

Green Hill Solar Farm

EN010170

Environmental Statement

Chapter 20: Agricultural Circumstances

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Issue Sheet

Report Prepared for: Green Hill Solar Farm
DCO Submission

Environmental Statement - Agricultural Circumstances

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20 Agricultural Circumstances

20.1 Introduction

- 20.1.1 This chapter presents the findings of the Environmental Impact Assessment (EIA) concerning the potential impacts of the Scheme on agricultural circumstances during the construction, operation and maintenance, and decommissioning phases.
- 20.1.2 The following receptors have been identified via scoping and preliminary environmental impact assessment stages and will be assessed in this chapter:
- Soils;
 - Agricultural land; and
 - Agricultural landholdings.
- 20.1.3 For project description details, please refer to **Chapter 4: Scheme Description [EN010170/APP/GH6.2.4]** of this Environmental Statement.
- 20.1.4 This chapter have been prepared by Arcadis Consulting (UK) Ltd (see Statement of Competence [EN010170/APP/GH6.3.1.1]).

Appendices and Figures

- 20.1.5 This chapter is supported by the following appendices:
- **Appendix 20.1:** Agricultural Land Classification Technical Report; and
 - **GH7.6:** Outline Soil Management Plan
- 20.1.6 This chapter is supported by the following standalone figures:
- **Figure 20.1:** Soil Association;
 - **Figure 20.2:** Agricultural Land Classification;
 - **Figure 20.3:** Provisional and Previous Detailed Agricultural Land Classification;
 - **Figure 20.4:** Agri-environment Schemes; and
 - **Figure 20.5:** Forestry and Woodland Schemes.
- 20.1.7 This chapter is supported by the following tables:
- **Table 20.1: Summary of Consultation and Responses**
 - **Table 20.2: Sensitivity of Agricultural Land**
 - **Table 20.3: Sensitivity of Soils**
 - **Table 20.4: Sensitivity of Soils in Relation to Handling/Disturbance**
 - **Table 20.5: Sensitivity of Agricultural Landholding**
 - **Table 20.6 Magnitude of Impact on Agricultural Land**
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- **Table 20.9: Significance Matrix**
- **Table 20.10: Significance Categories and Description**
- **Table 20.12: Landholding Baseline Information**
- **Table 20.13: ALC Grade of the Assessed Agricultural Land**
- **Table 20.14: Assessment of Effect on Soils during Construction**
- **Table 20.15: Assessment of Effect on Agricultural Land during Construction**
- **Table 20.16: Assessment of Magnitude of Impact on Agricultural Holdings during the Construction Phase**
- **Table 20.17: Assessment of Impact on Agricultural Landholdings during Construction**
- **Table 20.18: Assessment of Effect on Soil Function during Operation**

20.2 Consultation

20.2.1 **Table 20.1** outlines consultation comments and the corresponding responses on how these have been addressed through the ES.

20.2.2 An EIA Scoping Report was submitted to the Planning Inspectorate (PINS) in July 2024 (Ref 20.1), with a formal request for a Scoping Opinion. PINS subsequently issued the Scoping Opinion on 30th August 2024. Consultations undertaken throughout the preapplication and EIA phase for the Scheme have informed the approach to the assessment of agricultural circumstances and the information provided within this chapter.

**Table 20.1: Summary of Consultation and Responses**

Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
The Planning Inspectorate 30 th August 2024 Scoping Opinion ID 3.16.1	<p>Agricultural land holding – construction and decommissioning (Table 21.7)</p> <p>No justification regarding the scoping out of this matter is provided within the SR therefore the Inspectorate is unable to agree to scope this matter out of further assessment. The ES should ensure that effects to agricultural land holdings are assessed over the entire lifetime of the Proposed Development including the construction, operational and decommissioning phases. Any deviation from this approach must be fully justified within the ES.</p>	The impact on agricultural land holdings have been assessed as part of this ES Chapter.	Section 20.8 of this chapter. Assessment of likely Impacts and Effects
Scoping Opinion ID 3.16.2	<p>Agricultural Land Classification (ALC) surveys (Paragraph 21.4.5)</p> <p>The Applicant states that a decision will be made regarding whether ALC surveys are required for the Cable Corridor once the</p>	Due to temporary and minimal disturbance on soils and agricultural land along the Cable Route Corridor during construction, a Soil Resource Survey will be undertaken post consent and preconstruction (instead of an ALC survey) to inform the development of a detailed Soil Management Plan (DSMP). An outline Soil	Section 20.4 of this chapter Table 20.12 of this chapter Chapter 4 Scheme Description [EN010170/APP/GH6.2.4] . Chapter 5 Alternatives and Design Evolution [EN010170/APP/GH6.2.5] .



Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
	<p>route has been refined. The Inspectorate expects that an ALC for the whole site, including the Cable Corridor, will be undertaken to support the ES unless there is substantial justification dictating otherwise.</p> <p>The ES should contain a clear tabulation of the areas of land in each BMV classification to be temporarily or permanently lost as a result of the Proposed Development, with reference to accompanying map(s) depicting the grades. Specific justification for the use of the land by grade should be provided.</p> <p>Consideration should be given to the use of BMV land in the Applicant's discussion of alternatives.</p>	<p>Management Plan has been prepared to set out soil management strategy, approach and key measures during construction, operation and decommissioning stages. The outline Soil Management Plan will be further developed into a DSMP along with the results of Soil Resource Survey to be conducted, ALC survey conducted and evolved design.</p> <p>Table 20.12 shows land in each ALC Grade as well as BMV and Non-BMV land for all the Sites and Cable Route.</p> <p>As stated in Chapter 4 Scheme Description [EN010170/APP/GH6.2.4], the Sites will be returned to their original use and condition as far as practicable as part of the decommissioning of the Scheme</p> <p>The Scheme conducted a search for potential development areas (PDAs) at Stages 2-5 of its site selection methodology, with the consideration of the use of the poorer quality land and avoidance of the use of BMV land where possible. Details of PDA search, the site selection methodology and consideration of the use of agricultural land are in Chapter 5 Alternatives and Design Evolution [EN010170/APP/GH6.2.5].</p>	



Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
North Northamptonshire Council (NNC) December 2024	NNC consider that a revised scheme design and exclusion of development from areas of BMV agricultural land (Grade 2 at the very least) will minimise negative impacts on soil resources.	The Scheme conducted a Potential Development Areas (PDAs) search at Stages 2 to 5 of its site selection process, with the consideration of the use of the poorer quality land and avoidance of the use of BMV land where possible. Details of PDA search and consideration of the use of agricultural land are in Chapter 5 Alternatives and Design Evolution [EN010170/APP/GH6.2.5].	Chapter 5 Alternatives and Design Evolution [EN010170/APP/GH6.2.5].
Irchester Parish Council December 18 2024	Significant impact on prime agricultural land and UK food production, including the effects of imported food.	The utilised agricultural area (UAA) in the UK was 16.8 million hectares (ha) in 2024. The agricultural land taken for the Scheme represents less than 0.01% of the UAA and is not expected to have a significant impact on national food production and security. In addition, the land is not being entirely removed from farming, as sheep grazing may still take place on most of the Sites, allowing it to continue contributing to food production. Furthermore, soil health is expected to improve over the Scheme's 60-year lifespan as the land transitions away from intensive arable farming.	Please see Section 20.8. Assessment of likely Impacts and Effects
Mears Ashby Parish Council December 12 2024	UK Food Security: The parish council is concerned that while the UK is currently considered self-sufficient in cereal production, increased demand over the next 60 years (the proposed lifetime	The utilised agricultural area (UAA) in the UK was 16.8 million hectares in 2024. The agricultural land taken for the Scheme represents less than 0.01% of the UAA and is not expected to have a significant impact on national food production and security. In addition, the land is not being	Please see Section 20.8. Assessment of likely Impacts and Effects



Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
	of the solar farm) is likely to substantially reduce the UK's ability to meet required production levels	entirely removed from farming, as sheep grazing may still take place on most of the Sites, allowing it to continue contributing to food production. Furthermore, soil health is expected to improve over the Scheme's 60-year lifespan as the land transitions away from intensive arable farming.	
Hardingstone Parish Council December 14 2024	Food vs. Energy Security: Covering vast areas of agricultural land with solar panels compromises food security for energy security, but both are essential.	The utilised agricultural area (UAA) in the UK was 16.8 million hectares in 2024. The agricultural land taken for the Scheme represents less than 0.01% of the UAA and is not expected to have a significant impact on national food production and security. In addition, the land is not being entirely removed from farming, as sheep grazing may still take place on most of the Sites, allowing it to continue contributing to food production. Furthermore, soil health is expected to improve over the Scheme's 60-year lifespan as the land transitions away from intensive arable farming.	Please see Section 20.8. Assessment of likely Impacts and Effects
Bozeat Parish Council December 2024	There is no mention of cleaning during the operational phase. The method and frequency should be specified to prevent soil compaction and contamination. Deionised water should be required to avoid contamination.	The cleaning method and frequency are described in Chapter 4 Scheme Description [EN010170/APP/GH6.2.4] . An outline Soil Management Plan has been prepared to set out the soil management strategy, approach and key measures during construction, operation and decommissioning stages. The outline Soil Management Plan will be further	Chapter 4 Scheme Description [EN010170/APP/GH6.2.4] . Please see Section 20.4 and Section 20.8



Consultee and Date	Comment	How has the comment been addressed	Location of response in chapter
	There is no condition mentioned for soil restoration after decommissioning. Appeals have found that soil quality is degraded by construction, maintenance, and decommissioning activities.	<p>developed into a DSMP along with the results of Soil Resource Survey to be conducted, ALC survey conducted and evolved design.</p> <p>The conversion of agricultural land currently under arable production to grassland (land between and under the solar panels) during the operational phase has potential benefits in relation to soil health and land quality such as increase in soil organic carbon, better soil structure, increased infiltration and enhanced soil microbial populations. As a result, this may have a potentially beneficial effect on soil health and land quality</p>	
Lavendon Parish Council December 2024	GF9: Concerns about wildlife disturbance, soil compaction, and root damage.	An outline Soil Management Plan has been prepared to set out the soil management strategy, approach and key measures during construction, operation and decommissioning stages. The outline Soil Management Plan will be further developed into a DSMP along with the results of Soil Resource Survey to be conducted, ALC survey conducted and evolved design.	Please see Section 20.4



20.3 Legislation, Planning Policy and Guidance

20.3.1 This section provides an overview of the legislation, planning policy and guidance against which the Scheme will be considered for Agricultural Circumstances.

Legislation

The Agricultural Land (Removal of Surface Soil) Act 1953

20.3.2 The Agricultural Land (Removal of Surface Soil) Act 1953 (Ref 20.2) makes it an offence to remove surface soil from land in certain circumstances.

Planning Policy

National Planning Policy

National Policy Statement for Energy (EN-1)

20.3.3 National Policy Statement (NPS) EN-1 (Ref 20.4) paragraph 5.11.12 states that Applicants should *'seek to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land in areas of poorer quality (grades 3b, 4 and 5).'*

20.3.4 Paragraph 5.11.13 states that *'Applicants should also identify any effects and seek to minimise impacts on soil health and protect and improve soil quality taking into account any mitigation measures proposed.'*

20.3.5 Paragraph 5.11.14 states that *'Applicants are encouraged to develop and implement a Soil Management Plan which could help minimise potential land contamination. The sustainable reuse of soils needs to be carefully considered in line with good practice guidance where large quantities of soils are surplus to requirements or are affected by contamination.'*

20.3.6 Paragraph 5.11.23 states that *'Although in the case of most energy infrastructure there may be little that can be done to mitigate the direct effects of an energy project on the existing use of the proposed site (assuming that some of that use can still be retained post project construction) applicants should nevertheless seek to minimise these effects and the effects on existing or planned uses near the site by the application of good design principles, including the layout of the project and the protection of soils during construction.'*

20.3.7 Paragraph 5.11.34 states that *'The Secretary of State should ensure that applicants do not site their scheme on the best and most versatile agricultural land without justification. Where schemes are to be sited on best and most versatile agricultural land the Secretary of State should take into account the economic and other benefits of that land. Where development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.'*

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

20.3.8 NPS EN-3 (Ref 20.5) sets out guidance on Agricultural Land Classification (ALC) and land type for renewable energy infrastructure, as follows:

20.3.9 Paragraph 2.10.29 states *'While land type should not be a predominating factor in determining the suitability of the site location applicants should, where possible,*



utilise suitable previously developed land, brownfield land, contaminated land and industrial land. Where the proposed use of any agricultural land has been shown to be necessary, poorer quality land should be preferred to higher quality land avoiding the use of “Best and Most Versatile” agricultural land where possible. ‘Best and Most Versatile agricultural land is defined as land in grades 1, 2 and 3a of the Agricultural Land Classification.’.

- 20.3.10 Paragraph 2.10.31 states *‘It is recognised that at this scale, it is likely that applicants’ developments will use some agricultural land. Applicants should explain their choice of site, noting the preference for development to be on suitable brownfield, industrial and low and medium grade agricultural land.’.*
- 20.3.11 Paragraph 2.10.32 states *‘Where sited on agricultural land, consideration may be given as to whether the proposal allows for continued agricultural use and/or can be co-located with other functions (for example, onshore wind generation, storage, hydrogen electrolyzers) to maximise the efficiency of land use.’.*
- 20.3.12 Paragraph 2.10.33 states *‘The Agricultural Land Classification (ALC) is the only approved system for grading agricultural quality in England and Wales and, if necessary, field surveys should be used to establish the ALC grades in accordance with the current, or any successor to it, grading criteria and identify the soil types to inform soil management at the construction, operation, and decommissioning phases in line with the Defra Construction Code.’.*
- 20.3.13 Paragraph 2.10.34 states *‘Applicants are encouraged to develop and implement a Soil Resources and Management Plan which could help to use and manage soils sustainably and minimise adverse impacts on soil health and potential land contamination. This should be in line with the ambition set out in the Environmental Improvement Plan to bring at least 40% of England’s agricultural soils into sustainable management by 2028 and increase this up to 60% by 2030.’.*
- 20.3.14 Paragraph 2.10.80 states *‘Applicants should consider earthworks associated with construction compounds, access roads and cable trenching.’.*
- 20.3.15 Paragraph 2.10.81 states *‘Where soil stripping occurs, topsoil and subsoil should be stripped, stored, and replaced separately to minimise soil damage and to provide optimal conditions for site restoration.’.*
- 20.3.16 Paragraph 2.10.127 states *‘The Defra Construction code of practice for the sustainable use of soils on construction sites provides guidance on ensuring that damage to soil during construction is mitigated and minimised. Mitigation measures focus on minimising damage to soil that remains in place, and minimising damage to soil being excavated and stockpiled. The measures aim to preserve soil health and soil structure to minimise soil carbon loss and maintain water infiltration and soil biodiversity. Mitigation measures for agricultural soils include use of green cover, multispecies cover crops - especially during the winter minimising compaction and adding soil organic matter.’.*
- 20.3.17 Paragraph 2.10.145 states *‘The Secretary of State should take into account the economic and other benefits of the best and most versatile agricultural land. The Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to minimise impacts on soils or soil resources.’.*



National Policy Statement for Renewable Electricity Networks Infrastructure (EN-5)

- 20.3.18 Paragraph 2.9.25 of NPS EN-5 (Ref 20.6) states that the Secretary of State should consider *'the applicant's commitment, as set out in their ES, to mitigate the potential detrimental effects of undergrounding works on any relevant agricultural land and soils (including peat soils), particularly regarding Best and Most Versatile land, including development and implementation of a Soil Resources and Management Plan. Such a commitment must guarantee appropriate handling of soil, backfilling, and return of the land to the baseline Agricultural Land Classification (ALC), thus ensuring no loss or degradation of agricultural land. Such a commitment should be based on soil and ALC surveys in line with the 1988 ALC criteria and due consideration of the Defra Construction Code of Practice for Sustainable Use of Soils on Construction Sites.'*

National Planning Policy Framework

- 20.3.19 This ALC assessment is consistent with the direction given by paragraph 187 of the National Planning Policy Framework (NPPF) (Ref 20.7) as follows:
- 'Planning policies and decisions should contribute to and enhance the natural and local environment by: [...] (b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.'*
- 20.3.20 The NPPF defines best and most versatile (BMV) agricultural land as grades 1, 2, and 3a of the Agricultural Land Classification.
- 20.3.21 The NPPF states in the footnote 65, *'Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.'*

Local Planning Policy

North Northamptonshire Joint Core Strategy 2011-2031

- 20.3.22 Paragraph 3.32 of North Northamptonshire Joint Core Strategy 2011-2031 (North Northamptonshire Council, 2016) (Ref 20.8) states *'Soils are an important asset in geodiversity, providing a growing medium for many resources including food and non-food crops. Soils should be protected from pollution and the best and most versatile agricultural land should be safeguarded, wherever possible.'*

Bedford Borough Local Plan 2030

- 20.3.23 Policy 46S - Use of previously developed land and use of undeveloped land of Bedford Borough Local Plan 2030 (Ref 20.9) states *'Where significant development is demonstrated to be necessary on agricultural land, poorer quality land should be used in preference to the best and most versatile agricultural land (grades 1-3a). Where the site is located on agricultural land outside of existing settlements, applicants will be required to provide evidence of the grade of agricultural land and, where that land is likely to be grade 3 or higher, undertake a detailed survey of land quality.'*



- 20.3.24 Paragraph 9.1 of Bedford Borough Local Plan 2030 (Ref 20.9) states '*Soil, air and water resources are non-renewable resources, and their use needs to be managed carefully to ensure that development is sustainable.*'

Milton Plan: MK 2016-2031

- 20.3.25 Policy NE7 (Ref 20. 10) states '*In assessing proposals for the development of greenfield sites, the Council will take into account the economic and other benefits of the best and most versatile agricultural land. Development involving the loss of agricultural land should seek to use areas of poorer quality land (grades 3b, 4 and 5 of the Agricultural Land Classification) in preference to that of a higher quality unless other sustainability considerations suggest otherwise.*'

MK City Plan 2050 (Regulation 18 plan for consultation)

- 20.3.26 Policy GS7 (Ref 20. 11) Wind Turbine and Solar PV Spatial Strategy states '*The preferred areas for solar farm development (with a minimum size of 5MW) are those designated as a Solar Farm Development Area of Search, as shown on the Policies Maps*' and '*All proposals for solar farm and wind turbine development will be supported if it can be demonstrated that the proposals would not have unacceptable impact on the availability of best and most versatile agricultural land and would accord with other relevant policies in the Plan*'

West Northamptonshire Local Plan - 2041 (Regulation 18)

- 20.3.27 Policy EC5 (Ref 20.12) '*Development proposals which sustain and enhance the rural economy by creating or safeguarding jobs and businesses will be supported where they are of an appropriate scale for their location, respect the environmental quality and character of the rural area and protect the best and most versatile agricultural land.*'

Guidance

Guide to assessing development proposals on agricultural land (Natural England, 2021)

- 20.3.28 Protecting agricultural land and the undertaking of an ALC assessment is supported by the Natural England Guide to assessing development proposals on agricultural land (Ref 20.13).

Agriculture Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land (MAFF, 1988)

- 20.3.29 The Agriculture Land Classification of England and Wales guidance (Ref 20.14) provides guidelines and criteria for grading the quality of agricultural land and grades agricultural land in England and Wales into grades 1, 2, 3a, 3b, 4 and 5.

A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022)

- 20.3.30 The Institute of Environmental Management and Assessment (IEMA) guidance (Ref 20.15) outlines the criteria to assess the impact on soils as part of an EIA.



Design Manual for Roads and Bridges LA109: Geology and soils (National Highways, 2019)

- 20.3.31 The Design Manual for Roads and Bridges (DMRB) LA109 document (Ref 20.16) sets out the requirements and methodology for assessing and reporting the effects on agricultural land quality.

Design Manual for Roads and Bridges LA112: Population and human health (National Highways, 2020)

- 20.3.32 This DMRB LA112 document (Ref 20.17) sets out the requirements and methodology for assessing and reporting the environmental effects on agricultural landholdings from construction and operation.

Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Defra, 2009)

- 20.3.33 The Code of Practice (Ref 20.18) assists construction activities to better protect soil resources by providing guidance to help protect and enhance soil resources on site through pre-construction planning, soil management during construction.

Good Practice Guide for Handling Soils in Mineral Workings (Institute of Quarrying, 2024)

- 20.3.34 The guidance (Ref 20.14) provides guide and approaches to soil handling in construction.

20.4 Assessment Methodology and Significance Criteria

- 20.4.1 The methodologies described in the following sections have been developed in line with the relevant planning policy and appropriate industry guidance for collecting baseline information and assessing the effects from the Scheme on agricultural circumstances.

Study Area

- 20.4.2 The Study Area for agricultural circumstances are the Sites – Green Hill A, A.2, B, BESS, C, D, E, F, G and the Cable Route Corridor as shown in **GH2.1 Location Plan**.

Baseline Data Collection

- 20.4.3 The baseline data collection on agricultural land, soils and agricultural landholdings was through desk-based study and field surveys. The sources of desk-based study are as follows:

- Provisional and previous ALC information is from MAGIC application (Ref 20.22); and
- Soil Association data and map is from National Soil Resources Institute (Ref 20.27).

- 20.4.4 The field surveys included soil/ALC surveys across the Sites and agricultural landholding information collation.

- 20.4.5 The ALC survey covers the Sites. A Soil Resource Survey will be undertaken post-consent and pre-construction to cover the construction working width of the



Cable Route where soils and agricultural land will be disturbed as a result of cable installation, with all land being reinstated to its pre-construction condition.

Impact Assessment Methodology

- 20.4.6 The assessment of the impacts on soils has been undertaken in accordance with IEMA guidance (Ref 20.15).
- 20.4.7 The assessment of the impacts on agricultural land has been undertaken in accordance with DMRB LA109 (Ref 20.16) as this is the only available methodology to assess the impact on agricultural land and has been used widely in EIA on agricultural land.
- 20.4.8 The assessment of agricultural landholding has been undertaken in accordance with DMRB LA112 (Ref 20.17) as this is the only available methodology to assess the impact of development on agricultural landholding from development.
- 20.4.9 **Tables 20.2-20.8** below set out the criteria to determine the sensitivity and the magnitude of impacts on agricultural land, soils and agricultural land holding. **Table 20.9-20.10** provide the matrix and category for identifying the significance of the effects.

Sensitivity of Receptors

Table 20.2: Sensitivity of Agricultural Land

Sensitivity	Description
Very High	ALC grades 1 and 2
High	ALC grade 3a
Medium	ALC grade 3b
Low	ALC grades 4 and 5; and / or soils supporting non-designated notable or priority habitats
Negligible	Previously developed land formerly in 'hard uses' with little potential to return to agriculture

Table 20.3: Sensitivity of Soils

Sensitivity	Soil Resource and Soil Functions
Very High	<p>Biomass production: ALC Grades 1 and 2.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European or international site (e.g., Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site); Peat soils; Soils supporting a National Park, or Ancient Woodland.</p> <p>Soil carbon: Peat soils.</p> <p>Soils with potential for ecological / landscape restoration.</p> <p>Soil hydrology: Very important catchment pathway for water flows and flood risk management.</p>



Sensitivity	Soil Resource and Soil Functions
	<p>Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Scheduled Ancient Monuments (SAMs) and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community / recreational / educational access to land covered by National Park designation.</p> <p>Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access).</p>
High	<p>Biomass production: ALC Grade 3a</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., United Nations Educational, Scientific and Cultural Organisation (UNESCO) Geoparks, Site of Special Scientific Interest (SSSI) or area of Outstanding Natural Beauty (AONB), Special Landscape Areas (SLAs) and Geological Conservation Review sites); native forest and woodland soils; unaltered soils supporting seminatural vegetation (including the UKBAP Priority habitats or Section 6 habitats in Wales).</p> <p>Soil carbon: Organ mineral soils (e.g., peaty soils).</p> <p>Soil hydrology: Important catchment pathway for water flows and flood risk management.</p> <p>Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; historic parks and gardens; Regionally Important Geological Site (RIGS).</p> <p>Soils supporting community / recreational / educational access to RIGS and AONBs.</p> <p>Source of materials: Surface mineral reserves that would be sterilised (i.e., without future access).</p>
Medium	<p>Biomass production: ALC Grade 3b.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g., LNRs, Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), SLAs; Non-Native Forest and woodland soils.</p> <p>Soil carbon: Mineral soils.</p> <p>Soil hydrology: Important minor catchment pathway for water flows and flood risk management.</p> <p>Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/ recreational / educational access to land.</p> <p>Source of materials: Surface mineral reserves that would remain accessible for extraction.</p>



Sensitivity	Soil Resource and Soil Functions
Low	<p>Biomass production: ALC Grade 4 and 5.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats / landscapes. Agricultural soils.</p> <p>Soil carbon: Mineral soils.</p> <p>Soil hydrology: Pathway for local water flows and flood risk management.</p> <p>Archaeology, Cultural Heritage, Community Benefits and Geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community / recreational / educational access to land; and Source of materials: Surface mineral reserves that would remain accessible for extraction.</p>
Negligible	As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions.

Table 20.4: Sensitivity of Soils in Relation to Handling/Disturbance

Sensitivity	Definition
High Sensitivity (low resilience to structural damage)	<p>Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCD) are 150 or greater.</p> <p>Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater.</p> <p>All soils in wetness class (WCV or WCVI).</p>
Medium Sensitivity (medium resilience to structural damage)	<p>Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150.</p> <p>Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225.</p> <p>Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.</p>
Low sensitivity (high resilience to structural damage)	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

**Table 20.5: Sensitivity of Agricultural Landholding**

Sensitivity	Description of impacts
Very High	1) Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (daily).
High	1) Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a frequent basis (weekly).
Medium	1) Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).
Low	1) Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure; and 2) Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).
Negligible	1) Areas of land which are infrequently used on a non-commercial basis.

Magnitude of Impacts**Table 20.6 Magnitude of Impact on Agricultural Land**

Magnitude of impact (change)	Typical description
Major	Physical removal or permanent sealing of soil resource or agricultural land.
Moderate	Permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource).
Minor	Temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource).
Negligible	No discernible loss / reduction of soil function(s) that restrict current or approved future use.



Magnitude of impact (change)	Typical description
No change	No loss / reduction of soil function(s) that restrict current or approved future use.

Table 20.7: Magnitude of Impact on Soils

Magnitude of impacts	Description of impacts
Major	<p>Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20ha or loss of soil-related features set out in Table 20.3 (including effects from 'Temporary Developments'*);</p> <p>or</p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha or gain in soil-related features set out in Table 20.3 (including effects from 'temporary developments'*).</p>
Moderate	<p>Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20ha or loss of soil-related features set out in Table 20.2 (including effects from 'Temporary Developments'*);</p> <p>or</p> <p>Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20ha or gain in soil-related features set out in Table 20.3.</p>
Minor	<p>Permanent, irreversible loss over less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil related features set out in Table 20.3 above;</p> <p>or</p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features set out in Table 20.3.</p>
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.



Magnitude of impacts	Description of impacts
* Temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils.	

Table 20.8: Magnitude of Impact on Agricultural Landholding

Magnitude of impact	Description of impacts on private property and housing, community land and assets, development land and businesses and agricultural land holdings:
Major	1) Loss of resource and / or quality and integrity of resource; Severe damage to key characteristics, features or elements. e.g., direct acquisition and demolition of buildings and direct development of land to accommodate highway assets; and / or 2) Introduction (adverse) or removal (beneficial) of complete severance with no / full accessibility provision.
Moderate	1) Partial loss of / damage to key characteristics, features or elements, e.g., partial removal or substantial amendment to access or acquisition of land compromising viability of property, businesses, community assets or agricultural holdings; and/or 2) Introduction (adverse) or removal (beneficial) of severe severance with limited / moderate accessibility provision.
Minor	1) A discernible change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements, e.g., amendment to access or acquisition of land resulting in changes to operating conditions that do not compromise overall viability of property, businesses, community assets or agricultural holdings; and / or 2) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.
Negligible	1) Very minor loss or detrimental alteration to one or more characteristics, features or elements. e.g., acquisition of non-operational land or buildings not directly affecting the viability of property, businesses, community assets or agricultural holdings; and / or 2) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.
No Change	No loss or alteration of characteristics, features, elements or accessibility; no observable impact in either direction.



Assessment of Significance

20.4.10 **Table 20.9** presents the criteria for determining the degree of significance.

Table 20.9: Significance Matrix

Sensitivity	Magnitude				
	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Minor	Moderate or Major	Major or Severe	Severe
High	Neutral	Minor	Minor or Moderate	Moderate or Major	Major or Severe
Medium	Neutral	Neutral or Minor	Minor	Moderate	Moderate or Major
Low	Neutral	Neutral or Minor	Neutral or Minor	Minor	Minor or Moderate
Negligible	Neutral	Minor	Neutral or Minor	Neutral or Minor	Minor

20.4.11 Where the significance in **Table 20.9** is across two categories, professional judgment is used to determine which level of the significance is applicable.

20.4.12 **Table 20.10** presents the definition of each significance category. Severe, Major and Moderate effects are considered to be significant for the purposes of the EIA.

Table 20.10: Significance Categories and Description

Significance Category	Description
Severe	Effects at this level are material in the decision-making progress.
Major	Effects at this level are likely to be material in the decision-making progress.
Moderate	Effects at this level can be considered to be material in the decision-making process.
Minor	Effects at this level are not material in the decision-making process.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

20.4.13 The significance terminology used in **Table 20.9** and **Table 20.10** is in line with topic specific guidance from IEMA (Ref 20.15) and DMRB LA109 (Ref 20.16).



20.5 Assessment Assumptions and Limitations

- 20.5.1 The assessment of Agricultural Circumstances is in accordance with standard industry and professional body (IEMA) methodology and no limitations have been identified.
- 20.5.2 The baseline information of agricultural land quality for the Cable Route Corridor has been based on desk study information. A soil resource survey along the construction working width of the Cable Route where soils and agricultural land will be disturbed will be undertaken pre-construction to inform a DSMP. It is considered that this does not constitute a limitation on the assessment of agricultural land given the extent of ALC surveys conducted across the Sites and the temporary nature and small scale of the final cable trench meaning there would be minimal disturbance to soil and agricultural land over a short period with no change to the level of significance of the effect stated as an outcome of the assessment.

20.6 Baseline Conditions

- 20.6.1 This section describes the baseline characteristics of agricultural landholding, soils and agricultural land quality for the Scheme. Baseline conditions of the Scheme were established from a desk study and field surveys.

Existing Baseline

Agricultural land holding

- 20.6.2 The Sites comprise predominantly arable land. There are a total of 12 different agricultural landholdings across the Sites and 22 agricultural landholdings within the Cable Route Corridor. A breakdown of the landholdings is given below in **Table 20.11**. To retain anonymity, each landholding has been assigned a code. All Site landholders have entered into an option agreement for the Scheme.

Table 20.11: Landholder Information Breakdown

Green Hill Site	Area (ha)	Owner	%	Owner	%	Farm Type
A	174	A1	100			Arable
A.2	65	A.21	100			Arable
B	65	B1	78	B2	22	Arable
BESS	17	BESS1	51	BESS2	49	Arable
C	56	C1	100			Arable
D	42	DE1	100			Arable
E	309	DE1	70	E2	30	Arable
F	276	F1	100			Arable
G	171	G1	100			Arable
Cable Route		Various				Arable



20.6.3 The land is principally farmed, and most of the land is arable land used for combinable crops (cereals with combinable break crops). Some of the land is grassland grazed by sheep and some is used for growing hay.

20.6.4 The landholdings involved within the Sites are described below in **Table 20.12**.

Table 20.12: Landholding Baseline Information¹

Greenhill Site	Landowners	Farmers	Farm Sizes	Principal Enterprises on Site
A	One	One	Total farmed size circa 1,200 ha, owned, rented, contracted	Most of Green Hill A is an arable (cereals and break crops) rotation, but there is grassland at the western edge of the Site.
A2	One	One	Total farmed area circa 400 ha	This is an offlying parcel of arable land, farmed on a continuous cereals basis.
B	Two	One	Total area farmed circa 1,500 ha	The Site is a mix of arable (cereals) land and grassland, the latter used for making hay for horsefeed.
C	One	One	Total farmed about 800 ha (including Green Hill D and part of Green Hill E)	Arable rotation of wheat and oats.
D	One	One	Farmed with Green Hill C.	Farmed with Green Hill C.
E	One	Two	The majority of Green Hill E is farmed with Green Hill C and D.	Farmed with Green Hill C.
			Unknown – land is held on non-secure basis.	Arable (cereals and break crop) rotation.
F	One	Three	Part is tenanted and is farmed together with Green Hill G. Total area farmed over 1,000 ha owned and contracted.	Mostly used for cereals with some maize for anaerobic digestors.
			Part is farmed in hand by the Estate (c24 ha).	Mostly cereals.

¹ Data provided by Kernon Consultants



Greenhill Site	Landowners	Farmers	Farm Sizes	Principal Enterprises on Site
			Part is let to a local farm business.	Farmed as arable.
G	One	One	Farmed with part of Green Hill F. Over 1,000 ha owned and contracted.	Arable land used for growing cereals.
BESS	One	One	Circa 180 ha, owned and rented.	Arable land grown for cereals with periodic break crops.

Soils

20.6.5 Across the Sites and Cable Route Corridor, there are seven different Soil Associations shown on available previous national survey mapping (**Figure 20.1**). These are described below.

- Hanslope Association soils are found within Green Hill A, A.2, B, C, D, E, F and G which are described as slowly permeable calcareous or non-calcareous clayey soils with slight risk of water erosion;
- Banbury Association soils are found in Green Hill A, C, D and E and are described as well drained brashy fine and coarse loamy ferruginous soils over ironstone;
- Fladbury 1 Association soils are found in the north of the Green Hill BESS and are described as stoneless clayey soils, in places calcareous variably affected by groundwater;
- Oxpasture Association soils are found in the middle of the Green Hill BESS and are described as fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging;
- Waterstock Association soils are found in the south of the Green Hill BESS and are described as deep permeable mainly fine loamy soils variably affected by groundwater;
- Moreton Association soils are found in Green Hill D, E, F and G and are described as well drained calcareous clayey and fine loamy soils over limestone, in places shallow and brashy. Some deeper slowly permeable calcareous clayey soils;
- Ragdale Association soils are found in Green Hill C, F and G and are described as slowly permeable seasonally waterlogged clayey and fine loamy over clayey soils; and
- Wick 1 Association soils are found in a small area in the south of Green Hill C, approximately 1770 m², which may not be visible on the map due to the scale of the map.



20.6.6 The ALC survey and desk study has identified six major soil types across the Sites. Soil type 1 is the dominant soil, covering the majority of the Sites and Cable Route, while other five soil types cover only small areas.

- Soil type 1 - Deep clay. This soil dominates the majority area of all the Sites. It is generally a slowly permeable calcareous deep clay with non-calcareous clay topsoil locally;
- Soil type 2 - Deep loam. This soil was mainly found in small areas of Green Hill A and Green Hill E and consist of deep light or medium loams;
- Soil type 3 - Shallow soil over sandstone or ironstone. This soil is located in Green Hill E and is generally non-calcareous light or medium loam over sandstone or ironstone;
- Soil type 4 - Shallow soil over limestone. This soil was found in Green Hill F and is generally calcareous heavy loam or clay over limestone;
- Soil type 5 - Alluvial soil. This soil was found in Green Hill F and E and is generally either deep heavy loam, or heavy loam or clay over clay; and
- Soil type 6 - Valley soil. This soil was found in all the Sites. It is predominately deep heavy loam, or heavy loam or clay over clay.

Agricultural Land

20.6.7 The total area of agricultural land assessed from all the Sites and Cable Route Corridor is 1,324.6 ha.

20.6.8 As shown in **Appendix 20.2** and **Table 20.13** below, the ALC Grades of the assessed agricultural land from the Sites and Cable Route Corridor range from Grade 1 to 4. The total BMV land affected by the Scheme is 854.5 ha, accounting 65%.

Table 20.13: ALC Grade of the Assessed Agricultural Land

Green Hill Site	Grade 1		Grade 2		Grade 3a		Grade 3b		Grade 4		Total BMV	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
A	5.9	3.4%	52.3	30.5%	72.9	42.4%	40.7	23.7%			131.1	76.3%
A.2			5.1	7.8%	45.2	69.4%	14.9	22.9%			50.3	77.1%
B			2.8	4.5%	23.8	37.5%	36.9	58.1%			26.6	41.9%
C			5.1	9.2%	38.4	69.7%	11.6	21.0%			43.5	78.9%
D			10.7	25.5%	27.2	64.6%	4.1	9.9%			37.9	90.2%
E	8.3	2.7%	68.8	22.6%	108.2	35.5%	119.3	39.2%			185.3	60.8%
F			93.4	34.5%	71.7	26.5%	105.6	39%			165.1	61.0%
G			55.5	33.0%	71.8	42.7%	41.0	24.3%			127.3	75.6%
BESS					9.5	54.9%	7.8	45.1%			9.5	54.9%



Green Hill Site	Grade 1		Grade 2		Grade 3a		Grade 3b		Grade 4		Total BMV	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Cable Route Corridor			19.9	12%	58*	34.9%	62.3*	38%	25.9	15.6%		
Total	14.2	1%	313.6	24%	526.7	40%	444.2	34%	25.9	2%		
Grand total of assessed land area				1,324.6 ha								
BMV land area & %				854.5 ha; 65%								
Non-BMV land area & %				470.1 ha; 35%								
Grand total surveyed land area (excl. Cable Route Corridor)				1,158.5 ha								

* Grade 3 land from Provisional Map is further classified into Grade 3a and 3b based on the professional judgment with consideration of soil association distribution, soil type and ALC grades of relevant Sites from the ALC survey. Grade 3 land from Cable Route Corridor is mainly with Soil Type 1 (Deep Clay) and Soil Type 4 (Shallow soil over limestone).

Future Baseline

- 20.6.9 Climate change is the main factor affecting future baseline and likely impacts soil conditions and agricultural land as a result of rising temperature and more extreme seasonal variations, such as more intense rainfall and longer droughts. However, it is considered that the future baseline conditions, including the main soil characteristics and agricultural land quality (ALC grades), will remain consistent with the existing baseline conditions over the project lifetime.
- 20.6.10 Future changes in land management practices and farm business approaches may occur. However, these changes are currently unknown (and would be driven by third parties) but it is expected that the land use would remain predominantly agricultural.

20.7 Embedded Mitigation Measures

- 20.7.1 In accordance with NPS EN-1, EN-3, EN-5 and the NPPF regarding the use of agricultural land, the Scheme conducted a search for potential development areas (PDAs) at Stages 2 to 5 of its site selection process, with the consideration of the use of the poorer quality land and avoidance of the use of BMV land where possible. Details of the PDA search and consideration of the use of agricultural land are in Chapter 5 Alternatives and Design Evolution [EN010170/APP/GH6.2.5].
- 20.7.2 In compliance with NPS EN-1, EN-3 and EN-5 on the requirement for sustainable reuse of soils and the development and implementation of a Soil Resources and Management Plan, ALC surveys have been conducted at all the Sites to identify the ALC grades and soil resources (see **Appendix 20.1** [EN010170/APP/GH6.3.20.1]) and an outline Soil Management Plan (OSMP) [EN010170/APP/GH7.6] has been prepared as part of outline Construction



Environment Management Plan (OCEMP) [EN010170/APP/GH7.1]. As stated in previous sections, a Soil Resource Survey along the construction working width of the Cable Route where soils and agricultural land will be disturbed will be undertaken post consent and precontraction and included in the update to the OSMP.

Embedded Construction Mitigation Measures

- 20.7.3 The OSMP sets out the strategy, approach, methodology and guidance for soil mitigation, and the key requirements for the development of a DSMP preconstruction for soil handling during construction, operation and decommissioning stages.
- 20.7.4 The OSMP includes the following mitigation aspects:
- Role and responsibility
 - Site Environmental Manager;
 - Soil Agent; and
 - Soil Scientist.
 - Preconstruction planning
 - Preparation of a DSMP; and
 - Provision of training to Site Environmental Manager or delegated agent from qualified Soil Scientist.
 - Site Preparation
 - Vegetation clearance and removal of arisings; and
 - Layout of haul routes, compounds, stockpile areas and permanent work design.
 - Soil Stripping
 - Soils to be stripped according to the thickness of soil horizons and soil types without mixing;
 - Soils to be stripped in the driest conditions possible with works stopped where necessary during wet ground conditions; and
 - Minimisation of dust and silt-laden runoff generation.
 - Soil Stockpiling
 - Stockpiles to be located in appropriate locations to avoid increased flood risk, watercourses and topographic depressions;
 - Soils to be stockpiled in designated stockpile area according to temporary work design;
 - Topsoil and subsoil materials to be stockpiled separately and clearly labelled;
 - Soils to be stockpiled within the height stated in DSMP; and



- Soil movements and stockpile content to be recorded.
- Soil Stockpile Maintenance
 - Stockpiles to be seeded with low maintenance grass and clover mix to minimise risk of soil erosion and reduce the spread of weeds if stockpiled for over six months; and
 - Vegetation cover to be managed during the summer months to control the spread of weeds.
- Soil Reinstatement
 - For areas of landscape planting or habitat creation, soil profiles to be created using available soil resources that support the required end use;
 - Soils to be reconditioned before reinstatement where required; and
 - The full volume of soils to be reinstated (i.e. no materials will be taken off-site).
- Soil Aftercare
 - Reinstated soils will be checked by qualified Soil Scientist to ensure that soils are restored correctly, and any required remediation implemented.
- Soil Management during the operational phase.
- Soil Management during the decommissioning phase.

Embedded Operational Mitigation Measures

- 20.7.5 Maintenance work on solar arrays and equipment in relation to soil and land disturbance will be carried out in accordance with the DSMP.

Embedded Decommissioning Mitigation Measures

- 20.7.6 The DSMP produced at the pre-construction stage will be further updated prior to decommissioning to account for any changes to the construction approach, phasing and good practice at that time. The DSMP will cover soil handling, reconditioning and soil/land restoration during decommissioning and soil aftercare post decommissioning.

20.8 Assessment of Impacts and Effects

Construction Phase

Soils

- 20.8.1 The Scheme may impact soil function and soil volume (via sealing and loss of soil) as well as soil condition due to the general construction activities and the construction of substations and the BESS. Therefore, soil function, volume and soil resilience to structural damage were assessed in line with the criteria set out in Section 20.4.



- 20.8.2 Six major soil types have been identified at the Sites and the Cable Route Corridor as stated in paragraph 20.6.4 and presented in **Table 20.14** below. FCD across all the Sites are below 150 and, in accordance with criteria in **Table 20.4**, the sensitivity of the soils is therefore considered to be either Medium or Low resilience to structural damage as shown in **Table 20.14**. In accordance with the criteria in **Table 20.7**, the magnitude of impact on soil structure would be Minor due to the temporary and minimal disturbance to soils and the soils resilience to soil structural damage. This would result in Minor adverse effect on soil structure, which is **Not Significant**.
- 20.8.3 The construction of the BESS, substations, conversion units, access track, fencing, cabling and permissive paths would result in temporary loss of soils (function and volume) from ALC Grade 3a and 3b land. In accordance with the criteria in **Table 20.3**, **Table 20.7** and **Table 20.9**, the sensitivity, magnitude and significance of effect on soil function and volume was assessed as follows:
- The sensitivity of the soils from ALC Grade 1 and 2 land is Very High, from Grade 3a land is High and from Grade 3b land is Medium;
 - The magnitude of impact on the soils from ALC Grade 1, 2, 3a and 3b land is **Minor** due to the temporary and minimal disturbance to soils; and
 - The effect on the soils from Grade 1 and 2 land is **Moderate adverse (Significant)**, from Grade 3a land is **Moderate adverse (Significant)** and from Grade 3b land is **Minor adverse (Not Significant)**.
- 20.8.4 Details of sensitivity, magnitude, significance of effect in relation to soil function, volume and structure are presented in **Table 20.14**.

Table 20.14: Assessment of Effect on Soils during Construction

Soils		Sensitivity	Magnitude	Potential effect	Significance of Effect
Soil function and soil volume	ALC Grade 1 and 2	Very High	Minor	Moderate or (Adverse)	Significant
	ALC Grade 3a	High	Minor	Moderate (Adverse)	Significant
	ALC Grade 3b	Medium	Minor	Minor (Adverse)	Not Significant
	ALC Grade 4	Low	Minor	Minor (Adverse)	Not Significant
Soil resilience (to soil structural damage)	Soil type 1 - Deep clay	Medium	Minor	Minor (Adverse)	Not Significant
	Soil type 2 - Deep loam: light loam	Low	Minor	Minor (Adverse)	Not Significant
	Soil type 2 - Deep loam: medium loam	Medium	Minor	Minor (Adverse)	Not Significant
	Soil type 3 - Shallow soil over	Low	Minor	Minor (Adverse)	Not Significant



Soils	Sensitivity	Magnitude	Potential effect	Significance of Effect
sandstone or ironstone: light loam				
Soil type 3 - Shallow soil over sandstone or ironstone: medium loam	Medium	Minor	Minor (Adverse)	Not Significant
Soil type 4 - Shallow soil over limestone: heavy loam or clay	Medium	Minor	Minor (Adverse)	Not Significant
Soil type 5 - Alluvial soil: heavy loam or clay	Medium	Minor	Minor (Adverse)	Not Significant
Soil type 6- valley soil: heavy loam or clay	Medium	Minor	Minor (Adverse)	Not Significant

Agricultural Land

- 20.8.5 As shown in **Table 20.13**, there is Grade 1 (14.2 ha, 1%), Grade 2 (313.6 ha, 25%), Grade 3a (526.7 ha, 43%), Grade 3b (444.2 ha, 36%) and Grade 4 (25.9 ha, 15.6%) land within the Sites and Cable Route Corridor. In accordance with criteria in **Table 20.2**, the sensitivity of Grade 1 and 2 land is classified as **Very High**, Grade 3a as **High**, Grade 3b as **Medium** and Grade 4 as **Low**.
- 20.8.6 As the Sites and Cable Route Corridor will be returned to their original use and condition as far as practicable after construction and decommissioning, in accordance with criteria in **Table 20.6**, the magnitude of impact on agricultural land would be **Minor**.
- 20.8.7 Therefore, the Scheme would have **Moderate (Significant)** effect on Grade 1 and 2 land, **Moderate adverse (Significant)** effect on Grade 3a land, and **Minor adverse (Not Significant)** effect on Grade 3b and 4 land.
- 20.8.8 The assessment of the impacts on agricultural land is summarised in **Table 20.15**.

Table 20.15: Assessment of Effect on Agricultural Land during Construction

ALC Grade	Sensitivity	Magnitude	Significance	Significance of Effect
1 and 2	Very High	Minor	Moderate (adverse)	Significant
3a	High	Minor	Moderate (adverse)	Significant



ALC Grade	Sensitivity	Magnitude	Significance	Significance of Effect
3b	Medium	Minor	Minor (adverse)	Not Significant
4	Low	Minor	Minor (adverse)	Not Significant

Agricultural Landholdings

- 20.8.9 As set out in **Table 20.11** and **Table 20.12**, there are a number of farms with land within the Sites. These all operate mostly arable cropping, with some grassland farming. None of the enterprises operated are particularly sensitive to the location of land, such that all are therefore capable of adapting to change.
- 20.8.10 The table below estimates the proportion of the total area farmed within the Site. Most of the farm businesses have entered a relatively small proportion of their total farmed area.

Table 20.16: Assessment of Magnitude of Impact on Agricultural Holdings during the Construction Phase

Landholding	Area Farmed (total)	Area of Site (ha)	Proportion
A	1,200	173.7	c.15%
A2	400	65.2	c.16%
B	1,500	64.7	c.5%
C	800	56.4	c.7%
D	800	42.1	c.5%
E1	800	213.6	c.27%
E2	Not known	103.0	Non-secure
F1	Not known	53.0	Non-secure
F2	570	91	c.16%
F3	1,000	23.6	c.2%
G	1,000	168.3	c.17%
BESS	180	43.3	c.24%

- 20.8.11 The sensitivity of the agricultural landholdings from all the Sites and Cable Route Corridor is assessed as being **Low** as there is no key infrastructure such as crop/fertiliser storage, sprayer filling and pesticide facilities, barn, silage clamp, slurry store, and manure storage, within the Scheme's boundary. As all the Sites are in blocks and there would be no severance in relation to farm activities once the construction starts, the magnitude of impact on severance and access on farm activities would be predominantly **Minor**. Hence this would result in either **Neutral or Minor (adverse)** effect on agricultural holdings depending on landholding size and key infrastructure locations, which is **Not Significant**.



20.8.12 The impact on the holding containing the BESS will be medium, as all use of approximately 10% of the holding will be lost at construction and for the duration of the operational phase. This is a **Minor (adverse)** effect, which is **Not Significant**.

20.8.13 The details of the assessment of impacts on agricultural landholding is presented in **Table 20.17**.

Table 20.17: Assessment of Impact on Agricultural Landholdings during Construction

Landholding Code	Sensitivity	Magnitude	Significance	Significance of Effect
A1	Low	Minor	Minor (adverse)	Not Significant
A.2	Low	Minor	Neutral	Not Significant
B1	Low	Minor	Minor (adverse)	Not Significant
B2	Low	Minor	Minor (adverse)	Not Significant
BESS1	Low	Moderate	Minor (adverse)	Not Significant
C1	Low	Minor	Neutral	Not Significant
D1	Low	Minor	Neutral	Not Significant
E1	Low	Minor	Minor (adverse)	Not Significant
E2	Low	Minor	Minor (adverse)	Not Significant
F1	Low	Minor	Minor (adverse)	Not Significant
F2	Low	Minor	Minor (adverse)	Not Significant
F3	Low	Minor	Minor (adverse)	Not Significant
G1	Low	Minor	Neutral	Not Significant
Cable Route Corridor	Low	Minor	Minor (adverse)	Not Significant

Operational Phase

20.8.14 During the operation of the Scheme, all construction activities will have ceased and agricultural practices could continue (for example sheep grazing).

20.8.15 During the operational phase, general maintenance and activities on the Sites would be minimal and would be restricted principally to vegetation management, equipment maintenance and servicing, ad hoc replacement of any components



that fail, periodic fence inspection, and monitoring to ensure the continued effective operation of the Scheme.

- 20.8.16 Scheduled replacement activities of panels and batteries will be required throughout the lifetime of the Scheme. Good soil handling practice would be followed throughout the duration of the Scheme in line with the Soil Management Plan.
- 20.8.17 As such, potential adverse impacts on soils, agricultural land quality and agricultural landholdings are scoped out during the operational phase as there would be no further impacts to these receptors.
- 20.8.18 The conversion of land currently under arable production to grassland (land between and under the solar panels) during the operational phase has potential benefits in relation to soil health. Cessation of cultivation will remove disturbance effects on the soils and, along with the grassland vegetation, may result in an increase in soil organic carbon, better soil structure, increased infiltration and enhanced soil microbial populations. This is supported by research from Defra etc (Ref 20. 24, Ref 20.25 and Ref 20.26) which showed that conversion of tillage land to permanent pasture had soil organic carbon (especially in the land between solar panels) and wider environmental benefits. As such, there would be a potential beneficial impact on soils and agricultural land although it should be noted the extent of benefits will depend on the actual land use during operation (for example high levels of grazing will limit the potential for beneficial effects).
- 20.8.19 The assessment on soils, and agricultural land and agricultural landholding in relation to Cable Route Corridor is excluded as the soils and agricultural land will have been restored and returned to landowner for normal agricultural use after construction stage although there may be maintenance/repair work within Cable Route Corridor, the impact on soils and agricultural land is expected to be minor or negligible.

Soils

- 20.8.20 **Table 20.18** below presents the details of impact on soils during operation. The Scheme would have a potential **Moderate to Major beneficial** effect on soil functions (especially on soil carbon), which is **Significant**.

Table 20.18: Assessment of Effect on Soil Function during Operation

Soils		Sensitivity	Magnitude	Potential effect	Significance of Effect
Soil function	Grade 1 and 2	Very high	Moderate	Major (beneficial)	Significant
	Grade 3a	High	Major	Major (beneficial)	Significant
	Grade 3b	Medium	Major	Moderate (beneficial)	Significant



Agricultural Land

- 20.8.21 The potentially increased soil organic matter may convert some mineral topsoil into organic topsoil potentially increasing ALC grades according to the ALC guidelines. Therefore, the Scheme may have a potentially **Minor to Moderate (Significant) beneficial** effect on agricultural land.

Agricultural Landholdings

- 20.8.22 With the exception of the solar array areas, generally small areas for fixed infrastructure or landscaping, the majority of the land will be available for agricultural use for grazing for the duration of the operational phase. This may be operated by the current landowners or let to others to farm, but the operational impact as a consequence is **Minor or Neutral (adverse)** resulting from a changed, and potentially reduced, level of agricultural activity. Those effects are **Not Significant**.
- 20.8.23 The BESS Site will not be available for agricultural use. The effect on this landholding will be a temporary but long-term reduction in available land, of the order of 10% of the landholding, which will be a **Minor (adverse)** effect, which is **Not Significant**.

Decommissioning Phase

- 20.8.24 During the decommissioning phase of the Scheme, land will be required on a temporary basis. Following completion of decommissioning operations, all land of the Sites would be reinstated and returned to the landholders to continue in agricultural use. All infrastructure will be removed to ensure there are no obstructions to cultivation.
- 20.8.25 The significance of effects on soils and agricultural land are likely to be similar to those assessed for the construction phase, with continued compliance with the Soil Management Plan secured in the Outline Decommissioning Statement.
- 20.8.26 The significance of effect on agricultural landholdings are likely to be less as the underground cables may be left in situ or be removed by opening the ground at regular intervals and pulling the cable through to the extraction point, avoiding the need to open up the entire length of the cable route.

20.9 Additional Mitigation Measures

- 20.9.1 No additional mitigation measures have been identified as require. The Scheme has conducted PDAs and considered in design to avoid, prevent, reduce and remediate impact on BMV land and their soils.

20.10 Residual Effects

- 20.10.1 This section summarises the residual significant effects of the Scheme following the implementation of embedded and additional mitigation as outlined in Sections 20.7 and 20.9 of this Chapter.
- 20.10.2 As stated in **Chapter 4 Scheme Description [EN010170/APP/GH6.2.4]**, after the construction and decommissioning phases, the Cable Route Corridor and the Sites will be returned to their original use and condition as far as practicable as part of the construction and the decommissioning of the Scheme. This means



that soil function, volume and conditions and agricultural land would be returned to their previous conditions.

20.10.3 The residual effects of agricultural circumstance during construction and operation will remain the same as the significance of effect as assessed in Section 20.8.

20.10.4 After mitigation measures applied at decommissioning stage, the residual effects on soils and agricultural land when this is returned to agricultural use would be as follows:

- The residual effect on soil function would be the same as in the operational phase, the Scheme would have **Moderate to Major beneficial** effect on soil functions (especially on soil carbon), which is **Significant**. This is mainly due to accumulation of soil organic matter in topsoil.
- Due to mitigation measures from Soil Management Plans, the residual effect on soil structure would be **Minor adverse**, which is **Not Significant**.
- As the agricultural land would be restored to previous conditions after mitigation measures, the effect on agricultural land would be **Neutral**. However, due to the potential increase of topsoil organic matter, there may be an increase in ALC grades for some land and this would result in a **beneficial** effect, which is **Not Significant**.
- After decommissioning stage, the effect on agricultural landholding would be **Neutral**, which is **Not Significant**, as the Sites will be returned to landowners for agricultural use.

20.11 Cumulative Effects

Cumulative effects

20.11.1 There are considered to be potential significant cumulative effects in conjunction with other similar developments or as the combined effect of a set of developments following respective mitigation that would cumulatively impact the Scheme. All other developments are outside of the study area but within the 2km zone of influence, which is considered to be appropriate on the assessment of cumulative effects on agricultural circumstances.

20.11.2 Within the zone of influence there are five other developments all within North Northamptonshire (Wellingborough Area) at various stages of planning. Approximately 1.7km northeast of Green Hill D there is a validated application (planning reference NW/24/00138/OUT) awaiting decision to build a residential-led mixed development with up to 1,000 homes. There is also a planning application for up to 3,000 dwellings (planning reference WP/2008/0150/OEIA), including retail and commercial facilities is also in the ongoing application stages. The land at these two locations is mapped as Provisional Grades 2 and 3; as such a worst-case scenario would indicate that the entire development will have a significant impact on use of BMV land. Both these two applications are located within the current Wellingborough Local Plan Part 2 (Glenvale Park) (Ref 20.29).



- 20.11.3 Adjacent to Green Hill BESS there is associated infrastructure including drainage, access and landscape awaiting approval. The ALC survey at Green Hill BESS indicated ALC grades 3a and 3b, land adjacent to this is expected to also comprise of Grades 3a (BMV) and 3b (non-BMV) as provisional ALC grade for this land is Grade 3. The impact of this development therefore will affect BMV land and infrastructure land take is likely greater than 5ha therefore impact is likely significant.
- 20.11.4 Overall, the effect of other developments within the zone of influence would likely cause a significant effect due to the large proportion of BMV land within the area and developments resulting in significant permanent infrastructure where land take is likely greater than 20ha BMV land. However, as the two housing developments (planning reference NW/24/00138/OUT and WP/2008/0150/OEIA) are within the current Wellingborough Local Plan Part 2, the effects from the two developments is considered to be **Not Significant**. Therefore, the cumulative effect is the same as the effect of the Scheme.

In-combination effects

- 20.11.5 No in-combination effect has been identified from other topics affecting agricultural circumstances receptors.

20.12 Summary

- 20.12.1 **Table 20.19** summarises the effects on agricultural circumstances.


Table 20.19: Summary of Residual Effects for Agricultural Circumstances

Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
Construction Phase (All Sites and Cable Route Corridor)							
Soils	Soil function and volume from different ALC Grades of land	ALC Grade 1 and 2 - Very High ; ALC Grade 3a - High ; ALC Grade 3b- Medium ALC Grade 4- Low	Minor	Soil Management Plan	ALC Grade 1 and 2 - Moderate (adverse) ; ALC Grade 3a - Moderate (adverse) ; ALC Grade 3b- Minor (adverse) ALC Grade 4- Minor (adverse)	N/A	ALC Grade 1 and 2 - Moderate (adverse) ; ALC Grade 3a - Moderate (adverse) ; ALC Grade 3b- Minor (adverse) ALC Grade 4- Minor (adverse)
	Soil structure	Medium/Low	Minor	Soil Management Plan	Minor(adverse) to Neutral	N/A	Minor (adverse) to Neutral
Agricultural land	Agricultural land quality in terms of ALC Grades	ALC Grade 1 and 2 - Very High ; ALC Grade 3a - High ; ALC Grade 3b- Medium	Minor	Soil Management Plan	ALC Grade 1 and 2 - Moderate (adverse) ; ALC Grade 3a - Moderate (adverse) ; ALC Grade 3b- Minor (adverse)	N/A	ALC Grade 1 and 2 - Moderate (adverse) ; ALC Grade 3a - Moderate (adverse) ; ALC Grade 3b- Minor (adverse)



Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
		ALC Grade 4- Low			ALC Grade 4- Minor (adverse)		ALC Grade 4- Minor (adverse)
Agricultural landholding	Loss of resource and damage to key characteristics, features or elements. Access between land and key agricultural infrastructure	Low	Minor on all the Site and Cable Route Corridor except BESS; Minor (BESS)	N/A	Neutral to Minor (adverse) on all the Site and Cable Route Corridor except BESS; Minor (adverse) (BESS)	N/A	Neutral to Minor (adverse) on all the Site and Cable Route Corridor except BESS; Minor (adverse) (BESS)
Cumulative effects	Permanent agricultural land take within 2km of Zol	High/Medium	Major	Unknown	Major/Severe (adverse)	Unknown	Major/Severe (adverse)
Operational Phase (excluding Cable Route Corridor as it will have been restored)							
Soils, agricultural land and Agricultural landholding	Potential adverse impacts on soils, agricultural land quality and	N/A	N/A	N/A	N/A	N/A	N/A



Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
	agricultural landholdings are scoped out during the operation phase as there would be no further impacts to these receptors						
Soil function (soils from each ALC grade land)	Beneficial impact from less soil disturbance and organic matter accumulation	ALC Grade 1 and 2 - Very High ; ALC Grade 3a - High ; ALC Grade 3b- Medium	ALC Grade 1 and 2 – Moderate ; ALC Grade 3a - Major ; ALC Grade 3b- Major	Soil Management Plan on maintenance work	ALC Grade 1 and 2 – Major (beneficial) ; ALC Grade 3a - Major (beneficial) ; ALC Grade 3b- Moderate (beneficial)	N/A	ALC Grade 1 and 2 – Major (beneficial) ; ALC Grade 3a - Major (beneficial) ; ALC Grade 3b- Moderate (beneficial)
Agricultural land	Beneficial impact from less soil/land disturbance and organic matter accumulation	N/A	N/A	N/A	Minor to Moderate (beneficial)	N/A	Minor to Moderate (beneficial)



Receptor	Description of Impact	Sensitivity of Receptor	Magnitude of Impact	Embedded Mitigation	Significance of Effect (with embedded mitigation)	Additional Mitigation Measures	Residual Effect (with additional mitigation)
Decommissioning Phase (All Sites and Cable Route Corridor)							
Soils	Impact on soil function and volume from different ALC Grades of land	ALC Grade 1 and 2 - Very High ; ALC Grade 3a - High ; ALC Grade 3b- Medium	Minor	Soil Management Plan	ALC Grade 1 and 2 - Moderate or Major (adverse) ; ALC Grade 3a - Minor or Moderate (adverse) ; ALC Grade 3b- Minor (adverse)	N/A	ALC Grade 1 and 2 – potentially Major or Severe (beneficial) ; ALC Grade 3a - Major or Severe (beneficial) ; ALC Grade 3b- Moderate or Major (beneficial)
	Soil structure	Medium/Low	Minor	Soil Management Plan	Minor (adverse) to Neutral	N/A	Minor (adverse) to Neutral
Agricultural land	Impact on agricultural land quality in terms of ALC Grades.	ALC Grade 1 and 2 - Very High ; ALC Grade 3a - High ; ALC Grade 3b- Medium ALC Grade 4- Low	Minor	Soil Management Plan	ALC Grade 1 and 2 - Moderate (adverse) ; ALC Grade 3a - Moderate (adverse) ; ALC Grade 3b- Minor (adverse) ALC Grade 4- Minor (adverse)	Post decommissioning soil aftercare and remediation	Neutral with potential beneficial impact to improve ALC grades classification at the Sites.



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