained locations. Excavations required for cable installation will be undertaken in a manner as to minimise time which subsoil layers are exposed. Soil stockpiles would be managed to contain sediment to that locality, preventing pollution of watercourses. In addition, the ground would be restored as quickly as possible following construction and existing vegetation reinstated.
- 11.8.24 To reduce the potential impacts in relation to pollution from construction activities and vehicles, best practice mitigation measures would be implemented. These include measures such as bunding of storage and refueling areas, disposal of solid and liquid waste off-site, cleaning of vehicles to be carried out off-site and the use of spill kits and absorbent mats. Construction activities would be undertaken in accordance with best practice measures and any measures, commitments and actions identified to manage environmental effects during construction would be contained with the Outline EMP and carried forward to the CEMP.
- 11.8.25 The mitigation measures outlined in this section would reduce the potential effects in relation to hydrology and flood risk. The aforementioned mitigation measures for soils are relevant for ensuring minimal impacts upon water quality from increased siltation or pollutants. Pollution risk will be reduced through best management practices and siltation levels reduced using vegetation cover and silt traps. This will improve the water quality running off-site and therefore the risk posed to the health of the surrounding WFD water bodies, surrounding SSSIs, lakes and Ramsar site will be reduced. These measures, as identified in the Outline EMP, would be carried forward to the CEMP for the Proposed Development. Meanwhile, vegetation and SuDS design will increase onsite attenuation, infiltration and reduce the rates of overland flow, reducing the flood risk posed downstream of the Proposed Development. These measures will be presented within the Surface Water Drainage Strategy which will be appended to the ES.

- 11.8.26 With the implementation of the mitigation measures presented above, it is not likely that significant effects would occur in relation to hydrology and flood risk during the construction phase. Therefore, it is proposed that all aspects of hydrology and flood risk are scoped out of the ES. As described above, a combined FRA and an Outline Surface Water Drainage Strategy and a WFD assessment will accompany the ES. The mitigation measures presented within this section will be encapsulated within the design and/or Outline EMP and will be included within the ES.

Operation

Potential Effects

- 11.8.27 The Proposed Development would result in a small increase of impermeable areas through the construction of a substation and supporting infrastructure. Additionally, the regular use of semi-permeable or permeable maintenance tracks may cause soil compaction over time, decreasing soak away potential leading to increased runoff. An increase in impermeable area on-site leads to a reduction in infiltration and an increase in surface water runoff. This means rainwater could reach rivers faster, carrying a larger volume of water, subsequently increasing downstream flood risk. However, the proposed impermeable area is very small relative to the size of the Proposed Development, and it is unlikely to lead to a significant increase in flood risk. The proposed solar PV modules themselves are thought to have a limited impact on the surface water runoff regime of the Site Area as due to the tilt of the solar PV modules that are raised above ground, rainwater can still reach the existing vegetation underneath.
- 11.8.28 The layout of the solar PV modules would also be designed to minimise the risk of local scour problems. If the final design of the Proposed Development utilises tracking solar PV modules, this would allow water to drip from the solar PV modules along the length of each row at certain times and will prevent high velocity flow of rainwater from scouring the soil below the solar PV modules.
- 11.8.29 The EA flood maps indicate that the site is largely situated within Flood Zone 1 and is therefore considered to not be at a significant risk of river flooding. Two areas are within Flood Zone 3 associated with Little Station Beck (NGR: 434159, 521023) and Bishopton Beck (NGR: 436070, 521592) respectively. The flood extent associated with the Bishopton Beck is immediately adjacent to the proposed Solar PV Modules but conservatively has been assumed to encroach upon the solar PV modules. The Flood Zone for Little Stainton Brook indicates the flooding occurs at a sharp turn in the watercourse. A request for flood risk data at these locations will be submitted to the EA to acquire flood levels prior to submission of the DCO application. As solar PV modules are located within the Flood Zone 3, there is the potential for a slight reduction in flood storage as a result of the supporting framework for the solar PV modules and any associated infrastructure/tracks. This has the potential to increase the risk of flooding outside of Flood Zone 3.

- 11.8.30 A review of the EA surface water flood risk map indicates that the majority of the Proposed Development is also at low risk of surface water flooding, with a chance of flooding of less than 0.1% across almost the entire Site Area. The areas that are at a higher risk of flooding have the potential to flood infrastructure during periods of heavy rainfall.
- 11.8.31 During the operational phase of the Proposed Development, the risk of pollution is small. This can come from siltation coming off the site due to soil erosion, chemical spills arising from onsite maintenance or from faults from the Solar PV Modules. Any polluting event on-site is at risk of polluting the Skerne Operational Catchment and the Tees Lower and Estuary operational catchment and the corresponding Ramsar site downstream and the surrounding SSSI.

Mitigation

- 11.8.32 To reduce soil compaction beneath and around the solar PV modules and vegetation will be maintained. The introduction of wildflower meadows, which have deeper root structures than conventional grass will reduce soil compaction overtime while increasing water infiltration and improving biodiversity. The reduction of soil compaction through these methods would minimise any loss of groundwater recharge. An ongoing habitat maintenance plan would be implemented ensure the habitats are maintained and continue to mitigate any operational effects.
- 11.8.33 The impact of the solar PV modules on the existing drainage is expected to be minimal due to their design. The planting of grassland buffer strips and wild flower planting will further work to mitigate additional surface runoff flows. An FRA and Outline Surface Water Drainage Strategy will be provided as described above in Section 11.8.27
- 11.8.34 The proposed building infrastructure, where surface water flow would be impeded, would be located outside of the areas indicated to be at risk of surface water flooding to ensure existing surface water drainage routes are not impeded.
- 11.8.35 Based on the data provided by the EA for fluvial and surface water flood risks, the majority of the Proposed Development is not at significant flood risk and therefore no mitigation measures are required for these areas. In areas that are within the Flood Zone, essential infrastructure will be located higher than the design flood level, taking into account allowances for climate change. The FRA will review the current sources of flood risk and will identify the appropriate flood levels which will be fed into the design and layout of the Proposed Development.
- 11.8.36 To prevent on-site pollution, regular maintenance will be carried out to ensure the continued functionality of the solar PV modules are maintained and that the on-site vegetation is continuing to protect the soil layer. Best practice mitigation methods will be in place such as disposal of solid and liquid waste off-site, the cleaning of vehicles to be carried out off-site and the use of spill kits and absorbent mats to ensure any pollution from maintenance vehicles is minimised.

- 11.8.37 In addition, the conversion of this land to support solar PV modules would result in the reduction of agricultural practices in the area. Any reduction in agriculture would help reduce the amount of diffuse pollution from entering the watercourses. As this area is located within two NVZ, utilising this land as a solar farm will support the objectives of the NVZ designation in reducing nitrate pollution in nearby watercourses.
- 11.8.38 The mitigation measures outlined in this section would reduce the potential effects in relation to hydrology and flood risk. The aforementioned mitigation measures for soils are relevant for ensuring minimal impacts upon water quality from increased siltation or pollutants. Pollution risk would be reduced through best practice measures and siltation levels reduced using vegetation cover and silt traps. This would improve the water quality coming off-site and therefore the risk posed to the health of the surrounding WFD areas, surrounding SSSI, lakes and Ramsar sites will be reduced. Meanwhile vegetation and SuDS design will increase onsite attenuation, infiltration and reduce the rates of overland flow, reducing the flood risk posed downstream of the site.
- 11.8.39 With the implementation of the mitigation measures presented above, it is not likely that significant effects would occur in relation to hydrology and flood risk during the operational phase. Therefore, it is proposed that a separate chapter on hydrology and flood risk within the ES is not required, and a combined FRA and Outline Surface Water Drainage Strategy and a WFD assessment will accompany the ES.

Decommissioning

Potential Effects and Mitigation

- 11.8.40 Management and mitigation measures will be incorporated into the Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities in advance of the commencement of decommissioning.
- 11.8.41 The decommissioning phase of the Proposed Development will comprise activities similar to the construction phase and are not expected to result in any greater effects. Best practice measures will be in place to prevent pollution which will mitigate effects in relation to water quality. The future baseline environment is likely to result in more frequent and intense rainfall and flooding events. This is not considered to result in greater effects during the decommissioning phase compared with the construction phase. All other effects are considered to be no worse than during construction and therefore a separate assessment of the decommissioning phase is proposed to be scoped out.

Summary

- 11.8.42 Table 11.8 summarises each of the hydrology and flood risk aspects and assesses whether they should be scoped in or scoped out of the assessment

in relation to both the construction and operation of the Proposed Development.

- 11.8.43 Documents that will be submitted in support of the DCO are a combined FRA and outline surface water drainage strategy and a WFD assessment.

Table 11.8 Summary of Hydrology assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Water quality from siltation of runoff and pollution events (spillages)	Scoped out	Scoped out	Scoped out	<p>During the construction phase, earthworks and excavations would be minimal. On steep sections silt traps, soil bungs and grass strip filters would be used to reduce any scour. Best practice mitigation measures would be implemented as part of the Outline EMP, and CEMP, to reduce the likelihood of pollution of watercourses/groundwater and effects would not be significant.</p> <p>During the operational phase, the passive and non-polluting nature of the Proposed Development means that effects would be not significant. Maintenance would be minimal and best practice mitigation would be implemented to ensure no pollution incidents occur.</p> <p>Decommissioning of the Proposed Development will comprise activities similar to the construction phase and is not expected to result in any greater effects. The Framework DEMP will set out the general principles to be followed during decommissioning of and these measures, commitments and actions will be carried forward to a detailed DEMP, to prevent pollution which will mitigate effects in relation to water quality.</p>
Designated Sites	Scoped out	Scoped out	Scoped out	<p>No increase in chemical pollutants, siltation events or downstream flooding is expected to occur. Therefore, no impact on designated sites is predicted.</p>
Surface water runoff from soil compaction	Scoped out	Scoped out	Scoped out	<p>Grasses would be used to promote healthy topsoil and stabilise any movement. During construction, site traffic will stick to access roads and a traffic plan would be designed to</p>

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
				<p>minimise site traffic. Solar PV modules, once installed, would have a negligible impact on soil compaction.</p> <p>To reduce soil compaction beneath and around the solar PV modules and vegetation will be maintained.</p>
Pluvial Flooding	Scoped out	Scoped out	Scoped out	<p>During the construction and operation phases, the use of SuDS and improved vegetation would act to improve infiltration, attenuation and drainage. SuDS measures would be used to attenuate any loss of impermeable area from infrastructure and buildings.</p>
Fluvial Flooding	Scoped out	Scoped out	Scoped out	<p>The majority of the Site Area is located in a low flood risk area and as such, mitigation measures are not required. Where solar PV modules are to be located within the Flood Zone, the impact will be minimal as the solar PV modules and all electrical connectors will be located above the design flood level, including a suitable freeboard.</p>

11.9 Major accidents and disasters

Introduction

11.9.1 The EIA Regulations Schedule 4 Section 5 requires a developer to assess ‘the expected significant effects (on the environment) arising from the vulnerability of the Proposed Development to “major accidents or disasters” that are relevant to that development’.

11.9.2 For the purpose of this EIA Scoping Report, the following definitions from the IEMA Major Accidents and Disasters in EIA: A Primer²³⁹ (hereafter referred to as the ‘IEMA Primer’) have been adopted:

- Accident – something that happens by chance or without expectation;
- Disaster – a natural hazard (e.g., earthquake) or a man-made / external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the client or its appointed representatives to manage;
- Risk – the likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur;
- Risk event – an identified, unplanned event, which is considered relevant to the proposed development and has the potential to result in a major accident and / or disaster, subject to its potential to result in a significant adverse effect on an environmental receptor; its potential to result in a significant adverse effect on an environmental receptor;
- Vulnerability – describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 Schedule 4 Section 5, vulnerability refers to ‘exposure and resilience’ of the proposed development to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact; and
- Significant environmental effect (in relation to a major accident and / or disaster assessment) – includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.

11.9.3 The aim of the scoping stage, as described by the IEMA Primer, is ‘to determine in more detail whether there is potential for significant effects as a result of major accidents and/or disasters associated with a development, and the resulting scope of and approach to the assessment if required.’

²³⁹ IEMA (2020). *Major Accidents and Disasters in EIA: A Primer*. Available at: <https://www.iema.net/resources/reading-room/2020/09/28/major-accidents-and-disasters-in-eia-an-iema-primer>

11.9.4 A risk identification screening exercise has been undertaken and is defined in Tables 11.10 and 11.11. The outcome this exercise demonstrates that all possible major accidents and/or disasters are adequately covered by existing design measures or compliance with legislation and best practice. As a result, major accidents and disasters have been scoped out of the EIA for the construction, operation and decommissioning of the Proposed Development.

Relevant legislation, policy and guidance

11.9.5 The scoping review has considered the following appropriate policy, legislation, and guidance for major accidents and disasters:

- Overarching NPS for Energy (EN-1): Section 4.11 (Safety)²⁴⁰;
- County Durham Local Plan, Policy 28: Safeguarded Areas²⁴¹; and
- IEMA Major Accidents and Disasters in EIA: A Primer²⁴².

Baseline conditions

11.9.6 Table 11.9 details the baseline data sources used to inform the identification of potential risks. The Cabinet Office National Risk Register of Civil Emergencies (2020 Edition)²⁴³ and the County Durham and Darlington Local Resilience Forum Community Risk Register²⁴⁴ have also been used to inform the identification of potential major accidents and natural disasters relevant to the Proposed Development.

11.9.7 A full description of the Proposed Development is provided in Chapter 2.

Table 11.9 Baseline data sources

Baseline data	Source of data
Potential risks	<ul style="list-style-type: none"> • County Durham and Darlington Local Resilience Forum Community Risk Register • National Risk Register
Control of Major Accidents and Hazard (COMAH) sites	<ul style="list-style-type: none"> • Health & Safety Executive website & COMAH search tool
Flooding	<ul style="list-style-type: none"> • EA flooding data
Fire risk	<ul style="list-style-type: none"> • Fire and Rescue Service statistics on Gov.uk
Traffic	<ul style="list-style-type: none"> • Crashmap website

²⁴⁰ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf
²⁴¹ Durham County Council (2020). *County Durham Plan*. Available online at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-pdf/CountyDurhamPlanAdopted2020vDec2020.pdf?m=637725862605900000>
²⁴² IEMA (2020). *Major Accidents and Disasters in EIA: A Primer*. Available at: <https://www.iema.net/resources/reading-room/2020/09/28/major-accidents-and-disasters-in-eia-an-iema-primer>
²⁴³ Gov.uk (2020) *National Risk Register*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf
²⁴⁴ Durham County and Darlington Local Resilience Forum (2021). *Community Risk Register*. Available at: <https://www.ddfire.gov.uk/sites/default/files/2022-03/Community%20Risk%20Register%2022-23.pdf>

Baseline data	Source of data
Unexploded Ordnance	<ul style="list-style-type: none"> Zetica online UXO map

Potential for effects and mitigation measures

11.9.8 To determine the risk of a significant effect, the likelihood of an event is taken into consideration, followed by the potential consequence should the event occur. In examining the consequence, the following is considered:

- the geographic extent of the effects of the risks. Effects beyond the boundary of the proposed development are more likely to be considered significant;
- the duration of the effects from the risks. Effects which are permanent (i.e., irreversible) or long lasting are more likely to be considered significant;
- the severity of the effects in terms of number, degree of harm to those impacted and the response effort required. Effects which trigger the mobilisation of substantial civil emergency response effort are more likely to be considered significant;
- the sensitivity of the identified receptors; and
- the effort required to restore the environment. Effects requiring substantial clean-up or restoration efforts are more likely to be considered significant.

11.9.9 In addition, any embedded mitigation measures within the Proposed Development will be taken into consideration to determine if, through them, the risk is mitigated.

11.9.10 The IEMA Primer also identifies significance, based on criteria adopted from Annex VI of the Seveso III Directive²⁴⁵, a Directive which details the general classifications and labelling requirements of dangerous substances and preparations.

11.9.11 Using this reference, the significance threshold for the Proposed Development is set at anything which causes loss of life or permanent injury and/or long-lasting damage to an environmental receptor.

11.9.12 Tables 11.10 and 11.11 set out details of potential risks and any mitigation identified. A summary of the potential risk events which have been scoped in to and out of the assessment for construction, operation and decommissioning are set out below in Table 11.12.

²⁴⁵ European Commission (2012). *Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EC Text with EEA relevance*. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32012L0018>

Construction

11.9.13 The construction of the Proposed Development has the potential for limited interactions which may give rise to major accidents and/or disasters. These interactions are likely to principally relate to the following construction effects set out in Table 11.10.

Table 11.10 Major accidents and disasters screening matrix (construction)

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Flooding	Flash flooding Extreme weather event and/or flash flooding leading to a pollution event	Designated sites	Section 11.7 Hydrology states that the majority of the Site Area is located within Flood Zone 1 (less than a 1 in 1000 AEP of flooding from main rivers) and is therefore considered to not be at a significant risk of river flooding. The majority of the Site Area is also at low risk of surface water flooding, though a few areas are at a higher risk. There is also a	Damage to habitats and injury/fatality of species individuals	Section 11.7 Hydrology sets out mitigation associated with downstream flooding risk. These include: <ul style="list-style-type: none"> An Outline EMP will be produced as part of the DCO application which will outline the environmental mitigation measures to be implemented during the construction phase. The measures, outlined in the 	No

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>risk of flooding from failure of nearby small reservoirs, though this is considered a very unlikely event.</p>		<p>Outline EMP will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.</p> <ul style="list-style-type: none"> • Minimising erosion and siltation by reduce the time of open workings; • The Outline EMP will include supplementary outline management plans which would later be included in full 	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
<p>Severe weather</p> <p>Fire</p>	<p>Localised flooding</p> <p>Fire caused by construction</p>	<p>See Flooding section for baseline, mitigation and conclusion.</p> <p>Designated sites,</p>	<p>From 2021-2022, the fire service responded</p>	<p>Fatality/injury to public</p>	<p>within the CEMP including an Outline CTMP. The CTMP is to reduce vehicle journeys and resulting soil compaction;</p> <ul style="list-style-type: none"> • A combined FRA and an Outline Surface Water Drainage Strategy and a WFD assessment will accompany the ES; and • Best practice pollution prevention guidelines during construction. <p>In order to manage the risk of fire on the</p>	<p>No</p>

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
	<p>activities or construction plant</p> <p>Wildfire spreading to construction machinery</p> <p>Lightning strike causing a fire</p>	<p>Local community</p>	<p>to 629 accidental fires and 126 deliberate fires associated with outdoor equipment and machinery. They also responded to 9278 accidental and 14465 deliberate grassland, woodland and crop fires as well as over 12,000 other outdoor fires²⁴⁶. COMAH sites have been identified within 5 km of the Proposed Development, including:</p> <ul style="list-style-type: none"> • Prefere UK Resins Limited, 2.5 km from the Proposed Development, is an 	<p>Damage to habitats and injury/fatality of species individuals.</p>	<p>construction site, three types of measures will be followed:</p> <ul style="list-style-type: none"> • Passive protection measures such as adequate maintenance and emergency intervention plans; • Monitoring measures such as smoke, flame and heat detection; and • Suppression and containment measures such as inert or clean fire suppression agents. <p>Both COMAH sites identify the potential major accidents which</p>	

²⁴⁶ Gov.uk (2022) Primary fires, fatalities and non-fatal casualties in outdoor primary locations and secondary fires by motive and location, England. Available from: <https://www.gov.uk/government/statistical-data-sets/fire-statistics-data-tables#non-dwelling-fires-attended> [last accessed: 05/09/2022]

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>upper tier COMAH site which manufactures chemicals which are flammable liquids and gases, hazardous to the aquatic environment and toxic; and</p> <ul style="list-style-type: none"> • INOVYN ChlorVinyls Limited, 3.3 km from the Proposed Development, also an upper tier site, is a plastic and rubber manufacturer involving substances including flammable liquids 		<p>could result from their activities as being accidental release of dangerous substances, explosions and fire. Accidental release of dangerous substances is not considered a significant risk to the proposed development as both COMAH sites are considered distant enough to be unlikely to impact on the construction site (with construction workers having sufficient time to evacuate if required). Fire and explosions from the COMAH sites are also not considered to present a risk to the Proposed Development</p>	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
<p>Transport accidents</p>	<p>Accident associated with a</p>	<p>Local community</p>	<p>and gases, hazardous to the aquatic environment, petroleum products and alternative fuels and self-reactive substances and mixtures and organic peroxides. Information on the Public Information Zones (PIZs), defined as the area where people have the potential to be affected by a major accident, for each COMAH site were not available.</p> <p>Section 11.11 Traffic and Transport states that the Site Area is</p>	<p>Fatality/injury to public</p>	<p>during construction due to the distance of the COMAH sites from the site and the fire control measures outlined for the COMAH sites including fire detection systems, automatic shutdown and isolation systems.</p> <p>Section 11.11 Traffic and Transport states that the change in</p>	<p>No</p>

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
	construction vehicle		located in a rural setting with a combination of A roads, including the A1(M) and A167, and rural roads used to access the various locations within the site. Crashmap data has shown there are no accident clusters or common trends with just five accidents of varying severity recorded in the vicinity of the Proposed Development between 2017-2021.		traffic flows is expected to be within daily variation meaning there should be no significant increase in potential road accidents and the CTMP will minimise the impact on severance by carefully managing access.	
System failures	Damage to a utility pipe/cable during construction	Designated sites Construction workers	There are multiple utilities crossing the Site Area including high pressure gas mains, water pipes,	Fatality/injury to public Damage to habitats and	Prior to construction, the design team and the Principal Contractor will review the utilities plans and use them to	No

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Pollution incidents	<p>Pollution of a watercourse by vehicle or plant fuel spillage</p> <p>Other ground contamination</p>	<p>Designated sites</p> <p>Local community</p>	<p>No major surface water courses are located within the Site Area.</p> <p>The geological map does not indicate the presence of</p>	<p>telecoms cables, electrical cables and drainage.</p> <p>injury/fatality of species individuals</p> <p>Soak through the subsoil and into the groundwater leading to changes in the in-stream hydrochemistry</p>	<p>inform the plans for the proposed works to ensure all known utilities are avoided. In the event of damage to a utility during construction, procedures detailed in the Outline EMP would be followed including contacting the relevant utility company and emergency procedures to ensure the safety of construction workers.</p> <p>To reduce the potential impacts in relation to pollution from construction activities and vehicles, best practice mitigation measures would be implemented. These</p>	<p>No</p>

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>made/artificial ground within the site. As the Site Area is currently used for agricultural practices, and the Proposed Development will require the installation of shallow foundations, there is very low potential for contamination (limited to land contamination associated with agricultural activities on-site and the presence of the local farm holdings immediately off-site).</p>		<p>include measures such as bunding of storage and refuelling areas, disposal of solid and liquid waste off-site, cleaning of vehicles to be carried out off-site and the use of spill kits and absorbent mats. Construction activities would be undertaken in accordance with best practice measures and in line with a CEMP.</p> <p>An FRA will be prepared for the Proposed Development and will be submitted as part of the ES. The FRA will outline the existing flood risk and</p>	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Unexploded Ordnance (UXO)	Explosions	Designated sites Local community	A review of the Zetica online UXO map indicates low potential of UXO. Based on	Fatality/injury to public	any necessary mitigation. A land quality focused preliminary risk assessment (PRA - Desk Top Study) will be prepared and submitted with the ES as a supporting document and will inform a conceptual site model for the site which will be used to establish risk posed by pollution linkages and need for further assessment and mitigation.	No

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>anticipated ground conditions and the history of the site and local area, the level of risk is considered low and a detailed UXO survey is not considered necessary.</p>			

Operation

11.9.14 The operation of the Proposed Development has the potential for limited interactions which may give rise to major accidents and/or disasters. These interactions are likely to principally relate to the following operational effects set out in Table 11.11.

Table 11.11 Major accidents and disasters screening matrix (operation)

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Flooding	Extreme weather event Flash flooding	Designated sites Local community	Section 11.7 Hydrology states that the majority of the Site Area is located within Flood Zone 1 (less than a 1 in 1000 AEP of flooding from main rivers) and is therefore considered to not be at a significant risk of river flooding. Two areas are located within Flood Zone 3 (an area having less than a 1 in 100 AEP of flooding from main rivers) which may encroach upon the panels. The majority of	Damage to habitats and injury/fatality of species individuals	Section 11.7 Hydrology states that, in order to reduce the risk of soil compaction around the solar PV modules (which could lead to increased run off and flooding), vegetation will be maintained. Risks would also be designed out, including the location of infrastructure outside areas shown to be at risk of surface water flooding. An outline surface water drainage strategy will be included to manage any	No

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Severe weather	Localised flooding Lightning strike causing a fire	Designated sites Local community	the Site Area is at low risk of surface water flooding, though a few areas are at a higher risk. There is also a risk of flooding from failure of reservoirs within 10km from the Proposed Development, though this is considered a very unlikely event. During operation there will be a small increase in impermeable surfaces as a result of the Proposed Development.	See separate flooding and fire sections.	increase in surface water runoff which will likely consist of landscaping to intercept runoff and perimeter swales to store any excess runoff, addressing any potentially faster hydrograph response due to surface water run-off from solar PV modules.	No
			See flooding section for flooding baseline. See fire section for fire baseline.		See flooding section for flooding mitigation. See fire section for mitigation for a fire.	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
Fire	Battery fire Lightning strike causing a fire Wildfire	Designated sites Local community	From 2021-2022, the fire service responded to 629 accidental fires and 126 deliberate fires associated with outdoor equipment and machinery. They also responded to 9278 accidental and 14465 deliberate grassland, woodland and crop fires as well as over 12,000 other outdoor fires ²⁴⁶ . COMAH sites have been identified within 5 km of the Proposed Development, including: <ul style="list-style-type: none"> • Prefere UK Resins Limited, 2.5 km from the proposed development, is an upper tier COMAH site which 	Fatality/injury to public Damage to infrastructure Damage to habitats and injury/fatality of	Both COMAH sites identify the potential major accidents which could result from their activities as being accidental release of dangerous substances, explosions and fire. Accidental release of dangerous substances is not considered a significant risk to the Proposed Development as both COMAH sites are considered distant enough to be unlikely to impact on the Site Area and there will be no permanent workers during the operation of the Proposed Development. Fire and explosions from the COMAH sites are also	No

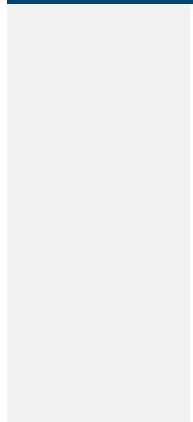
Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>manufactures chemicals which are flammable liquids and gases, hazardous to the aquatic environment and toxic; and</p> <ul style="list-style-type: none"> • INOVYN ChlorVinyls Limited, 3.3 km from the Proposed Development, also an upper tier site, is a plastic and rubber manufacturer involving substances including flammable liquids and gases, hazardous to the aquatic environment, petroleum products and alternative fuels and self-reactive substances and 	<p>species individuals</p> <p>Disruption to local networks, infrastructure and community</p>	<p>not considered to present a risk to the site during construction due to the distance of the COMAH sites from the site and the fire control measures outlined for the COMAH sites including fire detection systems, automatic shutdown and isolation systems.</p> <p><u>Battery Fire</u> Components of the Proposed Development, including the BESS, will be installed in accordance with the relevant Fire regulations and guidance from the Health and Safety Executive. An outline Battery Safety Management Plan (oBSMP) will be prepared</p>	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<p>mixtures and organic peroxides.</p> <p>Information on the Public Information Zones (PIZs), defined as the area where people have the potential to be affected by a major accident, for each COMAH site were not available.</p>		<p>and submitted with the DCO application. The oBSMP will detail the regulatory guidance reviewed to ensure that all safety concerns around the BESS element of the Proposed Development are addressed in so far as is reasonably practicable. The operational phase of the Proposed Development would involve:</p> <ul style="list-style-type: none"> • routine maintenance and servicing of equipment to ensure the safe operation of equipment; • fire equipment and notices will also be provided onsite for the availability of 	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
					<p>personnel and would be regularly inspected and serviced in accordance with relevant Fire Regulations;</p> <ul style="list-style-type: none"> • there will be extensive monitoring systems in place to detect any discharge of gas that could cause a fire; • operations and Management will also monitor the solar farm for any fire risk and maintain elements to minimise fire risk; and • routes and equipment will be maintained to ensure that response to fire is expedient, and the solar farm would be disconnected 	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
					<p>from the network in the event of a fire.</p> <p>The ES will include details on the measures incorporated into the design to minimise any potential impact of Proposed Development resulting from a fire. The oBSMP will detail the regulatory guidance reviewed to ensure that all safety concerns around the BESS element of the Proposed Development are addressed in so far as is reasonably practicable.</p> <p><u>Lightning Strike</u> The following safety measures to prevent fires caused by lightning strikes will be in place during the</p>	

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
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operation of the Proposed Development:

- Each row of panels will be earthed to ground any lightning strike;
- Repair would be carried out by the owner/operator; and
- The solar PV modules are designed to withstand lightning.

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
<p>Transport accidents</p>	<p>Glint (momentary flash of bright light) and glare (continuous source of bright light) from the sun reflecting off the solar panels blinding drivers</p>	<p>Local community</p>	<p>The Proposed Development is located in a rural area composed of open fields and arable land. There are currently no significant reflectors in situ within most or all of the Site Area. Receptors include:</p> <ul style="list-style-type: none"> • National, regional, and local roads located within 1km of the Site Area; • A number of dwellings located within 1km of the Site Area; 	<p>Fatality/injury to public</p>	<p>Modern solar PV module design creates a similar level of glint and glare to commonly encountered sources within an outdoor environment including still water, greenhouses and windows on buildings. A Solar Photovoltaic Glint and Glare Assessment will be prepared and will cover all risks associated with the potential for glint and glare.</p>	<p>No</p>

Risk Event	Source and/or Pathways	Receptor	Baseline Conditions	Reasonable worst-case consequence if event did occur	Mitigation	Could this lead to a major accident or disaster with mitigation in place?
			<ul style="list-style-type: none"> A section of railway line located within 500m of the Site Area; and Teesside International Airport located within 15km of the Site Area. 			

Decommissioning

- 11.9.15 The decommissioning of the Proposed Development has the potential for limited interactions which may give rise to major accidents and/or disasters. These interactions are likely to principally reflect the construction effects set out in Table 11.10, although to a lesser extent.
- 11.9.16 Management and mitigation measures will be incorporated into the Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities in advance of the commencement of decommissioning
- 11.9.17 Therefore, decommissioning activities are not considered likely to result in a major accident or disaster.

Summary

- 11.9.18 It is not anticipated that the construction, operation or decommissioning of the Proposed Development would result in significant effects in the context of major accidents and/or disasters. Mitigation measures will be included in the Outline EMP, oBSMP, FRA with Outline Surface Water Drainage Strategy, Solar Photovoltaic Glint and Glare Assessment and Framework DEMP.
- 11.9.19 Table 11.12 summarises the risk topics of the major accidents and/or disasters assessment and whether each should be scoped in or scoped out of the assessment in relation to the construction, operation and decommissioning of the Proposed Development.

Table 11.12 Summary of major accidents and disasters scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out (see Table 11.2 for full details)
Flooding	Scoped out	Scoped out	Scoped out	Flooding mitigation set out in Section 11.7 Hydrology sufficient to scope out risk.
Severe weather	Scoped out	Scoped out	Scoped out	Flooding mitigation set out in Section 11.7 Hydrology and fire mitigation set out in fire section sufficient to scope out risk.
Fire	Scoped out	Scoped out	Scoped out	Mitigation to be set out in fire management plans, including oBSMP, considered sufficient to scope out risk.
Transport Accidents	Scoped out	Scoped out	Scoped out	Given the nature of the Local Road Network and baseline data trends, change in traffic is expected to be within the daily variation in traffic flows and access to use established points of access. CTMP will ensure access is appropriately managed. Mitigation for glint and glare considered to be adequately covered in separate Glint and Glare Assessment.
System failures	Scoped out	Scoped out	Scoped out	Mitigation set out in Outline EMP and Framework DEMP are considered sufficient to scope out risk of damage

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out (see Table 11.2 for full details)
				to utilities during construction and decommissioning.
Pollution incidents	Scoped out	Scoped out	Scoped out	Mitigation set out in Outline EMP and Framework DEMP considered sufficient to scope out risk of pollution incidents and decommissioning.
Unexploded Ordnance (UXO)	Scoped out	Scoped out	Scoped out	The site has low potential for UXO.

11.10 Noise and vibration

Introduction

- 11.10.1 This section of the EIA Scoping Report describes the baseline conditions for the Site Area relating to noise and vibration and sets out the potential impacts that could occur during the construction, operation and decommissioning of the Proposed Development. It also gives a description of the measures that will be included in the design of the Proposed Development to mitigate or minimise these impacts.
- 11.10.2 During construction and decommissioning, noise and vibration could arise from onsite activities, such as the construction or decommissioning of onsite access tracks, solar PV modules and the substation and associated infrastructure. The movement of construction traffic, both onsite and travelling on public roads to and from the Proposed Development, represents a potential source for consideration.
- 11.10.3 An Outline EMP will accompany the DCO application, which will include measures to control noise as defined in BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'²⁴⁷, and measures to control vibration as defined in Section 8 of BS 5228:2009+A1:2014 'Part 2: Vibration'²⁴⁸ will be adopted where reasonably practicable. These measures will be carried forward to a CEMP which will be produced by the appointed contractor and agreed with the relevant local planning authorities prior to construction phase.
- 11.10.4 Travel planning and HGV management mitigation measures during the construction stage will be incorporated into an Outline CTMP, which will accompany the Outline EMP. In addition, the principles agreed to minimise disruption during construction will be reviewed and applied during decommissioning. These measures will be outlined in the Framework DEMP, which will accompany the DCO application, and will be carried forward to a detailed DEMP. The detailed DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.
- 11.10.5 During the operation of the Proposed Development, the main potential source of noise could be associated with operational traffic, including light vehicle traffic for maintenance purposes and ad-hoc deliveries by an HGV, and on-site supporting infrastructure, such as inverters and transformers.
- 11.10.6 Due to the proposed implementation of mitigation, noise and vibration is scoped out of the assessment.

Relevant legislation, policy and guidance

- 11.10.7 The scoping review has considered the following appropriate policy, legislation and guidance for noise:

²⁴⁷ British Standards Institute (2014). *BS 5228:2009+A1:2014 – Code of practice for noise and vibration control on construction and open sites*. London: BSI

²⁴⁸ British Standards Institute (2014) *BS 5228:2009+A1:2014 – Description and environment of environmental noise – Part 2: Vibration*. London: BSI

- Overarching NPS for Energy (EN-1): Section 5.11 (Noise and Vibration);
- NPS for Renewable Energy Infrastructure (EN-3)²⁴⁹, (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses;
- NPPF 2021²⁵⁰;
- The Noise Policy Statement for England (2010)²⁵¹;
- Stockton-on-Tees Borough Council Local Plan; ENV7: Ground, Air, Water, Noise and Light Pollution²⁵²;
- Planning Practice Guidance: Noise²⁵³;
- BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise; and
- Professional Practice Guidance on Planning and Noise²⁵⁴.

Baseline conditions

11.10.8 The Proposed Development is in a rural area of generally low population density, except for individual settlements such as Bishopton and Redmarshall to the north and Carlton to the east. Potential noise-sensitive dwellings are located within these settlements or as more isolated properties or farms. The nearest identified noise-sensitive receptors to the Proposed Development are listed below and can be identified in Figures 2.3 – 2.8:

- **Site A: Brafferton -**
 - Properties in towns and settlements: Brafferton village 6km to the west, Newton Ketton 3km to the east;
 - Local farms: Lovesome Hill Farm both within 100m north and west, High House 150m north, High Grange 500m north and East Ketton immediately south; and
 - Ecological receptors: there are no onsite ecological receptors. The nearest designated sites are Redcar Field SSSI which is approximately 650m to the west of Site A and Newton Ketton Meadow SSSI located approximately 900m to the east of Site A.
- **Site B: around Hauxley Farm -**

²⁴⁹ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²⁵⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²⁵¹ Defra (2010). Noise Policy Statement for England. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

²⁵² Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

²⁵³ Department for Levelling Up, Housing and Communities (2014) (as amended). *Planning Practice Guidance: Noise*. Available at: <https://www.gov.uk/guidance/noise--2>

²⁵⁴ Association of Noise Consultants, Institute of Acoustics, Chartered Institute of Environmental Health (2017). *Professional Practice Guidance on planning and noise*. Available at: <https://www.association-of-noise-consultants.co.uk/propg/>

- Properties in towns and settlements: there are no nearby towns or settlements;
 - Local farms: Oat Hill Farm immediately west, Stainton Hill House immediately north, Fir Tree Farm approximately 300m south west and Hauxley Farm which lies in the centre of Site B; and
 - Ecological receptors: there are no onsite ecological receptors. The nearest site is Newton Ketton Meadow SSSI located approximately 450m to the south of Site B.
- **Site C: Byers Gill Wood -**
 - Properties in towns and settlements: there are no nearby towns or settlements;
 - Local farms: The Mount immediately east, Viewley Hill Farm 350m east, Long Pasture Farm 500m south east and Mount Pleasant Farm which lies in the centre of Site B; and
 - Ecological receptors: Byers Gill Wood and Square Wood within the centre of Site C, Galloping Hill Plantation located east, with Nova Scotia Plantation and Catkill Lane Plantations to the south. The nearest designated site is Newton Ketton Meadow SSSI located approximately 100m to the west of Site C.
- **Site D: Great Stainton -**
 - Properties in towns and settlements: Great Stainton village lies 10m north west;
 - Local farms: Viewley Farm 250m west, Broad Lea farm 400m east, Woogra Farm 300m east and Mount Pleasant Farm 250m south west;and
 - Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Newton Ketton Meadow SSSI located approximately 1.5km to Site D.
- **Site E: West of Bishopton -**
 - Properties in towns and settlements: residential properties approximately 40m north and the small rural village Bishopton, along the north-western boundary; and
 - Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Whitton Bridge Pasture SSSI located approximately 2.5km to the east of Site E.
- **Site F: North of Bishopton -**
 - Properties in towns and settlements: Bishopton Village lies approximately 10m south, with Old Stillington village approximately 220m north;

- Local farms: Downland Farm which lies encircled in Site F, Adeux Lodge 300m east, Glebe Farm 500m south-east and West House Farm immediately east; and
- Ecological receptors: there are no onsite ecological receptors. The nearest designated site is Whitton Bridge Pasture SSSI, located approximately 900m to the east of Site F.

Potential for effects and mitigation measures

Construction

Potential Effects

11.10.9 The construction works are of a temporary nature (anticipated to be 12 months) and assessment of the temporary impacts of construction is primarily aimed at understanding the need for dedicated management measures.

11.10.10 The potential effects of the Proposed Development in relation to noise and vibration during construction are likely to include:

- construction traffic, including HGV trips to and from the Site Area; and
- construction activities, including preparatory works, and installation of solar PV modules and supporting equipment.

11.10.11 The nature of most works to construct the Proposed Development is such that activities will generally be limited both in intensity and/or duration, such that significant effects from the associated noise and vibration are considered unlikely.

Construction traffic

11.10.12 There is the potential for noise and vibration effects due to construction traffic, as HGV trips to and from the Proposed Development will be required to deliver materials and equipment. These vehicle trips would be temporary and, the nature of the Proposed Development would not require large scale material removal or delivery. For instance, there is no existing need to remove large amounts of demolition material, spoil, earth etc. from the site, nor is there an existing need for large amounts of construction materials such as concrete to be delivered.

11.10.13 An assessment of estimated construction traffic vehicles generated by the Proposed Development has been undertaken, which calculated approximately 6 HGV trips per site per day (12 trips in total). The Proposed Development is spread across 6 sites. Therefore, a potential worst case increase of 36 trips per day, in each direction, which is determined to be a less than 10% change in current traffic. Further details on this assessment are provided within Section 11.1 Traffic and transport.

11.10.14 Therefore, while there may be short term temporary noise impacts due to construction traffic, it is very unlikely that these would be sufficient to

constitute a significant effect due to the temporary nature, relatively low volume and intensity of movements.

- 11.10.15 Perceptible vibration due to construction traffic is also unlikely, except for situations where construction traffic passes very close (i.e., within a few metres) of residential properties. However, this would only occur for short periods. As such, significant vibration effects due to vibration caused by construction traffic are unlikely due to the low intensity of vehicle movements.

Construction activities

- 11.10.16 Potential noise and vibration effects during the construction and decommissioning phases are likely to include works activities associated with site preparation, plant installation, substation construction, cable laying, and construction-related vehicle trips within the Site Area and along access routes.

- 11.10.17 Direct effects on designated sites are unlikely, the closest ecological receptor is Newton Ketton Meadow SSSI located approximately 100m to the west of Site C.

Mitigation

- 11.10.18 It is proposed that any residual noise and vibration impacts are managed through the implementation of mitigation and management measures through the CEMP. Travel planning and HGV management mitigation measures during the construction stage will be incorporated into a CTMP.

- 11.10.19 An Outline EMP will be produced as part of the DCO application which will outline the environmental and ecological mitigation measures to be implemented during the construction phase. This will include the appointment of an Environmental Clerk of Works to advise and supervise the mitigation measures outlined in the CEMP. For further information on ecological receptors, see Chapter 6 Biodiversity. The measures, outlined in the Outline EMP will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

- 11.10.20 Measures to control noise as defined in Annex B of BS 5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise' and measures to control vibration as defined in Section 8 of BS 5228:2009+A1:2014 'Part 2: Vibration' will be adopted where reasonably practicable. These measures represent 'Best Practicable Means' (BPM) (as defined by section 72 of the Control of Pollution Act 1974²⁵⁵) to manage noise and vibration emissions from construction activities. Measures will be included in the Outline EMP, which will be developed into a CEMP prior to the start of construction.

- 11.10.21 Consequently, this would result in noise and vibration levels from the Proposed Development being below significant levels and it is therefore

²⁵⁵ HMSO (1974) Control of Pollution Act 1974. Available at: https://www.legislation.gov.uk/ukpga/1974/40/pdfs/ukpga_19740040_en.pdf

proposed that the assessment of noise and vibration from construction activities is scoped out of the EIA.

Operation

Potential Effects

11.10.22 The potential effects of the Proposed Development in relation to noise and vibration during operation are likely to result from:

- road traffic to and from the Proposed Development; and
- supporting infrastructure including inverters and transformers, BESS and the on-site substation.

Operational traffic

11.10.23 During the operational phase, it is possible that noise and / or vibration could be generated by road traffic to and from the Proposed Development, as well as by the operation of electrical plant and equipment that would be installed.

11.10.24 It is anticipated that traffic trips to and from the Proposed Development during operation would be minimal and for maintenance purposes only. It is considered that given the volumes, traffic trips generated by the Proposed Development is unlikely to result in significant noise or vibration effects. Further detail about traffic and transport trips is provided in Section 11.11.

11.10.25 As such, noise and vibration effects generated by operational traffic are proposed to be scoped out of the EIA.

Operational activities

11.10.26 During the operational phase, it is possible that noise and / or vibration could be generated by supporting infrastructure that would be installed as part of the Proposed Development.

11.10.27 The solar PV modules and connecting cables do not emit noise, and there are no overhead cables proposed as part of the Proposed Development. However, there is the potential for the BESS and the solar farm supporting infrastructure, such as inverters, transformers, and the on-site substation, to generate some noise during operation.

11.10.28 Inverters will be located towards the middle of the Site Area, within shipping container style storage, and located as far away as possible from neighboring receptors and within the rows of solar arrays.

11.10.29 Full details of any noise generating supporting infrastructure would also be included as part of the ES Proposed Development description, along with further details as to how the design of the Proposed Development has been developed to minimise any adverse impacts on the residential amenity of surrounding occupiers as part of the alternatives assessment. It is not anticipated that any noise impacts arising from plant and supporting

infrastructure would be to levels deemed to be significant, particularly in consideration of the passive nature of solar farm development.

11.10.30 In addition, the nature and type of supporting infrastructure proposed for the Proposed Development is unlikely to generate levels of vibration that would be perceptible at residential receptors.

11.10.31 Given the low levels of noise and vibration anticipated from the Proposed Development, as well as the proximity of receptors to the Site Area, operational noise and vibration impacts are scoped out of the EIA.

Mitigation

11.10.32 There is a low likelihood of noise and vibration resulting from the operational phase of the Proposed Development. Measures to mitigate any noise or vibration from operational activities will be embedded into the design of the Proposed Development.

Decommissioning

Potential Effects

11.10.33 The works involved for the decommissioning phase would be similar or of a lower magnitude/duration than for the construction phase. Therefore, it is considered it would have similar/lower effects and subject to similar management or control procedures, would not require explicit consideration.

Mitigation

11.10.34 A Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development, will also be produced as part of the DCO application. These measures, commitments, and actions, which will include appropriate best practice measures to reduce noise during decommissioning, will be carried forward to a detailed DEMP

11.10.35 On this basis, decommissioning noise and vibration impacts are scoped out of the EIA.

Summary

11.10.36 Based on the nature of the construction, operation and decommissioning of the Proposed Development, it is anticipated that noise and vibration effects would be limited and not significant.

11.10.37 It is proposed that the consideration of noise and vibration from construction, operational and decommissioning traffic and activities within the Proposed Development is scoped out of the assessment with suitable mitigation and management measures secured through the CEMP, CTMP and DEMP.

11.10.38 Table 11.13 summarises each of the noise and vibration aspects whether they should be scoped in or scoped out of the assessment in relation to the construction, operation and decommissioning of the Proposed Development.

Table 11.13 Summary of Noise and vibration assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Noise and vibration from traffic	Scoped out	Scoped out	Scoped out	<p>Construction noise and vibration would be controlled through the measures, commitments and actions secured through the CEMP and CTMP.</p> <p>Operational traffic trips would be minimal and for maintenance purposes only.</p> <p>Effects from decommissioning would be controlled through the measures, commitments and actions outlined in the DEMP.</p>
Noise and vibration from activities	Scoped out	Scoped out	Scoped out	<p>Construction noise and vibration to be controlled through the measures, commitments and actions secured through the CEMP.</p> <p>Placement and type of supporting infrastructure unlikely to generate significant noise and/or vibration.</p> <p>Decommissioning noise and vibration would be controlled through the measures, commitments and actions secured through the detailed DEMP.</p>

11.11 Traffic and transport

Introduction

11.11.1 This section of the EIA Scoping Report describes the baseline conditions for the Site Area relating to traffic and transport, and sets out the potential impacts that could occur during the construction, operation and decommissioning of the Proposed Development. It also gives a description of the measures that will be included in the design of the Proposed Development to mitigate or minimise these impacts.

11.11.2 During construction and decommissioning, traffic and transport impacts could arise from vehicles travelling to and from the Site Area to deliver or collect construction materials, in addition to workforce trips.

11.11.3 During the operation of the Proposed Development, there will be occasional operational traffic, including light vehicle traffic for maintenance purposes and ad-hoc deliveries by an HGV.

Relevant legislation, policy and guidance

11.11.4 The following legislation, regulations and policies have been consulted to inform the scoping review of the Proposed Development in relation to transport impacts during the design development:

- Overarching NPS for Energy (EN-1): Section 5.13 (Traffic and transport)²⁵⁶;
- NPS for Renewable Energy Infrastructure (EN-3)²⁵⁷, (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses;
- NPS for Electricity Networks Infrastructure (EN-5)²⁵⁸, (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS²⁵⁹ includes a section on the need to make the design of access roads an integral part of the site layout;
- NPPF 2021²⁶⁰;
- The Tees Valley Combined Authority Strategic Transport Plan 2020 – 2030²⁶¹;
- Darlington Local Plan (2016-2036)²⁶², Policy IN1 Delivering a Sustainable Transport Network;

²⁵⁶ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²⁵⁷ Department of Energy and Climate Change (2011). *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps-renewable-energy-en3.pdf

²⁵⁸ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

²⁵⁹ Department for Business, Energy and Industrial Strategy (2021). *Draft National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015238/en-5-draft-for-consultation.pdf

²⁶⁰ Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Department for Levelling Up, Housing and Communities (2021). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²⁶¹ Tees Valley Combined Authority (2020). *Strategic Transport Plan 2020-2030*. Available at: <https://tvca.wpenginepowered.com/wp-content/uploads/2020/10/STP-Main-Report-Design-Digital-pages.pdf>

²⁶² Darlington Borough Council (2022). *Darlington Local Plan 2016 – 2036*. Available online at: <https://microsites.darlington.gov.uk/media/2399/local-plan-adopted-feb22v2.pdf>

- Stockton-on-Tees Borough Council Local Plan²⁶³, Policy SD6 Transport and Infrastructure Strategy;
- Planning Policy Guidance, Transport evidence bases in plan making and decision taking²⁶⁴;
- Planning Policy Guidance, Travel Plans, Transport Assessments and Statements²⁶⁵; and
- IEMA Guidelines for the Environmental Assessment of Road Traffic.

Baseline conditions

11.11.5 In considering the impacts, the review looks at the change between the Baseline and the Future Baseline during construction, operational phase and decommissioning of the Proposed Development.

Highway Transport

11.11.6 The Proposed Development is located in a rural area, in between the urban conurbations of Darlington and Stockton on Tees. There are a number of villages within the vicinity of the Site Area including (from west to east) Brafferton, Great Stainton and Bishopton.

11.11.7 The surrounding Strategic Road Network (SRN) is comprised of the A1(M) to the west of Proposed Development boundary, and the A66 to the south. The Proposed Development could also be accessed via the SRN from the A19(T) to the east. The local highway network serving the Proposed Development can be described as follows:

- **Site A: Brafferton**
 - From the A1(M) Junction 59, access to Site A could be via the A167 onto Brafferton Lane. Brafferton Lane is a rural road, subject to the national speed limit, with a footway on one side of the carriageway. From Brafferton Lane, vehicles could connect to High House Lane through the village to access Site A using the existing field access.
- **Site B: Hauxley Farm**
 - It is expected that vehicle access to Site B would via the A1(M) as per Site A, but from Brafferton Lane, vehicles could connect to Lime Lane and Lodge Lane, both rural roads with no footways. An access road is provided off Lodge Lane into the Site B.

²⁶³ Stockton-on-Tees Borough Council (2019). *Stockton-on-Tees Borough Council Local Plan*. Available at: https://www.stockton.gov.uk/media/2518/Local-Plan-2019/pdf/Local_Plan_2019.pdf?m=637810468860870000

²⁶⁴ Department for Levelling Up, Housing and Communities (2015). *Planning Practice Guidance: Transport evidence bases in plan making and decision taking*. Available at: <https://www.gov.uk/guidance/transport-evidence-bases-in-plan-making-and-decision-taking>

²⁶⁵ Department for Levelling Up, Housing and Communities (2014). *Planning Practice Guidance: Travel Plans, Transport Assessments and Statements*. Available at: <https://www.gov.uk/guidance/travel-plans-transport-assessments-and-statements>

- **Site C: Byers Gill Wood**
 - Site C is centrally located within the Site Area and therefore vehicles, depending on their origin, may travel to / from the site via the A1(M) to the north and west, the A66 to the south or the A19(T) from the east.
 - If vehicles access the site from the A1(M) south, they would travel the same route as vehicles travelling to Site B, but from Lodge Lane vehicles could continue to the priority T-junction where Lodge Lane meets Elstob Lane, and travel south on Elstob Lane to access the track into Byers Gill Wood.
 - From the A1(M) north, vehicles could access Elstob Lane by leaving the A1(M) at Junction 60 onto the A689 and connect to Elstob Lane by exiting the Sands Hall roundabout onto Racecourse Road. There is a shorter connection from the A689 via Mordon, but HGV access through Mordon village is restricted.
 - From the A66 to the south, vehicles could connect to the rural roads of Bishopton Lane or Hill House Lane, both of which converge onto Elstob Lane.
 - From the A19(T) to the east, vehicles could access Elstob Lane via the A689 and exit at Racecourse Road, using the same route as those travelling via Junction 60 of the A1(M). Alternatively, they may connect to the A66 and approach from the south, or use local routes through Stockton.
- **Site D: Great Stainton**
 - Site D has similar access routes as Site C, as it is also located off Elstob Lane, opposite Site C.
- **Site E and F: West of Bishopton and North of Bishopton**
 - The existing access into Site E is located off the rural road that connects to Elstob Lane at a priority T-junction and travels through the village of Bishopton. Access into Site F is gained from this same unnamed road through Bishopton village.
 - Access to the sites in Bishopton is expected to be via the same routes described above (A1(M) to the north and west, A66 to the south, and A19-A689 to the east).

11.11.8 Collision data covering the Site Area has been sourced, for the period 2017 to 2021 inclusive, from the Crashmap website. Reviewing the data west to east shows that there have been no recorded collisions in the last five years at the A167 / Brafferton Lane junction. Two slight accidents have been recorded in the last five years at the Lime Lane / Lodge Lane junction, and a slight and serious accident were recorded at the Lodge Lane / Elstob Lane junction. Two slight accidents were also recorded at the A689 / Racecourse

Road junction. The data indicates that there are no clusters of accidents, or common trends.

Walking and Cycling

11.11.9 Due to the location of the scheme in rural Tees Valley, limited footway provision is available alongside the carriageways in the vicinity. However, there is a network of PRow that cross the Site Area, further information can be found in Chapter 9: Land Use and Socio-economics. Similarly, there are a number of advisory cycle routes and bridleways that pass through the Sites A, B, C and D.

Public Transport

11.11.10 There is little public transport provision surrounding the Proposed Development, nonetheless, a section of railway line that runs to Stockton, through Stillington, is located within 500m of the Site Area. Teesside Airport Railway Station is located within 5km of the Site Area, however, there is only one Sunday service from the station per week.

11.11.11 The Site Area is also a zone for the TeesFlex service, a Demand Responsive Bus Service operated by Stagecoach, in partnership with the Tees Valley Combined Authority. This provides a demand responsive service for the residents of villages surrounding the Proposed Development. The frequency of TeesFlex service is dependent on demand so varies day to day. TeesFlex offers connections to Stockton, Darlington, Billingham, and Sedgefield. There are no formal bus stops for this service so pick up and drop off points are based on user demand.

Potential for effects and mitigation measures

Construction

Potential Effects

11.11.12 The construction works are of a temporary nature (12 months), however, during this temporary period the traffic generated by the Proposed Development could have the following effects:

- severance (change in traffic flows);
- driver delay;
- pedestrian and cyclist amenity (change in traffic flows on routes used by pedestrians and cyclists); and
- accidents and safety.

Severance

11.11.13 To understand the scale of potential effects, an estimate of the amount of construction traffic the Proposed Development could generate has been

calculated based on the construction of other Solar Farm developments throughout the UK.

11.11.14 Data from two other JBM UK based Solar Farm Planning Applications sites has been obtained, which showed that for the duration of the construction period, they generated an average of 104 deliveries per 13 hectares of panel area, and each 32 acres of construction took approximately 3 and a half weeks to complete. Applying these factors to the size of each of the solar PV module areas, results in an estimate that each solar PV module area could generate approximately 6 construction (HGV) trips (in and out of each site) per day, during the construction phase (12 trips in total).

11.11.15 The Proposed Development is spread over six sites. Table 11.14 shows possible access route scenarios. It shows the total volume of traffic that could result if all construction traffic approaches all six sites using the same route. An indication has also been provided on the cumulative number of trips on different routes if traffic uses the likely shortest route to each solar PV module area to/from the SRN.

Table 11.14: Possible routes and impact on traffic flow during the construction phase

	Cumulative HGV Trips – Same Route			Cumulative HGV Trips – Assigned to Nearest Route		
	A1(M)	A19 via A689	A66	A1(M) - A167 (A – C)	A19 via A689 (E-F)	A66 (D)
Total Trips in	36	36	36	18	12	6
Total Trips Out	36	36	36	18	12	6
Total number of trips	72	72	72	36	24	12

11.11.16 Table 11.14 forecasts that cumulatively the Proposed Development could add 72 trips per day onto the network if the solar PV module areas are constructed together and the traffic uses the same route. This is a worst-case scenario. Table 11.14 also presents the likely route and shows that the A1(M) is expected to accommodate the largest number of trips, with 18 trips in and out of the Site Area per day expected to travel via the A1(M) (36 trips in total).

11.11.17 To consider whether this potential change in traffic flows would have a severance effect, judgement has to be made on the magnitude of change in accordance with IEMA guidance. The A1, A19 and A66 are all part of the SRN and, within the vicinity of the Site Area, are all dual carriageway routes with high daily average flows. For example, the A1 is subject to a AADF of approximately 40,000 vehicles at Junction 59 (data taken from National Highways online survey data – webtris). The connecting rural roads are relatively lightly trafficked. There is no existing survey data available, but it is

considered that the proposed change in traffic flow (approximately 36 trips per day, in each direction) is still likely to be less than a 10% change in traffic flows on rural routes. A change in traffic of less than 10% is considered to have no discernible environmental effect, given that daily variations in background traffic flow may fluctuate by this amount.

- 11.11.18 Mitigation measures, including travel planning and HGV management during the construction stage, will be incorporated into a CTMP. Therefore, given the forecast change in traffic flow (<10%) and through the application of traffic management messages to be agreed in the CTMP, no significant severance impact is anticipated. It is therefore proposed that the assessment of severance from the construction of the Proposed Development is scoped out.

Driver Delay

- 11.11.19 The IEMA Guidelines note that driver delays are only likely to be 'significant' when the traffic in the network surrounding the development is already at, or close to, the capacity of the system.
- 11.11.20 No survey data of the baseline highway network has been obtained. There are no significant trip generators within the local area so whilst no survey data has been obtained, given the rural nature of the Site Area, it is unlikely that there are capacity issues on the routes providing access to the sites.
- 11.11.21 During the construction phase, it is expected that there will be an average of 6 deliveries per day (12 trips), per solar PV module area. In other schemes of a similar nature, this volume of increased traffic on the network has not been significant and is not expected to have a significant impact on driver delay. Therefore, it is proposed that impacts of driver delay are scoped out of the construction assessment.

Pedestrian and cyclist amenity

- 11.11.22 IEMA guidelines recommend pedestrian and cyclist amenity should be assessed where there is a significant increase in HGV flows on roads used by pedestrians and cyclists. As described within the baseline, limited footway provision is available alongside the carriageways in the vicinity of the Proposed Development which are likely to be used for construction vehicles. Combined with the fact that the change in traffic flows is likely to be low (below 10%), it is not anticipated that pedestrian and cyclist amenity on local roads would be affected by the Proposed Development.
- 11.11.23 It is recognised that there are villages that some traffic may need to travel through, such as Brafferton to access Site A, and Bishopton, to access Sites E and F. Whilst it is recognised that an increased HGV presence could produce a change in the character of the walking environment of these areas, forecast traffic flows are low and the presence of HGVs within the environment would be temporary and short-term. It is considered that any potential effects can therefore be managed through the proposed CTMP.
- 11.11.24 It is acknowledged that pedestrian and cyclist amenity on the PRow network in the area may be affected, however, this would be considered further in

Chapter 9 Land Use and Socio-economics. Mitigation proposals will be developed where necessary and appropriate diversions and/or new routes will be established through the PRow Management Plan to be submitted alongside the ES.

11.11.25 Therefore, it is recommended that the assessment of pedestrian and cyclist amenity is considered within the Land Use and Socio-economic assessment, with the focus of any effects likely to be on the PRow network as opposed to the local road network. Pedestrian and cyclist amenity is therefore scoped out of the construction assessment.

Accidents and Safety

11.11.26 The review of baseline conditions did not identify any clusters of collisions, and the change in traffic is expected to be within the daily variation of traffic flows. Vehicular access into the Proposed Development will use established points of access off the public road network. It is therefore considered that there is no reason to consider the effects of the Proposed Development on accidents and safety any further, and it is scoped out of the construction assessment.

Mitigation

11.11.27 An Outline EMP will be produced as part of the DCO application which will outline the environmental mitigation measures to be implemented during the construction phase. The measures, outlined in the Outline EMP will be carried forward to a CEMP, which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. The Outline EMP will include supplementary outline management plans which would later be included in full within the CEMP including an Outline CTMP and a PRow Management Plan.

Operation

Potential effects and mitigation

11.11.28 Based on evidence from Solar Farm developments elsewhere, it is forecast that when the Proposed Development is operational, a small number of maintenance trips are expected. Operational traffic is expected to be minimal, with occasional visits taking place by a handful of operatives. The majority of these trips will be by cars or vans, rather than HGVs. Thus, it is expected that any operational impacts on traffic and transport will be minimal, and the topic is scoped out of the operational assessment.

Decommissioning

Potential effects

11.11.29 Decommissioning of the Proposed Development could give rise to the same level of forecast trip generation as the construction phase of the Proposed Development. However, given that the future baseline transport conditions are likely to have changed significantly when the Proposed Development is

decommissioned, it is not proposed that any further assessment of traffic and transport be undertaken for the decommissioning phase.

Mitigation

11.11.30 Management and mitigation measures will be incorporated into the Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions will be carried forward to a detailed DEMP, which would be prepared and agreed with relevant authorities in advance of the commencement of decommissioning.

11.11.31 The Framework DEMP will set out how vehicle access to and from the Site Area will be managed, and it is expected that the principles agreed to minimise disruption during construction will be reviewed and applied during decommissioning.

Summary

11.11.32 Table 11.15 summarises each of the traffic and transport aspects whether they should be scoped in or scoped out of the assessment in relation to both the construction and operation of the Proposed Development.

Table 11.15 Summary of traffic and transport assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Severance	Scoped out	Scoped out	Scoped out	The change in traffic flows is expected to be within daily variation and CTMP will ensure access is appropriately managed to minimise the impact on severance.
Driver and pedestrian delay	Scoped out	Scoped out	Scoped out	Rural route network where no local capacity issues are expected. The Proposed Development is not expected to generate significant amounts of increased traffic that would cause delay.
Pedestrian and cyclist's amenity	Scoped out	Scoped out	Scoped out	During construction, the change in traffic composition on local routes could impact on amenity. Furthermore, the development sites may require a diversion of some rights of way. It is recommended that the assessment of pedestrian and cyclist amenity is considered within the Land Use and Socio-economic assessment, with the focus of any effects likely to be on the PRoW network as opposed to the local road network. Pedestrian and cyclist amenity is therefore scoped out of the construction assessment.
Accidents and Safety	Scoped out	Scoped out	Scoped out	Given the nature of the Local Road Network and baseline data showing no trends in road safety, no further assessment is considered necessary.

11.12 Waste

Introduction

- 11.12.1 This section of the EIA Scoping Report describes the baseline conditions for the Site Area relating to waste and sets out the potential impacts that could occur during the construction, operation and decommissioning of the Proposed Development. It also gives a description of the measures that will be included in the design of the Proposed Development to mitigate or minimise these impacts.
- 11.12.2 The Proposed Development is likely to generate waste comprising of general construction waste, including packaging waste from materials, and construction materials from fencing, access roads and supporting infrastructure. During operation, it is anticipated that waste generation would be minimal. Waste from the decommissioning of the Proposed Development would be disposed of responsibly and undertaken in alignment with the future principles of recycling available at that time.
- 11.12.3 The Materials and Waste in Environmental Impact Assessment²⁶⁶ guidance provided by IEMA (the 'IEMA Guidance') has been used as part of this scoping assessment.
- 11.12.4 Waste is defined in line with the EU Waste Framework Directive (2008/98/EC)^{267,268}, as:
- “any substance or object which the holder discards or intends or is required to discard”.*
- 11.12.5 An Outline EMP will be produced as part of the DCO application and will include supplementary outline management plans including an Outline MMP and an Outline SWMP to manage resources and waste. These measures will be carried forward to a CEMP which will be produced by the appointed contractor and agreed with the relevant local planning authorities prior to construction phase.
- 11.12.6 Any waste generated as part of the decommissioning of the Proposed Development would be carried out in line with the Framework DEMP which will accompany the DCO application and will be carried forward to a detailed DEMP. The detailed DEMP would be prepared and agreed with relevant authorities at the time of decommissioning, in advance of the commencement of decommissioning.
- 11.12.7 As such, a separate chapter on waste within the ES is not considered to be required.

²⁶⁶ IEMA (2020). Materials and Waste in Environmental Impact Assessment. Available at: <https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment>

²⁶⁷ HMSO (2008). Waste Framework Directive (2008/98/EC). Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32008L0098&from=EN>

²⁶⁸ HMSO (2019). The Waste (Miscellaneous Amendments) (EU Exit) Regulations 2019. Available at: https://www.legislation.gov.uk/eudr/2008/98/pdfs/eudr_20080098_adopted_en.pdf

Relevant legislation, policy and guidance

11.12.8 The scoping review has considered the following appropriate policy, legislation and guidance for waste:

- Overarching NPS for Energy (EN-1): Section 5.14 (Waste Management)²⁶⁹;
- NPS for Renewable Energy Infrastructure (EN 3), (2011). The current NPS does not include specific reference to solar technologies however, the latest Draft NPS includes a section on solar photovoltaic generation, and this will be considered as the draft progresses;
- Waste Management Plan for England²⁷⁰;
- Tees Valley Joint Minerals and Waste Development Plan²⁷¹; and
- Durham County Council Minerals and Waste Policies and Allocation²⁷².

Baseline conditions

11.12.9 The study area for materials and waste is defined in line with the IEMA Guidance as follows:

- primary study area is based on the Site Area; constituting the area within which construction materials would be consumed and waste would be generated; and
- second study area (referred to as the ‘expansive study area’ under the IEMA Guidance) covers an area sufficient to identify feasible sources of construction materials, and suitable waste infrastructure that could accept arisings of waste generated by the Proposed Development:
- non-hazardous and inert waste management – Tees Valley;
- hazardous waste management – Tees Valley;
- availability of key construction materials, crushed rock, sand and gravel, ready-mixed concrete and asphalt – North East England; and
- availability of key construction materials, steel – UK.

11.12.10 The following sources for baseline data have been used:

²⁶⁹ Department of Energy and Climate Change (2011). *Overarching National Policy Statement for Energy (EN-1)*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf

²⁷⁰ Defra (2013). *Waste Management Plan for England*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/265810/pb14100-waste-management-plan-20131213.pdf

²⁷¹ Tees Valley Joint Council (2011). *Tees Valley Joint Minerals and Waste Development Plan Documents*. Available at: <https://www.middlesbrough.gov.uk/planning-and-housing/planning/planning-policy/tees-valley-joint-minerals-and-waste-dods>

²⁷² Durham County Council. *Consultation on our Minerals and Waste Policies and Allocation Document (stage one)*. Available at: <https://www.durham.gov.uk/article/24743/Consultation-on-our-Minerals-and-Waste-Policies-and-Allocation-Documents-stage-one->

- National and regional availability (consumption/sales) for key construction materials (steel, aggregates, asphalt and concrete)^{273, 274, 275, 276, 277};
- landfill void capacity in the North East (non-hazardous, inert landfill void capacity and hazardous landfill void capacity)²⁷⁸; and
- allocated/safeguarded waste and mineral sites, MSAs in the vicinity of the Proposed Development^{279, 280}.

Materials

11.12.11 The Proposed Development extends across Darlington Borough Council and Stockton-on-Tees Borough Council, North East England. Darlington, Stockton-on-Tees, Hartlepool, Middlesbrough, Redcar and Cleveland Borough Councils have entered into a joint minerals and waste planning strategy for Tees Valley.

11.12.12 The latest Annual Monitoring Report from North East Region Aggregates Working Party establishes that primary aggregate landbanks and reserves at end of 2017 were all above the minimum landbank requirements of the NPPF, as presented in Table 11.17.

Table 11.16 Landbank of permitted primary aggregates in North East England⁸

North East England (2017)				
Material	Permitted resources (million tonnes)	Landbank based on provision in LAAs (years)	Landbank based on ten-year sales average (years)	NPPF 2021 landbank years to be maintained
Sand and gravel	20.0	17.8	23.6	7 years
Crushed rock	220.7	45.9	54.0	10 years

11.12.13 Steel, asphalt and cement (used for concrete and concrete blocks) are all considered in relation to the national/global supply chain, which are considered to be generally free from known issues (Table 11.18).

²⁷³) Department for Levelling Up, Housing and Communities (2021). *National Planning Policy Framework*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

²⁷⁴ British Geological Survey (2022). *World Mineral Production 2016 – 20*. Available at: https://www2.bgs.ac.uk/mineralsuk/download/world_statistics/2010s/WMP_2016_2020.pdf

²⁷⁵ MPA (2022). *The Contribution of Recycled and Secondary Materials to total Aggregates Supply in Great Britain – 2020 Estimates*. Available at: https://mineralproducts.org/MPA/media/root/Publications/2022/Contribution_of_Recycled_and_Secondary_Materials_to_Total_Aggs_Supply_in_GB_2022.pdf

²⁷⁶ Tees Valley. (2017) *Tees Valley Joint Local Aggregates Assessment 2017*. Available at: <https://www.stockton.gov.uk/media/3161/Tees-Valley-Local-Aggregates-Assessment/pdf/tees-valley-local-aggregates-assessment-2017.pdf?m=637848537872100000>

²⁷⁷ North East Region Aggregates Working Party (2018). *Annual Aggregates Monitoring Report 2017*. Available at: <https://www.northumberland.gov.uk/NorthumberlandCountyCouncil/media/Planning-and-Building/planning%20policy/Studies%20and%20Evidence%20Reports/Minerals%20Waste%20Studies/1.%20NE%20Aggregates%20Working%20Party/NE-AA-Monitoring-Report-2017.pdf>

²⁷⁸ Environment Agency (2022) *2020 Waste Summary Tables for England*. Available at: <https://www.data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator>

²⁷⁹ Environment Agency (2021) *Historic Landfill Sites and EA, 2021*. Permitted Waste Sites - Authorised Landfill Site Boundaries. Available at: <https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fenvironment.data.gov.uk%2Farcgis%2Frest%2Fservices%2F%2F%2FHistoricLandfill%2F%2FFeatureServer&source=sd>

²⁸⁰ Tees Valley Joint Council (2011). *Joint Minerals and Waste Development Plan: Core Strategy*. Available at: <https://www.stockton.gov.uk/media/3009/Core-strategy-development-plan-document/pdf/minerals-waste-core-strategy-dpd.pdf?m=637814085576830000>

Table 11.17 National and global availability of construction resources in tonnes (t)

Material	UK Material availability (2020) (t)	Global material availability (2020) (t)
Steel²⁸¹	7 085 700	1,857,000,000
Asphalt²⁸²	5,500,000	-
Cement (concrete)¹²	8,046,000	-

Waste

11.12.14 The waste generation of the current Site Area is associated with agricultural practices. Waste generated by the Proposed Development is expected to be managed within North East England.

11.12.15 There are two historic landfills within 50m: Stillington Refuse Tip (EAHLD31673) and Cobby Castle Land Bishopton (EAHLD06523), as described in Section 11.6 Ground Conditions.

11.12.16 Data produced by the EA²⁸³ states that the remaining landfill capacity at end for 2020 in North East England was:

- Hazardous waste – 4,644,000t;
- Non-hazardous waste – 8,387,800t; and
- Inert waste – 13,023,000t.

Safeguarded waste and mineral sites

11.12.17 There are no allocated/safeguarded waste and active mineral sites within the Site Area.

11.12.18 The Proposed Development lies within MSAs for Sand and Gravel and Limestone, as shown in the Tees Valley Joint Minerals and Waste DPD: Core Strategy.

Potential for effects and mitigation measures

Construction

Potential Effects

²⁸¹ British Geological Survey (2022). *World Mineral Production 2016-2020*. Available at: https://www2.bgs.ac.uk/mineralsuk/download/world_statistics/2010s/WMP_2016_2020.pdf

²⁸² MPA (2022). *The Contribution of Recycled and Secondary Materials to total Aggregates Supply in Great Britain – 2020 Estimates*. Available at: https://mineralproducts.org/MPA/media/root/Publications/2022/Contribution_of_Recycled_and_Secondary_Materials_to_Total_Aggs_Supply_in_GB_2022.pdf

²⁸³ Environment Agency (2022). *Waste Management in North East*. Available at: <https://www.data.gov.uk/dataset/237825cb-dc10-4c53-8446-1bcd35614c12/remaining-landfill-capacity>

11.12.19 Construction materials required to construct the Proposed Development are unlikely to be significant in the context of regional or national construction materials availability.

11.12.20 The types of waste generated during construction are likely to comprise:

- general waste from site offices and welfare facilities (e.g., wood, cardboard and paper, etc.);
- small quantities of waste from the maintenance of construction vehicles (e.g., waste fuels and oils, wastewater from cleaning vehicles, etc.);
- packaging waste from incoming materials; and
- other waste from construction of fencing, access roads and other supporting infrastructure.

11.12.21 The Site Area is arable land, therefore minimal site preparation and excavation waste, and no demolition waste will be produced.

11.12.22 All the electrical infrastructure such as solar PV modules, racks, inverters, transformers, batteries and other supporting infrastructure will be manufactured offsite and delivered to the Site Area ready for installation. Therefore, construction and assembly waste is expected to be minimal.

11.12.23 Large scale earth works are not anticipated as result of the construction of the Proposed Development. Due to the non-intrusive nature of the Proposed Development, the two historic landfill sites are unlikely to be directly impacted, as described in Section 11.6 Ground Conditions.

11.12.24 Although the Proposed Development is located within Sand and Gravel, and Limestone MSAs. Chapter 9 Land use and Socio-economics scopes out impacts to MSAs due to the non-sterilisation of these reserves from the non-intrusive nature of the Proposed Development, the MSAs are unlikely to be directly impacted.

11.12.25 Therefore, waste arisings from construction are considered minimal and are unlikely to be significant in the context of regional or national landfill void capacity.

Mitigation

11.12.26 Construction of the Proposed Development would be carried out in accordance with industry standard good working practice and managed through the CEMP. This would include the environmental measures that would be adopted during the construction phase.

11.12.27 An Outline EMP will be produced as part of the DCO application which will outline the environmental mitigation measures to be implemented during the construction phase. Mitigation measures will include details of how excavated materials will be managed, best practice measures to avoid contamination or pollution linkages, good practice measures for managing waste. The measures, outlined in the Outline EMP will be carried forward to a CEMP,

which will be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction.

- 11.12.28 The Outline EMP will include supplementary outline management plans which would later be included in full within the CEMP including an Outline MMP and an Outline SWMP.
- 11.12.29 Any reused or recycled materials will be used in line with measures set out in a MMP, produced and managed by the contractor.
- 11.12.30 A SWMP will be produced during the design phase and managed by the contractor during the construction phase to direct an effective circular economy approach to the management of resources and waste materials. This will push the waste management activities up the Waste Hierarchy²⁸⁴, to ensure that as much material is reused and/or recycled as possible to minimise the amount of construction waste requiring disposal. A summary of the waste hierarchy is provided in Table 11.19.

Table 11.18 National and global availability of construction resources

Stages	Includes
Prevention	Using less material in design and manufacture. Keeping products for longer; re use. Using less hazardous material.
Preparing for re-use	Checking, cleaning, repairing, refurbishing, whole items or spare parts.
Recycling	Turning waste into a new substance or product. Includes composting if it meets quality protocols.
Other recovery	Includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste; some backfilling operations.
Disposal	Landfill and incineration without energy recovery

Operation

Potential Effects

- 11.12.31 Waste generation during the operational phase will be minimal as solar PV modules do not generate any waste, and due to the long-term design life of solar infrastructure.
- 11.12.32 Waste arisings associated with maintenance activities such as component replacement during the operational life of the Proposed Development are expected to be minimal.

²⁸⁴ As mandated by the Waste (England and Wales) Regulations 2011, the “waste hierarchy” ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. landfill).

Mitigation

11.12.33 Waste from the Proposed Development would follow the waste hierarchy to prioritise waste prevention, followed by preparing for re-use, recycling and recovery and lastly disposal to landfill.

Decommissioning

Potential Effects

11.12.34 The decommissioning of the Proposed Development would involve the removal of all solar infrastructure, including the Solar PV modules, underground cables and onsite supporting equipment after at minimum 40 years of operation.

11.12.35 Solar PV modules are made of a frame (typically aluminum), glass, crystalline silicon solar cells and copper wiring, of which 99% can be recycled. The remaining one percent is an encapsulant material to bond the layers of the solar PV modules together²⁸⁵.

11.12.36 In the UK, solar PV modules are subject to the Waste Electrical and Electronic Equipment (WEEE) Regulations 2013²⁸⁶, as amended by the Waste (Miscellaneous Amendments) (EU Exit) (No. 2) Regulations 2019²⁸⁷. The WEEE Regulations mandate that manufacturers must take back decommissioned solar PV modules for recycling. The aim is to ensure that the solar PV modules are disposed of responsibly and as much of the materials as possible are recycled. The Applicant will ensure that suppliers of solar PV modules for the Proposed Development are registered with a producer compliance scheme that has an industry managed take-back and recycling scheme.

11.12.37 In a special article from BEIS on Energy Trends²⁸⁸ it stated that:

“The use of solar PV to generate energy in the UK has grown rapidly since 2010, increasing capacity from 95 MW to 13,800 MW at the end of 2021. There are now over one million solar PV installations in the UK. In 2021 solar PV contributed more than 10 per cent of renewable generation and more than 4 per cent of total electricity generation in the UK.”

11.12.38 Possibilities to re-use or recycle materials will be explored before resorting to landfill options. There is a new industry emerging for recycling solar PV modules. This would be explored, in addition to any resale of any operational panels.

²⁸⁵ Solar Energy UK (2022). *Everything under the Sun: The Facts about Solar Energy*. Available at: <https://solarenergyuk.org/wp-content/uploads/2022/03/Briefing-Fact-Checker-1.pdf>

²⁸⁶ HMSO (2013). *The Waste Electrical and Electronic Equipment Regulations*.

²⁸⁷ HMSO (2019). *The Waste (Miscellaneous Amendments) (EU Exit) (No. 2) Regulations 2019*. Available at:

https://assets.publishing.service.gov.uk/media/5c19311d40f0b60c8701ab1c/the_Waste_Miscellaneous_Amendments_EU_Exit_No_2_Regulations_2019_-_SI.pdf

²⁸⁸ Department for Business, Energy and Industrial Strategy (2022). *Review of solar PV capacity publications*. Special article – Energy Trends

Mitigation

11.12.39 A Framework DEMP, which will set out the general principles to be followed in the decommissioning of the Proposed Development, will also be produced as part of the DCO application.

11.12.40 The Framework DEMP will include measures relating to waste management. These measures, which will include the application of the core waste management principles of prevention, reuse, recycle, recover and disposal as defined in the 'Waste Hierarchy', will be carried forward to a detailed DEMP

Summary

11.12.41 It is anticipated that minimal waste impacts from construction and operation are expected from the Proposed Development. Waste from the decommissioning of the Proposed Development would be disposed of responsibly and undertaken in alignment with the principles of recycling available at that time.

11.12.42 It is proposed that waste and materials from construction, operational and decommissioning activities within the Proposed Development is scoped out of the assessment with suitable mitigation and management measures secured through the CEMP, MMP, SWMP and DEMP.

11.12.43 Therefore, a separate waste ES Chapter is not considered to be required.

11.12.44 Table 11.19 summarises the outcome of this scoping exercise in relation to both the construction, operation and decommissioning of the Proposed Development.

Table 11.19 Summary of Waste assessment scope

Aspect	Construction	Operation	Decommissioning	Rationale for scoping in or out
Waste	Scoped out	Scoped out	Scoped out	<p>Materials and waste would be controlled through the measures, commitments and actions secured through the CEMP, MMP and SWMP.</p> <p>It is anticipated that there will be minimal waste during construction as the Proposed Development will be manufactured offsite. Operational waste would be minimal as Solar PV modules do not produce waste and from maintenance activities only. Effects from decommissioning would be controlled through the measures outlined in the Framework DEMP.</p>

12 Structure and content of the ES

- 12.1.1 An outline structure of the ES is provided within this chapter, in accordance with the guidance for the content of scoping requests contained within the PINS Advice Note Seven²⁸⁹.
- 12.1.2 The ES for the Proposed Development will be prepared in accordance with the requirements for an ES as set out in Regulation 14 and Schedule 4 of the EIA Regulations.
- 12.1.3 The ES will be presented in the following volumes:
- **Non-Technical Summary (NTS)** – this document will summarise the main elements of the Proposed Development and the significant environmental effects identified through the EIA process. The NTS will be designed to provide information on the Proposed Development in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the Proposed Development;
 - **ES Volume 1: Main Report**– this document will comprise the main body of the ES and it will detail the results of the environmental assessment, the likely significant effects arising from the Proposed Development and any proposed mitigation measures to avoid, reduce or minimise any identified likely significant adverse environmental effects;
 - **ES Volume 2: Figures** - this will comprise a complete set of figures reference which support the assessments in ES Volume 1; and
 - **ES Volume 3: Technical Appendices** – this will comprise the supporting technical appendices to the aspect chapters in ES Volume 1, including background data, technical reports and survey data.

12.2 ES Report Structure

- 12.2.1 **ES Volume 1: Main Report** will form the main body of the ES and will be divided into a number of background and technical chapters, each supported with figures and background information, as outlined in Table 12.1.
- 12.2.2 The ES will consider the environmental effects associated with a number of identified environmental aspects where significant effects are likely and will be consistent with the advice provided by PINS through the Scoping Opinion. As shown in Table 12.1, each identified environmental aspect will be assigned a separate technical chapter in the ES. This currently reflects the scope as proposed through this Scoping Report.

²⁸⁹ PINS (2018). *Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements*. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>

Table 12.1 ES Volume 1: Main Report Structure

ES Chapter Number	ES Chapter Name
Chapter 1	Introduction
Chapter 2	The Proposed Development
Chapter 3	Consideration of alternatives and design evolution
Chapter 4	Environmental Impact Assessment approach and methodology
Chapter 5	Climate change
Chapter 6	Biodiversity
Chapter 7	Landscape and visual
Chapter 8	Cultural heritage
Chapter 9	Land use and Socio-economics
Chapter 10	Cumulative effects
Chapter 11	Summary
N/A	Abbreviations and glossary

12.3 Supporting Assessments and Management Plans

12.3.1 The ES will be supported by a number of documents either as appendices or standalone application documents, which may include, but are not limited to the documents outlined in Table 12.2.

Table 12.2 Supporting Assessments

Document	Standalone Document / Associated chapter of the ES
Surveys and assessments	
Flood Risk Assessment, including an Outline Surface Water Drainage Strategy	Chapter 2 The Proposed Development
Land quality preliminary risk assessment (Desk Top Study)	Chapter 2 The Proposed Development
Transport Statement	Chapter 2 The Proposed Development

Document	Standalone Document / Associated chapter of the ES
Arboricultural Impact Assessment	Chapter 6 Biodiversity Chapter 7 Landscape and Visual
Solar Photovoltaic Glint and Glare Assessment	Chapter 7 Landscape and Visual
Heritage Desk-Based Assessment	Chapter 8 Cultural Heritage
Historic Environment Settings Assessment	Chapter 8 Cultural Heritage
Agricultural Land Classification (ALC) Report	Chapter 9 Land use and Socio-economics
Habitats Regulations Assessment	Standalone Document
Water Framework Directive assessment	Standalone Document

Management Plans

12.3.2 A number of plans will be produced will be produced as part of the DCO application, which will be used as a mechanism for securing the required mitigation. These are likely to include:

- Detailed management plans;
- An Outline Environmental Management Plan (EMP);
- A Framework Decommissioning EMP; and
- An outline Battery Safety Management Plan (oBSMP).

Detailed management plans

12.3.3 A number of detailed management plans will be produced and submitted as standalone as part of the DCO application:

- Arboricultural Method Statement (AMS);
- Landscape and Ecology Management Plan (LEMP); and
- PRow Management Plan.

12.3.4 It is expected that these plans and their recommendations would be secured through DCO Requirements prior to the commencement of construction activities.

Outline Environmental Management Plan

12.3.5 An Outline EMP will be produced as part of the DCO application, and will set out the measures, commitments and actions identified in the ES to manage environmental effects during construction.

- 12.3.6 It will provide the framework for recording environmental risks, commitments and other environmental constraints, and would identify the structures and processes that would be used to manage and control these aspects during construction and operation.
- 12.3.7 Following the DCO application and as the design and construction plans are finalised, the Outline EMP would be refined and expanded into a CEMP. The measures, commitments and actions outlined in the Outline EMP will be carried forward to the CEMP, which would be produced by the appointed construction contractor and agreed with the relevant local planning authorities prior to construction. It is expected that the requirements of the DCO would commit to its production prior to the commencement of construction activities.
- 12.3.8 The Outline EMP produced as part of the DCO application will also include supplementary outline management plans and supporting strategies which would later be included in full within the CEMP. These management plans may include, but are not limited to:
- Outline Construction Traffic Management Plan (CTMP);
 - Outline Health and Safety Plan (H&SP);
 - Outline Materials Management Plan (MMP);
 - Outline Pollution Response Plan;
 - Outline Site Waste Management Plan (SWMP);
 - Outline Soil Resources Management Plan (SRMP); and
 - Outline Spillage Emergency Response Plan (SERP).

Framework Decommissioning Environmental Management Plan

- 12.3.9 A Framework DEMP will be prepared as part of the DCO application, which will set out the general principles to be followed in the decommissioning of the Proposed Development. These measures, commitments and actions will be carried forward to a detailed DEMP which will be prepared and agreed with the relevant authorities at that time of decommissioning, in advance of the commencement of decommissioning works.
- 12.3.10 It is expected that the Framework DEMP would include details regarding:
- arboricultural management;
 - traffic management;
 - materials management; and
 - waste management.

Outline Battery Safety Management Plan (oBSMP)

- 12.3.11 An oBSMP will be prepared and submitted with the DCO application as a standalone document. The scope of the oBSMP will cover the regulatory

guidance, safety standards and protection requirements of the BESS. The oBSMP will identify the structures and processes that would be used to manage and control any safety risk during construction, operation and decommissioning.

- 12.3.12 It is expected that the oBSMP would be produced by the operator of the Proposed Development, in liaison with the equipment supplier, ahead of operation.

13 Conclusion

13.1 Summary of the proposed EIA approach

- 13.1.1 In accordance with Regulation 8(1)(b) of the EIA Regulations, this EIA Scoping Report provides notification to the SoS that the Applicant will produce an ES which will accompany the DCO application for the Proposed Development. This EIA Scoping Report has been produced to support an application for a Scoping Opinion with regards to the scope and level of detail of information to be provided in the ES, in accordance with Regulation 10 of the EIA Regulations.
- 13.1.2 This EIA Scoping Report has identified the likely significant effects of the Proposed Development with respect to each environmental topic and set out the proposed approach and methodology for further assessment in the EIA. Table 13.1 provides a summary of the proposed scope of the topics, including the aspects of each topic which are proposed to be scoped out and the rationale behind each decision.

Table 13.1 Summary of proposed scope of the EIA

Topic	Proposed scope of assessment	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
Climate Change	<p>Impact of the Proposed Development on climate (GHG emissions) during construction, operation and decommissioning.</p> <p>Resilience of the Proposed Development to climate change during operation through a CCRA.</p>	<p>In-combination climate change impacts.</p>	<p>The combined effect of the impacts of the Proposed Development and potential climate change impacts on the receiving environment during construction, operation and decommissioning are unlikely to give rise to significant effects.</p>
Biodiversity	<p>Effects of construction activity on permanent and temporary loss of habitat.</p> <p>Loss of breeding and foraging habitat for ground-nesting bird species and farmland birds.</p>	<p>Operational effects on permanent and temporary loss of habitat and trees including bat foraging habitat and trees supporting roosting bats.</p> <p>Loss of habitat and incidental harm and mortality of great crested newts and reptiles.</p> <p>Impacts on national and non-statutory designated sites.</p>	<p>The operational phase of the Proposed Development will involve no additional habitat loss.</p> <p>The final landscape design will provide habitat enhancements and connectivity across the Site Area.</p> <p>There will be no direct land take from designated sites and management and mitigation</p>

Topic	Proposed scope of assessment	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
			<p>measures will avoid potential for indirect effects.</p> <hr/> <p>Disturbance to badger setts. The Proposed Development will be designed to retain existing badger setts and ensure no disturbance to setts.</p> <p>Fragmentation of habitat due to security fencing. Security fencing will be designed to incorporate appropriate gates to allow mammal access.</p>
Landscape and visual	<p>Effects on local landscape designations, local landscape character areas and views and visual amenity within 2km of the Proposed Development.</p> <p>Effects on landscape fabric.</p>	<p>Effects on local landscape designations, local landscape character areas and views and visual amenity beyond 2km of the Proposed Development.</p> <p>Effects on national landscape character areas and national landscape designations.</p>	<p>Effects on receptors beyond 2km of the Proposed Development are deemed to be negligible given expected visibility.</p> <p>There are no national landscape designations within 5km of the Site Area.</p>

Topic	Proposed scope of assessment	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
<p>Cultural heritage</p>	<p>Direct construction impacts to known and unknown archaeological remains.</p>	<p>Direct operational or decommissioning impacts to known and unknown archaeological remains.</p>	<p>Any potential impacts to both known and unknown archaeological remains will occur during construction.</p>
	<p>Indirect operational impacts to highly designated, designated and non-designated heritage assets within the Site Area, 2km and 5km study areas.</p>	<p>Direct and indirect construction and decommissioning impacts on highly designated, designated and non-designated heritage assets within the Site Area, 2km and 5km study areas.</p>	<p>The Proposed Development will not result in any physical impacts on heritage assets however has the potential to impact on the setting of assets through the finished built form.</p>
		<p>Direct impacts to designated and non-designated heritage assets including those beyond the development footprint during operation.</p>	<p>No works associated with the Proposed Development are planned to take place which would lead to any direct, physical impact, up to and including complete removal, on any designated heritage asset.</p>
		<p>Construction and operational impacts on specific heritage assets</p>	<p>Rationale for scoping out each heritage asset is provided in Chapter 8 Cultural Heritage.</p>

Topic	Proposed scope of assessment	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
		including Grade II* listed buildings.	
Land Use and Socio-Economics	<p>Employment and supply chain effects during construction, operation and decommissioning.</p> <p>Potential effects on land uses during construction and operation including access and use of recreational resources / open space.</p>	All other potential socio-economic effects related to the local population	Potential effects on the local population would focus on employment opportunities. Indirect effects such as visual amenity and other amenity impacts would be dealt with by other assessment.
	<p>Loss of agricultural land.</p> <p>Impact on soil resource.</p>	Wider impact on agricultural holdings / farm businesses.	Agricultural holdings / farm businesses that form part of the Proposed Development have signed up by voluntary negotiation and impacts have been considered through this process.
		Impact on mineral resources.	The mineral resource identified would not be permanently sterilised by the Proposed Development due to its non-intrusive nature.

Topic	Proposed scope of assessment	Aspects proposed to be scoped out	Rationale for aspects proposed to be scoped out
Cumulative Effects	<p>In-combination effects will be considered within each environmental topic's chapter of the ES and will not form part of the scope within the Cumulative Effects Assessment chapter.</p> <p>A CEA will be undertaken comprising an assessment of cumulative effects of a number of different projects within the vicinity, in combination with the environmental impact of the Proposed Development on a range of different resources/receptors.</p>	None	No topics prepared to be scoped out.

13.1.3 Due to the nature of the Proposed Development, it is considered appropriate to scope out some environmental topics which are not deemed likely to result in significant effects. Table 13.2 provides a summary of the environmental topics proposed to be scoped out of the EIA and the rationale behind each decision.

Table 13.2 Summary of topics scoped out of the EIA

Topic	Rationale for scoping out of the EIA
Air quality	Air quality emissions from the Proposed Development are likely to be restricted to the construction and decommissioning phases, with limited emissions anticipated during the operational phase due to the low number of anticipated vehicle trips and the nature of the Proposed Development. Due to the proposed implementation of mitigation, including the Outline EMP and Framework DEMP, and with development

Topic	Rationale for scoping out of the EIA
	traffic flows anticipated to be below relevant screening criteria, a separate air quality ES chapter is not considered to be required.
Arboriculture	Due to the nature of the Proposed Development and the location of trees around field edges, the requirement to remove trees would be minimal, and construction activities would largely be situated away from trees. Impacts and mitigation will be detailed in the AIA, Outline EMP and Framework DEMP, which will support the landscape and visual ES chapter. A buffer would be created and maintained around ancient and veteran trees. An AMS to avoid damage to retained trees may be produced prior to construction to guide operatives in sensitive construction works near trees. Therefore, a separate chapter on the arboricultural impacts of construction, operation and decommissioning within the ES is not considered to be required.
Electric, magnetic, and electromagnetic fields	The Proposed Development is not anticipated to exceed the ICNIRP exposure guidelines, and the design of the Proposed Development will consider any infrastructure constraints. Mitigation measures will be included in the outline EMP and Framework DEMP to ensure the protection of infrastructure. Therefore, electric, magnetic, and electromagnetic fields are scoped out of further assessment.
Glint and glare	A Solar Photovoltaic Glint and Glare Assessment will be undertaken, and the results and recommendations incorporated into the design to ensure to mitigate any identified effects. These mitigation measures will be recorded in the Outline EMP. As such, it is considered that the Solar Photovoltaic Glint and Glare Assessment, in conjunction with the landscape and visual ES Chapter and Outline EMP, will sufficiently mitigate any significant effects. Therefore, a separate chapter on glint and glare within the ES is not considered to be required.
Ground conditions	A land quality focused preliminary risk assessment (Desktop Study) will be prepared, and the results and recommended mitigation measures will be incorporated into the design to mitigate any identified potential effects. These mitigation measures will be recorded in the Outline EMP and Framework DEMP. Therefore, a separate chapter on ground conditions within the ES is not considered to be required.
Human health	It is anticipated that there would be limited interactions with human health during the construction and operation of the Proposed Development. Any potential effects will be considered elsewhere in the ES, such as in the landscape and visual ES chapter or the land use ES chapter, and in supporting

Topic	Rationale for scoping out of the EIA
	documentation, such as the Outline EMP, LEMP, Outline CTMP and Framework DEMP. Therefore, a separate human health ES chapter is not considered to be required and is scoped out of the assessment.
Hydrology	During the construction phase, earthworks and excavations would be minimal. Best practice mitigation measures would be implemented to reduce the likelihood of pollution of watercourses/groundwater and effects wouldn't be significant. During the construction and operation phases, the use of SuDS and improved vegetation would act to improve infiltration, attenuation and drainage. SuDS measures would be used to attenuate any loss of impermeable area from infrastructure and buildings. Mitigation measures will be included in the Outline CEMP, and combined FRA and outline surface water drainage strategy, and Framework DEMP. Therefore, a separate chapter on hydrology and flood risk within the ES is not considered to be required.
Major accidents and disasters	It is not anticipated that the construction or operation of the Proposed Development would result in significant effects on major accidents and/or disasters. Mitigation measures will be included in the outline EMP, combined FRA and outline surface water drainage strategy, Solar Photovoltaic Glint and Glare Assessment, oBSMP and Framework DEMP. Therefore, major accidents and disasters is scoped out of the EIA for the construction, operation and decommissioning of the Proposed Development.
Noise and vibration	It is anticipated that there would be limited interactions with noise and vibration during the construction and operation of the Proposed Development. Any potential effects and mitigation will be included in the Outline EMP, Outline CTMP and Framework DEMP. Therefore, due to the proposed implementation of mitigation, noise and vibration is scoped out of further assessment.
Traffic and transport	It is not anticipated that the construction, operation or demolition of the Proposed Development would result in significant effects on traffic and transport. The forecasted construction traffic flows are a less than 10% change from the current baseline, which is 10% is considered to have no discernible environmental effect, given that daily variations in background traffic flow may fluctuate by this amount. Mitigation measures, including travel planning, HGV management and pedestrian and cyclist management will be incorporated into an Outline CTMP, PRoW Management Plan, Outline EMP and Framework DEMP. Therefore, a separate chapter on traffic and transport within the ES is not considered to be required.

Topic	Rationale for scoping out of the EIA
Waste	It is anticipated that there will be minimal waste during construction as the Proposed Development will be manufactured offsite. Operational waste will be minimal from maintenance activities only. An Outline EMP, Outline SWMP, Outline MMP and Framework DEMP will include mitigation measures for any adverse effects. Therefore, a separate chapter on waste within the ES is not considered to be required.

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Glossary

Term	Description
Agricultural Land Classification (ALC)	The system by which the physical quality of agricultural land is determined and graded on a scale of 1 to 5 with a subdivision of Grade 3 into the subgrades 3a and 3b.
Air Quality Management Area (AQMA)	An area that has been reviewed and assessed by the local authority and determined that the national air quality objectives are not likely to be achieved. Within the AQMA a local air quality action plan is put together.
Battery Energy Storage System (BESS)	Battery storage installation which will allow for the storage, importation and expiration of energy.
Best and Most Versatile Quality (BMV)	Agricultural land that is defined as land that falls in ALC grades 1, 2 or 3a.
Buffer	Specified area or distance surrounding a site or feature of interest
Built heritage	A structure or building of historic value. These structures are visible above ground level.
Cable route	The passage taken by the cables which connect the solar PV modules and the existing National Grid Substation.
Construction Environmental Management Plan (CEMP)	A site-specific plan that ensures that a site will mitigate its potential impacts on the environment during construction.
Chartered Institute of Ecology and Environmental Management (CIEEM)	The professional body for ecologists and environmental managers, many of which are either Chartered Ecologists or Chartered Environmentalists.
Conservation area	An area designated under section 69 of the Planning (Listed Buildings and Conservation Areas) Act 1990 as being of special architectural or historic interest and with a character or appearance which is desirable to preserve or enhance.
Cumulative effects	Cumulative effects are the additional effects arising from changes caused by a development in conjunction with other past, present or reasonably foreseeable actions.
Decommissioning Environmental Management Plan (DEMP)	A decommissioning environmental management plan sets out the general principles to be followed in the decommissioning of a development.
Defra biodiversity metric	The biodiversity metric is a habitat-based approach used to assess an area's value to wildlife. The metric (an Excel

Term	Description
	spreadsheet) uses habitat features to calculate a biodiversity value.
Designated heritage asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
Direct effect	A direct (or primary) effect may be defined as an effect that is directly attributable to the development.
District level licence	An approach whereby a developer can pay a sum to contribute towards the strategic conservation of great crested newts within a given area avoiding the need for survey and mitigation within a development.
Ecological Impact Assessment	The process of assessing the potential impacts on ecology arising from a development or project. This process is undertaken in accordance with guidelines produced by the Chartered Institute of Ecology and Environmental Management.
Environmental Management Plan (EMP)	An environmental management plan sets out sets out the measures, commitments and actions identified in the environmental statement to manage environmental effects during construction.
Environmental Impact Assessment (EIA)	An assessment of the impact of planned activities on the environment.
Environmental Statement (ES)	An environmental statement is publicly available document which sets out the developer's own assessment of the likely environmental effects of the proposed development. It is prepared by the developer and submitted with the planning application
Flood zone 1	Areas deemed to be in flood zone 1 have been shown to be at less than 0.1% chance of flooding in any year, this is sometimes known as having a 1:1000 year chance.
Flood zone 2	Areas deemed to be in flood zone 2 have been shown to have between 0.1% – 1% chance of flooding from rivers in any year (between 1:1000 and 1:100 chance) or between 0.1% – 0.5% chance of flooding from the sea in any year (between 1:1000 and 1:200 chance).
Flood zone 3	Areas within flood zone 3 have been shown to be at a 1% or greater probability of flooding from rivers or 0.5% or greater probability of flooding from the sea.
Geophysical survey	The systematic collection of geophysical data for spatial studies. Geophysical surveys are archaeological methods that use ground-based physical sensing techniques to produce a detailed image or map of an area.

Term	Description
GLVIA3	'Guidelines for Landscape and Visual Impact Assessment, Third Edition', published jointly by the Landscape Institute and Institute of Environmental Management and Assessment 2013.
Habitat regulations	Also known as the Conservation of Habitats and Species Regulations 2017, the habitats regulations protects sites which are internationally important for threatened habitats and species and is a legal framework for species requiring strict protection.
Habitats Regulation Assessment (HRA)	A HRA is carried out to test if a plan or project proposal could significantly harm the designated features of a European site. You must consult the relevant SNCB at the appropriate assessment stage of the HRA process
Heavy Goods Vehicles (HGV)	A heavy goods vehicle is a motor vehicle with a maximum allowed mass or gross combination mass of over 3,500 kilograms
Heritage asset	A building, monument, site, place, area or landscape of historic value.
Historic England	Statutory body responsible for advising local and national government on matters relating to designated heritage assets
Historic Environment Record (HER)	A record of known archaeological finds and features and historic buildings and historic /landscape features, relating to all periods from the earliest human activity to the present day; maintained by each County and Unitary Authority in the United Kingdom.
Indirect effect	An indirect (or secondary) effect is an effect that results indirectly from the proposed project as a consequence of the direct effect, often occurring away from the site, or as a result of a sequence of interrelationships or a complex pathway. They may be separated by distance or in time from the source of the effects. ²⁹⁰
In situ	In the original place.
Inverter	Inverters convert the direct current (DC) electricity collected by the PV modules into alternating current (AC), which allows the electricity generated to be exported to the National Grid.
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
Landscape capacity	The amount of change which a particular landscape character type or area is able to accommodate without significant

²⁹⁰ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p156

Term	Description
	detrimental effects on its character. Capacity is likely to vary according to the type and nature of change proposed.
Landscape character	The distinct and recognisable pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape character areas	These are single unique areas which are the discrete geographical areas of a particular landscape type.
Landscape character types	These are distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur, they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes.
Landscape effects	Effects on the landscape as a resource in its own right.
Landscape elements	Individual components which make up the landscape such as trees and hedges.
Landscape features	Particularly prominent or eye-catching elements, like tree clumps, church towers or wooded skylines.
Landscape quality or condition	This is a measure of the physical state of the landscape. It may include the extent to which a typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
Landscape receptor	Defined aspects of the landscape resource that have the potential to be affected by a proposal.
Landscape resource	The combination of elements that contribute to landscape context, character and value.
Landscape value	The relative value or importance attached to different landscapes by society on account of their landscape qualities.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Listed building	A building which is considered to be of special architectural or historic interest and listed in accordance with the Town and Country Planning (Listed Buildings and Conservation Areas) Act 1990.
LiDAR	Light Detection and Ranging – data gathered from aircraft which can provide highly detailed and accurate models of the land surface at metre and sub-metre resolution, including within woodland.
Magnitude (of effect)	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether

Term	Description
	it is reversible or irreversible and whether it is short or long term in duration.
Mineral Safeguarding Areas	Areas defined by mineral planning authorities with known mineral resources that are of identified economic or conservation value.
Mitigation	Measures including any process, activity or design to avoid, reduce, remedy or compensate for adverse environmental impact or effects of a development.
National park	Designation as a national park means that the area has been identified as being of importance to the national heritage and as such is worthy of special protection and attention
National Policy Statement (NPS)	A national policy statement gives reasons for the policy set out in the statement and must include an explanation of how the policy takes account of government policy relating to the mitigation of, and adaptation to, climate change.
Natura 2000 sites	Natura 2000 is a network of protected areas covering Europe's most valuable and threatened species and habitats. It is the largest coordinated network of protected areas in the world, extending across all 27 European Union countries.
Non statutory designated sites	Also known as Local Wildlife Sites are areas of land that are especially important for their wildlife. They are some of our most valuable wildlife areas. Local Wildlife Sites are identified and selected locally using scientifically determined criteria and surveys
Photomontage	A visualisation which superimposes an image of a proposed development upon a photograph or series of photographs.
Preliminary Ecological Appraisal (PEA)	An initial ecological survey designed to identify the likely ecological constraints to development and scope the requirement for further detailed species or habitat specific surveys.
Preliminary Risk Assessment (PRA)	A Preliminary Risk Assessment is a Phase I Desk Study which focuses on potential risks to human health, controlled waters and the wider environment. It can also be called a Phase I contamination survey and is often a pre-requisite for planning applications.
Ramsar sites	Ramsar sites are wetlands of international importance that have been designated under the criteria of the Ramsar Convention on Wetlands for containing representative, rare or unique wetland types or for their importance in conserving biological diversity.
Receptor	A receptor is who or what will be, or can be, affected by pollution.
Residential visual amenity	A collective term describing the views and visual amenity from a residential property, relating to the type, nature, extent and quality of views that may be experienced from the property

Term	Description
	and its 'domestic curtilage' including gardens and access driveway. Residential Visual Amenity is only one component of the overall Residential Amenity, others being for example noise, shadow flicker and access amongst others.
Residual effects	Potential environmental effects remaining after mitigation.
Scheduled monument	Nationally important historic sites, buildings or monuments identified by Historic England and designated by the Secretary of State (SoS) for Culture, Media and Sport. Any work affecting a scheduled monument must gain consent from Historic England under the Ancient Monuments and Archaeological Areas Act (1979).
Sense of place	The essential character and spirit of an area: genius loci literally means 'spirit of the place'.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor. ²⁹¹
Significant effects	<p>It is a requirement of the EIA Regulations to determine the likely significant effects of development on the environment which should relate to the level of an effect and the type of effect. Where possible significant effects should be mitigated.</p> <p>The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and sensitivity of the receptor) that should be attached to the impact described.</p> <p>Whether an effect should be considered significant is not absolute and requires the application of professional judgement.</p>
Site area	The planning boundary.
Solar PV modules	Solar PV modules, or 'solar panels, use sunlight as a source of energy to generate direct current electricity.
Source protection zone	An area that is protected as a source of drinking water determined by geo – hydrology and designed to protect groundwater aquifers from development or pollution
Special Protection Area (SPA)	Special Protection Areas (SPAs) are protected areas for birds in the UK classified under the Wildlife & Countryside Act 1981 (as amended) and the Conservation (Natural Habitats, & c.)

²⁹¹ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p157

Term	Description
	Regulations 2010 (as amended) in England, Scotland and Wales.
Site of Special Scientific Interest (SSSI)	A Site of Special Scientific Interest (SSSI) is a formal conservation designation. Usually, it describes an area that's of particular interest to science due to the rare species of fauna or flora it contains.
Study area	The spatial area within which environmental effects are assessed (i.e., extending a distance from the scheme footprint in which significant environmental effects are anticipated to occur).
Substation	A set of equipment reducing the high voltage of electrical power transmission to that suitable for supply to consumers.
Transformer	A transformer is an apparatus for reducing or increasing the voltage of an alternating current (AC).
Visual amenity	Whether an effect is direct, indirect, temporary or permanent, positive (beneficial), neutral or negative (adverse) or cumulative.
Visual effect	Value of a particular place in terms of what is seen by visual receptors taking account of all available views and the total visual experience.
Visual receptors	Effects on specific views and on the general visual amenity experienced by people. ²⁹²
Visualisation	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Wetness Class (WC)	The soil moisture regime defined in terms of the depth and duration of waterlogging in most years, ranging from I (freely draining) to VI (permanently waterlogged).
Wireframe or Wireline	Computer simulation, photomontage or other technique to illustrate the appearance of a development. ²⁹³
Zone of Theoretical Visibility (ZTV)	Area within which a proposed development may have an influence or an effect on visual amenity. ²⁹⁴

²⁹² The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158

²⁹³ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158

²⁹⁴ The Landscape Institute/Institute of Environmental Management and Assessment; *Guidelines for Landscape and Visual Impact Assessment*; Spon; 2013; p158

Abbreviations

Term	Description
AADT	Annual Average Daily Traffic
AC	Alternating Current
AEP	Annual Exceedance Probability
AHLV	Areas of Higher Landscape Value
AIA	Arboricultural Impact Assessment
AIL	Abnormal Indivisible Loads
ALC	Agricultural Land Classification
AMS	Arboricultural Method Statement
AONB	Area of Outstanding Natural Beauty
ATC	Air Traffic Control
AQMA	Air Quality Management Area
AQO	Air Quality Objective
BEIS	Department for Business, Energy and Industrial Strategy
BESS	Battery Energy Storage System
BGS	British Geological Survey
BMV	Best and Most Versatile Quality
CCGT	Combined Cycle Gas Turbine
CCRA	Climate Change Resilience Assessment
CCTV	Closed-circuit television
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CLIVA	Cumulative Landscape and Visual Impact Assessment

Term	Description
COMAH	Control of Major Accidents and Hazards
COSHH	Control of Substances Hazardous to Health
CSM	Conceptual Site Model
CTMP	Construction Traffic Management Plan
DBA	Desk-Based Assessment
DC	Direct Current
DCLG	Department for Communities and Local Government
DHER	Durham Historic Environment Record
DLUHC	Department for Levelling Up, Housing and Communities
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DEMP	Decommissioning Environmental Management Plan
DLL	District Level Licence
DMRB	Design Manual for Roads and Bridges
DPD	Development Plan Documents
EA	Environment Agency
EIA	Environmental Impact Assessment
EMF	Electric, Magnetic and Electromagnetic Fields
EMP	Environmental Management Plan
EPUK	Environment Protection UK
ERP	Emergency Response Plan
ES	Environmental Statement
FRA	Flood Risk Assessment

Term	Description
GHG	Greenhouse Gas
GVLIA	Guidelines for Landscape and Visual Impact Assessment
GW	Gigawatt
HDV	Heavy Duty Vehicle
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HPI	Habitats of Principal Importance
HRA	Habitats Regulation Assessment
H&SP	Health & Safety Plan
HVAC	Heating, ventilation and cooling
IAQM	Institute of Air Quality Management
ICCI	In-combination Climate Change Impact
ICE	Inventory of Carbon and Energy
ICNIRP	International Commission on Non – Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
km	Kilometres
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
m	Metres
MAFF	Ministry of Agriculture, Fisheries and Food
MD	Moisture Deficit

Term	Description
MW	Megawatt
NERC	Natural Environment and Rural Communities Act 2006
NHLE	National Heritage List for England
NHS	National Health Service
NPPF	National Planning Policy Framework
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NSIP	Nationally Significant Infrastructure Project
NTS	Non-Technical Summary
NVC	National Vegetation Classification
NVZ	Nitrate Vulnerable Zones
oBSMP	Outline Battery Safety Management Plan
PEA	Preliminary Ecological Appraisal
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PIZ	Public Information Zones
PPE	Personal Protective Equipment
PRA	Preliminary Risk Assessment
PRoW	Public Right of Way
RPA	Root Protection Area
RVAA	Residential Visual Amenity Assessment
SERP	Spillage Emergency Response Plan
SoS	Secretary of State
SPA	Special Protection Area
SRMP	Soil Resources Management Plan

Term	Description
SRN	Strategic Road Network
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage System
SWMP	Site Waste Management Plan
TASMR	Tees Archaeology Sites and Monuments Record
WC	Wetness Class
WeBS	Wetland Bird Survey
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WHO	World Health Organisation
WSI	Written Scheme of Investigation
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Appendices

Appendix 11.1 – Glint and Glare Receptor Scoping Assessment

Glint and Glare Receptor Scoping Assessment

JBM Solar Developments Limited

Byers Gill Solar

October 2022



PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

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1 INTRODUCTION

1.1 Overview

This receptor scoping report presents all the identified receptors such as aviation, railway, dwellings, and roads, which will be taken forward for the full technical glint and glare assessment, for the Byers Gill Solar development. A report has therefore been produced that contains the following:

- Presentation of indicative Solar Photovoltaic (PV) module areas;
- Explanation of glint and glare;
- Overview of relevant guidance;
- Overview of relevant studies;
- Identification of receptors:
 - Licensed and unlicensed aerodromes (Air Traffic Control Towers and approach paths);
 - Road receptors;
 - Dwelling receptors;
 - Railway receptors.
- Assessment methodology and process;
- Stakeholders where consultation may be required.

1.2 Glint and Glare Definition

The definition of glint and glare is as follows¹:

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

The term 'solar reflection' is used in this report to refer to both reflection types.

¹ These definitions are aligned with those presented within the Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) – published by the Department for Business, Energy & Industrial Strategy in September 2021 and the Federal Aviation Administration in the USA.

2 PROPOSED DEVELOPMENT LOCATION AND DETAILS

2.1 Site Area Layout Plan

The latest solar PV layout for the Proposed Development is shown in Figure 1² below. The coloured hatched areas represent the areas where solar PV modules will be located. These have been extrapolated from the site area layout plan and overlaid onto aerial imagery in Figure 2 below.

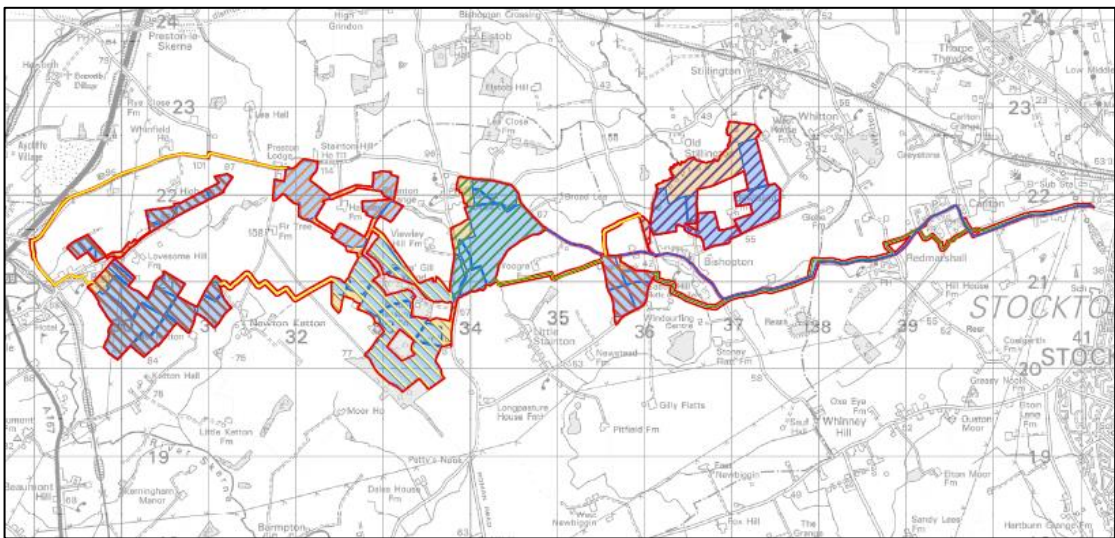


Figure 1 Site Area Layout Plan

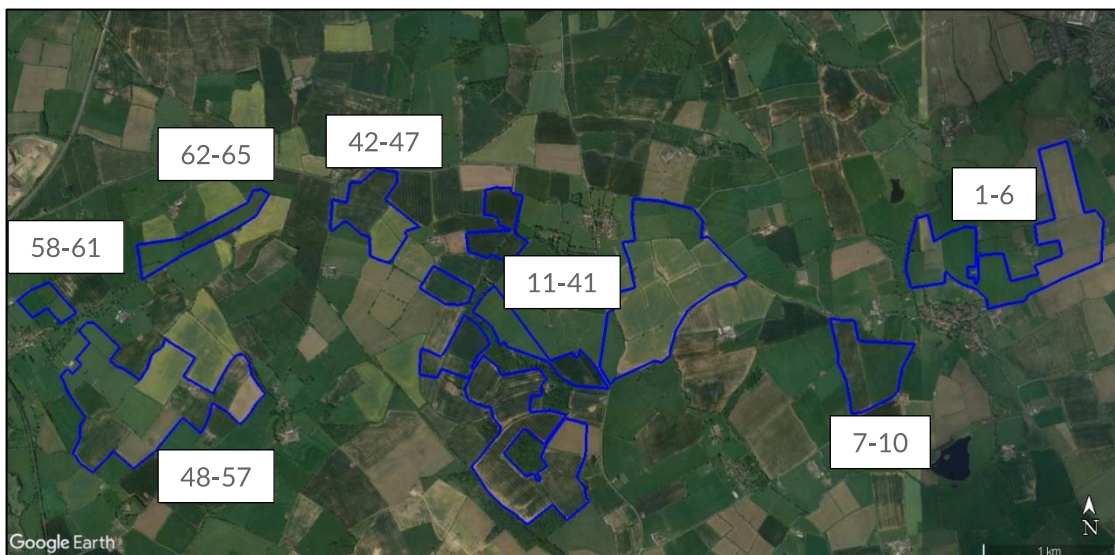


Figure 2 Panel Areas - aerial image

² Source: A3-BGS-SR02-00002-Layout of Proposed Development.pdf (cropped)

3 IDENTIFICATION OF AVIATION RECEPTORS

3.1 Overview of Aviation Receptors

One active airfield has been identified for the assessment; this is Teesside International Airport. Receptor details can be found in Appendix A.

3.2 Air Traffic Control (ATC) Tower

It is standard practice to determine whether a solar reflection can be experienced by personnel within the ATC tower. The ATC tower for Teesside International Airport is located approximately 7.5km south of panel area 10. The relative location of the ATC Tower at Teesside International Airport is shown in Figure 3 on the following page.

3.3 Aviation Receptors – Approaching Aircraft

The methodology used to assess whether a solar reflection can be experienced on the approach paths for the associated runways. This is considered to be the most critical stage of the flight. Teesside International Airport has one operational runway with two associated approach paths, one for each bearing.

The approach for determining receptor (aircraft) locations on the approach path is to select locations along the extended runway centre line from 50ft above the runway threshold out to a distance of 2 miles. The height of the aircraft is determined by using a 3-degree descent path relative to the runway threshold height.

The receptor details for each runway approach are presented in Appendix A. Figure 3 on the following page shows the identified approach paths as lines.

Full technical modelling of aviation receptors associated with Teesside International Airport will be required for all Solar PV modules.



Figure 3 Identified aerodrome: runway approach path locations – aerial image

4 IDENTIFICATION OF GROUND-BASED RECEPTORS

4.1 Overview

There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. The significance of a reflection, however, decreases with distance because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

The above parameters and extensive experience over a significant number of glint and glare assessments undertaken show that consideration of receptors within 1km of solar PV module areas is appropriate for glint and glare effects on roads and dwellings, and consideration of receptors within 500m of panel areas is appropriate for glint and glare effects on railways. Therefore, the study area has been designed accordingly as a 1km boundary from solar PV module areas for roads and dwellings, and a 500m boundary from solar PV module areas for railways (white outlined areas on the proceeding figures).

Potential receptors are identified based on mapping and aerial photography of the region. The initial judgement is made based on a high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

4.2 Road Receptors

Road types can generally be categorised as:

- Major National – Typically a road with a minimum of two carriageways with a maximum speed limit of up to 70mph. These roads typically have fast-moving vehicles with busy traffic.
- National – Typically a road with a one or more carriageways with a maximum speed limit of up to 60mph or 70mph. These roads typically have fast-moving vehicles with moderate to busy traffic density.
- Regional – Typically a single carriageway with a maximum speed limit of up to 60mph. The speed of vehicles will vary with a typical traffic density of low to moderate.
- Local - Typically roads and lanes with the lowest traffic densities. Speed limits vary.

Technical modelling is not recommended for local roads, where traffic densities are likely to be relatively low. Any solar reflections from the proposed development that are experienced by a road user along a local road would be considered low impact in the worst case in accordance with the guidance presented in Appendix D. The analysis has considered any major national, national, and regional roads that:

- are within the one-kilometre study area; and
- have a potential view of the panels.

In total, 247 road receptor locations have been identified distanced circa 100m apart across three road sections:

- A1(M) (road receptors 01 to 23);
- Aycliffe Interchange/A167 (road receptors 24 to 42);
- Lime Lane (road receptors 43 to 73);
- Ricknall Lane/Lodge Lane (road receptors 74 to 109);
- Elstob Lane/Bishopton Lane (road receptors 110 to 156);
- Unnamed Road/The Green/ High Street (road receptors 157 to 199);
- South Street (road receptors 200 to 237);
- Whitton Road (road receptors 238 to 247).

These are shown in Figure 4 below and in more detail in Figures 5 to 14 on the following pages.



Figure 4 Overview of road receptors - aerial image



Figure 5 A1(M): road receptors 01 to 23 – aerial image

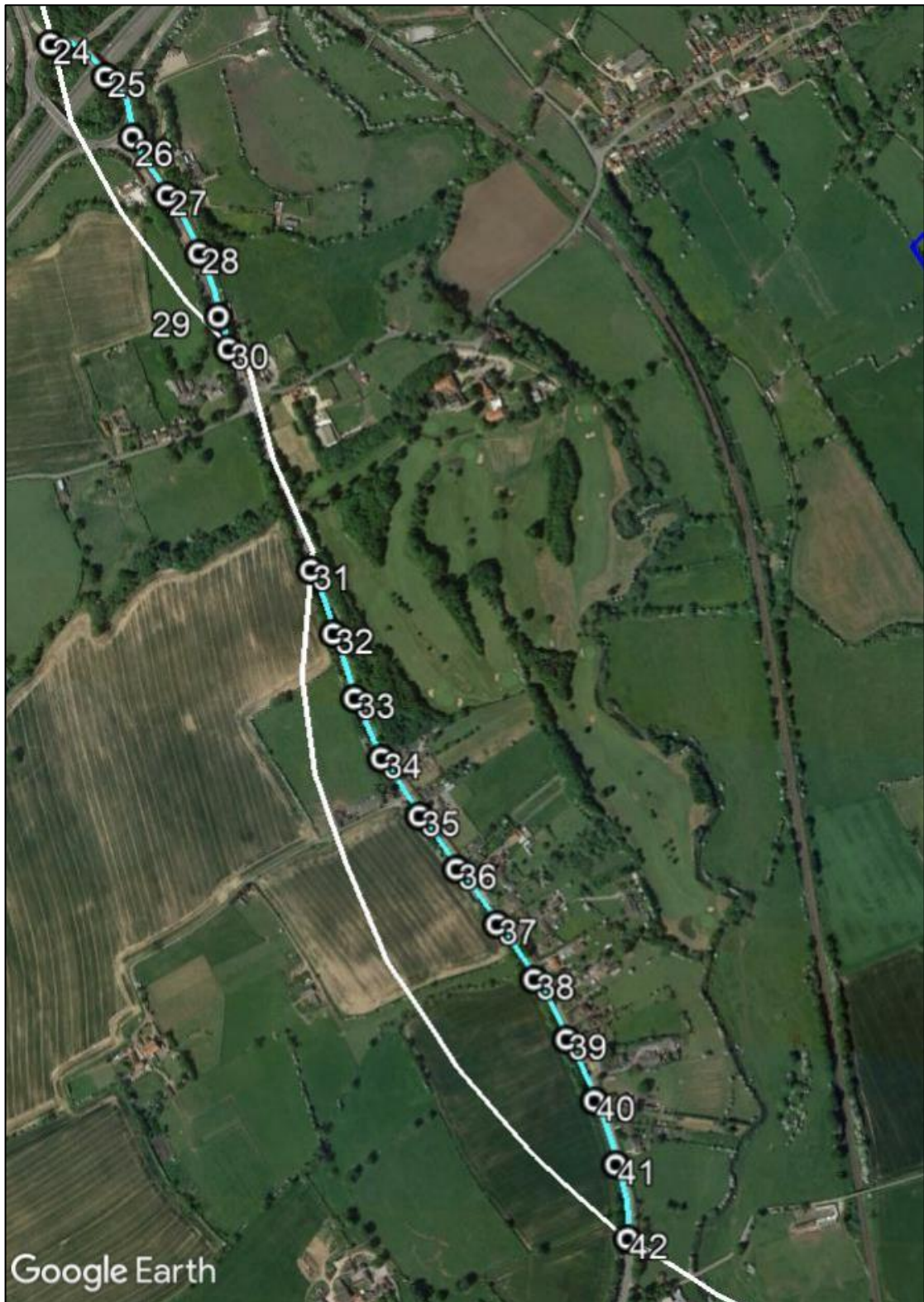


Figure 6 Aycliffe Interchange/A167: road receptors 24 to 42 - aerial image



Figure 7 Lime Lane: road receptors 43 to 73 – aerial image



Figure 8 Ricknall Lane/Lodge Lane: road receptors 74 to 109 – aerial image

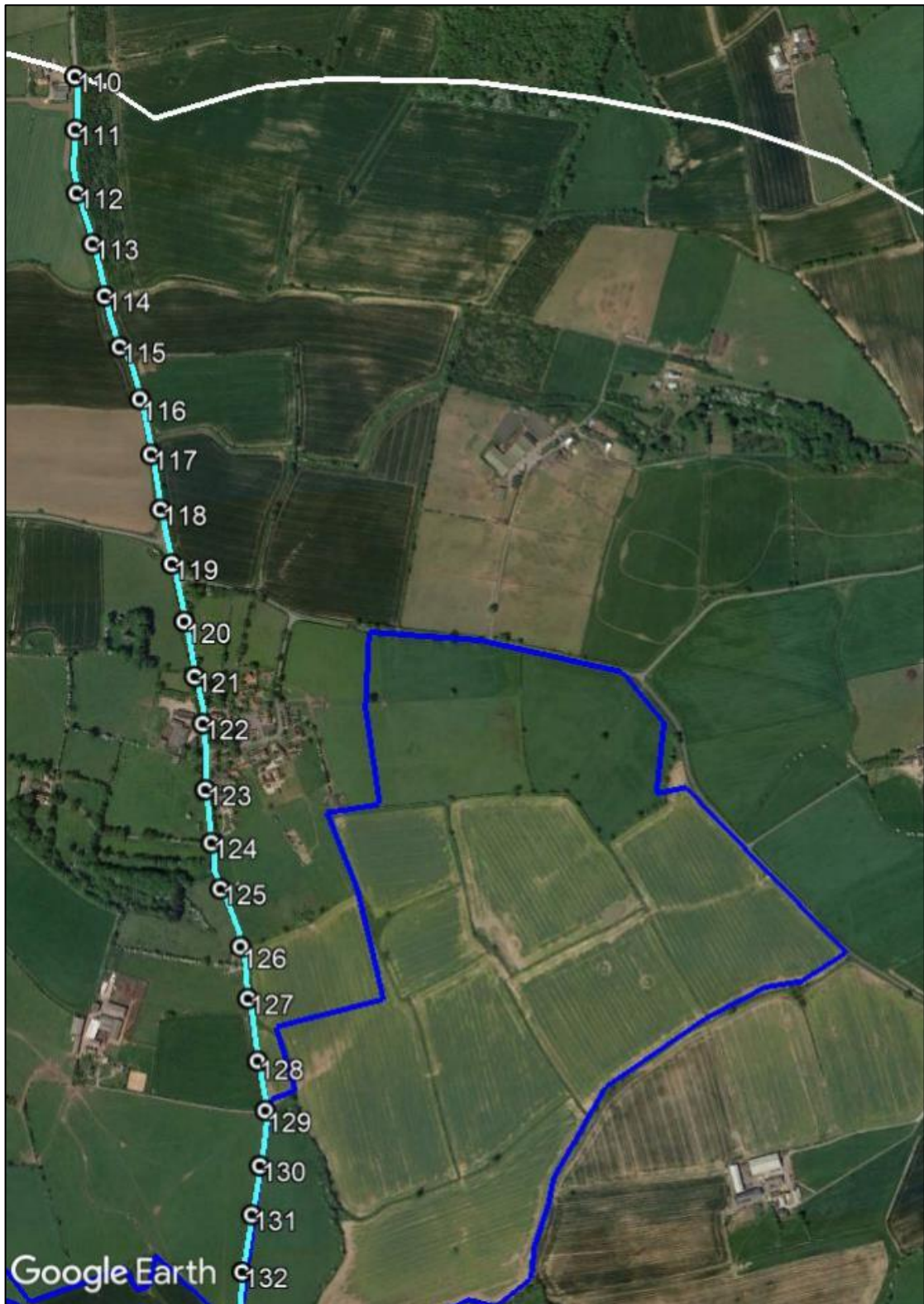


Figure 9 Elstob Lane/Bishopton Lane: road receptors 110 to 132 - aerial image

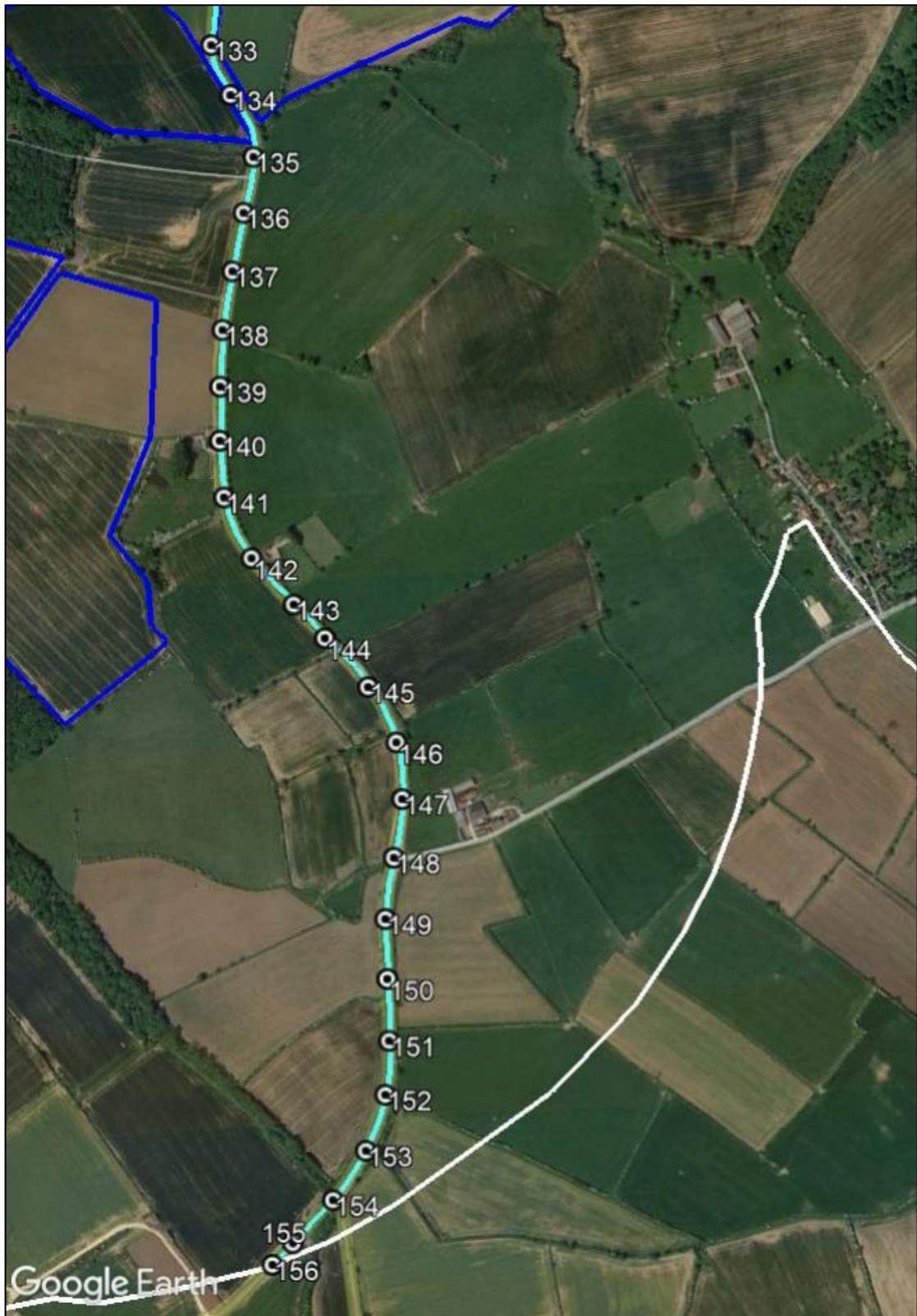


Figure 10 Elstob Lane/Bishopton Lane: road receptors 133 to 156 - aerial image



Figure 11 Unnamed Road/The Green/ High Street: road receptors 157 to 178 – aerial image

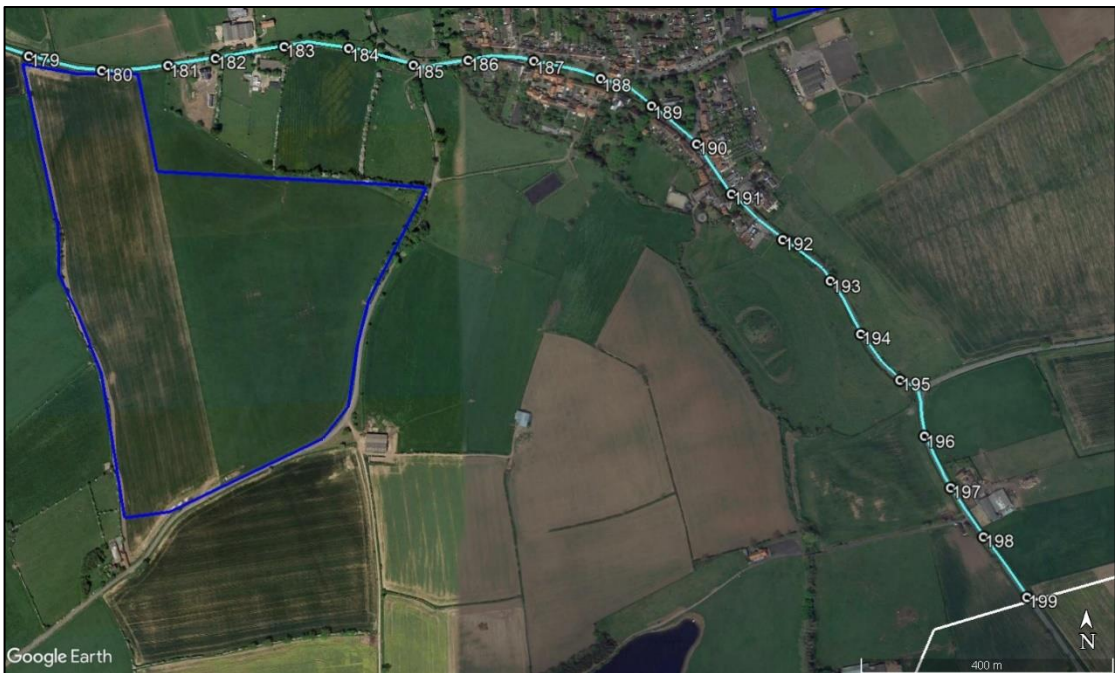


Figure 12 Unnamed Road/The Green/ High Street: road receptors 179 to 199 – aerial image



Figure 13 South Street: road receptors 200 to 237 – aerial image



Figure 14 Whitton Road: road receptors 238 to 247 – aerial image

4.3 Dwelling Receptors

The analysis has considered dwellings that:

- are within the one-kilometre study area; and
- have a potential view of the panels.

In residential areas with multiple layers of dwellings, only the outer dwellings have been considered for assessment. This is because they will mostly obscure views of the solar panels to the dwellings behind them, which will therefore not be impacted by the Proposed Development because line of sight will be removed, or they will experience comparable effects to the closest assessed dwelling.

In some cases, one physical structure is split into multiple separate addresses. In such cases, the results for the assessed location will be applicable to all associated addresses. The sampling resolution is sufficiently high to capture the level of effect for all potentially affected dwellings.

In total, 309 dwellings were identified for assessment, these are shown in Figure 15 below, and these are shown in more detail in Figures 16 to 62 on the following pages.

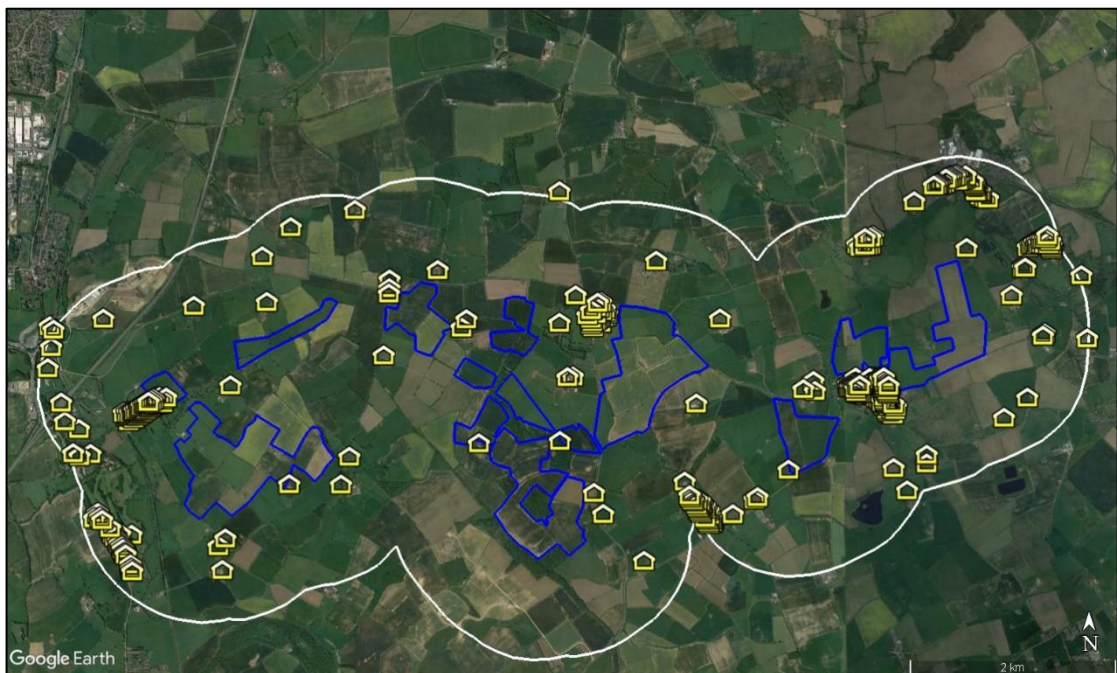


Figure 15 Overview of dwelling receptors – aerial image

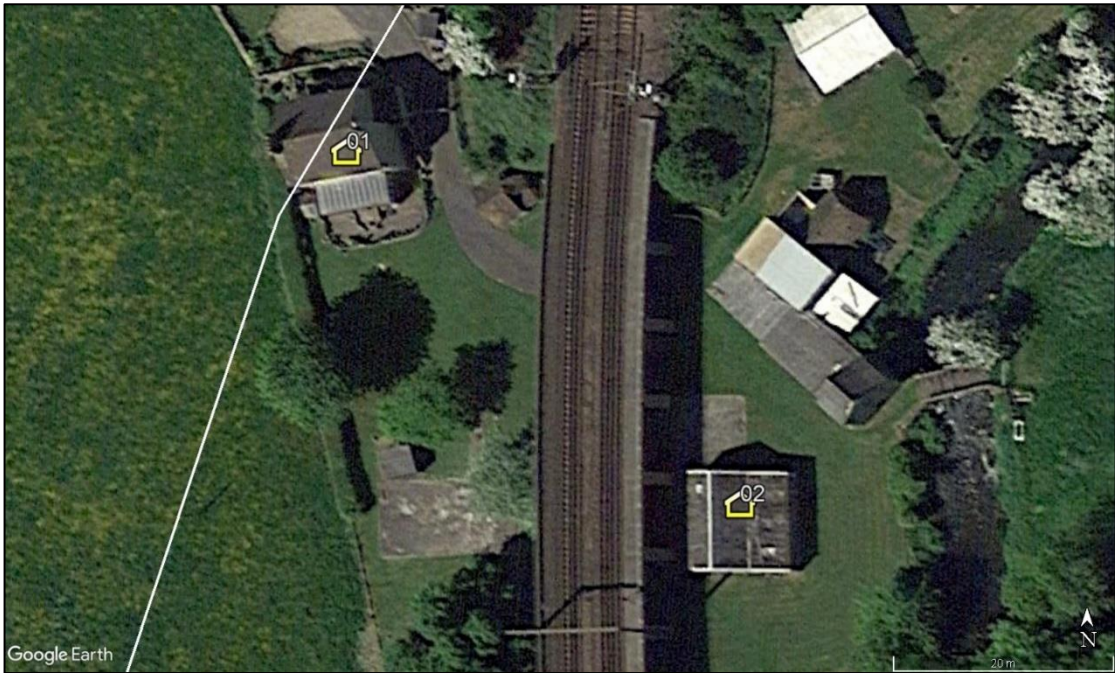


Figure 16 Assessed dwelling receptors 01 and 02 – aerial image

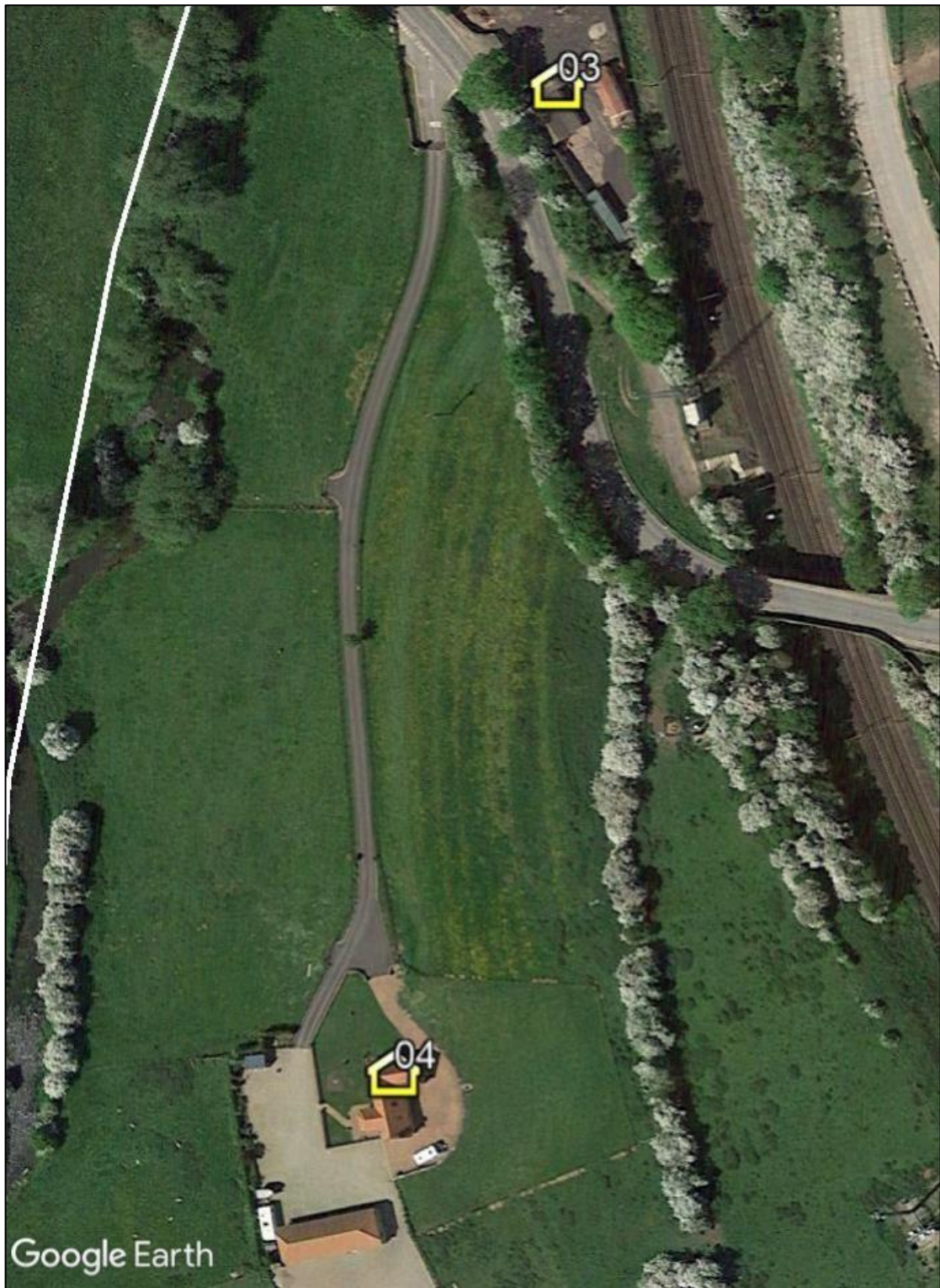


Figure 17 Assessed dwelling receptors 03 and 04 - aerial image



Figure 18 Assessed dwelling receptor 05 – aerial image

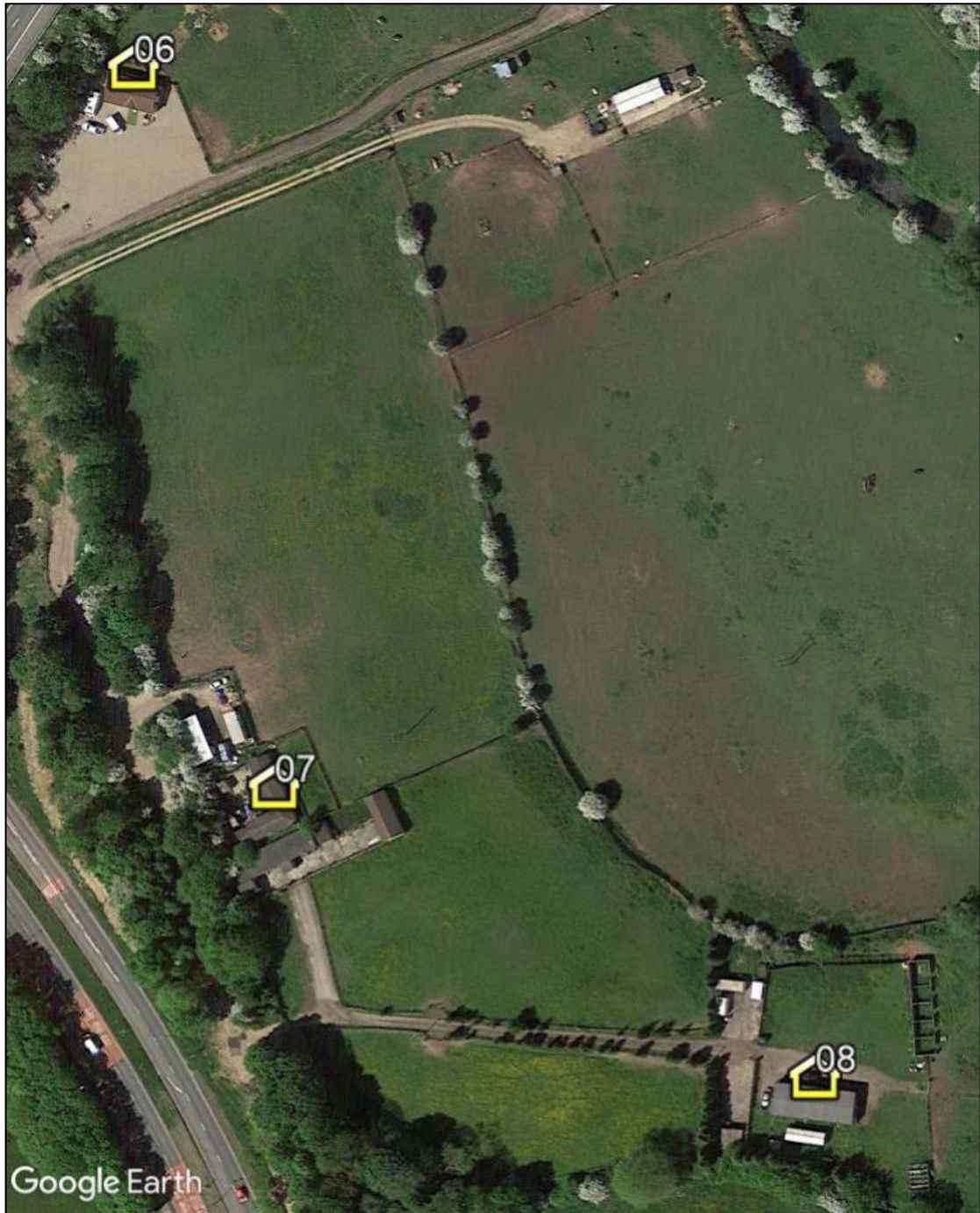


Figure 19 Assessed dwelling receptors 06 to 08 - aerial image

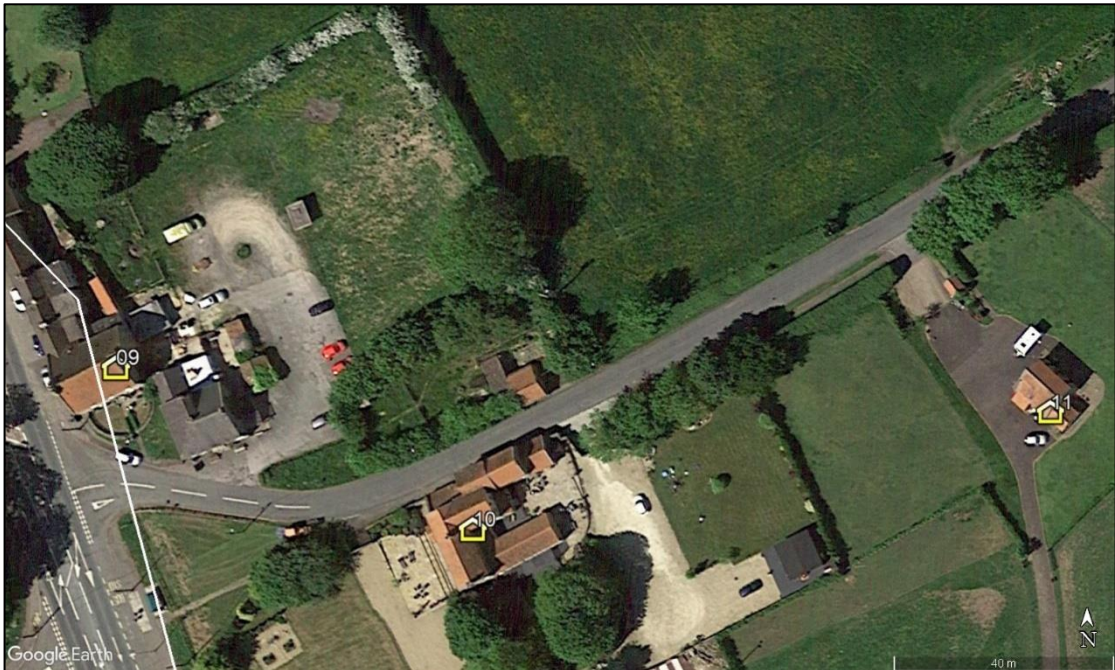


Figure 20 Assessed dwelling receptors 09 to 11 – aerial image

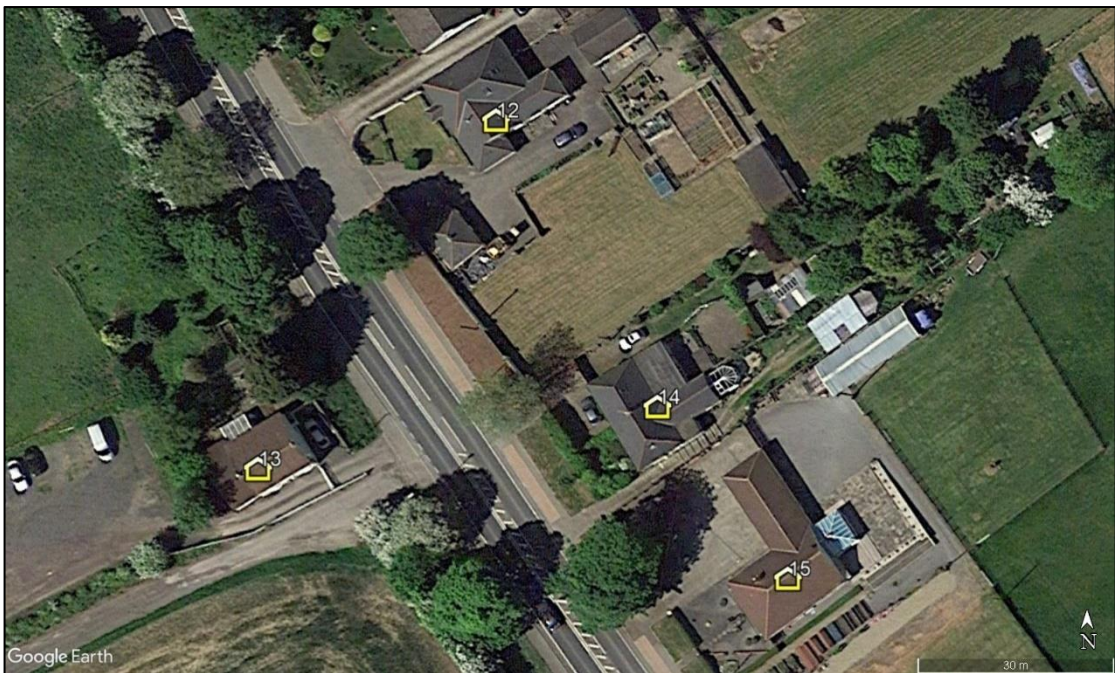


Figure 21 Assessed dwelling receptors 12 to 15 – aerial image

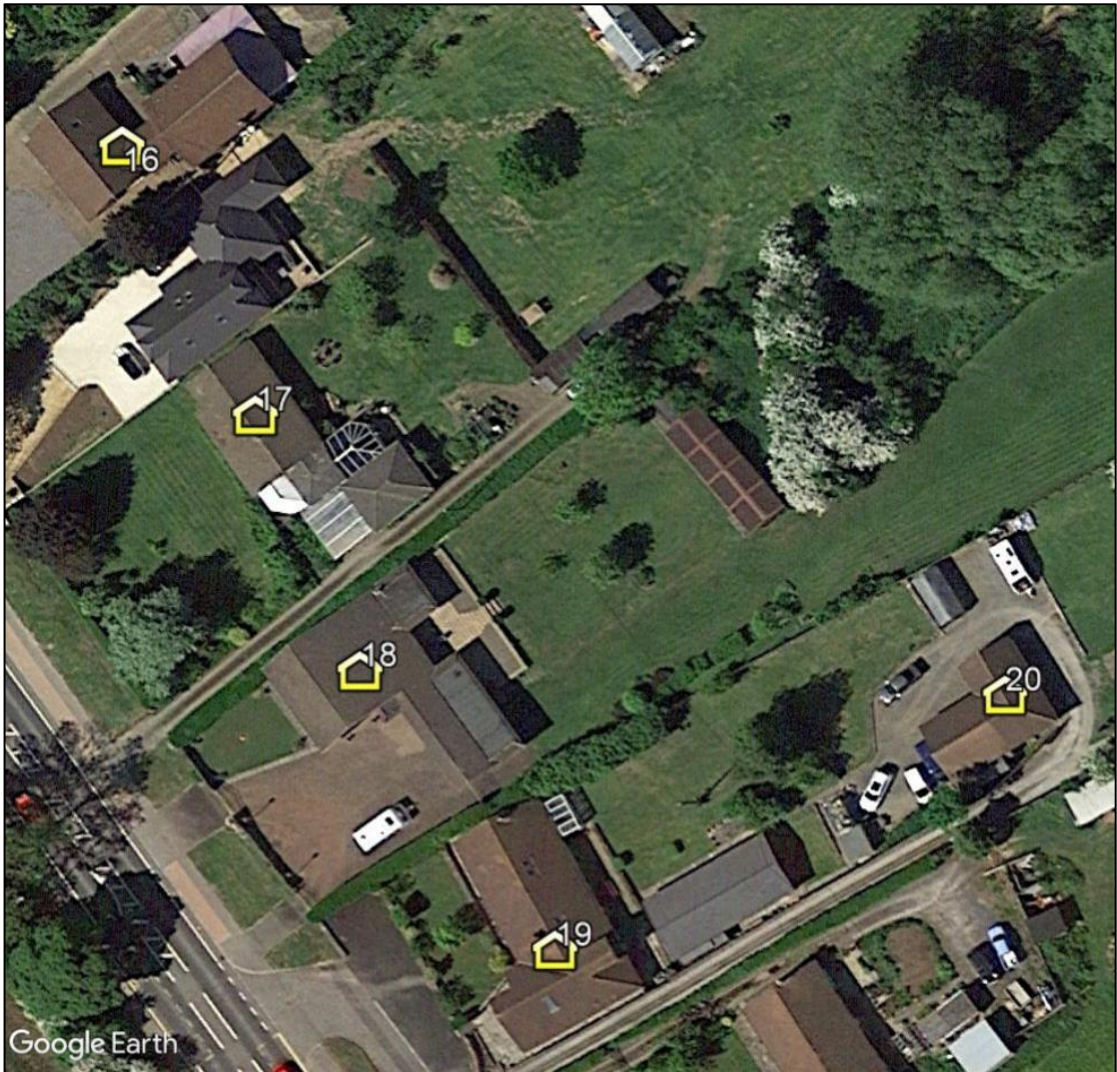


Figure 22 Assessed dwelling receptors 16 to 20 – aerial image



Figure 23 Assessed dwelling receptors 21 to 25 - aerial image



Figure 24 Assessed dwelling receptors 26 to 28 – aerial image



Figure 25 Assessed dwelling receptors 29 to 31 – aerial image

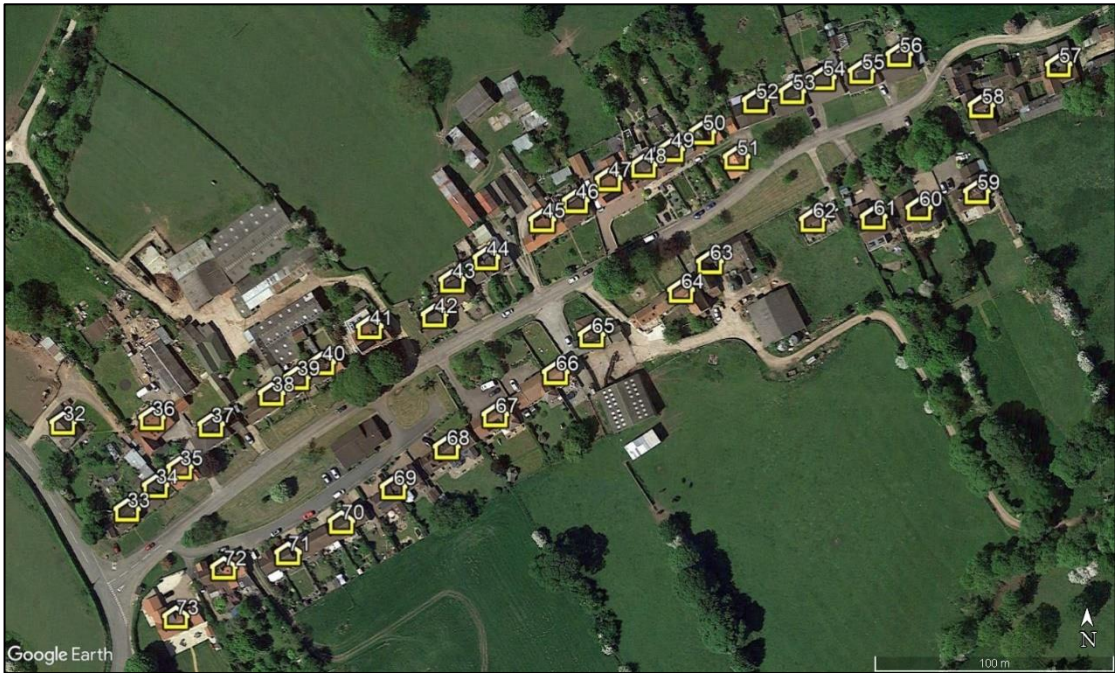


Figure 26 Assessed dwelling receptors 32 to 73 – aerial image

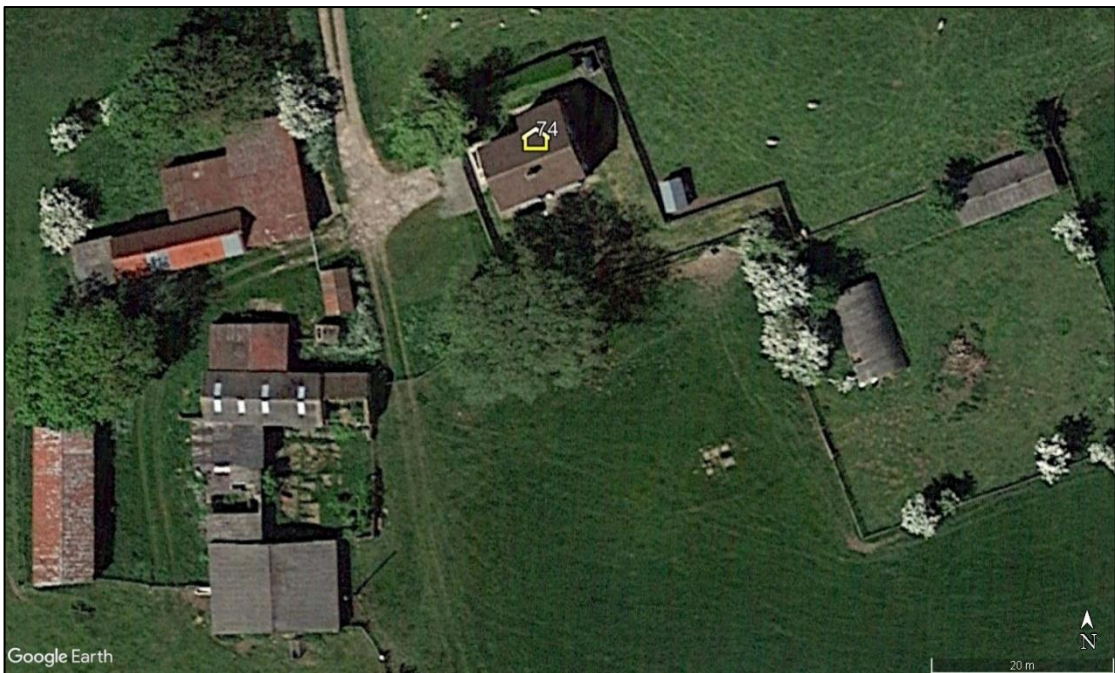


Figure 27 Assessed dwelling receptor 74 – aerial image



Figure 28 Assessed dwelling receptor 75 – aerial image



Figure 29 Assessed dwelling receptors 76 to 78 – aerial image



Figure 30 Assessed dwelling receptors 79 to 81 – aerial image



Figure 31 Assessed dwelling receptors 82 – aerial image



Figure 32 Assessed dwelling receptors 83 and 84 – aerial image



Figure 33 Assessed dwelling receptor 85 – aerial image



Figure 34 Assessed dwelling receptors 86 to 89 – aerial image



Figure 35 Assessed dwelling receptor 90 – aerial image



Figure 36 Assessed dwelling receptors 91 and 92 – aerial image



Figure 37 Assessed dwelling receptor 93 – aerial image



Figure 38 Assessed dwelling receptors 94 to 117 – aerial image



Figure 39 Assessed dwelling receptors 118 and 119 - aerial image

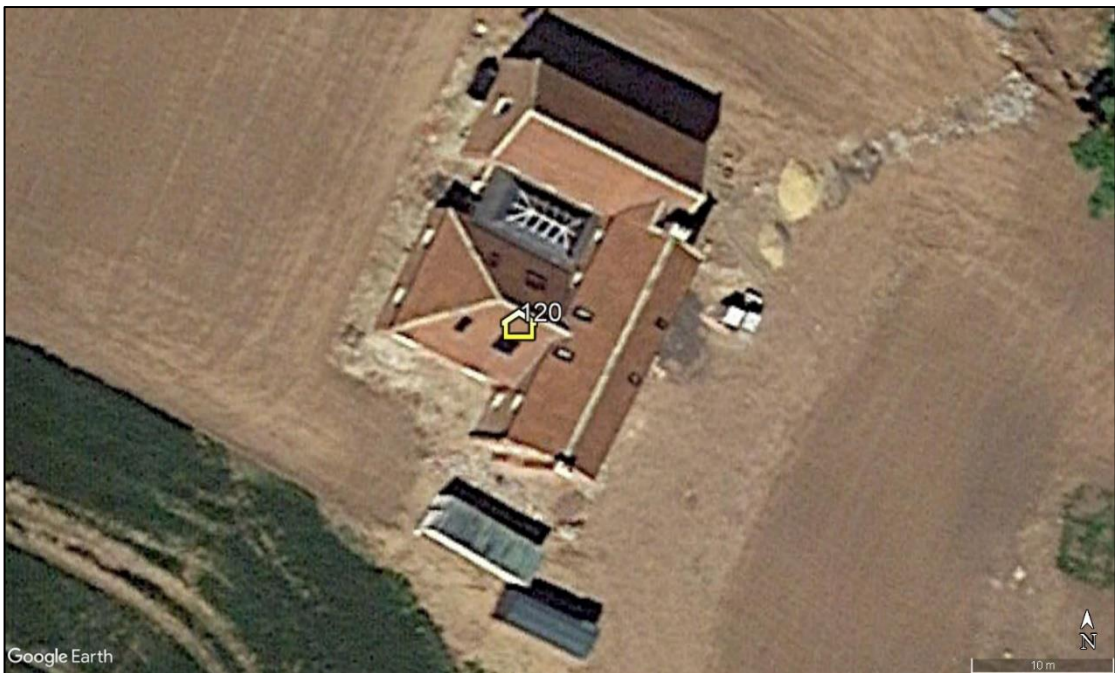


Figure 40 Assessed dwelling receptor 120 - aerial image



Figure 41 Assessed dwelling receptor 121 – aerial image

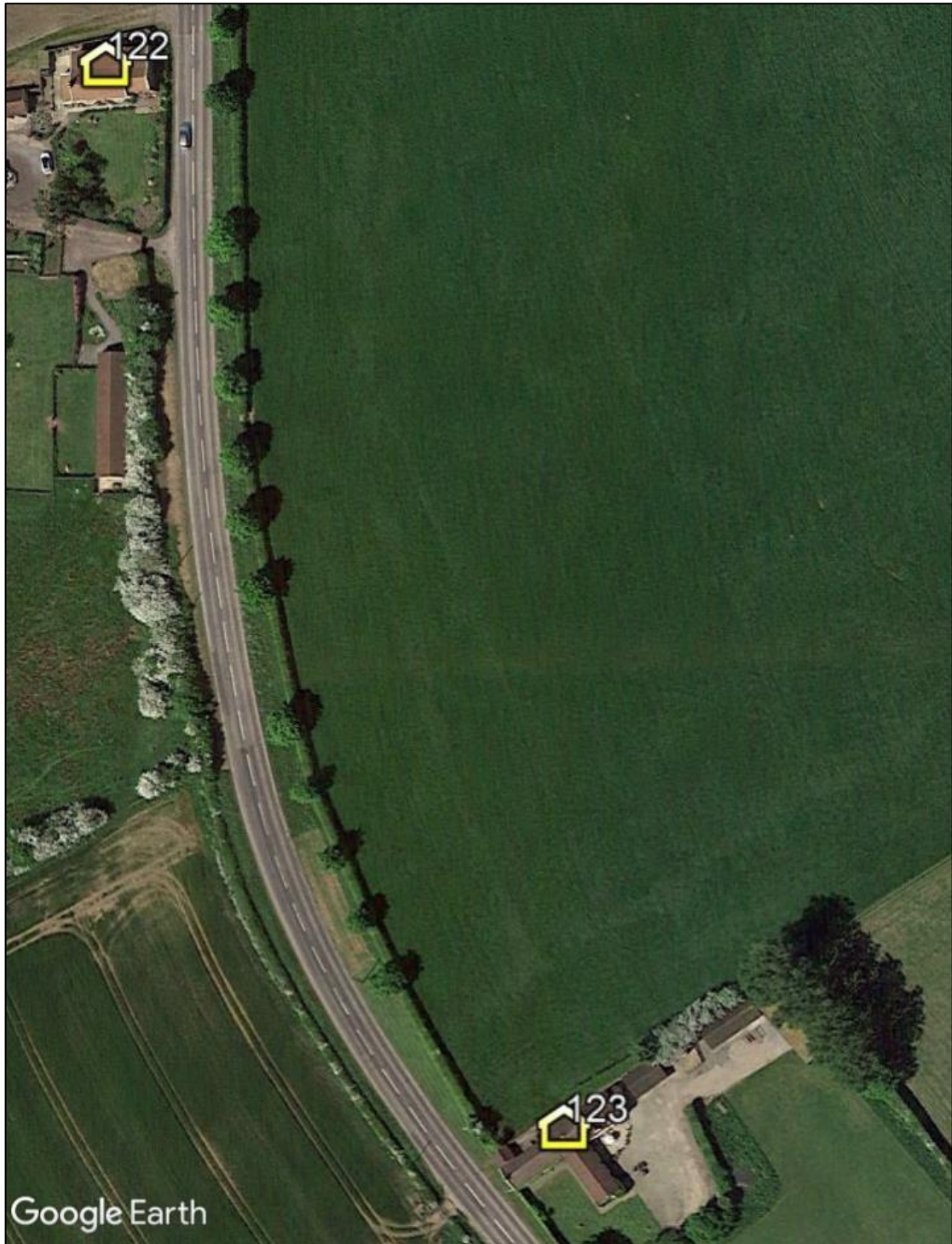


Figure 42 Assessed dwelling receptor 122 and 123 – aerial image



Figure 43 Assessed dwelling receptor 124 - aerial image



Figure 44 Assessed dwelling receptor 125 - aerial image



Figure 45 Assessed dwelling receptor 126 - aerial image



Figure 46 Assessed dwelling receptor 127 - aerial image



Figure 47 Assessed dwelling receptor 128 - aerial image



Figure 48 Assessed dwelling receptors 129 to 154 - aerial image

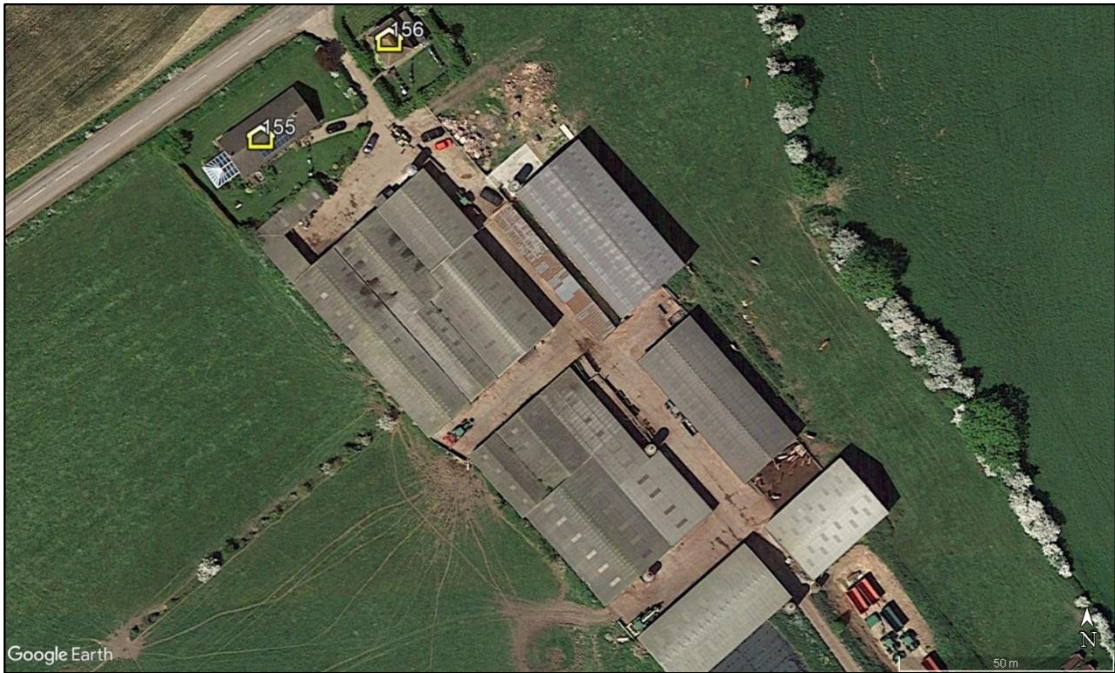


Figure 49 Assessed dwelling receptors 155 and 156 – aerial image



Figure 50 Assessed dwelling receptor 157 – aerial image



Figure 51 Assessed dwelling receptors 158 to 160 – aerial image



Figure 52 Assessed dwelling receptors 161 to 206 and 216 to 222 – aerial image

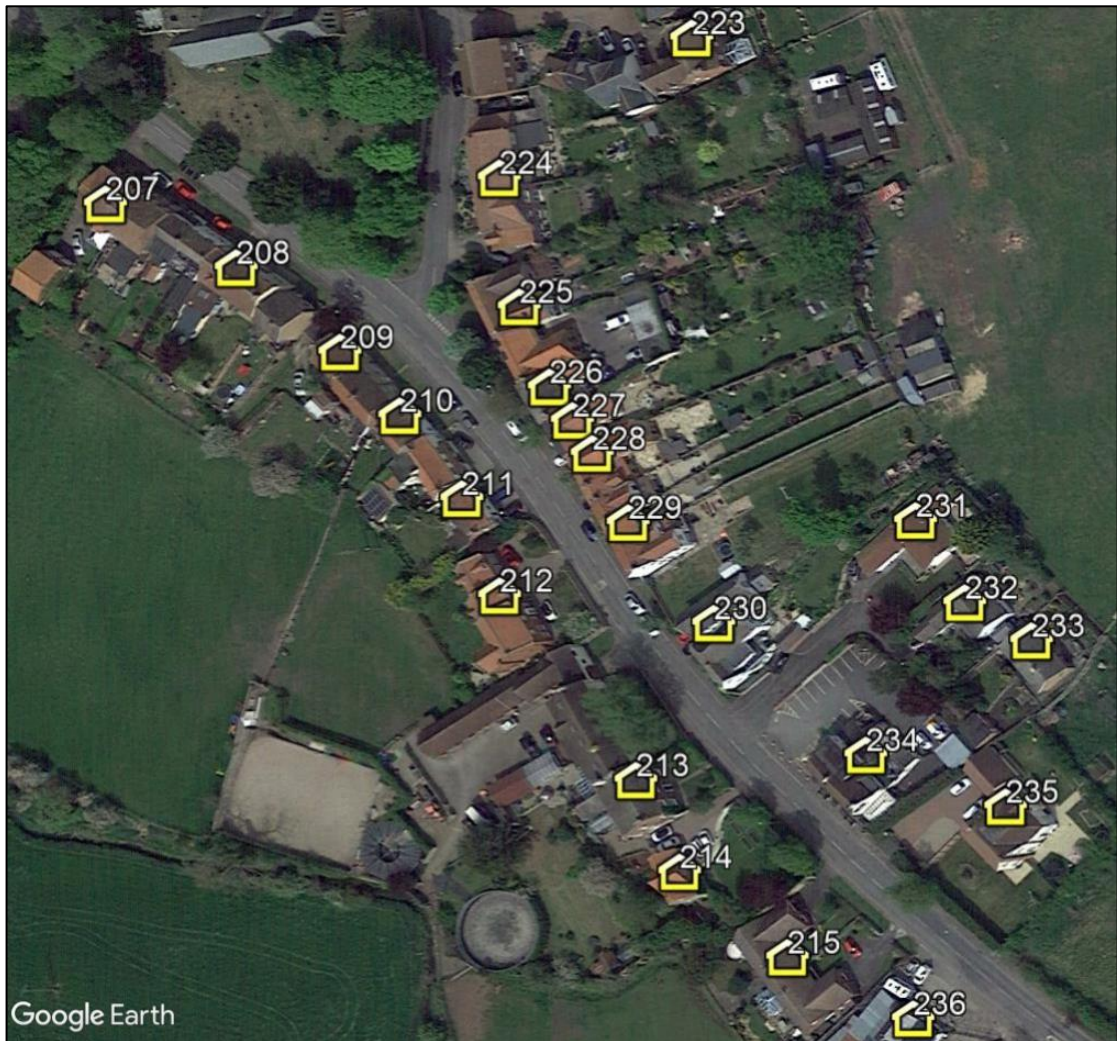


Figure 53 Assessed dwelling receptors 207 to 215 and 223 to 236 – aerial image



Figure 54 Assessed dwelling receptors 237 to 240 - aerial image



Figure 55 Assessed dwelling receptors 241 and 242 - aerial image



Figure 56 Assessed dwelling receptors 243 to 250 – aerial image

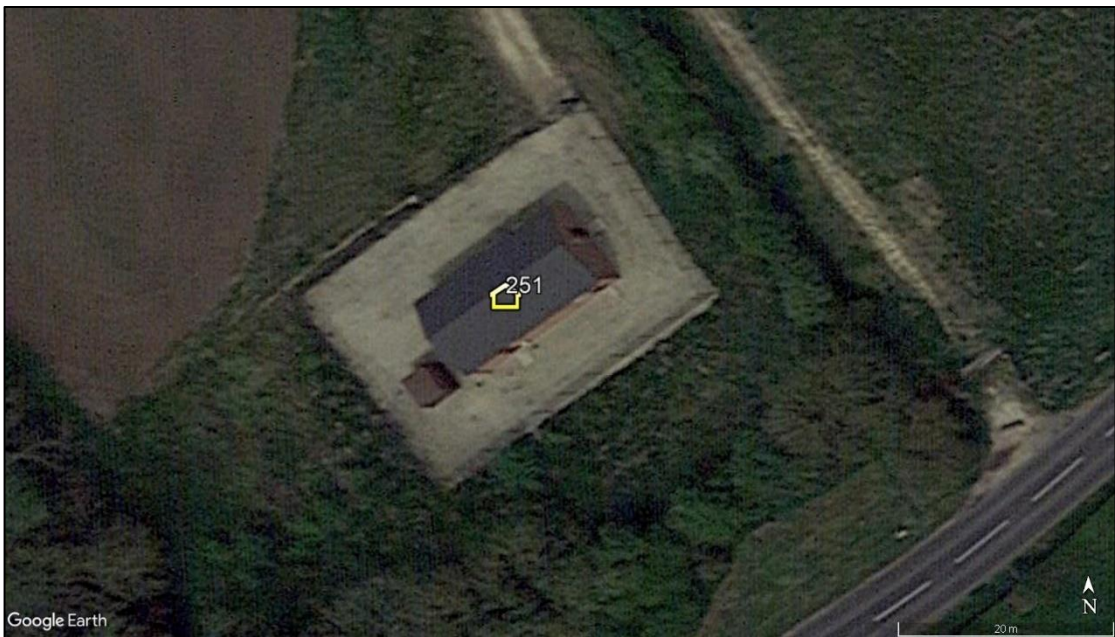


Figure 57 Assessed dwelling receptor 251- aerial image



Figure 58 Assessed dwelling receptors 252 to 282 – aerial image



Figure 59 Assessed dwelling receptor 283 – aerial image

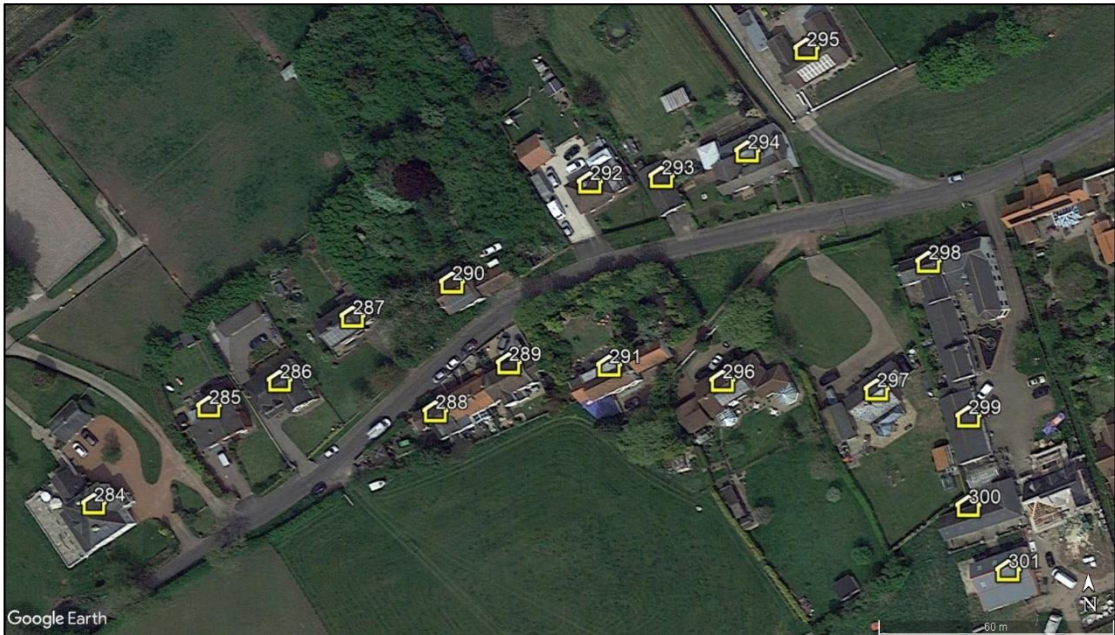


Figure 60 Assessed dwelling receptors 284 to 301 – aerial image

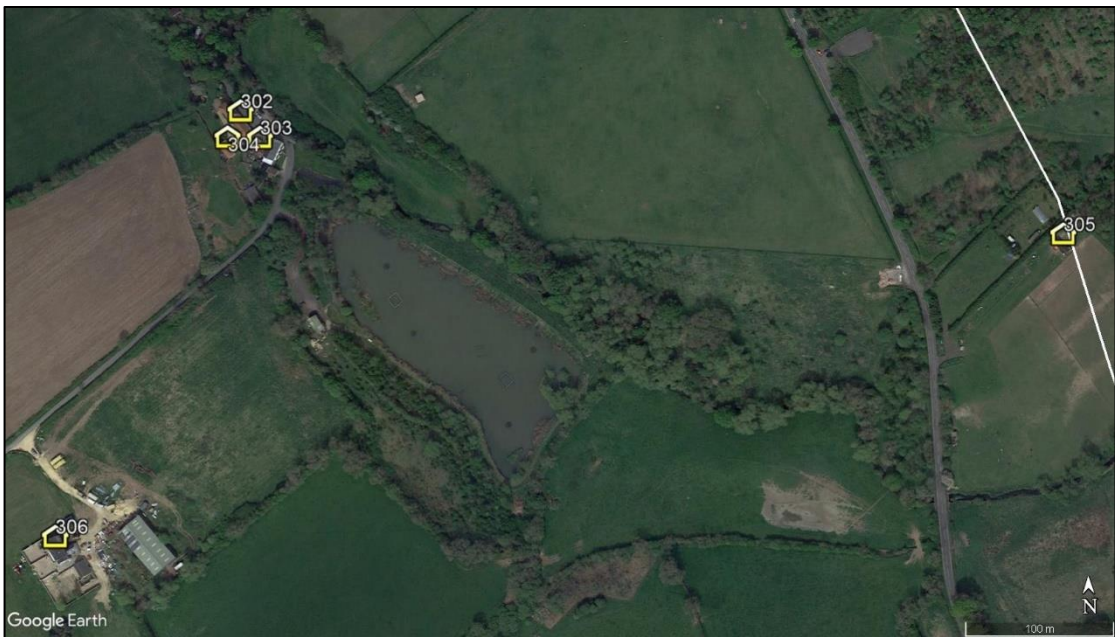


Figure 61 Assessed dwelling receptors 302 to 306 – aerial image



Figure 62 Assessed dwelling receptors 307 to 309 – aerial image

4.4 Railway Receptors

A 1.4km section of railway line has been identified for assessment, as shown by the blue line in Figure 63 below. In total, 15 train driver receptors are identified, distanced circa 100m apart. The co-ordinates of the train driver receptor locations are presented in Appendix A.



Figure 63 Overview of train driver receptors – aerial image

Following a conservative review of available imagery, no railway signal locations were identified along the section of railway line that has been identified for assessment. It is recommended that Network Rail be contacted for signal details before completing the Solar Photovoltaic Glint and Glare assessment.

5 STAKEHOLDER CONSULTATION

5.1 Consultation Process

The following stakeholders may require consultation:

- Safeguarding personnel at Teesside International Airport.
- Network Rail to request signal details before completing the Solar Photovoltaic Glint and Glare assessment.

APPENDIX A – RECEPTOR DETAILS

ATC Tower Location – Teesside International Airport

The table below presents the ATC Tower coordinates.

Type	Longitude (°)	Latitude (°)
ATC Tower	-1.427587	54.513247

ATC Tower coordinates

Receptor Locations for Aircraft Landing on Runway 05

The table below presents the coordinate data for the recommended receptors for aircraft on approach to runway 05. The altitude of the aircraft would be calculated based on a 3-degree descent path referenced to 50 feet (15.2m) above the runway threshold.

No.	Miles from Approach	Longitude (°)	Latitude (°)
Approach 05- Receptor 01	Threshold	-1.442428	54.502231
Approach 05- Receptor 02	0.1	-1.444265	54.501251
Approach 05- Receptor 03	0.2	-1.446102	54.500271
Approach 05- Receptor 04	0.3	-1.447939	54.499292
Approach 05- Receptor 05	0.4	-1.449776	54.498312
Approach 05- Receptor 06	0.5	-1.451613	54.497333
Approach 05- Receptor 07	0.6	-1.453451	54.496353
Approach 05- Receptor 08	0.7	-1.455288	54.495374
Approach 05- Receptor 09	0.8	-1.457125	54.494394
Approach 05- Receptor 10	0.9	-1.458962	54.493414
Approach 05- Receptor 11	1.0	-1.460799	54.492435
Approach 05- Receptor 12	1.1	-1.462636	54.491455
Approach 05- Receptor 13	1.2	-1.464473	54.490476
Approach 05- Receptor 14	1.3	-1.46631	54.489496
Approach 05- Receptor 15	1.4	-1.468148	54.488517
Approach 05- Receptor 16	1.5	-1.469985	54.487537

No.	Miles from Approach	Longitude (°)	Latitude (°)
Approach 05- Receptor 17	1.6	-1.471822	54.486557
Approach 05- Receptor 18	1.7	-1.473659	54.485578
Approach 05- Receptor 19	1.8	-1.475496	54.484598
Approach 05- Receptor 20	1.9	-1.477333	54.483619
Approach 05- Receptor 21	2.0	-1.47917	54.482639

Aircraft receptor locations on the approach path for runway 05

Receptor Locations for Aircraft Landing on Runway 23

The table below presents the data for the assessed locations for aircraft on approach to runway 23. The altitude of the aircraft is based on a 3-degree descent path referenced to 50 feet (15.2m) above the runway threshold.

No.	Miles from Approach	Longitude (°)	Latitude (°)
Approach 23- Receptor 01	Threshold	-1.416392	54.516139
Approach 23- Receptor 02	0.1	-1.414553	54.517118
Approach 23- Receptor 03	0.2	-1.412715	54.518097
Approach 23- Receptor 04	0.3	-1.410877	54.519076
Approach 23- Receptor 05	0.4	-1.409038	54.520056
Approach 23- Receptor 06	0.5	-1.4072	54.521035
Approach 23- Receptor 07	0.6	-1.405362	54.522014
Approach 23- Receptor 08	0.7	-1.403523	54.522993
Approach 23- Receptor 09	0.8	-1.401685	54.523972
Approach 23- Receptor 10	0.9	-1.399847	54.524952
Approach 23- Receptor 11	1.0	-1.398008	54.525931
Approach 23- Receptor 12	1.1	-1.39617	54.52691
Approach 23- Receptor 13	1.2	-1.394332	54.527889
Approach 23- Receptor 14	1.3	-1.392493	54.528868
Approach 23- Receptor 15	1.4	-1.390655	54.529848
Approach 23- Receptor 16	1.5	-1.388816	54.530827

No.	Miles from Approach	Longitude (°)	Latitude (°)
Approach 23- Receptor 17	1.6	-1.386978	54.531806
Approach 23- Receptor 18	1.7	-1.38514	54.532785
Approach 23- Receptor 19	1.8	-1.383301	54.533764
Approach 23- Receptor 20	1.9	-1.381463	54.534744
Approach 23- Receptor 21	2.0	-1.379625	54.535723

Aircraft receptor locations on the approach path for runway 23

Road Receptor Details

The road receptors details are presented in the table below.

No.	Longitude (°)	Latitude (°)	No.	Longitude (°)	Latitude (°)
1	-1.561414	54.583596	125	-1.479520	54.589580
2	-1.560395	54.584292	126	-1.479020	54.588630
3	-1.559414	54.584955	127	-1.478840	54.587780
4	-1.558313	54.585661	128	-1.478590	54.586760
5	-1.557293	54.586304	129	-1.478380	54.585950
6	-1.556218	54.586971	130	-1.478540	54.585050
7	-1.555258	54.587593	131	-1.478780	54.584250
8	-1.554188	54.588262	132	-1.479070	54.583310
9	-1.553140	54.588917	133	-1.479240	54.582420
10	-1.552097	54.589574	134	-1.478750	54.581670
11	-1.551008	54.590260	135	-1.478150	54.580730
12	-1.550016	54.590892	136	-1.478400	54.579880
13	-1.548980	54.591553	137	-1.478680	54.578990
14	-1.547806	54.592299	138	-1.478930	54.578100
15	-1.546699	54.593001	139	-1.478990	54.577240
16	-1.545836	54.593543	140	-1.478990	54.576420
17	-1.544648	54.594307	141	-1.478870	54.575560

18	-1.543739	54.594955	142	-1.478150	54.574640
19	-1.542809	54.595715	143	-1.477060	54.573940
20	-1.542047	54.596401	144	-1.476250	54.573430
21	-1.541281	54.597197	145	-1.475130	54.572690
22	-1.540591	54.598039	146	-1.474400	54.571850
23	-1.540225	54.598498	147	-1.474250	54.570990
24	-1.561761	54.584455	148	-1.474470	54.570100
25	-1.560518	54.584025	149	-1.474700	54.569170
26	-1.559897	54.583221	150	-1.474650	54.568260
27	-1.559124	54.582449	151	-1.474610	54.567320
28	-1.558373	54.581673	152	-1.474710	54.566500
29	-1.557896	54.580823	153	-1.475220	54.565650
30	-1.557660	54.580389	154	-1.476090	54.564900
31	-1.555798	54.577448	155	-1.477142	54.564244
32	-1.555279	54.576599	156	-1.477707	54.563898
33	-1.554784	54.575735	157	-1.480640	54.594590
34	-1.554151	54.574937	158	-1.479110	54.594410
35	-1.553282	54.574168	159	-1.477720	54.594090
36	-1.552448	54.573456	160	-1.476210	54.593840
37	-1.551539	54.572714	161	-1.474670	54.593690
38	-1.550677	54.571977	162	-1.473040	54.593630
39	-1.549913	54.571183	163	-1.471610	54.593530
40	-1.549261	54.570366	164	-1.470090	54.593320
41	-1.548778	54.569512	165	-1.468500	54.593090
42	-1.548515	54.568516	166	-1.467320	54.592590
43	-1.561516	54.589644	167	-1.466640	54.591790

44	-1.560542	54.588973	168	-1.466090	54.590990
45	-1.559707	54.588264	169	-1.465080	54.590340
46	-1.558282	54.588088	170	-1.463960	54.589650
47	-1.556722	54.587888	171	-1.462930	54.589010
48	-1.555253	54.587699	172	-1.461840	54.588410
49	-1.553676	54.587569	173	-1.460520	54.587920
50	-1.552184	54.587857	174	-1.459140	54.587420
51	-1.551170	54.588489	175	-1.457770	54.586970
52	-1.550279	54.589227	176	-1.456320	54.586750
53	-1.549369	54.589989	177	-1.454880	54.586510
54	-1.548490	54.590732	178	-1.453560	54.586110
55	-1.547661	54.591427	179	-1.452170	54.585790
56	-1.546374	54.592018	180	-1.450380	54.585580
57	-1.545034	54.592343	181	-1.448750	54.585650
58	-1.543530	54.592657	182	-1.447590	54.585750
59	-1.542009	54.593018	183	-1.445920	54.585920
60	-1.540694	54.593382	184	-1.444360	54.585910
61	-1.539316	54.593796	185	-1.442780	54.585680
62	-1.537948	54.594221	186	-1.441430	54.585750
63	-1.536556	54.594546	187	-1.439810	54.585730
64	-1.535083	54.594828	188	-1.438170	54.585470
65	-1.533567	54.595122	189	-1.435810	54.584540
66	-1.532125	54.595450	190	-1.436920	54.585080
67	-1.530762	54.595811	191	-1.434950	54.583830
68	-1.529298	54.596104	192	-1.433680	54.583180
69	-1.527777	54.596281	193	-1.432510	54.582590

70	-1.526395	54.596422	194	-1.431760	54.581830
71	-1.524718	54.596299	195	-1.430790	54.581170
72	-1.523198	54.596122	196	-1.430190	54.580370
73	-1.521687	54.596500	197	-1.429550	54.579630
74	-1.529939	54.600805	198	-1.428750	54.578930
75	-1.528642	54.600278	199	-1.427690	54.578070
76	-1.527314	54.599779	200	-1.467900	54.592970
77	-1.525871	54.599514	201	-1.466740	54.593620
78	-1.524368	54.599356	202	-1.465650	54.594210
79	-1.522952	54.599119	203	-1.464120	54.594360
80	-1.521787	54.598506	204	-1.462530	54.594530
81	-1.521796	54.597656	205	-1.461100	54.594640
82	-1.521764	54.596740	206	-1.459600	54.594850
83	-1.520445	54.596366	207	-1.458130	54.595160
84	-1.518961	54.596156	208	-1.456550	54.595470
85	-1.517475	54.595947	209	-1.455180	54.595730
86	-1.515986	54.595747	210	-1.453650	54.596030
87	-1.514391	54.595532	211	-1.452150	54.596270
88	-1.512902	54.595331	212	-1.450680	54.596450
89	-1.511416	54.595124	213	-1.449150	54.596610
90	-1.509710	54.594915	214	-1.447610	54.596770
91	-1.508346	54.594923	215	-1.446140	54.596910
92	-1.506727	54.595004	216	-1.444750	54.597320
93	-1.505604	54.595552	217	-1.443550	54.597900
94	-1.504249	54.595823	218	-1.442270	54.598410
95	-1.502682	54.595694	219	-1.440740	54.598460

96	-1.501215	54.595620	220	-1.439230	54.598250
97	-1.499634	54.595573	221	-1.437750	54.598460
98	-1.498004	54.595608	222	-1.436470	54.598770
99	-1.496592	54.595833	223	-1.434970	54.599330
100	-1.494930	54.596130	224	-1.434880	54.600080
101	-1.493676	54.596110	225	-1.433710	54.600730
102	-1.492039	54.596084	226	-1.432520	54.601260
103	-1.490408	54.596021	227	-1.430950	54.601410
104	-1.488883	54.595990	228	-1.429820	54.601910
105	-1.487259	54.595869	229	-1.428620	54.602540
106	-1.485893	54.595652	230	-1.427270	54.603040
107	-1.484427	54.595563	231	-1.425720	54.603300
108	-1.482873	54.595399	232	-1.424320	54.603480
109	-1.481061	54.595166	233	-1.422700	54.603920
110	-1.483460	54.602710	234	-1.421970	54.604440
111	-1.483440	54.601850	235	-1.421270	54.605200
112	-1.483380	54.600820	236	-1.419880	54.605610
113	-1.482940	54.600000	237	-1.418240	54.605770
114	-1.482610	54.599160	238	-1.408690	54.598140
115	-1.482200	54.598340	239	-1.409220	54.597330
116	-1.481650	54.597500	240	-1.408580	54.596490
117	-1.481350	54.596610	241	-1.407940	54.595690
118	-1.481090	54.595720	242	-1.407370	54.594850
119	-1.480770	54.594840	243	-1.407280	54.593970
120	-1.480420	54.593910	244	-1.407130	54.593080
121	-1.480140	54.593020	245	-1.406420	54.592270

122	-1.479920	54.592260	246	-1.405510	54.591570
123	-1.479870	54.591190	247	-1.405000	54.590870
124	-1.479730	54.590330			

Road receptor locations

Dwelling Receptor Details

The dwelling receptors details are presented in the table below.

No.	Longitude (°)	Latitude (°)	No.	Longitude (°)	Latitude (°)
1	-1.560685	54.590972	156	-1.454749	54.576122
2	-1.560106	54.590672	157	-1.450115	54.578492
3	-1.560449	54.589171	158	-1.447868	54.585476
4	-1.560999	54.587344	159	-1.446139	54.585320
5	-1.552465	54.591618	160	-1.446351	54.586183
6	-1.558980	54.584361	161	-1.441047	54.585928
7	-1.558433	54.582739	162	-1.440910	54.585638
8	-1.556340	54.582074	163	-1.440677	54.585914
9	-1.557128	54.579991	164	-1.440677	54.585636
10	-1.556185	54.579737	165	-1.440399	54.585910
11	-1.554587	54.579918	166	-1.440405	54.585630
12	-1.553469	54.574803	167	-1.439978	54.586469
13	-1.553997	54.574351	168	-1.440114	54.585885
14	-1.553107	54.574430	169	-1.440159	54.585589
15	-1.552810	54.574204	170	-1.439873	54.585848
16	-1.551648	54.573509	171	-1.439976	54.585529
17	-1.551430	54.573250	172	-1.439629	54.585829
18	-1.551258	54.573001	173	-1.439914	54.585234
19	-1.550933	54.572727	174	-1.439384	54.585817
20	-1.550170	54.572975	175	-1.439628	54.585172

21	-1.550471	54.572402	176	-1.439126	54.585803
22	-1.550234	54.572133	177	-1.439345	54.585113
23	-1.548504	54.572906	178	-1.438806	54.585781
24	-1.549943	54.571898	179	-1.439069	54.585076
25	-1.549777	54.571666	180	-1.438523	54.585764
26	-1.549529	54.571518	181	-1.438852	54.585029
27	-1.549441	54.571331	182	-1.438162	54.585739
28	-1.549340	54.571208	183	-1.438415	54.584966
29	-1.548615	54.570344	184	-1.437745	54.585691
30	-1.548485	54.569956	185	-1.437647	54.585814
31	-1.548344	54.569748	186	-1.437696	54.585930
32	-1.549553	54.583486	187	-1.437754	54.586055
33	-1.549131	54.583166	188	-1.437816	54.586172
34	-1.548942	54.583256	189	-1.437914	54.586303
35	-1.548782	54.583325	190	-1.437907	54.586428
36	-1.548960	54.583506	191	-1.437633	54.586448
37	-1.548576	54.583483	192	-1.437367	54.586391
38	-1.548187	54.583597	193	-1.437066	54.586386
39	-1.548027	54.583655	194	-1.436803	54.586390
40	-1.547867	54.583710	195	-1.436513	54.586406
41	-1.547566	54.583841	196	-1.436337	54.586401
42	-1.547156	54.583884	197	-1.436260	54.586323
43	-1.547045	54.584011	198	-1.436291	54.586241
44	-1.546829	54.584092	199	-1.436293	54.586135
45	-1.546477	54.584230	200	-1.436265	54.586044
46	-1.546267	54.584299	201	-1.435783	54.586485

47	-1.546060	54.584378	202	-1.435696	54.586262
48	-1.545840	54.584428	203	-1.435639	54.586095
49	-1.545667	54.584484	204	-1.435524	54.585851
50	-1.545470	54.584548	205	-1.437661	54.585116
51	-1.545255	54.584458	206	-1.437356	54.584954
52	-1.545135	54.584663	207	-1.436877	54.584783
53	-1.544903	54.584696	208	-1.436473	54.584664
54	-1.544711	54.584747	209	-1.436154	54.584508
55	-1.544465	54.584772	210	-1.435971	54.584391
56	-1.544226	54.584834	211	-1.435782	54.584238
57	-1.543204	54.584801	212	-1.435670	54.584059
58	-1.543702	54.584649	213	-1.435249	54.583715
59	-1.543727	54.584335	214	-1.435116	54.583544
60	-1.544095	54.584275	215	-1.434777	54.583383
61	-1.544385	54.584242	216	-1.435757	54.585522
62	-1.544771	54.584232	217	-1.435582	54.585591
63	-1.545420	54.584078	218	-1.435390	54.585645
64	-1.545602	54.583973	219	-1.435072	54.585750
65	-1.546166	54.583811	220	-1.435689	54.585346
66	-1.546393	54.583674	221	-1.435197	54.585369
67	-1.546774	54.583519	222	-1.435121	54.585191
68	-1.547082	54.583401	223	-1.435028	54.585067
69	-1.547420	54.583254	224	-1.435638	54.584819
70	-1.547752	54.583127	225	-1.435585	54.584586
71	-1.548091	54.583011	226	-1.435496	54.584439
72	-1.548502	54.582957	227	-1.435426	54.584377

73	-1.548819	54.582771	228	-1.435365	54.584317
74	-1.538941	54.592733	229	-1.435256	54.584189
75	-1.533530	54.585858	230	-1.434992	54.584003
76	-1.534880	54.569869	231	-1.434348	54.584185
77	-1.535383	54.571949	232	-1.434196	54.584034
78	-1.534354	54.572620	233	-1.433986	54.583962
79	-1.524773	54.577320	234	-1.434517	54.583756
80	-1.517064	54.577277	235	-1.434075	54.583656
81	-1.515822	54.579680	236	-1.434379	54.583265
82	-1.528067	54.593069	237	-1.434311	54.578617
83	-1.528722	54.597015	238	-1.432291	54.576680
84	-1.524491	54.599529	239	-1.429347	54.579003
85	-1.514913	54.601009	240	-1.429339	54.579772
86	-1.509713	54.594991	241	-1.417771	54.582965
87	-1.509745	54.594238	242	-1.414273	54.584707
88	-1.509808	54.593780	243	-1.439701	54.598020
89	-1.502531	54.595797	244	-1.439248	54.597807
90	-1.510585	54.588442	245	-1.438551	54.597921
91	-1.498256	54.591551	246	-1.438563	54.598567
92	-1.498978	54.590834	247	-1.438144	54.597927
93	-1.484370	54.602600	248	-1.437745	54.597982
94	-1.481972	54.593611	249	-1.437754	54.598616
95	-1.478686	54.592977	250	-1.437378	54.598707
96	-1.478209	54.593018	251	-1.431139	54.601758
97	-1.478932	54.592607	252	-1.428174	54.603123
98	-1.478500	54.592536	253	-1.427836	54.603190

99	-1.477650	54.592452	254	-1.427649	54.603241
100	-1.479664	54.592331	255	-1.427459	54.603282
101	-1.478137	54.592268	256	-1.427085	54.603234
102	-1.477561	54.592197	257	-1.426603	54.603335
103	-1.480203	54.591904	258	-1.426399	54.603708
104	-1.478967	54.592014	259	-1.426105	54.603768
105	-1.477308	54.592042	260	-1.425824	54.603826
106	-1.479676	54.591602	261	-1.425565	54.603878
107	-1.479477	54.591322	262	-1.425095	54.603933
108	-1.479093	54.591430	263	-1.424770	54.604000
109	-1.478819	54.591543	264	-1.424619	54.603544
110	-1.478547	54.591681	265	-1.424375	54.603595
111	-1.478316	54.591739	266	-1.424093	54.603630
112	-1.477868	54.591740	267	-1.423857	54.603659
113	-1.477455	54.591817	268	-1.423564	54.603697
114	-1.478241	54.591255	269	-1.423436	54.603996
115	-1.479644	54.591114	270	-1.422356	54.603483
116	-1.479358	54.590871	271	-1.422180	54.603325
117	-1.484392	54.591239	272	-1.422061	54.603199
118	-1.483209	54.586550	273	-1.421922	54.603070
119	-1.482410	54.586607	274	-1.421882	54.602628
120	-1.496436	54.580844	275	-1.421682	54.602589
121	-1.484337	54.581025	276	-1.421308	54.602648
122	-1.479246	54.576517	277	-1.421095	54.602595
123	-1.477875	54.574690	278	-1.421156	54.602266
124	-1.471766	54.570621	279	-1.421002	54.602125

125	-1.469922	54.596609	280	-1.420779	54.602070
126	-1.460360	54.591609	281	-1.420448	54.602069
127	-1.463933	54.584248	282	-1.420030	54.601987
128	-1.465670	54.577480	283	-1.423329	54.597700
129	-1.464942	54.576295	284	-1.414051	54.597776
130	-1.464794	54.576109	285	-1.413572	54.597998
131	-1.464504	54.575870	286	-1.413287	54.598054
132	-1.464313	54.575767	287	-1.412994	54.598197
133	-1.463876	54.575901	288	-1.412678	54.597980
134	-1.463440	54.575814	289	-1.412388	54.598087
135	-1.463893	54.575503	290	-1.412603	54.598270
136	-1.463283	54.575664	291	-1.411998	54.598078
137	-1.463093	54.575554	292	-1.412063	54.598488
138	-1.463702	54.575290	293	-1.411788	54.598497
139	-1.463560	54.575160	294	-1.411457	54.598550
140	-1.462708	54.575366	295	-1.411228	54.598774
141	-1.463389	54.574967	296	-1.411561	54.598041
142	-1.462551	54.575158	297	-1.410967	54.598016
143	-1.463181	54.574792	298	-1.410765	54.598299
144	-1.462594	54.574335	299	-1.410613	54.597953
145	-1.462113	54.574971	300	-1.410612	54.597751
146	-1.461975	54.574617	301	-1.410455	54.597603
147	-1.462308	54.574185	302	-1.414628	54.596146
148	-1.461687	54.574445	303	-1.414430	54.595984
149	-1.461634	54.574254	304	-1.414766	54.595987
150	-1.462101	54.573970	305	-1.405947	54.595326

151	-1.461997	54.573811	306	-1.416555	54.593590
152	-1.461413	54.574129	307	-1.411898	54.590072
153	-1.461624	54.573941	308	-1.411648	54.590264
154	-1.458454	54.574639	309	-1.405272	54.589831
155	-1.455191	54.575927			

Dwelling receptor locations

Train Driver Receptor Details

The train driver receptors details are presented in the table below.

No.	Longitude (°)	Latitude (°)	No.	Longitude (°)	Latitude (°)
1	-1.552127	54.583498	9	-1.545637	54.577601
2	-1.550877	54.582951	10	-1.545372	54.576717
3	-1.549767	54.582345	11	-1.545120	54.575831
4	-1.548760	54.581665	12	-1.544871	54.574958
5	-1.547896	54.580922	13	-1.544614	54.574060
6	-1.547160	54.580176	14	-1.544358	54.573162
7	-1.546527	54.579345	15	-1.544091	54.572227
8	-1.546010	54.578472			

Train driver receptor locations

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Appendices

Appendix 11.2 - Glint and Glare Receptor Screening Opinion

Glint and Glare Receptor Screening Opinion

JBM Solar Developments Limited

Byers Gill Solar

October 2022



PLANNING SOLUTIONS FOR:

- Solar
- Telecoms
- Railways
- Defence
- Buildings
- Wind
- Airports
- Radar
- Mitigation

www.pagerpower.com

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SCREENING ASSESSMENT

Baseline Context

The baseline context is presented with respect to possible glint and glare effects only. The Proposed Development is rurally located with:

- National, regional, and local roads located within 1km of the Site Area;
- A number of dwellings located within 1km of the Site Area;
- A section of railway line located within 500m of the Site Area;
- One major aerodrome (Teesside International Airport) located within 15km of the Site Area. It is possible that pilots approaching the airport will be affected by the Proposed Developments. It will be necessary to establish the impact significance upon approaching pilots from the south-west in particular, and upon the Air Traffic Control (ATC) Tower.

Guidance – Glint and Glare

Glint and glare guidelines exist in the UK (produced by the Civil Aviation Authority) and in the USA (produced by the Federal Aviation Authority) with respect to solar developments and aviation activity, however, a specific methodology for determining the impact upon road safety or residential amenity has not been produced to date. Pager Power has reviewed existing guidelines and the available studies in the process of defining its own glint and glare assessment guidance document and methodology¹. This methodology defines the process for determining the impact upon road safety, residential amenity and aviation activity.

Pager Power's approach is to undertake geometric reflection calculations and, where a solar reflection is predicted, consider the screening (existing and/or proposed) between the receptor and the reflecting solar panels. The scenario in which a solar reflection can occur for all receptors is then identified and discussed, and a comparison is made against the available solar panel reflection studies to determine the overall impact.

The available studies have measured the intensity of reflections from solar panels with respect to other naturally occurring and manmade surfaces. The results show that the reflections produced are of intensity similar to or less than those produced from still water and significantly less than reflections from glass and steel².

¹ Pager Power Glint and Glare Guidance, Third Edition (3.1), April 2021.

² SunPower, 2009, SunPower Solar Module Glare and Reflectance (appendix to Solargen Energy, 2010).

Potential Effects

Potential effects at the identified receptors include³:

- Glint – a momentary flash of bright light (typically experienced by moving receptors);
- Glare – a continuous source of bright light (typically experienced by static receptors).

The impact significance will be determined considering the visibility of the solar reflection including level of screening (existing or proposed), the sensitivity of the receptor, location of origin of the solar glare, time and duration of any reflection, location of the Sun at the time a solar reflection is possible, and solar reflection intensity (aviation only).

Outline Scope of Assessment

A 'Solar Photovoltaic Glint and Glare Assessment' will accompany the Development Consent Order (DCO) Application, considering the effect of the solar panel areas upon receptors identified in the 'Glint and Glare Receptor Scoping Assessment' that accompanies this document. The assessment will include the detailed modelling of the solar panels relative to surrounding roads and dwellings with potential views of the Site, the railway section to the west, and the 2-mile approach paths and ATC Tower at Teesside International Airport.

Assessment Methodology

There is no formal guidance with regard to the maximum distance at which glint and glare should be assessed. From a technical perspective, there is no maximum distance for potential reflections. The significance of a reflection, however, decreases with distance because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

The above parameters and extensive experience over a significant number of glint and glare assessments undertaken show that consideration of receptors within 1km of panel areas is appropriate for glint and glare effects on roads and dwellings, and consideration of receptors within 500m of panel areas is appropriate for glint and glare effects on railways.

Potential receptors are identified based on mapping and aerial photography of the region. The initial judgement is made based on a high-level consideration of aerial photography and mapping i.e. receptors are excluded if it is clear from the outset that no visibility would be possible. A more detailed assessment is made if the modelling reveals a reflection would be geometrically possible.

Pager Power's glint and glare assessment methodology has been derived from the information provided to Pager Power through consultation with stakeholders, assessment experience, and by reviewing the available guidance and studies. The methodology for ground level and aviation glint and glare assessments is as follows:

- Identify the key receptors in the area surrounding the Proposed Development.

³These definitions are aligned with those of the Draft National Policy Statement for Renewable Energy Infrastructure and Federal Aviation Administration (FAA) in the United States of America.

- Consider direct solar reflections from the Proposed Development towards the identified receptors by undertaking geometric calculations.
- Consider the visibility of the panels from the receptor's location. If the solar photovoltaic (PV) modules are not visible from the receptor then no reflection can occur.
- Based on the results of the geometric calculations, determine whether a reflection can occur, and if so, at what time it will occur.
- Consider both the solar reflection from the Proposed Development and the location of the direct sunlight with respect to the receptor's position.
- Consider the solar reflection with respect to the published studies and guidance - including intensity calculations where appropriate.
- Determine whether a significant detrimental impact is expected in line with Pager Power's standard process and recommended methodology.

Overall Screening Opinion

A desktop review of the available imagery and site plans has been completed. Any predicted impacts towards the ground-based infrastructure (roads, dwellings, and railways) can likely be solved with relatively simple mitigation strategies – the most common being the provision of screening (e.g. hedgerow planting) at the Site Area perimeter to obstruct views of potentially reflecting panels. Where views of reflecting panels are obstructed, no effects can be experienced. Other solutions such as layout modification can be considered but are rarely required in practice. Technical mitigation for approaching pilots or ATC personnel at Teesside International Airport is unlikely to be required due to the distances and orientation of each runway. Whilst formal guidance within the UK for quantifying impacts is sparse, the industry standard is to evaluate effects on aviation receptors based on their intensity (specifically the potential for a temporary after-image) as well as their duration and operational sensitivity.

Any “significant” impacts identified through the process of modelling within the impact assessment, and prior to submission of the DCO Application, will be adequately mitigated such that any impacts cannot be considered “significant” in the context of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. In practice this means quantifying whether potential effects are possible for approaching pilots and/or air traffic controllers and, if so, demonstrating that any effects are of acceptably low intensity. Where appropriate, evaluation of effects, duration, and the origin of the glare is considered. Technical mitigation options for aviation receptors can involve modifications to the panel configuration including varying the vertical tilt, azimuth angle and panel footprint.

Based on the above, it is recommended that glint and glare be scoped out of the Environmental Statement.

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