# OAKLANDS FARM SOLAR PARK

## Applicant: Oaklands Farm Solar Ltd

Environmental Statement
Chapter 15 – Agriculture and Soils
January 2024
Document Ref: EN010122/APP/6.1
Revision: -

Planning Act 2008
Infrastructure Planning (Application: Prescribed Forms and Procedure) Regulations 2009 - 5(2)(a)

# Oaklands Farm Solar Park - Environmental Statement Volume 1

## Chapter 15: Agriculture and Soils

**Final report**
Prepared by LUC
January 2024

# Chapter 15
# Agriculture and Soils

## Introduction

**15.1** This chapter considers the potential effects of the Proposed Development on the baseline agricultural receptors, in particular agricultural land and land quality, soils as a resource, food production, farm businesses and land use.

**15.2** Agricultural considerations were included in Chapter 12 of the Preliminary Environmental Information Report (PEIR) issued in November 2022, along with the effects in relation to public access, recreation and tourism. The final ES submitted with the application now considers those matters in a separate chapter (see **Chapter 12: Socio-Economics, Tourism and Recreation**).

**15.3** The agricultural assessment was undertaken by Kernon Countryside Consultants Ltd (KCC) and includes detailed Agricultural Land Classification (ALC) surveys carried out by Soil Environment Services Ltd (SES) and KCC.

**15.4** This chapter is supported by the following figures in **Volume 2**:

- **Figure 15.1: Agricultural Land Classification Results**.
- **Figure 1.4a and b: Field Numbers**.

**15.5** The following appendices are referred to in this chapter and can be found in **Volume 3**:

- **Appendix 15.1: ALC (Oaklands Farm area) (SES)**.
- **Appendix 15.2: ALC (Park Farm area) (KCC)**.
- **Appendix 15.3: Photographs of Soils Across the Site**.
- **Appendix 15.4: Photographs of Farm Buildings**.
- **Appendix 15.5: Analysis of UK Food Security**.

**15.6** Reference is made to the outline Soil Management Plan (oSMP) which forms an appendix to **Appendix 4.3: Outline Construction Environmental Management Plan** and **Appendix 4.5: Outline Decommissioning Environmental Management Plan**.

# Scope of the Assessment

## Effects Assessed in Full

**15.7** Effects on the following receptors have been assessed in full:

- Agricultural land quality. The assessment considers the quality of agricultural land, its pattern and distribution, and the potential effects on the land quality as a resource. Land of Grades 1, 2 and 3a of the Agricultural Land Classification (MAFF, 1988) are defined as 'Best and Most Versatile' in the NPPF (MHCLG, December 2023).
- Soil structure. Soil has many different functions and can be affected positively or negatively by land use and management even if agricultural land quality is not affected.
- Local farm businesses. Land management is influenced by many factors, and the effects on the ability to farm land may have localised implications, positive or negative.
- The wider rural economy. Potential effects on economic, employment and other receptors directly related to the current land use.

**15.8** The following potential effects have been identified.

- Direct and indirect effects during construction including:
  - Loss of function or land from construction activities, temporarily or permanently.
  - Disturbance or damage to soil structure affecting ALC grade.
  - Effects on farming activities across the holdings.
- Direct effects during operation including:
  - Effects on land quality from operational activities
  - Effects on soils from long-term grassland uses.

    Economic effects on farm businesses and related businesses.
  - Effects on the rural economy including on food production and changes in enterprise.

- Direct effects during decommissioning including:
  - Disturbance or damage to soil structure affecting ALC grade.

### Effects Scoped Out

**15.9** No effects on agricultural receptors have been scoped out.

## Assessment Methodology

### Legislation and Guidance

**15.10** There is no specific legislation relevant to the assessment of agricultural effects. The assessment has considered relevant national and local planning and development management policies, and relevant guidance on assessing the effects on agricultural land.

**15.11** This assessment has taken into consideration:

- The 2022 Institute of Environmental Management and Assessment (IEMA) publication 'A New Perspective on Land and Soil in Environmental Impact Assessment'[1].
- Natural England's Guide to Assessing Development proposals on Agricultural Land (2021)[2].

### National Planning Policy

#### Overarching National Policy Statement for Energy (EN-1) (November 2023) to be designated[3]

**15.12** The Overarching NPS for Energy (EN-1) to be designated (November 2023) identifies that development may affect soils, including loss of or physical damage to soil resources (paragraph 5.11.4). It is noted in paragraph 5.11.12 that applicants should seek to minimise impacts on BMV, and preferably use land in areas of poorer quality.

[1] IEMA (February 2022) A New Perspective on Land and Soil in Environmental Impact Assessment

[2] Natural England (2021) Guide to assessing Development proposals on Agricultural Land.

[3] Department for Energy Security and Net Zero (2023) Draft Overarching National Policy Statement for Energy (EN-1)

### National Policy Statement for Renewable Energy Infrastructure (EN-3) (November 2023) to be designated

**15.13** The draft EN-3[4] (November 2023) to be designated sets out at paragraph 2.10.29 that *"land type should not be a predominating factor in determining the suitability of the site's location"*. Where the use of agricultural land has been shown to be necessary, poorer quality land should be preferred to higher quality land.

**15.14** The development of ground mounted solar arrays is not prohibited on land of ALC Grades 1, 2 or 3a paragraph 2.10.30 advises, but the impacts must be considered.

**15.15** Further advice is provided on aspects of solar array development and have been taken into account in this assessment:

- Soil stripping and handling (2.10.81);
- Drainage and watercourses (2.10.86);
- Biodiversity relative to intensive agricultural use (2.10.89); and
- Mitigation and soil preservation (2.10,127).

**15.16** Paragraph 2.10.145 advises that the Secretary of State should take into account the economic and other benefits of BMV agricultural land. The Secretary of State should ensure that the applicant has put forward appropriate mitigation measures to minimise the impacts on soils or soil resources.

### National Planning Policy Framework

**15.17** The National Planning Policy Framework (NPPF) (2023)[5] is relevant in that it defines the best and most versatile (BMV) land in Annex 2.

[4] Department for Energy Security and Net Zero (2023) Draft National Policy Statement for Renewable Energy Infrastructure (EN-3)

[5] Department for Levelling Up, Housing and Communities (December 2023) National Planning Policy Framework

### Planning Practice Guidance for Renewable and Low Carbon Energy[6]

**15.18** This guidance highlights at paragraph 013, the following planning considerations:

- *"encouraging the effective use of land by focussing large scale solar farms on previously developed and non agricultural land, provided that it is not of high environmental value;*
- *where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays.*
- *that solar farms are normally temporary structures and planning conditions can be used to ensure that the installations are removed when no longer in use and the land is restored to its previous use."*

## Local Plan Policy

**15.19** The adopted Local Plan Part 1 (June 2016)[7] does not contain a specific policy governing development on agricultural land. Policy SD6 'Sustainable Energy and Power Generation' requires that the environmental effects have been appropriately considered, but does not reference agricultural land specifically.

**15.20** Development management policies are set out in the Local Plan Part 2 (November 2017). Policy BNE 5 supports development outside settlement boundaries where that development *"will not unduly impact on best and most versatile agricultural land"*.

## Consultation

**15.21** In undertaking this assessment consideration has been given to the scoping responses and other consultations undertaken as detailed in **Table 15.1**.

[6] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (published 2015 and updated 2023) Planning Practice Guidance for Renewable and Low Carbon Energy

[7] South Derbyshire District Council (2016) Adopted Local Plan Part 1

**Table 15.1: Consultation Responses**

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| Planning Inspectorate – September 2021 | Formal Scoping Opinion | Advised that the impact of loss of agricultural land for the duration of the Proposed Development should be assessed. Further noted that the ES should quantify the agricultural land which would be temporarily and permanently lost as a result of the Proposed Development. | This has been included in the assessment, see Table 15.7 and text following. |
| | | Advised that the ES should clearly set out what the economic benefits to the wider community are, given that the SR states that there will be minimal personnel onsite during operation. | This has been included in the assessment in respect of farm labour, and in all other respects in **Chapter 12: Socio-economics, Tourism and Recreation**. |
| | | Noted that the ES should assess the impacts during construction and operation of potential severance issues for farmers and other landowners. Further advised that measures should be included within the dDCO to ensure farmers and other landowners ability to | This has been included in the assessment, see construction effects: farm business impacts. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | access and move their livestock and that ability to access their land is not hindered. | |
| Drakelow Parish Council – 25th August 2021 | Formal Scoping Consultation | Stated that the use of land cannot be scoped out of the ES as during the operation of the Proposed Development the land can no longer be used for agricultural purposes. | This has been included in the assessment, see operational phase effects. |
| Rosliston Parish Council (RPC) – 17th September 2021<br><br>Walton on Trent Parish Council (WTPC) – 16th September 2021 | Formal Scoping Consultation | Does not agree with the scope of proposed significant effects in relation to socio-economics as the Proposed Development falls within grades 2 and 3 agricultural land and therefore land use should not be scoped out of the ES. | The use of agricultural land is included in this Chapter, assessing temporary and permanent effects. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| Natural England 20/09/21 | Formal Scoping Consultation | Recommend that soils should be considered in the context of the sustainable use of land and the ecosystem services they provide as a natural resource, as also highlighted in paragraph 170 of the NPPF. | This has been included in the assessment, see **operational effects: effects on soils**. |
| | | The Applicant should consider the following as part of the ES:<br>■ The degree to which soils are going to be disturbed/harmed as part of the Proposed Development andwhether 'best and most versatile' agricultural land is involved.<br>■ If required, an agricultural land classification and soil survey of the land should be undertaken.This should normally be at a detailed level, e.g. one auger boring per hectare, (or more detailedfor a small site) supported by pits dug in each main soil type to confirm the physical characteristics of the full depth of the soil resource, i.e. 1.2 metres.<br>■ The Environmental Statement should provide details of how any adverse impacts on soils can be minimised. Further guidance is | This has been considered in **Chapter 9: Ground Conditions** and in this assessment.<br>This Chapter includes:<br>■ the effects on soils. See operational effects: effects on soils;<br>■ the land quality following detailed ALC survey. See baseline;<br>■ the effects on soils and from construction are assessed: see |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | contained in the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites. | assessment of construction effects;<br>■ see also the CEMP in **Appendix 4.3**. |
| Derbyshire County Council (DCC) and South Derbyshire District Council (SDDC)<br>06/06/22 | Consultation on the PEIR | The applicant should consider utilising land which would not lead to the loss of Grade 2 and 3 agricultural land (albeit on a semi-permanent basis). | This Chapter considers the effects on land quality, and quantifies whether land is lost, temporarily or permanently. |
| Derbyshire County Council<br>24/03/2023 | Targeted consultation | That part of the site occupied by fixed infrastructure, is predominantly comprised of grade 3a and 3b agricultural land, fringed to the east and west by small areas of Grade 2 land. Current government policy set out within the National Planning Policy | The key policy documents are referenced in this Chapter.<br>The land use and food production implications of using BMV and |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | Framework states that the best and most versatile agricultural land (Grades 1, 2 and 3a) should be protected from development in the interests of agricultural production and food security. Furthermore, on 22nd December 2022, the Government published a consultation on its proposed revisions to the NPPF as part of its wider proposed reforms to the planning system through the Levelling Up and Regeneration Bill. In the consultation, the Government highlights its intention to emphasise the important role that our best performing farms have on food security, alongside imperatives such as energy security. The Government proposes to make amendments to the Framework to increase, compared to areas of poorer quality land, the consideration given to the highest value farmland used for food production, in both plans and decision making, where significant development of higher quality agricultural land is demonstrated to be necessary.<br><br>There is therefore some conflict between the provision of renewable energy, climate change mitigation and the preservation of best and | non-BMV land are considered in this Chapter. See Assessment of Operational Effects: Economic and Land use Effects.<br><br>Paragraph 181 of the NPPF (December 2023) is about plan making. Footnote 62 has been amended to require the availability of agricultural land used for food production to be considered alongside the other policies in the NPPF when deciding what sites are most appropriate for development. This footnote does not relate to decision making on planning applications. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | most versatile agricultural land, although the reduced extent of the proposal will clearly significantly reduce the loss of agricultural land.<br><br>It is noted that although best and most versatile agricultural land will be taken out of production for the duration of the proposed development, this loss of production will not necessarily be permanent and there are potentially biodiversity and soil health benefits to be gained from eliminating the use of agricultural chemicals, allowing the land to rest, returning the ground to a more biodiverse sward and potentially improving water quality in the unnamed tributaries flowing into the River Trent. | The potential benefits to soil health and quality are considered under the Assessment of operational effects: Effect on soils. |
| Natural England 21/04/23 | Targeted consultation | Natural England is a statutory consultee on development that would lead to the loss of over 20ha of 'best and most versatile' (BMV) agricultural land (land graded as 1, 2 and 3a in the Agricultural Land Classification (ALC) system, where this is not in accordance with an approved plan.<br><br>We consider that the proposed development, if temporary as described, is unlikely to lead to significant permanent loss of BMV | Noted |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | agricultural land, as a resource for future generations. This is because the solar panels would be secured to the ground by steel piles with limited soil disturbance and could be removed in the future with no permanent loss of agricultural land quality likely to occur, provided the appropriate soil management is employed and the development is undertaken to high standards.<br><br>Although some components of the development, such as construction of a sub-station, may permanently affect agricultural land this would be limited to small areas of BMV agricultural land.<br><br>However, during the life of the proposed development it is likely that there will be a reduction in agricultural production over the whole development area. Therefore consideration whether this is an effective use of land in line with planning practice guidance which encourages the siting of large scale solar farms on previously developed and non-agricultural land. Paragraph 174b and footnote 53 of the National Planning Policy Framework (NPPF) states that: | Noted – this is assessed under the assessment of construction and operational effects.<br><br>This is assessed and qualified: see Table 15.7<br><br>National policy and guidance has been referenced in this assessment. The NPPF has been updated (December 2023). |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | *'Planning policies and decisions should contribute to and enhance the natural and local environment by: 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.'*<br><br>Footnote 53: 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.<br><br>We would also draw to your attention to Planning Practice Guidance for Renewable and Low Carbon Energy (March 2015) (in particular paragraph 013), and advise you to fully consider best and most versatile land issues in accordance with that guidance.<br><br>Should you have any questions about ALC or the reliability of information submitted with regard to BMV land please refer to Natural England's 'Guide to assessing Development proposals on Agricultural Land'. This document describes the ALC system | This has been referenced in this Chapter. |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | including the definition of BMV land, existing ALC data sources and their relevance for site level assessment of land quality and the appropriate methodology for when detailed surveys are required.<br><br>Soil is a finite resource which plays an essential role within sustainable ecosystems, performing an array of functions supporting a range of ecosystem services, including storage of carbon, the infiltration and transport of water, nutrient cycling, and provision of food. It is recognised that a proportion of the agricultural land will experience temporary land loss. In order to both retain the long term potential of this land and to safeguard all soil resources as part of the overall sustainability of the whole development, it is important that the soil is able to retain as many of its many important functions and services (ecosystem services) as possible through careful soil management and appropriate soil use, with consideration on how any adverse impacts on soils can be avoided or minimised.<br><br>Consequently, Natural England would advise that to safeguard soil resources and agricultural land, including a required commitment for | This has been referenced in this Chapter.<br><br>Soil management has been considered in this Chapter and in the Outline Soil Management Plan within **Appendix 4.3: Outline Construction and Environmental Management Plan.** |

| Consultee and Date | Scoping/Other Consultation | Issue Raised | Response/Action Taken |
|---|---|---|---|
| | | the preparation of reinstatement, restoration and aftercare plans; normally this will include the return to the former land quality (ALC grade).<br><br>General guidance for protecting soils during development is also available in Defra's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, and should the development proceed, we recommend that relevant parts of this guidance are followed, e.g. in relation to handling or trafficking on soils in wet weather.<br><br>The British Society of Soil Science has published the Guidance Note Benefitting from Soil Management in Development and Construction which sets out measures for the protection of soils within the planning system and the development of individual sites, which we also recommend is followed. | The Construction Code of Practice is referenced in the oSMP.<br><br>This Guidance Note is followed. |

## Study Area

**15.22** The following study areas have been used:

- In terms of context for the agricultural land quality and rural-economy implications, the England-wide and local planning authority areas have been considered.
- In terms of potential effects on agricultural land quality and soils, the boundary of the Site has been considered (see **Figure 1.1: Site Location** in **Volume 2** of the ES).
- In terms of agricultural businesses, the study area is the whole of Oaklands Farm, plus the relevant parts of Fairfield Farm and Park Farm within the Site.

## Desk-based Research and Data Sources

**15.23** The following data sources have been used to inform the assessment:

- Provisional Agricultural Land Classification, 1:250,000 series (produced by MAFF in 1983, reprinted by Natural England in 2010, digitised 2020)[8].
- Likelihood of best and most versatile land maps, Natural England (2017)[9].
- Soil Survey of England and Wales 1:250,000 series soil maps, SSEW (1983)[10].
- Farm Impact Questionnaire responses.

## Field Surveys

**15.24** The following field surveys have been carried out:

- Detailed Agricultural Land Classification survey carried out by Soil Environment Services Ltd and reported in July 2020, **Appendix 15.1**.
- Detailed Agricultural Land Classification survey of part of the cable route, carried out by KCC Ltd and reported in April 2021. The relevant part for the cable route is reported in **Appendix 15.2**.

[8] Natural England (2010) Provisional Agricultural Land Classification East Midlands region 1:250,000 series Agricultural Land Classification, Natural England

[9] Agricultural Land Classification, Natural England (2010)

[10] Soils of England and Wales Sheet 3 Midland and Western England, Soil Survey of England and Wales (1983)

- Interview with the farmer and walk-over survey of the Oaklands Farm holding carried out by KCC Ltd in November 2022.

## Assessing Significance

**15.25** The significance criteria used below have been devised by KCC Ltd based on professional judgement and taking full account of the IEMA Guide[1]. The assessment process sets out the sensitivity and the magnitude in **Tables 15.2** and **15.3**, and then uses the matrix in **Table 15.4** to determine the resulting significance of the effects. The IEMA Guide has a very high sensitivity category, which means that the matrix for this chapter differs from the matrices for other chapters.

**15.26** The IEMA Guide assesses magnitude based on "*permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading)*". The footnote to Table 3 notes that "*temporary developments can result in a permanent impact if resulting disturbance or land use change causes permanent damage to soils*". Therefore, the magnitudes are assessed based on permanent, irreversible loss by sealing or downgrading of land.

**15.27** The IEMA Guide does not assess loss based on the use or intensity of use. The ALC methodology does not determine ALC grade based on the current intensity of use, but on the long-term inherent potential of the land. Natural England notes that "*the current agricultural use, or intensity of use, does not affect ALC grade*" (Technical Information Note 049, Natural England (December 2012))[11].

**15.28** The IEMA Guide references impacts on farming in section 8.3.3, noting that these are social and economic dimensions and that the important consideration include land use changes, the proportion of the holding affected, effects on land management and access, and loss of farm buildings and infrastructure. The Guide does not, however, develop receptor sensitivity or magnitude guidance for these considerations.

**15.29** BMV land accounts for about 42% of utilised agricultural land in England (TIN049) equating to approximately 3.7 million hectares. Of this about half (21% of agricultural land) is of

[11] Natural England (2012) Technical Advice Note 049 'Agricultural Land Classification: Protecting the best and most versatile agricultural land'

Grades 1 and 2, and half (21% of agricultural land) is of Subgrade 3a. The threshold for consultation with Natural England is where development involves the loss of 20 ha or more of BMV agricultural land.

**15.30** The tables below set out receptor sensitivity and magnitude criteria for agricultural businesses devised by KCC using professional judgement and experience. The ALC and soil criteria are based on IEMA. ALC effects can be of very high sensitivity as defined in the IEMA Guide. Some soils are sensitive to damage in certain climatic conditions and can be of high sensitivity, for example high clay soils or medium textured soils in wetter areas where the soils can be more readily damaged if handled when wet. The Field Capacity Days for the Site are 137 so no soils fall into the high sensitivity category. There is no policy or guidance for the effects on farm businesses, food production or the rural economy, and those receptors are prone to change over short periods of time and are resilient to change, and accordingly are of medium sensitivity or less.

**Table 15.2: Receptor Sensitivity Criteria**

| Sensitivity | ALC/biomass production[12] | Sensitivity of topsoil and subsoil[13] | Agricultural businesses and rural economy |
|---|---|---|---|
| Very High | Land of ALC Grades 1 and 2 | | - |
| High | Land of ALC Subgrade 3a | High clay soils where the FCD[14] is >150, or medium textured soils where the FCD is >225 | |

[12] IEMA Table 2

[13] IEMA Table 4. For the full list please refer to the IEMA Guide (2022) Table 4

[14] Field Capacity Days, FCD is a measure of the duration of climatic wetness through the year, rather than total rainfall. Field Capacity (FC) is when the soil holds the maximum water it can hold under gravity, i.e. the soil moisture deficit is 0. At Field Capacity, soils are considered too wet for cultivation. It is normally the period when field drains flow. The number of FCD is the number of days per year a soil is at Field Capacity. FCD is a key criterion in ALC assessment of soil wetness and workability.

| Sensitivity | ALC/biomass production[12] | Sensitivity of topsoil and subsoil[13] | Agricultural businesses and rural economy |
|---|---|---|---|
| Medium | Land of ALC Subgrade 3b | High clay soils where the FCD is <150, or medium textured soils where the FCD is <225 | Full-time farm businesses, and farm enterprises where the location of land is particularly important such as dairy farms, high-value crops such as horticulture, farms affected outwith the Site boundary. |
| Low | Land of ALC Grades 4 and 5 | Soils with a high sand fraction where the FCD is <225. Soil biodiversity of agricultural soils. | Part-time farms or farms with low sensitivity to change, eg arable land held on short-term arrangements. |
| Negligible | Indirect or unproven links | - | Agricultural land that is not farmed or does not form part of a farm business. |

**Table 15.3: Impact Magnitude Criteria**

| Magnitude of Effect | Definition | |
|---|---|---|
| | Effects on Agricultural Land and Soils | Effects on Farm Businesses (Agricultural businesses) |
| High | The Proposed Development would directly lead to the loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil | The impact of development would render a full-time agricultural business non-viable, or would result in significant operational changes to sensitive or high-value farm enterprises outwith the site |

| | | |
|---|---|---|
| | volumes over an area of over 20 hectares of soil-related features; or potential for improvement in one or more soil functions over an area of more than 20 ha. | boundary. There would be an effect on the rural economy of regional significance. |
| **Medium** | The Proposed Development would directly lead to the loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil volumes over an area of between 5 and 20 hectares of soil-related features; or potential for improvement in one or more soil functions over an area of between 5 ha and 20 ha. | The impact of the development would require significant changes in the day-to-day management of a full-time agricultural business, or closure of a part-time agricultural business, or moderate effects on farm enterprises outwith the site boundary. Loss of buildings or impacts on drainage or water supplies affecting the potential for at least 5 ha of adjacent land to be farmed fully. Rural economic effects of local significance. |
| **Low** | The Proposed Development would directly lead to loss (including permanent sealing or land quality downgrading) of one or more soil functions or soil volumes over an area of less than 5 hectares of soil-related functions; or potential for improvement in one or more soil functions over an area of less than 5 ha. | Land take would require only minor changes in the day-to-day management / structure of a full-time agricultural business or land take would have a significant effect on a part-time business. Minor effects, direct or indirect, on surrounding land beyond the boundaries of the Site. Minor rural economic effects. |

| | | |
|---|---|---|
| **Negligible** | No discernible loss or reduction or improvement of soil functions or volumes. | Land take would require only negligible changes in the day-to-day management of a full-time agricultural business or land take would require only minor changes to a part-time farm business. |

**Table 15.4: Significance of Effect Matrix**

| Receptor Sensitivity | Magnitude of change | | | |
|---|---|---|---|---|
| | High | Medium | Low | Negligible |
| Very High | **Major** | **Major - Moderate** | Moderate | Negligible |
| High | **Major - Moderate** | Moderate | Minor | Negligible |
| Medium | Moderate | Minor | Minor | Negligible |
| Low | Minor | Minor | Minor | Negligible |
| Negligible | Negligible | Negligible | Negligible | Negligible |

**15.31** The IEMA Guide sets out magnitude and sensitivity thresholds. These have been used in this assessment. In determining what is a significant effect, the loss of 20ha or more of Subgrade 3a (BMV land) is considered to be significant. Under the IEMA Guide, this is a **major-moderate** adverse effect (ie high magnitude, high sensitivity). The loss of 5ha or more of land of Grades 1 and 2 is also defined as a **major-moderate** adverse effect (ie medium magnitude, very high sensitivity). Losses of lesser amounts are not considered to be significant, and accordingly adverse effects of **moderate** significance are not considered to be significant in the context of the EIA Regulations.

**15.32** For example:

- The loss through sealing or irreversible downgrading of between 5 and 20 ha of Grades 1 or 2 is significant.
- The loss through sealing or irreversible downgrading of between 5 and 20 ha of Grade 3a land is not significant.
- The loss through sealing or irreversible downgrading of more than 20 ha of Grade 3a will be significant.

**15.33** Therefore major and major - moderate effects are considered to be significant in the context of the EIA Regulations. Moderate, minor and negligible effects are not considered to be significant.

## Assessment Limitations

**15.34** There are no significant limitations to the assessment.

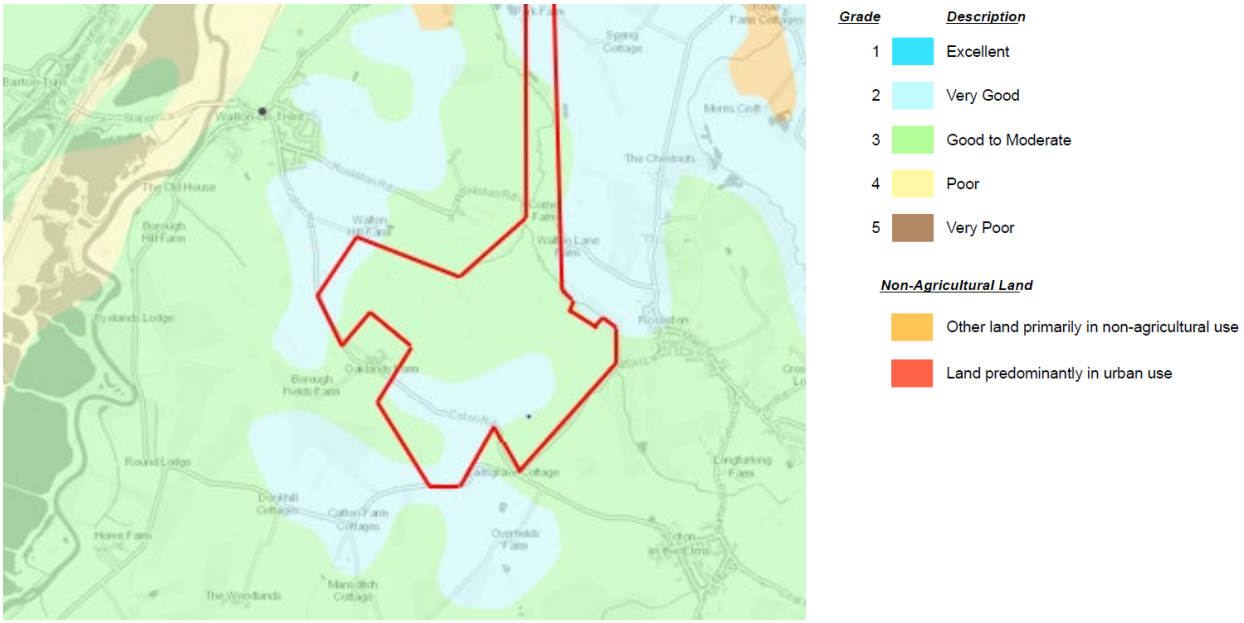
**15.35** Detailed field survey has provided the data for a detailed ALC of the Site. In setting that in context, and in considering the policy framework, reference has been made to published 'provisional' ALC maps and ‘likelihood of BMV' maps. Those maps were not the result of extensive field survey and have limitations to their accuracy as a consequence. As advised in Natural England’s Technical Information Note 049[11], these maps are not sufficiently accurate for use in assessment of individual fields or development sites, and should not be used other than as general guidance.

**15.36** Not all of the cable route (Work No. 4) has been surveyed for ALC. The works in this corridor are temporary, for the construction period only, and should not affect land quality. A pre-entry soil survey is proposed as part of the SMP, to be controlled by requirement of the Development Consent Order (DCO), to ensure that soil is suitably managed such that the land quality, whatever the grade, is not adversely affected.

# Baseline Conditions

**15.37** The Oaklands Farm area[15] and the land around it are shown on the 'provisional' ALC maps[8] as mostly undifferentiated Grade 3, with areas of Grade 2, as shown in **Plate 15.1** below. In the wider context there is a small area of Grade 4 adjacent to the River Trent. The maps do not differentiate between subgrades of Grade 3 and were produced before the changes to the ALC methodology in 1988, and therefore must be used only as general guidance. To avoid the risk of assigning undue accuracy to these plans, the general area of the PV array is indicated approximately. The cable route is shown as Grades 2 and 3.

**Plate 15.1: Provisional ALC (digitised 2020) (Site boundary very approximate)**

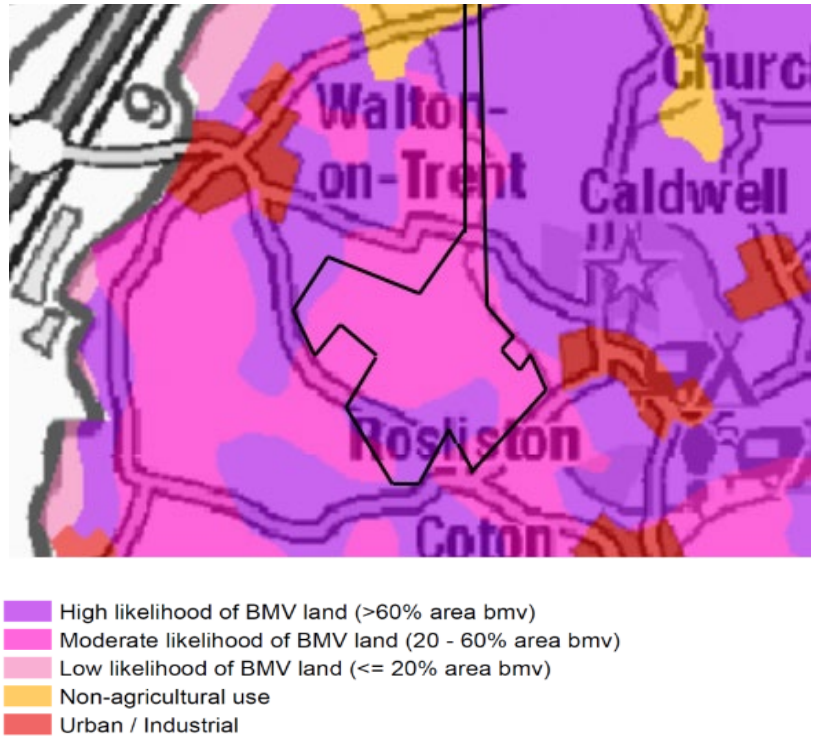



**15.38** The Oaklands Farm area is shown as mostly falling into the 'moderate (20 – 60% area BMV)' category on Natural England's Predictive Best and Most Versatile maps, as shown in **Plate 15.2** below. Much of the surrounding area is shown as in the 'high (>60% area BMV)' category. Only small areas adjacent to the River Trent fall into the 'low' category. These maps therefore show that the area of the PV array and associated infrastructure (Works No1, 2 & 3) mostly falls into land predicted to be of the poorest quality locally (ie in the lowest likelihood of

[15] See Figure 1.3: Areas of the Site

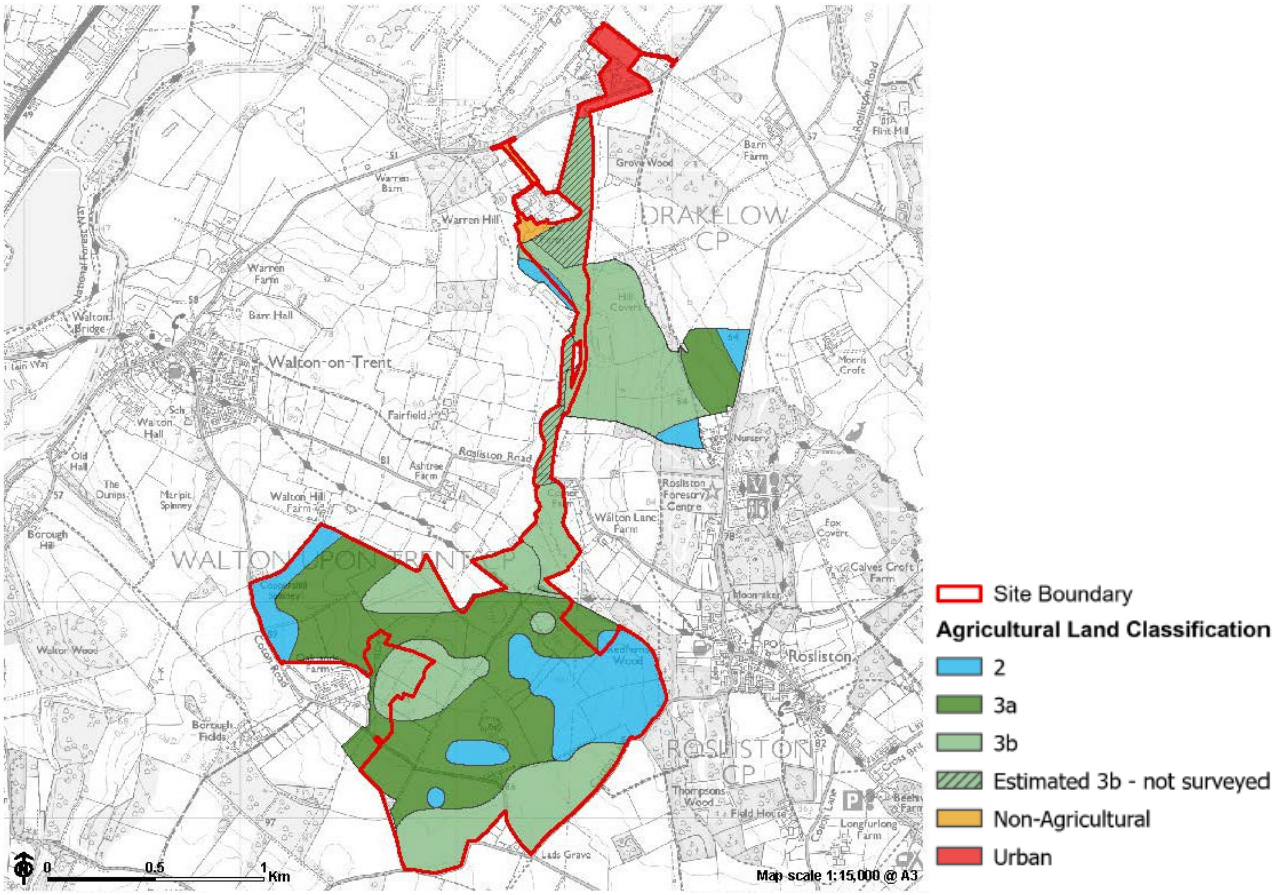
BMV category in this area). The cable route is shown as a mix of moderate and high likelihood of BMV.

**Plate 15.2: Predictive ALC (Site boundary very approximate)**




**15.39** The Oaklands Farm area has been the subject of a detailed Agricultural Land Classification survey by SES. The report and plans are set out in **Appendix 15.1**. The survey covered a wider area than is now proposed for solar panels. The following is an extract from the ALC plan and shows the Site to comprise a mixture of ALC grades.

**Plate 15.3: ALC Results (extract from Figure 15.1)**




**15.40** The ALC for the Site as a whole, and divided between the solar PV array area and associated infrastructure (Work No. 1, 2 & 3 as shown on the Work Plans at **Appendix 1.3**) and the cable route (Work No.4), are set out in **Table 15.5** below.

**Table 15.5: ALC Results**

| ALC Grade | Area in hectares | | |
|---|---|---|---|
| | Site | PV Arrays | Cable Route |
| 2 very good | 36 | 35 | <1 |
| 3a good | 79 | 79 | |
| 3b moderate | 58 | 46 | 12 |
| 3b moderate estimated | 12 | 0 | 12 |
| Non-agricultural | 1 | 0 | 1 |
| Urban | 5 | 0 | 5 |
| **Total** | **191** | **160** | **31** |

**15.41** Some of the fields and soils in the Oaklands Farm area are shown below in **Plates 15.4** to **15.10**, with a wider selection of photographs set out in **Appendix 15.3**. Note that all photographs are the author's own, unless otherwise stated. Field numbers are shown on **Figure 1.4a and b**.

**Plate 15.4: Field O16 looking west**

**Plate 15.5: Field O7 looking east**

**Plate 15.6: Field O4 looking west**

**15.42** The Site includes land of Grade 2, Grade 3a and Grade 3b, as shown on the ALC Plan **Figure 15.1**. Some of these soils are shown in the photographs in **Plates 15.7** to **15.10**.

**Plates 15.7 – 15.8: Some of the soils encountered on Site**

Grade 2

Grade 2

**Plates 15.9 – 15.10: Some of the soils encountered on Site**

Grade 3a

Grade 3b

**15.43** The Field Capacity Days[16] (FCD) for the Site are 137 per annum. The soils are medium or high clay soils where the FCD is less than 150, and therefore the soils are classified as medium sensitivity in the IEMA Guide and the Receptor Sensitivity, as set out in table at **Table 15.2**.

**15.44** The cable route will involve a trench within the boundaries of the Site. The land in this part of the Site has been surveyed or estimated as almost all Subgrade 3b (see **Plate 15.3**). The works involve only temporary disturbance and so long as the works are undertaken according to good practice there will be no downgrading or adverse effects on land quality or soils.

**15.45** Oaklands Farm is a mixed arable and livestock farm, extending to 185 ha (455 acres) in total. Most of this is in agricultural use, with a few small woodland/copse areas, and an area of farm buildings.

**15.46** The principal enterprises are:

- A milking herd of 320 Jersey cows, plus followers (ie calves, replacement heifers, bulls etc).
- Fodder production to support the dairy.
- Arable cropping.

[16] days when the soils are replete with water.

**15.47** There are extensive buildings, including a rotary milking parlour. Some of the buildings are shown in **Appendix 15.4**. It is anticipated that the dairy unit will continue to operate during the operational phase of the Proposed Development as confirmed by the landowner/farmer. None of the farm buildings will be affected by the Proposed Development.

**15.48** The dairy herd is mostly housed and only a proportion of the animals graze the land. These are usually the low-yielding cows, which graze grassland adjacent to the farmyard.

**15.49** The majority of the farm is arable land. The cropping is typically a rotation of ley (i.e., short-term) grassland, typically for three years, then a crop of maize followed by a wheat crop (grown as animal feed), then returned to ley grassland. Some fields are rotated with three years of ley grass, two years of maize, then two years of cereals.

**15.50** As described in the ALC reports (**Appendices 15.1 and 15.2**) and earlier in this chapter, with photographs, the soils are generally clayey. In the eastern part of the Oaklands Farm area there are stones in the profile. The land is suited to cereal and arable break crops or for grassland, but is not suited to root crop production.

**15.51** The farm rents some land from neighbouring landowners for the growing of maize. The farm rents 14 ha of grassland on a rolling arrangement nearby.

**15.52** The farm employs 3 full-time workers and 2 part-time workers, who mostly work on the dairy unit. The arable crop operations are mostly carried out in-hand, but contractors are used for drilling and harvesting.

**15.53** There is a small amount of diversification, with a farm building let out. The farm is therefore a full-time business and potentially sensitive to change, and therefore of medium sensitivity in the Receptor Sensitivity, at **Table 15.2**.

## Future Baseline in the Absence of the Proposed Development

**15.54** UK Climate Change Projections 2018 (UKCP18)[17] predicts a greater change of hotter, drier summers and warmer, wetter winters. A summary of the relevant climate change projections by the 2070s is provided below:

[17] UKCP18 Climate Change Over Land Summary Material

- Temperatures are projected to increase, particularly in summer.
- Winter rainfall is projected to increase and summer rainfall is most likely to decrease.
- Heavy rain days (rainfall greater than 25mm) are projected to increase, particularly in winter.
- Near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant effects of winds; however, the increase in wind speeds is projected to be modest.
- An increase in frequency of winter storms over the UK.

**15.55** It is not considered likely that these projections would significantly change the baseline conditions outlined above, though they may affect how the farming practices continue to perform into the future. For example, hotter weather conditions and increases in rainfall may affect how well the farm can grow crops.

## Design Considerations and Embedded Mitigation

**15.56** During the site selection and design process the requirement to maximise the project output was balanced with the design aim to minimise loss of BMV land (including land of higher ALC grade). As described in **Chapter 3: Site Selection and Design**, during the site selection process, a Sequential Study was undertaken, which sought to determine whether there were any sequentially preferable sites on lower quality agricultural land and previously developed land, within a 10km radius of the proposed grid connection point at Drakelow. The assessment looked at constraints to development (such as flood zones, woodland, developed areas) and land parcels of a similar size to the Site of the Proposed Development. It identified five sites that were taken forward for further consideration.

**15.57** The second phase of the assessment focused on identifying whether any alternative areas were likely to be located on lower quality agricultural land, or previously developed (brownfield) land. It also checked for further constraints and potential grid connection routes using the existing road network. Two of the five sites identified in the initial sift comprised 100% BMV agricultural land, and two had 70-75%. Only one of the five identified larger sites had a lower proportion of BMV agricultural land than the Oaklands Farm area. However, the identified

site lies 7.8km from the Drakelow substation and adjacent to a village, and was therefore deemed less suitable for development.

**15.58** The review concluded that none of the areas identified would be less sensitive or otherwise more suitable than the Oaklands Farm area. The review did not identify any previously developed (brownfield) sites over 50ha suitable for solar within 10km of the connection point.

**15.59** The BESS and Proposed Development's substation are largely located on agricultural land of Subgrade 3a, with the very southern part of the substation compound located on agricultural land of Subgrade 3b and represent the only potential 'permanent' loss of agricultural land. While higher quality Grade 2 agricultural land has been avoided, it has not been possible to site this infrastructure completely within Grade 3b due to the need to balance with minimising visual and noise effects on neighbouring residential properties, as described in **Chapter 3**. In addition, this location is close to existing farm tracks minimising the length of new tracks required, and makes use of the existing field pattern and hedgerows for screening.

**15.60** The trafficking of soils during construction should so far as possible be carried out in suitable conditions. An oSMP is appended to the CEMP (**Appendix 4.3**) which reflects this principle and is considered as embedded mitigation in the assessment.

**15.61** The oSMP sets out the best practice for installing the panels, including the time of the year and assessments of soil conditions. The land quality and soils will not be affected unless there is significant compaction that is not alleviated. As described above and in the oSMP, the machinery involved in installing the solar PV arrays is smaller than most farm machinery, so this is not a significant risk of compaction.

**15.62** The risk comes from travelling on the land in unsuitable conditions. This could result in surface damage or, in some limited cases, compaction of soils. These effects are all capable of rectification, because they will be limited to the main traffic areas (e.g., between the rows and construction haul routes). These areas, if restored in suitable conditions, will not suffer any adverse effects on soils. Compaction needs to be substantial and deep (below 35cm), in most cases, before land quality is downgraded and the ALC methodology assumes most compaction can be alleviated. The oSMP sets out how compaction can be assessed and alleviated.

# Assessment of Construction Effects

**15.63** The assessment of effects is based on the project description in **Chapter 4: Project Description**.

# Predicted Construction Effects

**15.64** The construction effects considered are:

- Effects on soils and land quality from the solar PV arrays and related cabling.
- Effects on soils and land quality from the fixed equipment installed for the duration of the Proposed Development.
- Short-term effects from the installation of the cable connection to the substation.
- Effects on the farm businesses from construction activities.

## Solar PV Arrays and Related Cabling

**15.65** The physical process of installing solar PV arrays (Work No. 1 as shown on the Work Plans at **Appendix 1.3**) is quick. The process involves initially marking out the grid on the ground and laying out the steel stanchions. This stage is non-intrusive. Machinery, typically a tractor and trailer and small loadall, is used to carry the legs. Ideally this movement should take place when soils are suitably dry. Typically a tractor and farm trailer are used to transport the legs to the fields, then each leg is lifted off by hand, so the vehicle sizes are typical agricultural sizes.

**15.66** A team then arrives to pile/knock the stanchions/legs in. KCC's observations demonstrate that it takes a little over a minute per leg to knock the leg into the ground and move the machine to the next leg[18]. This operation is shown in the photograph below, showing legs being inserted into a clay soil.

[18] This observation was made on clay soils at the Purton Solar Farm, Wiltshire, in 2015. Ground conditions will inevitably affect installation speed.

**Plate 15.11: Legs being Installed**

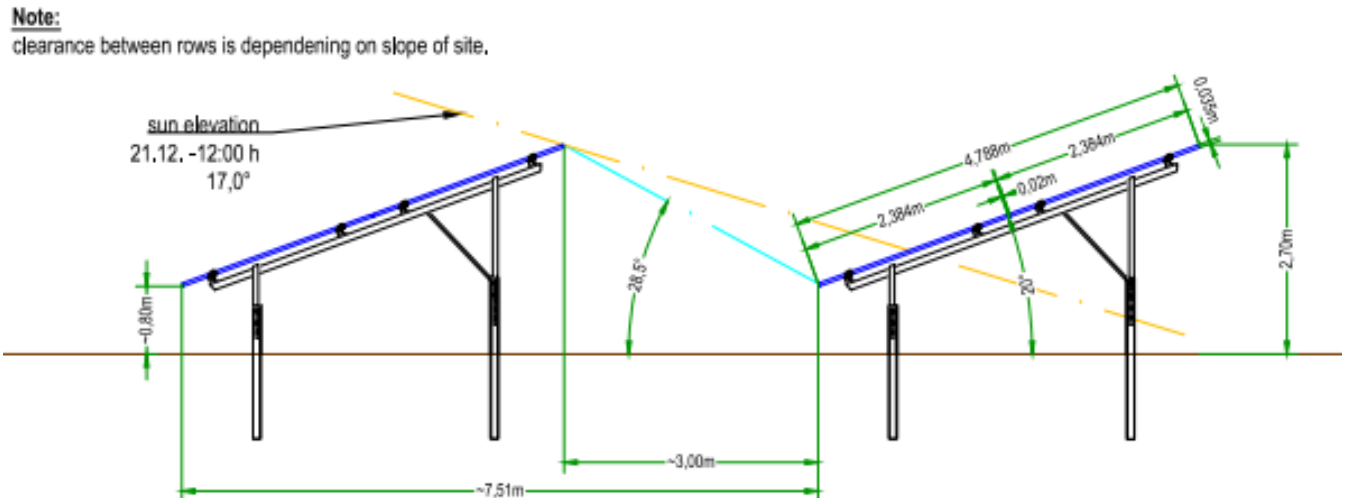
**15.67** The design varies between sites, but the limited impact of installing legs on the underlying land and soil is illustrated by the photographs below. The purpose of these photographs is to show the limited effect on soil. The solar arrays may vary in design to those proposed in this Proposed Development.

**Plate 15.12: Legs Installed (Bentham Farm, Purton)**

**Plate 15.13: Legs Installed (Tiln Farm, Retford, in January 2023)**

**15.68** The panels for the Proposed Development will be taller than the Bentham example shown above, and this will enable sheep to be grazed below panels. An indicative panel design for the Proposed Development is shown below.

**Plate 15.14: Indicative Panel Design**




**15.69** The minimal damage, if carried out in dry conditions, of the movement of machinery and workers involved in the bolting-on of the panels is evident in the photograph below, taken a few days after the panels had been added to the frames.

**Plate 15.15: After Panels Bolted-on**

**15.70** As set out in the oSMP, the installation will so far as possible avoid periods of unsuitable weather when soil is likely to be unsuitable for trafficking. Heavy rainfall can affect ground conditions even in summer. So far as possible trafficking over the land will only take place when

the ground is adequately dry, but that is not always possible. The machinery involved in installing the panels is generally smaller than farm machinery, and no long-term damage is likely to ensue.

**15.71** Some of the panels will be mounted in stone or concrete pad bases, not involving any significant ground penetration to avoid damaging a water main. An example using stone gabions is shown below. These non-intrusive methods do not affect soils or land quality.

**Plate 15.16: Non-Intrusive Panel Bases**

**15.72** It is necessary to connect electric cables between the panels and to run the cables back to the Proposed Development's substation. The installation of cables is one of the few operations that involves digging whereby the soil structure could potentially be affected. This involves digging trenches with a machine. Immediately after digging these look disruptive to the soil, however, the on-site cables are installed in a similar way to field drainage pipes, and the disturbance to soils is temporary and minor.

**Plate 15.17: Cabling Channels during Cable Installation**


**15.73** As set out in the oSMP, in areas where there is a clear subsoil and topsoil distinction, the topsoil should be placed on one side of the trench, and the subsoil on the other. Then once the cable has been laid the subsoil can be added back first, then the topsoil second, to reinstate the soil structure to its original order and state.

**15.74** This means that soils are restored back to the original profile and settle within days, and return to grass growth rapidly, or are suitable for being sown.

**15.75** In respect to the installation of the solar PV arrays and the internal site cabling, the land quality involved is a mixture of Grade 2 and Subgrades 3a and 3b. Such land is of very high, high and medium sensitivity (**Table 15.2**). The soils across the solar PV array are sandy clay loams, medium clay loams, heavy silty clay loams and occasional clays or silty loams, all of which are of medium resilience to structural damage in this climatic area and therefore of medium sensitivity. These soils therefore need to be handled carefully to avoid causing structural damage which would necessitate alleviation, but are moderately resilient to structural damage.

**15.76** The installation of the solar PV arrays and the related cabling does not result in the loss, either by sealing or irreversible downgrading, of agricultural land. The soils will be of medium resilience to structural damage, and of medium sensitivity. The effect is assessed as follows:

- The effect on agricultural land quality will be of negligible magnitude on resources of very high, high and medium sensitivity, which results in effects of **negligible** significance, which is **not significant**;

- The effects on soils will be of negligible magnitude on resources of medium sensitivity, which results in a **negligible** effect which is **not significant**.

## Transformers, Tracks and Sub-station

**15.77** Based on the illustrative layouts (see **Figures 4.1a and b: Illustrative Concept Design** and **Figure 4.10a and b: Access Tracks - permanent and temporary**), the access tracks which will remain for the duration of the operational phase will be 3.5m to 6m wide, constructed of up to 200mm of Type 1 MOT compacted gravel (see **Figure 4.11: Indicative Access Track Cross-Section**). The soil will be stored in a shallow bund to one side, so that it is available for re-use during post operational restoration.

**15.78** The solar panel transformers are expected to require a hardstanding base, and for the purposes of estimating land areas affected, each is estimated at 16 sqm, which allows for an area around each item.

**15.79** The Proposed Development's substation and BESS will be placed in one grassland field (field O12), which is the smallest field on the farm. It is shown below, looking westwards. The field has been graded as a mix of Subgrade 3a and 3b land. For the assessment it is assumed that the whole field is affected for the construction phase, although the table shows the exact area within the field that is disturbed.

**Plate 15.18: Field for Proposed Development's Substation and BESS looking west**

**15.80** The area affected by installation of the fixed equipment is estimated below, allowing for passing bays.

**Table 15.6: Estimate of Temporary Land Take from Fixed Equipment during construction**

| Component | Length in m (linear) by ALC Grade | | | | |
|---|---|---|---|---|---|
| | Grade 2 | Subgrade 3a | Subgrade 3b | Total | Grand Total |
| Tracks, temporary 3.5m | 1943 | 2981 | 1981 | 6905 | **11805** |
| Tracks, temporary 6m | - | 1115 | 518 | 1633 | |
| Tracks, permanent 6m | 185 | 529 | 2553 | 3267 | |
| Total | **2128** | **4625** | **5052** | | |
| | Units by ALC Grade | | | | |
| Transformers | 8 | 39 | 16 | 63 | **63** |
| | Area in sqm by ALC Grade | | | | |
| Substation | - | 2776 | 3013 | 5789 | **11350** |
| BESS compound | - | 5561 | - | 5561 | |
| Total | **-** | **8337** | **3013** | | |

**15.81** By ALC grade the areas of fixed equipment are divided approximately as follows. This rounds to losses up to the nearest 0.1 ha.

**Table 15.7: Temporary Land Take by ALC Grade**

| | Areas in ha by ALC Grade | | | |
|---|---|---|---|---|
| **Component** | **Grade 2** | **Subgrade 3a** | **Subgrade 3b** | **Total** |
| Tracks | 0.8 | 2.0 | 2.5 | 5.3 |
| Transformers | <0.1 | 0.1 | <0.1 | 0.1 |
| Substation | 0 | 0.8 | 0.3 | 1.1 |
| **Totals** | **0.8** | **2.9** | **2.8** | **6.5** |

**15.82** These areas are all capable of being restored at the decommissioning phase. If restored, there will be no permanent loss by sealing, and no permanent downgrading, of agricultural land. However, in order to present a reasonable worst-case scenario for this assessment, it has been assumed that these areas will either not be restored, or if restored they may not be restored to the comparable quality. The assessment assumes the permanent loss or downgrading of these areas.

**15.83** Therefore, in respect of the fixed equipment areas (transformers, tracks, substation), the land quality involved includes Grade 2 and Subgrades 3a and 3b. Such land is of very high, high and medium sensitivity (Table 15.2). The soils are clay loams and are of medium sensitivity (**Table 15.2**) because they have a high clay content and are in an area with a Field Capacity Period of <150 days.

**15.84** The areas involved are 3.7 ha of BMV land, and 2.8 ha of Subgrade 3b. The impact on BMV land is, therefore, of low magnitude on resources of very high or high sensitivity, which results in effects of **moderate** or **minor adverse** significance (**not significant**).

**15.85** The effect on soils will be a low magnitude effect on soils of medium sensitivity, which will result in a **minor adverse** effect which is **not significant**.

**Connecting Cable Route**

**15.86** The cable route connecting the Proposed Development's substation to the grid involves the insertion of the cable into a trench. Normal construction practice involves the removal of topsoil for a working width (typically 16m), with the cable trenching being up to about 1.5m wide. This is a physical work which will disturb the soils, but it is a short-term and temporary effect. The installation will not result in the sealing or downgrading of agricultural land, and the cable will be buried at a depth that does not affect ongoing agricultural use of the land once it has been installed.

**15.87** The handling of soils during the installation of the cable is set out in the oSMP within **Appendix 4.3: Outline Construction Environmental Management Plan**. The installation methodology will involve stripping off the topsoil and setting that to one side. The subsoils will then be stripped and placed in a separate bund to the topsoils.

**15.88** Once the cable has been laid, the subsoil will be replaced. It will not normally be necessary to press this with the bucket, and wherever possible the soil should be allowed to settle naturally. The topsoil can then be replaced and levelled.

**15.89** Once installation is complete, the area can be lightly cultivated with normal agricultural equipment and returned to use for agriculture.

**15.90** The land quality of the whole cable route corridor is Subgrade 3b as set out at **Appendix 15.2**. As discussed at paragraph **15.36**, some of the cable route corridor has not been surveyed for ALC. The works in this area are temporary and should not affect ALC grade. A pre-existing soil survey will be carried out prior to construction. However land quality has been inferred using professional judgement. The method statement for laying the cable connection is set out in the oSMP within the CEMP, and the ALC grade will not be affected by the installation of the cable.

**15.91** . The land quality (mostly grade 3b) is of medium sensitivity, and the effect is temporary and of a negligible magnitude. This results in a **negligible** effect, which is **not significant**.

**15.92** The soils in this climatic area are of medium resilience to being handled, hence of medium sensitivity, and the effect will be temporary and of negligible magnitude. This results in a **negligible** effect, which is **not significant**.

## Farm Business Impacts

**15.93** The farm business will need to adjust to the changes, which will occur at the construction phase. The long-term economic effects are considered in the operational phase assessment.

**15.94** The dairy herd is mostly housed, and available grassland close to the dairy buildings will be retained. The farm will reduce the amount of land being used to grow cereals and winter forage. There will be considerable changes to the farm business, but it will not be rendered unviable and the rental income from the Proposed Development will provide support to maintain the farm business.

**15.95** The construction activities will not cause severance of access routes for the occupying farm business, or any other farm business.

**15.96** The farm is a full-time unit, and of medium sensitivity (**Table 15.2**). The impact will be of medium magnitude (**Table 15.3**). The overall impact will therefore be a **minor adverse** effect (**Table 15.4**), which is **not significant**.

## Summary of Construction Effects

**15.97** The assessment of construction effects is summarised as follows:

- The installation of the solar PV arrays, and related localised cabling will be temporary and will not affect land quality or soils adversely. This is an impact of negligible magnitude, on

land of very high (Grade 2), high (Subgrade 3a) and medium (Subgrade 3b) sensitivity, which results in a **negligible** effect which is **not significant**.

- The installation of the fixed equipment listed in **Tables 15.6 and 15.7** amounts to 0.8 ha of Grade 2 and 2.9 ha of Subgrade 3a. This amounts to a low magnitude impact (<5ha) on (**Table 15.3**) resources of very high or high sensitivity (**Table 15.2**). This equates to **moderate** or **minor** adverse effects, as per the matrix at **Table 15.4**, which is **not significant**. The effect on soils will be a low magnitude effect on soils of medium sensitivity, which will result in a **minor adverse** effect which is **not significant**
- The installation of the cable between the Proposed Development's substation and the National Grid Drakelow substation will involve the temporary disturbance of soils, but this will not result in any sealing of land or land quality downgrading. The land quality is of medium sensitivity (Subgrade 3b) and the magnitude of impact is negligible. The effect on land quality and soils will therefore be **negligible**, which is **not significant**.
- The effects on soils from construction traffic and works and trenching are generally temporary. The soils across the Site are all of medium sensitivity, with medium resilience to structural damage. The magnitude of effects is low or negligible, resulting in **minor or negligible** effects, which is **not significant**.
- The construction effects will require significant changes to the day to day operation of a full-time farm business, which under **Table 15.2** amounts to a medium magnitude of change on a resource of medium sensitivity, which is a **minor adverse** effect, which is **not significant**.

## Proposed Mitigation

**15.98** As set out at paragraph 15.60 embedded mitigation is provided in the form of an oSMP. No additional mitigation is necessary.

## Residual Construction Effects

**15.99** Residual construction effects would remain as presented above.

# Assessment of Operational Effects

**15.100** The assessment of operational effects is based on the project description as outlined in **Chapter 4: Project Description**.

# Predicted Operational Effects

**15.101** The operational effects considered are:

- Effects on land quality of trafficking for maintenance machinery.
- Effects on soils from long-term grassland uses.
- Economic effects on farm businesses and related businesses.
- Effects on the rural economy including on food production and changes in enterprise.

## Effects on Land Quality and Soils from Maintenance

**15.102** There will be no need for heavy machinery to traffic the soils during the operational phase. Any deliveries of replacement parts, if required, will use the operational access tracks. Accordingly, there will be no compacting of soils and the combination of increasing organic matter levels and lack of machinery activity will allow a natural enhancement of the soil, as described below.

**15.103** Maintenance and cleaning machinery is normally a van or small tractor, and generally lighter than standard farm machinery. Panel cleaning takes place once a year and clean, chemical-free water is used. If the soils are wet when access is taken, there is the potential for slight indentations to be made (such as below), however, this operation has no significant adverse effects on soils or land quality.

**15.104** Negligible magnitude of impact on land of very high (Grade 2), high (Subgrade 3a) or medium (Subgrade 3b) sensitivity will result in a **negligible** effect (**Table 15.4**), which is **not significant**.

**15.105** The soils will similarly be negligibly affected. The soils are of medium sensitivity, so the effect is **negligible** which is **not significant**. An example of machinery effects is shown below.

**Plate 15.19: Example of Minor Rutting by Maintenance Machinery**

## Effect on Soils from Long-term Grassland Use

**15.106** There is the potential for benefits to soil health and quality. The land is currently arable land, intensively managed, and fertilised with inorganic fertiliser as well as spread with farmyard manure and liquid slurry. Grass is grown in rotation and organic matter levels within the soil are reasonable as a result. The land will be sown to grassland and managed, including grazing with sheep, for the duration of the operational phase. This is expected to have a positive benefit for the soils.

**15.107** Some of the known implications and benefits for soils from being reverted to long-term grassland are summarised below, and include reduced erosion and greater carbon retention in soils:

- Soil is an important natural capital resource, but as a nation our understanding of soils is hindered by a lack of data. In the Environment Agency's 'Summary of the State of the Environment: Soil' report of January 2023[19], they note that UK soils currently store about 10 billion tonnes of carbon, equal to 80 years of annual greenhouse gas emissions. The report notes that soil biodiversity and the many biological processes and soil functions that it supports *"are thought to be under threat"*. The report sets out that almost 4 million hectares of soil are at risk of compaction, over 2 million hectares of soil are at risk of erosion and that intensive agriculture has caused arable soils to lose about 40 to 60% of their organic carbon.

[19] Environment Agency (2023) Summary of the State of the Environment: Soil

- The state of soil biology is poorly researched, but the report identifies that intensive agriculture reduces soil biodiversity. The report records a study which identified 42% of fields may be overworked, as evidenced by an absence or rarity of earthworms. It is noted that *"tillage had a negative impact on earthworm populations, and organic matter management did not mitigate tillage impacts"* (page 11).
- The UK Food Security Report 2021[20] notes that, whilst grain is generally the most efficient form of production in terms of calories per hectare, it has a significant environmental impact *"due to the lack of biodiversity in conventional grain fields, damage to soil through ploughing, environmental harms caused by fertilisers and pesticides, and the oil use embedded in fertilisers and field operations"*.
- The Environment Agency 'State of the Environment: soil' report[19] notes that bare soils, reduced hedgerows and increased field sizes mean that, in England and Wales, an estimated 2.9 million tonnes of topsoil is lost to erosion every year. Erosion regularly exceeds the rate of formation of new soils (which is at about 1 tonne per hectare per year) on many soils, with 40% of arable soils at risk, especially lighter soils on hillslopes and peats in upland areas. *"Significant decreases in erosion risk occurred when fields changed from winter cereal use to permanent grassland"*, the EA reported. Management practices in arable land can make a big difference, but the constant vegetation cover of grassland reduces erosion significantly.
- Organic matter in soil acts like a sponge and can hold up to 20 times its weight in water. Most arable soils have lost 40 to 60% of their organic carbon. The British Society of Soil Science record (Science Note: Soil Carbon, BSSS (v2 2022))[21] the declining state of soil carbon (soil organic carbon and soil inorganic carbon), and note that the greatest and most rapid soil carbon gains can be achieved through land use change, e.g., converting arable land to grassland. Sustainable soil management practices are needed for all soils.
- The role of soil organic carbon in soils is complex, as described in the British Society of Soil Science Note 'Soil Carbon' (v2 2022)[21]. As described under the heading 'Soil Carbon Functions' on page 4, *"a soil with a greater SOC content has a more stable structure, is less*

[20] Department for Environment, Food and Rural Affairs (2021, updated 2023) UK Food Security Report 2021

[21] British Society of Soil Science, Science Note: Soil Carbon (Version 2, May 2022)

*prone to runoff and erosion, has greater water infiltration and retention, increased biological activity and improved nutrient supply compared to the same soils with a smaller SOC content. Even small increases in SOC can markedly influence and improve these properties"*.

- It is noted in that same report at the top of page 5 that *"Significant long-term land use change (e.g. conversion of arable land to grassland or woodland) has by far the biggest impact on SOC, but is unrealistic on a large scale because of the continued need to meet food security challenges".*

**15.108** There will be benefits to soils across the whole of the solar PV array (labelled Work No. 1 on the Work Plans at **Appendix 1.3**) (>50ha), except those areas taken up by tracks and fixed equipment. The benefit will not affect the sensitivity of the soils to being trafficked, nor will it result in ALC upgrading. Therefore the effect is beneficial over an area of in excess of 20ha (high magnitude). The sensitivity of soils to soil biodiversity is low (**Table 15.2**), so a high magnitude effect on a resource of low sensitivity results in a **minor** beneficial effect (**Table 15.4**), which is **not significant**.

## Effect on Farm Business

**15.109** The farm business will be able to continue throughout the operational phase. The farm will need to adapt and will need to either rent land for fodder production or buy-in more winter fodder and straw, but the dairy unit is expected to continue throughout the operational phase. Therefore there will be significant changes to the way the farm operates day to day, although the farm will continue to operate as a full-time farm and the rental income from the Proposed Development will provide support to maintain the farm business.

**15.110** There may be opportunities for enterprise development for sheep, which are expected to form part of the land management of the Site.

**15.111** The impact is an adverse effect of medium magnitude on a resource of medium sensitivity, resulting in an effect of **minor adverse** significance (**Table 15.4**), which is **not significant**.

## Wider Rural Economy Land Use Effects

**15.112** The assessment of effects has concluded that the impact on the BMV resource is negligible. The IEMA Guide magnitude assessment is based on the "*permanent, irreversible loss…. including permanent sealing or land quality downgrading*". It is not based on land use. Temporary developments do not cause an impact unless there is "*permanent damage to soils*". The BMV resource is not, therefore, adversely affected.

**15.113** There will be a limitation in the opportunities for agricultural enterprises or land uses of the solar PV array (Work No. 1 as shown on the Work Plans at **Appendix 1.3**) for the duration of the operational phase, however. The cable route part of the Site will not be affected. Therefore, this part of the assessment considers:

- Policy and incentives on land use and agricultural use.
- The effects on land use in the national context.
- The effects on land use in the local context.

### Policy and Incentives on Use of Agricultural Land.

**15.114** Planning permission is required to change the use of land out of agriculture, but so long as the land use remains within the definition of 'agriculture' in the Town and Country Planning Act[22] there is a wide range of land uses that a landowner can undertake. Some of these relate to food production, some do not. Land can be grazed by horses, used for biomass production, rewilded and grazed lightly, entered into agri-environmental schemes and managed appropriately, allowed to scrub over and turn to woodland, be planted as orchards, used for polytunnel production, farmed for industrial crops or farmed for food crops. It is the choice of the landowner as to the level of intensity of use, whether land is fertilised or organic, and whether the farmer practices fallows or continual cropping.

**15.115** The limitations on potential agricultural enterprises, and the resultant effects on production, must therefore be assessed in that context.

**15.116** There is no obligation on a landowner to produce food or non-food products from agricultural land. Nor are there any Government incentives to produce food or any other products from the land. The Government has a number of initiatives for agri-environmental

[22] Town and Country Planning Act 1990, section 336

schemes which cover large areas. For example the latest statistics for the Countryside Stewardship Scheme[23], which is being phased out and replaced with new schemes identifies 161,000 ha of arable land being funded for non-arable, mostly non-production uses, as shown in Table 15.8, below

**Table 15.8: Countryside Stewardship Agreement April 2023**

| Option Code | Description | Amount in agreement (ha) |
|---|---|---|
| AB1 | Nectar flower mix | 13,900 |
| AB2 | Unharvested cereal headland | 2,800 |
| AB3 | Beetle banks | 200 |
| AB5 | Nesting plots for lapwing and curlew | 1,600 |
| AB8 | Flower rich margin and plots | 40,000 |
| AB10 | Unharvested cereal headland | 2,800 |
| AB15 | Two-year sown legume fallow | 62,400 |
| SW1 | 4-6m buffer stirp on cultivated land | 19,400 |
| SW3 | In-field grass strips | 7,600 |
| SW4 | 12-24 watercourse buffer on cultivated land | 2,600 |
| SW7 | Arable reversion to grassland with low fertilizer input | 7,700 |
| **Total** | | **161,000** |

**15.117** Across England 42% of agricultural land is BMV. Within arable land, which accounts for about half of this, the proportion will be higher. Nevertheless, if the 42% is applied to the above total, it suggests that 67,000 ha of BMV land is being funded under the Countryside Stewardship Scheme alone to be in non-production uses, to meet other objectives.

[23] Countryside Stewardship and Environmental Stewardship Option Summaries of 1 April 2023, Defra (31 August 2023)

## The Effects on Land Use in the National Context.

**15.118** Natural England predict that 42% of agricultural land is of BMV quality, with half of that being Grades 1 and 2, and half being Subgrade 3a[24].

**15.119** England has a land area of just over 13 million hectares[25]. The Utilised Agricultural Area (UAA) at 1st June 2023 was 8.8 million hectares[26]. The total croppable area accounts for 55% of the total, at just under 4.9 million hectares, with cereals accounting for about 70% of the land use of arable land. 42% of agricultural land, some 3.7 million hectares, is therefore estimated to be of BMV quality.

**15.120** The Oakland Farm area includes the use of 115 ha of BMV. This represents 0.003% of the national resource of 3.7 million hectares (1/33,300th of the total).

**15.121** The Site is currently used as a mixture of grassland and arable land. Once the solar PV arrays are in place the land has the potential to be grazed by sheep, which is an ongoing agricultural land use involving grassland.

**15.122** The UK does not have a food security concern. A detailed analysis was carried out in 2021 and published in the UK Food Security Report 2021[27]. This provided data that lead to the Government Food Strategy[28] (June 2022). The Government's position was clarified in December 2022[29] in a press release that stated "*the UK's food supply chain remains resilient, with supply from diverse sources guaranteeing a high level of food security*".

**15.123** The land is suited to the production of grass, cereals and arable break crops. It is not suited to vegetables and horticultural crops or soft fruit production. An analysis of UK food security in these crops is set out in **Appendix 15.5**.

**15.124** The Government Food Strategy (June 2022) does not seek to increase food production. The Foreword recognises near self-sufficiency in wheat, most meat, eggs and some vegetables, but not in soft fruit although the trend is favourable. The Strategy states "*Overall, for the foods that we can produce in the UK, we produce around 75% of what we consume. That has been*

[24] TIN 049, Natural England 2012

[25] Land use Statistics: England 2022, Department for Levelling Up, Housing and Communities (27 October 2022)

[26] Agricultural Land Use in England at 1 June 2023 Defra (9 November 2023)

[27] United Kingdon Food Security Report 2021, Defra (last updated 5 October 2023).

[28] Policy Paper: Government Food Strategy, Defra (13 June 2022).

[29] Updated Government Food Strategy, Defra (December 2022)

*broadly stable for the past 20 years and in this food strategy we commit to keep it at broadly the same level in future*".

**15.125** . The UK produced over 24 million tonnes of cereals in 2022 (Cereal and Oilseed Production in the United Kingdom, Defra (12 October 2023)). This can meet our calorie needs. In the Food Security Report 2021 (latest update December 2022), it was stated "*from a purely calorific perspective, the (below average) grain yield in 2020 of 19 million tonnes would be sufficient to sustain the population. It is equivalent to 283kg per person, 0.8 kilos per day. A kilo of wheat provides 3,400 calories (and barley slightly more at 3520 calories), making 0.8 kilos of grain over 2,600 calories, compared to recommended calorie intake of 2 to 2,500 for adults. From these figures it is easy to demonstrate that, even without accounting for other domestic products like potatoes, vegetables, grass-fed meat and dairy, and fisheries, current UK grain production alone could meet domestic calorie requirements if it was consumed directly by humans in a limited choice scenario*".

**15.126** There is no policy in the NPSs, or Local Plan that relates directly to food production and positive use of agricultural land. The requirement in the NPPF is that the economic and other benefits are recognised.

**15.127** Therefore in the national context:

- There is no policy or initiative to require agricultural land to be actively used for food production.
- Agri-environmental Schemes have taken large areas of land out of production for other benefits.
- There are about 8.8 million ha in active agricultural use (which will include the agri-environmental land), of which an estimated 3.7 million ha are of BMV quality.
- There is no food security concern, and therefore food production is not a concern governed by specific policy.

**15.128** If it is accepted that there is a need to use agricultural land for large scale solar PV arrays, then an appropriate method of assessment may be to estimate the difference in production if non-BMV land was used instead of BMV land (ie the incremental production difference of using non-BMV to BMV land).

**15.129** There are no studies that set out yields of BMV to non-BMV land, so the assessment is somewhat crude. The following table shows the difference between a 'high' yield and an 'average' yield in the Nix Pocketbook for Farm Management.

**Table 15.9: Crop Production Budgets (based on Pocketbook for Farm Management)**

| Crop | Average yield | High yield | Difference |
|---|---|---|---|
| Winter feed wheat | 8.6 t/ha | 10.0 t/ha | 1.4 t/ha |
| Winter feed barley | 7.3 t/ha | 8.25 t/ha | 0.95 t/ha |
| Winter oilseed rape | 3.5 t/ha | 4.0 t/ha | 0.5 t/ha |
| Lowland sheep ewes | 9 ewes/ha | 10 ewes/ha | 1 ewe/ha |

*Nix Pocketbook for Farm Management 53rd Edition*

**15.130** If the 115 ha of BMV land within the Oaklands Farm area was used instead of poorer quality arable land elsewhere, using a four year rotation of two feed wheats, one feed barley and an oilseed rape break crop, the implications for food production would be:

- 81 tonnes of wheat;
- 27 tonnes of barley;
- 14 tonnes of oilseed rape.

**15.131** This should be seen in the context, from 2022 production across the UK, of:

- 15,500,000 tonnes of wheat;
- 7,400,000 tonnes of barley;
- 1,400,000 tonnes of oilseed rape.

**15.132** If all the BMV land within the Oaklands Farm area was growing wheat, being the highest-yielding crop, the incremental effect would be 161 tonnes. The total potential yield if all the land achieved 10 t/ha would be 1,150 tonnes. Each represent a negligible amount of production compared to the 24 million tonnes of cereals the UK produced in 2022 (0.0007% or 0.0048% respectively).

**15.133** The IEMA Guide addresses BMV land sensitivity in terms of biomass. There is no direct reference to food production. Therefore there is no reason why food production should have

particular sensitivity in EIA assessment. In that context, the effect in the national context is of negligible magnitude and therefore **negligible**, which **is not significant**.

### Effect in the Local Context

**15.134** The provisional ALC maps estimated the land area of Derbyshire to be of the order of 240,000 ha, and of South Derbyshire to be of the order of 32,000 ha. Broadly 40% of Grade 3 land nationally is Subgrade 3a. Applying that proportion to the provisional ALC map data for South Derbyshire approximately 47% of the agricultural land in the District is of BMV quality, which is higher than the national average of 42%. The Oaklands Farm area extends to 160 ha, which is a negligible proportion of the County (0.066%) and a minor proportion of the District (0.5%).

**Table 15.10: Provisional ALC Grades South Derbyshire**

*South Derbyshire District*

| Grade | Hectares | % |
|---|---|---|
| Grade 2 | 7,024 | 20.8 |
| Grade 3 | 20,445 | 60.5 |
| Grade 4 | 4,875 | 14.4 |
| Grade 5 | 0 | 0.0 |
| Non Agricultural | 604 | 1.8 |
| Urban | 864 | 2.6 |

**15.135** The land has the potential to be grazed by sheep. The dairy herd will continue, and the related employment across the farm and Oaklands Farm area has the potential to be similar to or higher than the current labour, because the management of sheep is more labour-intensive than for arable cropping.

**15.136** The effect on the local rural economy is therefore considered to be of low magnitude in respect of scale, but of negligible magnitude in respect of land use change (the area remains agricultural), and labour. The effect at a local level on resources of medium sensitivity is therefore **minor adverse**, which is **not significant**.

## Summary of Operational Effects

**15.137** Therefore, it can be concluded that in respect of operational effects:

- There will be a negligible magnitude of impact on land quality, on land of very high, high or medium sensitivity, partially reversible on decommissioning, which is a **negligible** effect

and **not significant**. There will be a **negligible** adverse effect on soils from operational work from an impact of negligible magnitude, on soil resources of medium or low sensitivity.

- There will be a benefit to the soils from being rested from intensive arable use, and of high magnitude. Soil biodiversity is a resource of low sensitivity. The overall effect will, therefore, be **minor beneficial**, which is **not significant**.
- There will be an impact of medium magnitude on the farm business, which is a resource of medium sensitivity; resulting in a **minor** adverse effect on the farm business, which is **not significant**.
- There will be **minor or negligible** adverse economic and food production effects at national and local level, which are **not significant.**

### Proposed Mitigation

**5.126** No additional mitigation is required.

### Residual Operational Effects

**5.127** Residual operational effects would remain as presented above.

## Decommissioning

**5.128** The decommissioning phase will not have any significant adverse effects on agricultural land or soils, nor on farm businesses.

**5.129** The cabling connecting the solar PV modules will be disconnected. The solar PV panels will then be dismantled by hand and removed on trailers. The framework will then be unbolted by hand and the metalwork removed from the Site on trailers. That will then leave the posts, and these framework posts will then be pulled out using machinery not dissimilar to that which installed the framework posts. The posts will be pulled up vertically and will not need to be removed by excavation, so there will be no disturbance to the soils. There will be trafficking by the machinery, which will likely have tracks to dissipate ground pressure and will be operated in dry conditions. Therefore the removal of the panels will not cause damage to the soils or alteration of the land quality.

**5.130** Deeply-buried cables will be left in situ or removed. These will be below the depth of any farm machinery and will cause no limitations for farming in the future, including arable farming. Shallow buried cables which might be caught by subsoilers will be removed by digging a narrow trench, removing topsoil to one pile, subsoil to another, removing the cable then reinstating the soils. This will be a similar process to that used to install the cables and will not result in long-term loss or downgrading of the land.

**5.131** Once all the panels and frameworks have been removed from a field or area the soils across the solar PV module areas will then be loosened with normal agricultural machinery. This will be to alleviate any minor compaction that might have resulted from the disassembling process. Thereafter the land will be returned to the farmers for continued agricultural use.

**5.132** Once the solar PV modules have been removed the bases for the fixed infrastructure can be removed, if required. If concrete pads have been utilised as the foundation solution for PV modules to protect sub-surface structures in specific areas, these pads will be lifted and removed from Site and the ground reinstated for agricultural use. It may be that the tracks are retained as they may be useful for the farming operations of the land. If the tracks and transformer bases are to be removed, the operation will involve removing the crushed stone bases, loosening the soil to remove compaction, then returning topsoil to the areas. The topsoil will then be worked with normal agricultural machinery to create a tilth suitable for return to the landowner.

**5.133** Decommissioning can be undertaken when soil conditions are suitable, as set out in the oSMP within the CEMP, and will not have any adverse agricultural effects. Thereafter, the land will be available for unfettered agricultural uses.

**5.134** It is assumed for this assessment that the substation and BESS will be removed, but that the land in these areas may not be restored back to the same ALC grade. The BESS and substation are within a small field of mixed Subgrade 3a and 3b quality. If the substation is not removed or suitably restored, there would be a permanent loss or downgrading of 1.5ha of Subgrade 3a, and 0.3ha of Subgrade 3b.

**5.135** The decommissioning works will not result in any significant additional adverse effects. They will result in effects of negligible magnitude on resources of high and medium sensitivity, which will result in a **negligible** significance of effect, which is **not significant**.

**5.136** The permanent loss of the BESS and substation area will be a low magnitude effect on resources of high or medium sensitivity, which will be **minor** adverse effects which are **not significant**.

## Cumulative Effects

## Predicted Cumulative Effects during Construction

**5.137** The schemes to be included in the cumulative assessment are set out in **Figure 2.1: Cumulative Schemes** and **Chapter 2: The Environmental Impact Assessment**. These developments have been reviewed for the potential to result in cumulative effects during construction in conjunction with the Proposed Development.

**5.138** No other solar developments are directly linked to the Site of the Proposed Development such that whilst the assessment considers the potential cumulative loss of agricultural land, as those developments affect the same receptor, the cumulative effects are indirect.

**5.139** The solar farm at Haunton (20/01245) involves 58ha of BMV, mostly sub-grade 3a, and is under construction but as the installation of solar PV arrays does not affect the land quality, except for small areas, most of the land is unlikely to be adversely affected by the development. The Proposed Development will, as a worst-case assessment, permanently affect 0.5ha of Grade 2 and 3.1ha of Subgrade 3a if the tracks and substation are not restored. These are effects of **minor** adverse significance (not significant). Significant cumulative effects are therefore not predicted.

**5.140** Other proposals may contribute to the loss of BMV land if for example a housing development is built on BMV. However, as the Proposed Development is not leading to a significant permanent loss of BMV, significant cumulative effects are not predicted.

**5.141** If none of the tracks and fixed infrastructure areas are restored, the Proposed Development results in the permanent loss by sealing or land quality downgrading of 0.5ha of Grade 2, 3.1ha of Subgrade 3a and 1.7ha of Subgrade 3b agricultural land in a worst case assessment (ie if those areas are not restored to comparable quality). Other schemes (eg housing schemes) involve the loss of varying amounts of land. The Proposed Development does not significantly increase that effect, adding only small areas to the amount of land involved.

### Proposed Mitigation for Cumulative Effects

**5.142** No additional mitigation is required beyond what each scheme is expected to commit to. For example, it is assumed all schemes will have a CEMP.

### Residual Cumulative Effects during Construction

**5.143** Residual cumulative effects would remain as presented above.

## Predicted Cumulative Effects during Operation

**5.144** There will be no further cumulative effects during operation.

### Proposed Mitigation

**5.145** No additional mitigation is required.

### Residual Cumulative Effects during Operation

**5.146** Residual cumulative effects would remain as presented above.

## Predicted Cumulative Effects during Decommissioning

**5.147** Assuming the solar farm at Haunton is decommissioned as per the Proposed Development, there will be no further cumulative effects during decommissioning.

### Proposed Mitigation

**5.148** No additional mitigation is required.

### Residual Cumulative Effects during Decommissioning

**5.149** Residual cumulative effects would remain as presented above.

## Combined Effects

**5.150** There are no combined effects of relevance to agriculture and soils.

### Further Survey Requirements and Monitoring

**5.151** There is no requirement for further survey. The SMP should be followed during the construction, operation and decommissioning phases. The content of the SMP will be updated prior to commencement in order to reflect any changes in the agricultural use of the land and baseline, although no changes are expected.

## Summary of Effects

**5.152 Table 12.11** summarises the predicted effects of the Proposed Development on agriculture and soils.

**Table 12.11: Summary of Effects**

| Predicted Effect | Significance | Mitigation | Significance of Residual Effect |
|---|---|---|---|
| Construction | | | |
| Loss of function of land (soils and land quality) from installation of solar PV arrays and localised cabling | Negligible (not significant) | No additional mitigation beyond that embedded in the SMP | Negligible (not significant) |
| Loss of high quality land for duration due to fixed infrastructure, effects on soils | Moderate to Minor adverse (not significant) | No additional mitigation beyond that embedded in the SMP | Moderate to minor adverse (not significant) |
| Effects from the connecting cable | Negligible (not significant) | No additional mitigation beyond | Negligible (not significant) |

| Predicted Effect | Significance | Mitigation | Significance of Residual Effect |
|---|---|---|---|
| (soils and land quality) | | that embedded in the SMP | |
| Effects on soils due to construction traffic and works and trenching | Minor adverse to negligible (not significant) | No additional mitigation beyond that embedded in the SMP | Negligible (not significant) |
| Effect on farming activities | Minor adverse (not significant) | No additional mitigation | Minor adverse (not significant) |
| Operation | | | |
| Effect on soils and ALC grade from operational activities | Negligible (not significant) | No additional mitigation beyond that embedded in the SMP | Negligible (not significant) |
| Effect on soils and soil health from long-term grassland | Minor beneficial (not significant) | No additional mitigation beyond that embedded in the SMP | Minor beneficial (not significant) |
| Effects on farm businesses | Minor adverse (not significant) | No additional mitigation | Minor adverse (not significant) |
| Wider rural economy/land use – local and national context | Minor adverse or negligible (not significant) | No additional mitigation | Minor adverse or negligible (not significant) |
| Decommissioning | | | |

| Predicted Effect | Significance | Mitigation | Significance of Residual Effect |
|---|---|---|---|
| Effect on soils and ALC | Negligible (not significant) | No additional mitigation beyond that embedded in the SMP | Negligible (not significant) |
| Permanent loss of BESS and substation area | Minor adverse (not significant) | No additional mitigation beyond that embedded in the SMP | Minor adverse (not significant) |
| Cumulative Effects – construction, operation, decommissioning | | | |
| Cumulative effects | None | No additional mitigation | None |