

## **Chapter 4: Land Take and Soils**

LAND TAKE AND SOILS (AGRICULTURE)	
AUTHOR	SOYL
SUPPORTING APPENDIX	ES Volume 3, Appendix: Land Take and Soils (Agriculture) Annex 1: Agricultural Land Classification
KEY CONSIDERATIONS	Potential agricultural effects include: <ul style="list-style-type: none"><li>• Loss of agricultural land, including that of best and most versatile quality;</li><li>• Loss of and damage to the soil resources;</li><li>• Reinstatement of agricultural land use; and</li><li>• Enabling on-site soil resources to fulfil existing primary functions.</li></ul>
CONSULTATION	An EIA Scoping Report was submitted to South Oxfordshire District Council (SODC) on 16 <sup>th</sup> December 2022 and is provided within <b>ES Volume 3, Appendix: Introduction and EIA Methodology – Annex 4</b> . An EIA Scoping Opinion was received from SODC on 31 <sup>st</sup> January 2023 and is provided within <b>ES Volume 3, Appendix: Introduction and EIA Methodology – Annex 5</b> . The EIA Scoping Opinion confirmed acceptability of the scope and method proposed for the land take and soils assessment.

ASSESSMENT METHODOLOGY

Defining the Baseline

- 4.1
- The current Agricultural Land Classification (ALC) and soil resources baseline conditions have been characterised through a soil survey and appraisal of the existing site conditions carried out in November 2022, February 2023 and January 2024. This assessment was undertaken in accordance with the ALC guidelines<sup>1</sup>.
- 4.2
- Details of the survey are provided within the ALC survey report provided within **ES Volume 3, Appendix: Land Take and Soils (Agriculture) – Annex 1**.

Evolution of the Baseline

- 4.3
- As the ALC system is concerned with the long-term limitations on agricultural use, there is not anticipated to be any change to the ALC or soil resources baseline in the future should the Proposed Development not come forward. There are also no anticipated changes to the day-to-day management of the agricultural land use practices should the Proposed Development not go ahead.

Impact Assessment Methodology

Enabling and Construction

- 4.4
- The effects on agricultural resources are concerned with the temporary loss of agricultural land at the site and the temporary effects on the soil resources within the site – i.e., for the duration of the operation of the Proposed Development.
- 4.5
- This assessment is made on the basis that all the agricultural land within the site will be removed from agricultural production during the construction period and will remain unavailable for agricultural use during the operation of the Proposed Development. Soil resources will be used for other purposes than agricultural production and therefore it is assumed that the soil resources will not be removed.

Completed Development

- 4.6
- All impacts on agricultural land and soil resources will be incurred during the enabling and construction works and the decommissioning of the Proposed Development and therefore an assessment of the potential effects

<sup>1</sup> MAFF (1988). Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land. <http://publications.naturalengland.org.uk/publication/6257050620264448>

on agricultural land from the completed development is not required and not considered any further in this ES.

Decommissioning

- 4.7
- As set out in **ES Volume 1, Chapter 2: Design Evolution, Alternatives and the Proposed Development**, the Proposed Development is intended to function for a maximum of 40 years. Following this 40-year lifespan, the battery storage infrastructure will be dismantled and the existing agricultural land will be returned to its original state for agricultural purposes. It should be noted that the connection tower will be a permanent feature of the Proposed Development and not decommissioned – this connection tower will result in the loss of approximately 0.5 hectares (ha) of Grade 2 agricultural land at the north-eastern extent of the site, which is considered negligible in the context of the overall 19.1ha of Grade 2 land across the site. As such, for the purposes of assessment, the effects on agricultural resources following decommissioning consider the permanent reinstatement of agricultural land at the site and enabling the on-site soil resources to fulfil their existing primary functions once again.

Basis of Assessment

- 4.8
- The assessment has been based on the proposed site layout, as presented in **ES Volume 1, Chapter 1: Introduction and EIA Methodology**, which shows the site boundary and the proposed areas of development.

Assumptions and Limitations

- 4.9
- No limitations have been established with regards to ALC survey, as noted within **ES Volume 3, Appendix: Land Take and Soils (Agriculture) – Annex 1**.

Embedded Mitigation

- 4.10
- There is no embedded mitigation relating to agricultural land or soil resources.

Methodology for Defining Effects

Receptors and Receptor Sensitivity

- 4.11
- The agricultural receptors identified are agricultural land, particularly best and most versatile (BMV) agricultural land, and soil resources.

Agricultural Land

- 4.12
- The sensitivity of agricultural land is defined according to its grade within the ALC, as set out in Table 4.1.

Table 4.1 Criteria for Sensitivity of Agricultural Land

Sensitivity	Description
High	Grade 1, Excellent Quality Agricultural Land
Medium	Grade 2 and Subgrade 3a, Very Good to Good Quality Agricultural Land
Low	Subgrade 3b and Grade 4, Moderate to Poor Quality Agricultural Land
Negligible	Grade 5, Very Poor Quality Agricultural Land

Soil Resources

- 4.13
- The impact on the soil resource is assessed according to the degree to which disturbed soil resources are re-used in a manner that enables the resource to fulfil one or more of the primary soil functions of:
  - The production of food and biomass, and the provision of raw materials;
  - The storage, filtration and cycling of water, carbon and nitrogen in the biosphere;

- The support of ecological habitats and biodiversity;
- Support for the landscape;
- The protection of cultural heritage; and
- The provision of a platform for human activities, such as construction and recreation.

4.14 The sensitivity of the soil resource reflects its textural characteristics and its susceptibility to the effects of handling during construction and the re-instatement of land, as shown Table 4.2.

Table 4.2 Criteria for Sensitivity of Soil Resources

Sensitivity	Description
High	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams)
Medium	Silty loams, medium silty clay loams, medium clay loams and sandy clay loams
Low	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams)

Magnitude of Impact

Agricultural Land

4.15 The magnitude of impact to agricultural land is assessed according to the criteria set out in Table 4.3. The thresholds for determining the magnitude of impact have been derived for development involving the loss of BMV agricultural land.

Table 4.3 Magnitude of Impact to BMV Agricultural Land

Impact	Description
High	Development would directly lead to the loss of over 50ha of BMV agricultural land
Medium	Development would directly lead to the loss of between 20ha and 50ha of BMV agricultural land
Low	Development would directly lead to the loss of between 5ha and 20ha of BMV agricultural land
Negligible	Development would directly lead to the loss of less than 5ha of BMV agricultural land

Soil Resources

4.16 The magnitude of impact on soil resources considers the continued ability of a soil to fulfil its primary functions, as set out in Table 4.4.

Table 4.4 Magnitude of Impact to Soil Resources

Impact	Description
High	The soil is unable to fulfil one or more of the primary soils functions.
Medium	The soil mostly fulfils the primary soil functions off-site or has a reduced capacity to fulfil the primary functions on site
Low	The soil mostly fulfils the primary soil functions on-site
Negligible	The soil retains its existing functions on-site

Defining the Effect

- 4.17 Effects on agricultural land and soil resources are local effects, occurring within the site. It is assumed that the disturbed soil resources will be retained and re-used on-site where possible as part of the enabling and construction of the Proposed Development. The loss of agricultural land to development and the disturbance and loss of function of soil resources are both adverse effects.
- 4.18 During construction, the effect on agricultural land will be direct and long-term, however will be temporary given that the site will be returned to agricultural use following decommissioning (see paragraph 4.7). The effect on soil resources during construction will also be direct, temporary and long-term, as re-establishing

structures and biological communities in soils that have been disturbed and reinstated can take several years.

- 4.19 A major effect occurs where the Proposed Development is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This effect is ‘significant’.
- 4.20 A moderate effect occurs where the Proposed Development is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This effect is more likely to be ‘significant’ but will be subject to professional judgement.
- 4.21 A minor effect occurs where the Proposed Development is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the Proposed Development is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This effect is ‘not significant’.
- 4.22 An effect is negligible where the Proposed Development is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change. This effect is ‘not significant’.
- 4.23 Table 4.5 sets out the matrix used to assist the assessment of the scale of effect to receptors. Professional judgement is used to determine the scale of effect in instances where a range of potential effects is shown in the matrix.

Table 4.5 Matrix for Classifying the Scale and Significance of Effects

Magnitude of Impact	Sensitivity of receptor/receiving environment to change			
	High	Medium	Low	Negligible
High	Major	Moderate to Major	Moderate	Negligible
Medium	Moderate to Major	Moderate	Minor to Moderate	Negligible
Low	Moderate	Minor to Moderate	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Geographic Extent of Effect

4.24 The geographical extent of the effects on agricultural receptors are all at a local or district level. Effects on agricultural land will be confined to the site. It is assumed that where practicable, the disturbed soil resources will be re-used on-site during enabling and construction activities for the Proposed Development.

Effect Duration

- 4.25 The effects assessed will occur during the enabling and construction of the Proposed Development, and once the Proposed Development is decommissioned. No effects will occur during the operation of the Proposed Development.
- 4.26 The enabling and construction effects are considered as temporary and long-term (given the 40-year loss of agricultural use and primary soil function), whilst the decommissioning phase effects are considered permanent and long-term (as set out in paragraph 4.7).

Direct and Indirect

4.27 All effects would be direct.

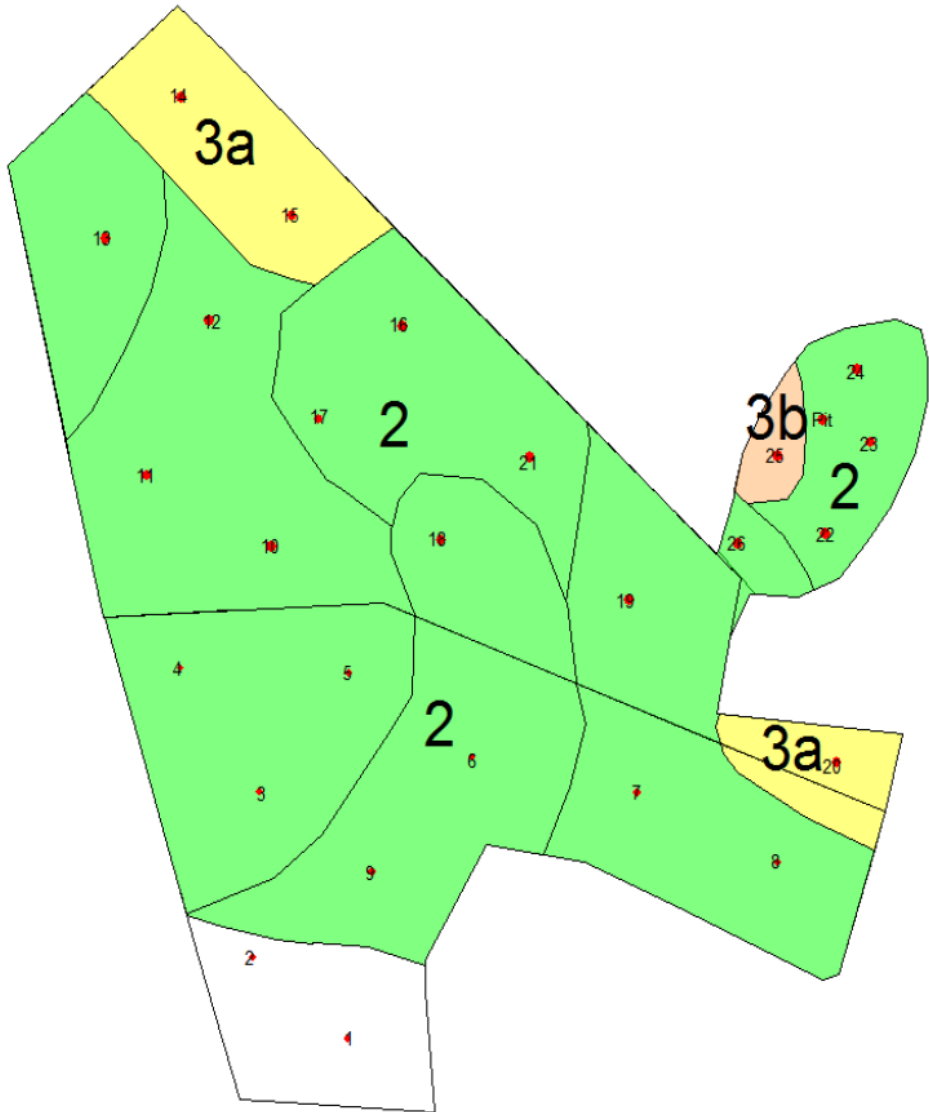
Categorising Likely Significant Effects

4.28 The scale of the effects is determined by combining the sensitivity of the resource with the magnitude of impact. Effects that are identified as being moderate or major are likely to be classed as significant effects, subject to professional judgement as set out above.

BASELINE CONDITIONS

- 4.29
- The area of land assessed by the ALC survey, as noted within **ES Volume 3, Appendix: Land Take and Soils (Agriculture) – Annex 1**, covers 21.7ha. This area of land is in agricultural use, currently harvested for hay and silage use.
- 4.30
- The agricultural land at the site has been classified (see Figure 4.1) as mostly Grade 2 (19.1ha) with smaller areas of Subgrade 3a (2.3ha) where the land is more gravelly at depth. There is also a small area of Subgrade 3b (0.3ha) next to the existing woodland at the north-eastern extent of the site where the subsoil is slowly permeable clay. The Grade 2 and Subgrade 3a agricultural land on site is considered to be BMV, with a total BMV land on site of 21.4ha.
- 4.31
- The soils on-site are described as comprising a mixture of loamy sand, sandy loam and sandy clay loam with a range of gravel content in the subsoil. They are all well drained except for at the north-eastern extent of the site which are over clay (soils D and E illustrated in **ES Volume 3, Appendix: Land Take and Soils (Agriculture) – Annex 1**). The gravelly Subgrade 3a soil (good quality) is limited by droughtiness and depth of soil, while the rest of the land is Grade 2 (very good quality), again limited by droughtiness except for a small area of Subgrade 3b (moderate quality) at the north-western extent of the site which is limited by soil wetness.

Figure 4.1 ALC Grade<sup>2</sup>



<sup>2</sup> ALC Grade is based on the ALC surveys undertaken, as presented in **ES Volume 3, Appendix: Land Take and Soils (Agriculture) – Annex 1**.

RECEPTORS AND RECEPTOR SENSITIVITY

Existing

- 4.32
- The existing receptors on-site are described below and summarised in Table 4.6. The soil resources are primarily light to medium textured, including loamy sand, sandy loam and sandy clay loam and clay with a range of gravel content in the subsoil, which is a resource of low to medium sensitivity.

Table 4.6 Receptor Sensitivity

Receptor	Sensitivity
Agricultural Land:	
Agricultural land of Grade 2, Subgrade 3a and Subgrade 3b quality	Low to Medium
Soil Resources:	
Loamy sand, sandy loam and sandy clay loam	Low to Medium

POTENTIAL EFFECTS

Enabling and Construction

Agricultural Land

- 4.33
- Enabling and construction of the Proposed Development will require the redevelopment of the existing agricultural land at the site which is in Grade 2, Subgrade 3a and Subgrade 3b and is a resource of low (associated with Subgrade 3b agricultural land) to medium (associated with Grade 2 and Subgrade 3a agricultural land) sensitivity. The Proposed Development would result in the loss of 21.4ha of BMV agricultural land, which in accordance with Table 4.3 is a medium magnitude of impact. The effect is assessed as being a local, direct, temporary Moderate Adverse effect (**Significant**) on agricultural land. The loss of 0.3ha of Subgrade 3b agricultural land is considered as a Negligible (Not Significant) effect.

Soil Resources

- 4.34
- The soil resources affected by the construction activities associated with the Proposed Development are mostly sandy loam or sandy clay loam which is a resource of low to medium sensitivity (see Table 4.2). As a result of construction activities, the potential magnitude of impact on the soil resource is high given that the primary function of the soils (agricultural use) will be lost (see Table 4.4), resulting in a local, direct, temporary, long-term Moderate Adverse effect (**Significant**) on soil resources.

Decommissioning

Agricultural Land

- 4.35
- Following decommissioning, the reinstatement of the site to productive agricultural use would be a Negligible effect (Not Significant), which is local, direct and permanent.

Soil Resources

- 4.36
- Following decommissioning, the reinstatement of the site to productive agricultural use would allow the soil resources to fulfil their existing primary functions. As such, the effect on soil resources will be a Negligible effect (Not Significant), which is local, direct and permanent.



## MITIGATION, MONITORING AND RESIDUAL EFFECTS

### Enabling and Construction Mitigation

#### Agricultural Land

- 4.37** The potential enabling and construction effects on agricultural land will remain as set out within the '*Potential Effects*' section of this ES chapter above, as there are no measures available to mitigate the direct and temporary loss of agricultural land.
- 4.38** Areas of built development that require the use of agricultural land should be directed toward the lowest quality of agricultural land available, so far as is practicable, although the avoidance of BMV land is not possible on the site as most of the agricultural land is within the BMV category. The residual effect on agricultural land during the enabling and construction period is assessed as being a local, direct, temporary Moderate Adverse effect (**Significant**).
- 4.39** It should be noted that whilst the site predominantly comprises Grade 2 and Subgrade 3a land which is of good quality to very good quality agricultural land, the land is currently harvested for hay and silage use, and as such is not utilising the site to its full potential from an agricultural point of view.
- 4.40** Following the decommissioning of the Proposed Development the site will be returned to agricultural use as discussed in paragraph 4.7.

#### Soil Resources

- 4.41** The potential enabling and construction effects on soil resources will remain as set out within the '*Potential Effects*' section of this ES chapter above given that a primary function of the soil resource (agricultural use) will be lost. The residual effect on soil resources during the enabling and construction period is therefore assessed as a Moderate Adverse effect (**Significant**).
- 4.42** The Construction Environmental Management Plan (CEMP) will address the measures set out in the Defra Construction Code of Practice for the Sustainable Use of Soils<sup>3</sup>, which includes the most appropriate re-use for the different types of soils within the site, as relevant, and the proposed methods for handling and storing soils on-site. The adoption of these measures will ensure that the soil resources on-site will be able to continue to fulfil various ecosystem services and functions.
- 4.43** It should be noted that given that soils will not be removed from the site, most soils will be able to continue other various primary ecosystem functions on the site, principally as a medium for producing biomass; for storage and cycling of water and carbon; and for supporting habitats, biodiversity and landscape planting.
- 4.44** Following the decommissioning of the Proposed Development and the return of the site to agricultural use, the soils will be able to fulfil their current primary functions in addition to the other various ecosystem services and functions maintained throughout the operation of the Proposed Development.

### Residual Effects

- 4.45** All the residual effects resulting from the Proposed Development, are presented in Table 4.7, identifying whether the effect is significant or not.

**Table 4.7 Residual Effects**

Receptor	Description of the Residual Effect	Scale and Nature	Significant / Not Significant	Geo	D I	P T	St Mt Lt
<b>Enabling and Construction</b>							
BMV agricultural land	Loss of 21.4ha of land in Grades 2 and Subgrade 3a	Moderate Adverse	<b>Significant</b>	L	D	T	Lt
Soil resources	The soil is unable to fulfil all of its primary functions due to	Moderate	<b>Significant</b>	L	D	T	Lt

<sup>3</sup> Department for Environment, Food and Rural Affairs (Defra) (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. <https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites>

Receptor	Description of the Residual Effect	Scale and Nature	Significant / Not Significant	Geo	D I	P T	St Mt Lt
	loss of agricultural land	Adverse					
<b>Completed Development</b>							
<i>No effects are anticipated once the Proposed Development is complete and operational.</i>							
<b>Decommissioning</b>							
BMV agricultural land	Reinstatement of agricultural land use	Negligible	Not Significant	L	D	P	Lt
Soil resources	The soil is able to again fulfil all of its primary function	Negligible	Not Significant	L	D	P	Lt
<b>Notes:</b> Residual Effect - Scale = Negligible / Minor / Moderate / Major - Nature = Beneficial or Adverse Geo (Geographic Extent) = Local (L), Regional (R), National (N) D = Direct / I = Indirect P = Permanent / T = Temporary St = Short Term / Mt = Medium Term / Lt = Long Term N/A = not applicable / not assessed							

## ASSESSMENT OF THE FUTURE ENVIRONMENT

### Evolution of the Baseline Scenario

- 4.46** The ALC is concerned with the long-term inherent physical characteristics of the site and its soils. If the Proposed Development were not to be implemented, the current soil and ALC baseline conditions are expected to remain unchanged for the foreseeable future. In the longer term, it is expected that climate change will affect the quality of the soils at the site in the absence of the Proposed Development coming forward, and will vary according to the soil types identified.
- 4.47** The existing agricultural circumstances are likely to remain unchanged should the Proposed Development not proceed.

### Cumulative Effects Assessment

- 4.48** The cumulative impact assessment identifies any significant effects that the Proposed Development may have in combination with other nearby cumulative schemes.
- 4.49** As set out in **ES Volume 1, Chapter 1: Introduction and EIA Methodology**, the cumulative effects assessment considers the potential for cumulative effects to arise as a result of the Proposed Development in-combination with defined 'Tier 1' (i.e. schemes which meet the defined criteria with regards to scale and distance from the site and have full planning consent, a resolution to grant consent, or have been submitted but not yet consented where considered appropriate) and 'Tier 2' (i.e. strategic allocations as per the Local Plan, whereby a formal planning application (or applications) for development in relation to these strategic allocations has not yet been submitted) cumulative schemes.
- 4.50** Schemes in the locality that involve the loss of agricultural land will have a cumulative effect on agricultural land when considered with the Proposed Development. The following schemes will not involve the loss of agricultural land, and as such are discounted from the cumulative assessment:
- Land in the North East Corner of, Culham Science Centre, near Clifton Hampden for the "Erection of a Fusion Demonstration Plant with ancillary office space, parking, landscaping and associated infrastructure, including plant and machinery" (P22/S1410/FUL) – Tier 1 Scheme;
  - Various sites across South and Vale From Clifton Hampden to Milton Exchange Via Appleford in relation to proposed road works and associated road infrastructure (P21/S4797/CM) – Tier 1 Scheme;

- UK A E A Culham Science Centre, near Clifton Hampden with regards to the development of an Energy Storage Facility (P16/S2368/FUL) – Tier 1 Scheme; and
- STRAT8 – Culham Science Centre strategic allocation to deliver a net increase in employment of 7.3ha – Tier 2 Scheme.

**4.51** The following schemes have been identified as potentially representing a cumulative effect upon the loss of agricultural land:

- STRAT9 – Strategic Allocation is for 217ha to be developed to deliver approximately 3,500 new homes, a net increase of at least 7.3ha of employment land in combination with the adjacent Science Centre and supporting services and facilities – Tier 2 Scheme.

**4.52** Effects on soil resources do not occur cumulatively as specific soil characteristics are unique to a site, and effects are heavily influenced by the management strategy adopted at each site. As such the following cumulative assessment focuses on the effects on agricultural land only.

### **STRAT9 Strategic Allocation - South Oxfordshire Local Plan<sup>4</sup>**

**4.53** The STRAT9 – Strategic Allocation is for 217ha to be developed to deliver approximately 3,500 new homes, a net increase of at least 7.3ha of employment land in combination with the adjacent Science Centre and supporting services and facilities. As a formal planning application (or applications) for development in relation to this strategic allocation has not yet been submitted, it is not possible to undertake a quantitative cumulative impact assessment of the Proposed Development in combination with any future development within this area. Therefore, the assessment below is qualitative.

**4.54** Assuming all of the STRAT9 site is developed as a worst-case scenario for the purposes of assessment, the development would require the use of 217ha of land currently comprising a mix of uses (predominantly agricultural use). The detailed design, and therefore how much of the land would be permanently lost to built development, is currently unknown.

**4.55** According to the National Soils Map<sup>5</sup>, the southern half of the STRAT9 site is liable to be quite gravelly, and therefore more likely to be Grade 3a land. The land in the northern half of the STRAT9 site is deeper sandy soil, and therefore more likely to be Grade 2 land.

**4.56** When considering the STRAT9 cumulative scheme in conjunction with the Proposed Development, assuming a worst-case scenario that all BMV quality land is permanently lost to built development, it is likely that there will be a cumulative loss of more than 238ha of BMV quality land which would be a high magnitude of change. The cumulative effect on agricultural land will be Moderate to Major Adverse, which is **Significant**.

**4.57** Following the decommissioning of the Proposed Development, given the extent of agricultural land removed to accommodate the STRAT9 site development, the cumulative effect would remain as Moderate to Major Adverse, **Significant**. It should be noted that this cumulative effect is related only to the development of the STRAT9 site.

### **LIKELY SIGNIFICANT EFFECTS**

**4.58** The enabling and construction phase effect of the Proposed Development on agricultural land and soil resources is likely to be Moderate Adverse, which is **Significant**.

**4.59** With regards to the cumulative loss of agricultural land resulting from the Proposed Development in combination with the STRAT9 site, given the potential extent of agricultural land loss resulting from a worst-case development at the STRAT9 site, the cumulative effect will be Moderate to Major Adverse (**Significant**) for both construction and decommissioning phases. It should be noted that the decommissioning phase cumulative effect is derived only from the development of the STRAT9 site.

<sup>4</sup> South Oxfordshire District Council. (2020). The South Oxfordshire Local Plan 2011-2035. Available at: <https://www.southoxon.gov.uk/south-oxfordshire-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2035/adopted-local-plan-2035/>

<sup>5</sup> <https://www.landis.org.uk/soilscapes/>