

Rosefield Solar Farm

Preliminary Environmental Information Report

Volume 1
Chapter 10: Land, Soil and Groundwater

September 2024



Table of Contents

- 10. Land, Soil and Groundwater 1**
 - 10.1. Introduction1
 - 10.2. Stakeholder engagement.....1
 - 10.3. Legislative framework, planning policy and guidance2
 - 10.4. Study area.....4
 - 10.5. Establishing baseline conditions5
 - 10.6. Environmental baseline6
 - 10.7. Mitigation embedded into the design 13
 - 10.8. Optionality 14
 - 10.9. Approach to the preliminary assessment 15
 - 10.10. Assessment of likely effects (without additional mitigation)25
 - 10.11. Additional mitigation.....28
 - 10.12. Assessment of residual effects (with additional mitigation)30
 - 10.13. Opportunities for enhancement33
 - 10.14. Difficulties and uncertainties.....33
 - 10.15. Further work required to inform the ES34

10. Land, Soil and Groundwater

10.1. Introduction

10.1.1. This chapter presents a preliminary assessment of the likely significant effects arising from the construction, operation (including maintenance) and decommissioning of Rosefield Solar Farm upon land, soil and groundwater and should be read in conjunction with the following figures and appendices in **Volume 2** and **Volume 3**, respectively:

- **Figure 10.1: Study Area for Land, Soil and Groundwater;**
- **Figure 10.2: Agricultural Land Classification Plan;**
- **Figure 10.3: Mineral Safeguarding Areas;**
- **Appendix 10.1: Agricultural Land Classification (ALC) Report;** and
- **Appendix 10.2: Preliminary Risk Assessment (Phase 1 Desk Study).**

10.2. Stakeholder engagement

10.2.1. **Table 10.1** provides a summary of the engagement undertaken to date to inform this preliminary assessment.

Table 10.1 – Engagement undertaken to date

| Consultee | Date and method | Key matters discussed |
|-------------------------|---|---|
| Environment Agency | 6 February 2024 Microsoft Teams call | Inception meeting with National Infrastructure Planning Team members and the DCO account manager to discuss the methodology of the ALC survey that had been undertaken. |
| Natural England | 15 March 2024 Email | Email confirming agreement with a semi-detailed survey (1 auger per 2 hectares (ha) plus representative pits) where the Site is expected to comprise non-Best and Most Versatile (BMV) land. However, a detailed survey is expected for areas of BMV land. The Applicant confirmed that this approach has been taken to date. |
| Buckinghamshire Council | 11 June 2024 Email | Initial engagement email issued to soil and agricultural land lead to request further engagement. No response has been received to date. |

10.3. Legislative framework, planning policy and guidance

10.3.1. This preliminary assessment has been undertaken with regard to the following legislation, planning policy and guidance.

Legislation

- Part IIA of the Environmental Protection Act 1990¹ provides a statutory regime for identifying and remediating contaminated land;
- The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009² covers the management and protection of water resources. It includes requirements to ensure sustainable use of water, prevent pollution and regulate activities that could affect availability or quality of water;
- The Water Framework Directive 2000/60/EC³ establishes a framework for action relating to water policy;
- The Groundwater Directive 2006/118/EC⁴ relates to the protection of groundwater from pollution and aims to reduce deterioration in quality;
- The Groundwater (Water Framework Directive) (England) Direction 2016⁵ sets out obligations to protect groundwater;
- The Priority Substances Directive 2008/105/EC⁶ relates to environmental quality standards for water; and
- The Environmental Permitting (England and Wales) Regulations 2016⁷, provide a structure for overseeing activities which have the potential to harm human health or the environment.

¹ Environmental Protection Act 1990. Available online:

<https://www.legislation.gov.uk/ukpga/1990/43/part/IIA> (accessed 5 June 2024).

² The Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009. Available online: <https://www.legislation.gov.uk/uksi/2009/3104/contents/made> (accessed 5 June 2024).

³ The Water Framework Directive 2000. Available online: <https://eur-lex.europa.eu/eli/dir/2000/60/oj> (accessed 5 June 2024).

⁴ The Groundwater Directive 2006. Available online: <https://eur-lex.europa.eu/eli/dir/2006/118/oj> (accessed 5 June 2024).

⁵ The Groundwater (Water Framework Directive) (England) Direction 2016. Available online: <https://www.gov.uk/government/publications/the-groundwater-water-framework-directive-england-direction-2016> (accessed 5 June 2024).

⁶ The Priority Substances Directive 2008. Available online: <https://eur-lex.europa.eu/eli/dir/2008/105/oj> (accessed 5 June 2024).

⁷ The Environmental Permitting (England and Wales) Regulations 2016. Available online: <https://www.legislation.gov.uk/uksi/2016/1154/contents/made> (accessed 5 June 2024).

National planning policy

- Overarching National Policy Statement for Energy (NPS EN-1) (2023)⁸ – Section 5.11 relates to land use and includes details of planning policy relating to land contamination, soil and agricultural land;
- National Policy Statement for Renewable Energy Infrastructure (NPS EN-3)⁹ (2023) – Section 2.10 considers issues relating to soil quality for solar development, including the consideration of land types on which schemes could be developed;
- National Policy Statement for Electricity Networks Infrastructure (NPS EN-5)¹⁰ (2023) which details issues relating to underground cables, in connection with soil and contamination, although predominantly dealing with overhead cables; and
- National Planning Policy Framework (NPPF) (2023)¹¹ with reference to Section 15 ‘Conserving and enhancing the natural environment’.

Local planning policy

- Vale of Aylesbury Local Plan (VALP) 2013-2033¹², specifically paragraphs 3.63, and 3.66 to 3.68 and policy S7; and
- The Buckinghamshire Minerals and Waste Local Plan¹³ includes issues relating to minerals (including Mineral Safeguarding Areas), soil

⁸ Department for Energy Security and Net Zero. (2023). Overarching National Policy Statement for Energy (EN-1). Available online: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1>

⁹ Department for Energy Security and Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available online: <https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3>

¹⁰ Department for Energy Security and Net Zero (2023). National Policy Statement for Electricity Networks Infrastructure (EN-5). Available online: <https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5>

¹¹ Ministry of Housing, Communities and Local Government and Department for Levelling Up, Housing and Communities. (2023). National Planning Policy Framework. Available online: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹² Vale of Aylesbury Local Plan (VALP) 2013 – 2033 Adopted Plan (2021). Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/Aylesbury_local_plan_L46JWaT.pdf

¹³ Buckinghamshire Minerals and Waste Local Plan, 2019. Available online: https://buckinghamshire-gov-uk.s3.amazonaws.com/documents/buckinghamshire-minerals-and-waste-local-plan-2016-2036_yiYUGSb.pdf (accessed 5 June 2024).

(including agricultural land), groundwater (including source protection zone) and waste.

Guidance

- Land Contamination Risk Management (LCRM) (Environment Agency, 2023)¹⁴;
- Institute of Environmental Management & Assessment Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022)¹⁵;
- Agricultural Land Classification for England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land (Ministry of Agriculture, Fisheries and Food (MAFF), 1988)¹⁶;
- Technical Information Note TIN049: Agricultural Land Classification: protecting the best and most versatile agricultural land, 2nd edition (Natural England, 2012)¹⁷; and
- Likelihood of Best and Most Versatile Agricultural Land strategic scale maps (Natural England, 2017)¹⁸.

10.4. Study area

- 10.4.1. The Study area for land, soil and groundwater is the area within and up to 1 km from the Site boundary. The Site boundary and the land, soil and groundwater Study area are shown in **Figure 10.1** in **Volume 2**.
- 10.4.2. The size of the Study area used for land, soils and groundwater is based on professional judgement and includes all features that may be impacted by the construction, operational (including maintenance) and decommissioning phases of Rosefield Solar Farm. For certain receptors, consideration has been afforded to their presence/absence up to 1 km

¹⁴ Land Contamination Risk Management (LCRM), Environment Agency, 2023. Available online: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> (accessed 5 June 2024).

¹⁵ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

¹⁶ Agricultural Land Classification for England and Wales 1988. Available online: <https://publications.naturalengland.org.uk/publication/6257050620264448> (accessed 5 June 2024).

¹⁷ Agricultural Land Classification: protecting the best and most versatile agricultural land 2009. Available online: <https://publications.naturalengland.org.uk/publication/35012> (accessed 5 June 2024).

¹⁸ Likelihood of Best and Most Versatile Agricultural Land 2017. Available online: <https://publications.naturalengland.org.uk/category/5208993007403008> (accessed 5 June 2024).

from the Site boundary, but the preliminary assessment does not necessarily provide details on every element in those instances where there are no potentially significant effects to consider. This is specified where relevant in **Section 10.6**.

10.5. Establishing baseline conditions

10.5.1. The following data sources have been used to understand the existing land, soil and groundwater conditions:

- Geological maps (bedrock and superficial geology) (British Geological Survey (BGS) mapping accessed online)¹⁹;
- Hydrogeological and groundwater vulnerability maps (BGS database²⁰ and MAGIC maps)²¹;
- Soil survey maps held by Department for Environment, Food & Rural Affairs (Defra)²² and Natural England²³;
- Site-specific data and historical mapping from the supporting environmental database report²⁴ (providing details of features on or close to the Site relating to water, waste, hazardous substances, geology and land use);
- SoilScapes mapping²⁵; and
- Mineral resources information from the Buckinghamshire Minerals and Waste Local Plan²⁶.

¹⁹ BGS GeoIndex Onshore. Available online: <https://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed 5 June 2024).

²⁰ BGS GeoIndex Onshore. Available online: <https://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed 5 June 2024).

²¹ MAGIC Maps portal. Available online: <https://magic.defra.gov.uk/MagicMap.aspx> accessed (5 June 2024).

²² MAGIC Maps portal. Available online: <https://magic.defra.gov.uk/MagicMap.aspx> accessed (5 June 2024).

²³ Regional Agricultural Land Classification Maps 2010. Available online: <https://publications.naturalengland.org.uk/category/5954148537204736> (accessed 5 June 2024).

²⁴ Envirocheck reports for main site area, and additional report for East Claydon substation area, provided in **Appendix 10.2** in **Volume 3** (report references 311552500_1_1 and 317083347_1_1, dated 19-05-2023 and 347702807_1_1, dated 22 May 2024).

²⁵ LandIS SoilScapes Viewer. Available online: <https://www.landis.org.uk/soilscapes/> (accessed 5 June 2024).

²⁶ Buckinghamshire Minerals and Waste Local Plan, 2019. Available online: https://buckinghamshire-gov.uk.s3.amazonaws.com/documents/buckinghamshire-minerals-and-waste-local-plan-2016-2036_yiYUGSb.pdf (accessed 5 June 2024).

- 10.5.2. An ALC survey has been undertaken and the survey report is presented in **Appendix 10.1** in **Volume 3**. There are several fields within the Site boundary where it has not yet been possible to undertake surveys (a total of 147 ha – refer to **Figure 10.2** in **Volume 2**). These areas will be surveyed to inform the ES.
- 10.5.3. A Preliminary Risk Assessment report has been prepared and is provided as **Appendix 10.2** in **Volume 3**. This report provides a desk-based analysis of Rosefield Solar Farm from a land, soil and groundwater perspective, and includes the results of a site reconnaissance survey.

10.6. Environmental baseline

Site history

- 10.6.1. A summary of the history is provided below in the context of land, soils and groundwater for the Study area.
- 10.6.2. Contamination associated with agricultural land use could include pesticides, herbicides, areas of made ground or infill around historical or current farm buildings or along the route of the former railway or farm tracks, infilled ponds, and possible areas of waste materials.
- 10.6.3. The Site is subdivided into four main land areas, referred to as Parcel 1, Parcel 1a, Parcel 2 and Parcel 3. There are also cable route search areas between Parcel 1 and Parcel 2, and between Parcel 2 and Parcel 3. The boundaries for these areas are shown in **Figure 10.1** in **Volume 2**.

Parcel 1

- 10.6.4. Within the Site boundary, on the earliest map from 1885, the land is shown separated into a number of small fields, generally comparable to the present day layout, with occasional small buildings, wells, springs and ponds shown to be present. There are no notable changes to land use or fields boundaries from the earliest available mapping to the present day.
- 10.6.5. Within the Study area, but outside the Site boundary for Parcel 1, the land is shown as small fields on the earliest map (1885), with some areas of woodland, farm buildings and tracks/roads. Within the western section of the Study area around Parcel 1, a railway is present from the 1900 map (200 m from the Site boundary, still present). A large brickworks is marked at Calvert from the 1952 map (partly within and partly outside the Study area), which is located to the west of the railway. Parts of Calvert Brickworks are later shown to have been infilled and reinstated as agricultural land (from 1984 to 1999), and later redeveloped with residential properties. Parts of the land associated with the brickworks that are within the Study area are known to have been used as a landfill.

Parcel 1a

- 10.6.6. The earliest map (1885) shows the land within the Site boundary for Parcel 1a as a main large field, with smaller fields in the west and south-east. A stream is located along the west and north boundaries of this Parcel. A track is later shown to be present across the centre of Parcel 1a (on the 1900 map). The current map (2023) does not show any significant alterations compared to the 1900 map.
- 10.6.7. Within the Study area, but outside the Site boundary for Parcel 1a, the land is a combination of fields, woodland areas and roads, including Romer Wood, Greatsea Wood and Sheephouse Wood. A railway line is present south-west of Parcel 1a by 1900 (as noted above).

Parcel 2

- 10.6.8. Within the Site boundary for Parcel 2, mapping from 1885 shows the land separated into small fields, with buildings present at Kitehill Farm, Coppice Lowhill Farm, Bernwood Farm and Claydon Lawn. Other features present include a stream, tracks, woodland, ponds and a well. Changes to field boundaries are noted by mapping from 1984, and all but one of the buildings are absent by this time (the remaining building is at Coppice Lowhill Farm). The well is shown to be covered by the map from 1999.
- 10.6.9. Within the Study area, but outside the Site boundary for Parcel 2, an airfield is located to the north (operating since 2005, currently used by a model aircraft club) as is the village of Botolph Claydon. Hogshaw Farm is to the east, and elsewhere there are fields and small woodland areas.

Parcel 3

- 10.6.10. Within the Site boundary for Parcel 3, the earliest map from 1885 shows that Parcel 3 was occupied by small fields, crossed by a railway running north to south. A small building was evident at Sion Hill Farm Crossing, with a stream, tracks and ponds also present. By 1900, a drain is indicated in the south-east corner of Parcel 3. The map from 1966 shows the railway to be disused, and it is no longer shown on the map from 1984. The small building is also absent by 1984, and an overhead electricity line is marked, roughly aligned with the route of the historical railway. The map from 1985 shows the presence of the large substation at East Claydon, within the northern part of the land parcel, and additional overhead electricity cables.
- 10.6.11. Within the Study area, but outside the Site boundary for Parcel 3, the surrounding land is generally agricultural, with no major changes shown from the earlier map editions to the present day. Winslow Road Station buildings are located to the north of the Site boundary.

Cable route search area between Parcels 1 and 2

- 10.6.12. Within the Site boundary for the cable route search area between Parcels 1 and 2, from the earliest map in 1885, the land is occupied by small fields, with some tracks and ponds. A windpump is present on the map from 1952, which is absent by 1984.
- 10.6.13. Within the Study area, but outside the Site boundary for this cable route search area, the surrounding area is made up of fields, woodland and tracks/roads.

Cable route search area between Parcels 2 and 3

- 10.6.14. Within the Site boundary for the cable route search area between Parcels 2 and 3, the earliest map from 1885 shows small fields, a possible pit feature, buildings, tracks and ponds. By 1900, Granborough Road railway station is present within this area, but is no longer marked on the map from 1966.
- 10.6.15. Within the Study area, but outside the Site boundary, no features of note were recorded.

Summary

- 10.6.16. In terms of historical site usage, the majority of the land within the Study area has been in use for agricultural purposes since the earliest historical mapping from 1885. Ponds, streams and tracks are common across all land areas, and a possible pit was noted in one location, which may have been infilled over time.
- 10.6.17. Notable features include a historical railway line within Parcel 3, and historical buildings in Parcels 1, 2 and 3. A railway station building was present in Parcel 3 (Granborough Road) and a large substation remains present in the northern section of Parcel 3.

Animal burial sites

- 10.6.18. There is no official register of animal burial sites and therefore it is not possible to assess whether there are any within the Study area. Due to the long-term agricultural site usage, it is a possibility that unrecorded animal burial pits could be present.

Unexploded ordnance

- 10.6.19. A review of publicly available unexploded ordnance (UXO) risk maps indicates that all land within the Study area has low potential for wartime bombs to be present (further detail is included within **Appendix 10.2** in **Volume 3**).

Information from environmental database report

10.6.20. Relevant information from the environmental database search is summarised below for the Study area. Data relating to discharge consents was reviewed for the full Study area, but only entries within 250 m of the Site boundary are detailed below, as more distant entries were reviewed, and were not considered to be within influencing distance of the Site.

- Calvert landfill site (pits 4, 5 and 6) is located approximately 200 m west from the Site boundary and is currently licensed for the recovery/disposal of non-hazardous waste;
- Greatmoor Waste Facility is located approximately 640 m to the south-west of Parcel 1a, with an active licence for the incineration of non-hazardous waste;
- Historical landfills are present approximately 240 m to the north-east of land Parcel 1 (Calvert landfill pit 1); 490 m to the north-west of Parcel 1 (Buckingham Rural District Council Refuse Tip); and 995 m to the west of land Parcel 1 (Brill Road Tip);
- The area occupied by the National Grid East Claydon Substation within Parcel 3 is shown as potentially infilled land;
- The completed sections of Calvert landfill site are identified as potentially infilled land;
- Current discharge consents include two within 250 m of Parcel 1 (for discharge of final effluent from domestic properties); three within 250 m of Parcel 2 (two final effluents from a farm and domestic property and one a trade discharge from a farm); and two in Parcel 3 (final effluent and trade effluent from the substation);
- The cable route search area between Parcels 1 and 2 includes two active discharge consents for domestic effluent, both at Muxwell Farm, and two within 250 m of the Site boundary (both for domestic effluent at Knowlhill Farm);
- The cable route search area between Parcels 2 and 3 has two active discharge consents within 250 m to the west of the Site boundary, at Borshaw Farm, for domestic effluent; and
- There is a slurry bed located at Borshaw Farm, west of the Site boundary, adjacent to the cable route search area between Parcels 2 and 3.

Site geology

10.6.21. Within the Site boundary, made ground is identified on geological mapping as being present in the area around the National Grid East Claydon Substation, within Parcel 3. Made ground is potentially also present in localised areas associated with infilled ponds or pits, farm buildings or tracks, but there is no indication that extensive areas of artificial ground would be present. Made ground outside of the Site boundary, but within

the Study area, is present, associated with the pits/landfills located at Calvert.

- 10.6.22. The bedrock geology across all parts of the Study area is composed of units from the Mercia Mudstone Group including the West Walton Formation, the Weymouth Mudstone Member, the Stewartby Member and the Peterborough Member.
- 10.6.23. The superficial geological units across the Study area comprise alluvium, till, glacial deposits and glaciofluvial deposits. Although specific peat deposits are not indicated on the geological mapping, some peat deposits may be present within the alluvium.
- 10.6.24. Depths to the mudstone bedrock are not widely recorded. On one of the BGS borehole records (located between Home Wood and Parcel 1), the top of bedrock is indicated to be at 0.2 m (overlain only by topsoil).

Geological hazards

- 10.6.25. Details are provided below relating to potential geological hazards within the Study area. The hazards identified in this section are not land, soil or groundwater receptors, but are potential hazards that will require consideration during the design works and construction (and potentially operation (including maintenance) and decommissioning) of Rosefield Solar Farm. As such, there would not be likely significant effects that are relevant to geological hazards, but issues to take into account as design and survey work progress:
- shrinkable clay soils, highly compressible units or low bearing capacity soils (including peat and soft clay) could be present within superficial units;
 - silt-rich soils susceptible to rapid loss of strength in wet conditions could be present within alluvium;
 - the environmental database report indicates that landslides may be a risk in some areas of the Site;
 - filled and made ground are expected to be present, including at embankments, infilled ponds and infilled pits;
 - varying Site levels are present in some locations; and
 - a high groundwater table is expected to be present due to geological conditions and the fact that the Site is recorded to be potentially susceptible to flooding from groundwater.

Site designated for their geological importance

- 10.6.26. There are no geological Sites of Special Scientific Interest (SSSIs) or Geological Conservation Review Sites within the Study area.

Mining and quarrying

10.6.27. The Study area is not within a part of the country where coal mining deposits are located. Data from the environmental database report indicates that there are no recorded mineral extraction sites onsite or within 250 m of the Site boundary, with the exception of Calvert Brickworks (as noted in **paragraph 10.6.20**). Sites further than 250 m from the Site boundary were reviewed as part of the baseline assessment but were concluded to be highly unlikely to influence Rosefield Solar Farm. One small feature was identified on historical mapping that could represent a pit, but this was not present beyond the mapping from 1883.

Mineral safeguarding areas

- 10.6.28. There are Mineral Safeguarding Areas which cover some of the Study area, relating to the presence of alluvial deposits along watercourses, as detailed below and presented in **Figure 10.3** in **Volume 2**.
- Parcel 1: Small section in the north-eastern corner, associated with the minor watercourse located on the Site boundary;
 - Parcel 1a: A Mineral Safeguarding Area is present in most of Parcel 1a, associated with the watercourse on the western and northern boundary;
 - Parcel 2: Sections of two fields in the north-western area (Fields D3 south and D12), an area near Borshaw Farm (Fields D8, D9 and sections of Fields D17, D18 and D19) and a small section of one field in the south (Field D31);
 - Parcel 3: The majority of Parcel 3 is covered by a Mineral Safeguarding Area;
 - Cable route search area between Parcels 1 and 2: Mineral Safeguarding Area is present in the north-west and north-eastern area and between Parcel 1 and Parcel 1a; and
 - Cable route search area between Parcels 2 and 3: A Mineral Safeguarding Area is located adjacent to the Claydon Brook.

Soil

- 10.6.29. A summary is provided below of the dominant soil properties within each Parcel and cable route search area. These details relate to the Site boundary only, as soil survey work covered the specific fields within the Site boundary, and does not incorporate adjoining land.
- Parcels 1, 1a and 3: dark greyish brown inorganic clay topsoil over light brown clay subsoil;
 - Parcel 2: similar soils as in Parcels 1, 1a and 3, except a variation to the south of Botolph Claydon, where soils are dark grey clay, clay loam or sandy clay loam topsoil over a dark greyish brown or grey sandy clay loam upper subsoil and sandy clay loam lower subsoil; and

- Cable route search areas (data taken from indicative regional mapping, not site-specific sampling): slowly permeable acid loamy and clayey soil with smaller areas of lime-rich loamy and clayey soils.

Agricultural land classification (ALC)

- 10.6.30. As with soil, this section considers only the land within the areas of Parcel 1, Parcel 1a, Parcel 2 and Parcel 3, and fields within the cable route search area. There are several fields within the Site boundary where it has not yet been possible to undertake surveys (a total of 147 ha – refer to **Figure 10.2** in **Volume 2**). These areas will be surveyed to inform the ES.
- 10.6.31. The following approximate percentages of soil grades have been recorded within the Site boundary to date, as shown in **Figure 10.2** in **Volume 2**:
- Grade 1 (excellent quality agricultural land) - none present;
 - Grade 2 (very good quality) – 0.5% (3.0 ha);
 - Grade 3a (good quality) – 1.2% (7.0 ha);
 - Grade 3b (moderate quality) - 98% (576.4 ha);
 - Grade 4 (poor quality) - none present; and
 - Non-agricultural land – 0.3% (1.5 ha).
- 10.6.32. Land that is classified as ALC Grade 1, Grade 2 or Grade 3a is considered to be BMV land. BMV land (Grade 2 and 3a) accounts for approximately 1.7% of the Site (10.0 ha) with the rest of the Site (except for the remaining fields to be surveyed) considered to be non-BMV land (577.9 ha). These figures will be updated within the ES, when the remaining 147 ha area has been surveyed. However, given the soil types mapped on the land that has been surveyed, the Applicant anticipates the unsurveyed areas to be entirely, or almost entirely, non-BMV land.

Groundwater

- 10.6.33. The Study area is underlain by superficial geological units that are classified as a secondary A aquifer and a secondary undifferentiated aquifer. The mudstone bedrock is classified as unproductive strata, meaning that it does not contain significant volumes of groundwater.
- 10.6.34. Local British Geological Society borehole records do not include details of depths to groundwater within the Study area, therefore, site-specific information on this is not available. However, a high groundwater table would be anticipated in some areas of the Study area, based on the geological conditions.
- 10.6.35. There are currently no licensed groundwater abstractions within the Study area.

10.6.36. With respect to source protection zones (SPZ) for the protection of groundwater, none are present within the Study area.

Future baseline

10.6.37. If Rosefield Solar Farm is not progressed, the future baseline with respect to land, soil and groundwater is not expected to be significantly impacted. It is anticipated that agricultural use of the land within the Site would continue, so there may be some minor associated degradation in soil quality. The geological and hydrogeological units would not be expected to change significantly, and no significant changes to mineral resources are expected to occur.

10.7. Mitigation embedded into the design

10.7.1. This preliminary assessment has been based on the principle that measures have been ‘embedded’ into the design of Rosefield Solar Farm to remove potential likely significant environmental effects as far as practicable, for example by the considered placement of infrastructure. Embedded (primary) environmental mitigation measures that are considered to be an inherent part of Rosefield Solar Farm are detailed within **Chapter 5: Approach to the EIA**. The embedded mitigation measures relevant to land, soil and groundwater and the benefits these provide are outlined in **Table 10.2** below.

Table 10.2 – Embedded mitigation measures relevant to land, soil and groundwater

| Embedded mitigation measures relevant to land, soil and groundwater | Benefit |
|---|---|
| Site location has been selected to avoid BMV land as far as possible. | Limit impacts to BMV land. |
| Internal access tracks and cable routes would use existing tracks, crossings and/or gaps in the hedgerows where reasonably practicable. | Where this is achieved, no further disturbance of hedgerows would be required, preventing additional disruption to existing soil horizons, habitats and ecosystems. |
| The cable routes would comprise underground cables – cabling routes will run alongside access tracks as much as possible to avoid wider excavations. Minimise the use of concrete, trenches and foundations. | Minimise impacts on soil (including BMV land) and geological units. |
| Minimum offset of least 10 m either side of Main Rivers, and 6 m from ditches and | This embedded mitigation has the added benefit of avoiding parts of the Minerals Safeguarding Areas present |

| Embedded mitigation measures relevant to land, soil and groundwater | Benefit |
|--|--|
| <p>ordinary watercourses, to all fence lines within Rosefield Solar Farm.</p> <p>Where crossing points are required over Main Rivers or ordinary watercourses, these will be designed to minimise effects on floodplain and any biodiversity interest associated with the watercourse.</p> | <p>within the Site boundary. For the Rosefield Solar Farm, Mineral Safeguarding Areas correspond to the presence of alluvium, which is associated with watercourses. An offset to protect the water resources will also mean that mineral reserves are not impacted.</p> |

10.8. Optionality

- 10.8.1. **Chapter 5: Approach to the EIA** sets out those elements of Rosefield Solar Farm for which optionality is present within the current design and sets out the scenarios assessed for the purpose of this PEIR.
- 10.8.2. The preliminary design principles as outlined in **Chapter 5: Approach to the EIA** and preliminary parameter plans (**Figures 3.1 to 3.5 in Volume 2**) set out the reasonable ‘worst case scenario’ that has been assessed within this chapter. The ‘worst case scenario’ options in relation to this preliminary land, soil and groundwater assessment are described in **Table 10.3** below.

Table 10.3 – Optionality scenarios assessed

| Project element | Scenario assessed for this preliminary assessment |
|-------------------------------|---|
| Satellite Collector Compounds | <p>This preliminary assessment has considered the siting of the Satellite Collector Compound in Parcel 1 within either Field B10 or Field B23, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario.</p> <p>For the same reason, all three field options (Fields D8, D9 and D17) are considered for the location of the Satellite Collector Compound in Parcel 2.</p> |
| Main Collector Compound | <p>The four fields that are being considered for the Main Collector Compound have all been taken into consideration within this preliminary assessment, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario.</p> |
| BESS | <p>This preliminary assessment considers both Scenario 1 and Scenario 2 for the location of the BESS, as it is considered likely that there will be no significant</p> |

| Project element | Scenario assessed for this preliminary assessment |
|---|---|
| | difference in effects relating to land, soil and groundwater with either scenario. |
| Rosefield Substation | This preliminary assessment considers both Scenario 1 and Scenario 2 with respect to the Rosefield Substation location, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario. |
| Cable route to connect the Solar PV Modules, BoSS, Collector Compounds, Rosefield Substation and BESS | For the purposes of this preliminary assessment, both of the cable route options have been considered, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater with either scenario. |
| BoSS | This preliminary assessment assumes the BoSS to be located independently outdoors and central inverters would be used as this is considered to be the worst case scenario for land, soils and groundwater as these would both require hardstanding bases. |
| Construction Compounds | For the purposes of this preliminary assessment, all suitable locations proposed for the Main and Satellite Construction Compounds have been considered, as it is considered likely that there will be no significant difference in effects relating to land, soil and groundwater. |

10.9. Approach to the preliminary assessment

- 10.9.1. For this preliminary assessment, the likely significant effects on identified receptors are reported based on the information available at the time of writing. The final assessment of likely significant effects will be reported in the ES.
- 10.9.2. A Minerals Safeguarding Assessment, to assess impacts to Mineral Safeguarding Areas (including any potential impact to loss of access to mineral resources during the lifetime of Rosefield Solar Farm), does not form part of this preliminary assessment but will be reported within the ES once further baseline information has been obtained and further consultation with Buckinghamshire Council has been undertaken.
- 10.9.3. A Preliminary Risk Assessment has been completed for Rosefield Solar Farm (see **Appendix 10.2** in **Volume 3**). This provides baseline data on the Study area, alongside an assessment of risks relating to human receptors, controlled waters and other sensitive receptors. This work is undertaken in line with the technical approach presented in LCRM and in

general accordance with British Standard (BS) 10175: 2011 + A2 2017²⁷. The Preliminary Risk Assessment report provided in **Appendix 10.2** in **Volume 3** includes coverage of the site history, geology, hydrogeology, hydrology, and other issues. A site walkover has been completed as part of this preliminary assessment.

- 10.9.4. The assessment criteria for land, soils and groundwater adopted for this preliminary assessment are detailed below. It should be noted that some of these criteria differ from the criteria proposed within Appendix D of the EIA Scoping Report, with an updated approach that provides additional robustness in terms of assessing the soil and agricultural land.

Receptor sensitivity relating to potential contamination

- 10.9.5. There are no published guidelines or criteria for assessing and evaluating effects on geology, hydrogeology or soil within the context of an EIA. The sensitivity criteria used in this preliminary assessment have therefore been derived from the Construction Industry Research and Information Association (CIRIA) document Contaminated land risk assessment, A guide to good practice (C552)²⁸. The IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment²⁹ has also been referred to when producing the definitions for receptor sensitivity. Sensitivity criteria are presented in **Table 10.4**.

Table 10.4 – Receptor sensitivity relating to potential contamination

| Sensitivity | Definition |
|-------------|---|
| Very High | <p>The receptor is highly sensitive and could be easily damaged by activities associated with Rosefield Solar Farm.</p> <p>The receptor is likely to be of national significance.</p> <p>The recovery of the receptor is either impossible or very long-term.</p> |

²⁷ Land Contamination Risk Management (LCRM), Environment Agency, 2023. Available online: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm> (accessed 5 June 2024).

²⁸ Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.

²⁹ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

| Sensitivity | Definition |
|-------------|--|
| High | <p>The receptor is of high sensitivity and is of importance at a local or regional level.</p> <p>The receptor is vulnerable to the effects of Rosefield Solar Farm and recovery would be slow and/or costly (e.g., remedial measures to groundwater may be required to prevent a wider impact).</p> |
| Medium | <p>The receptor is of medium value and is likely to be of local importance.</p> <p>The receptor is slightly vulnerable to impacts from Rosefield Solar Farm and would be expected to recover over a moderate timescale (e.g., up to five years for groundwater to return to its current or an improved condition).</p> |
| Low | <p>The receptor is of low value and has little contribution to local, regional or national resources.</p> <p>The receptor is not generally vulnerable to impacts that may arise from Rosefield Solar Farm and/or will recover over a short timescale (e.g., up to 1 year before groundwater returns to its current or improved condition).</p> |
| Negligible | <p>The receptor is of negligible positive value.</p> <p>The receptor is not vulnerable to impacts that may arise from Rosefield Solar Farm and/or will recover quickly.</p> |

Receptor sensitivity relating to soils and agricultural land

10.9.6. Sensitivity criteria for soils and agricultural land, derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment³⁰, are presented in **Table 10.5**. For Rosefield Solar Farm, the ALC Grades have been used as the determining factor for receptor sensitivity.

³⁰ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

Table 10.5 – Receptor sensitivity relating to soils and agricultural land

| Sensitivity (in-situ soils) | Soil resource |
|-----------------------------|---|
| <p>Very High</p> | <p>Biomass production: ALC Grades 1 & 2 or Land Capability for Agriculture (LCA) Classes 1 & 2.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., SAC, SPA, Ramsar); Peat soils; Soils supporting a National Park, or Ancient Woodland.</p> <p>Soil carbon: Peat soils.</p> <p>Soils with potential for ecological/landscape restoration.</p> <p>Soil hydrology: very important catchment pathway for water flows and flood risk management.</p> <p>Archaeology, cultural heritage, community benefits and geodiversity: Scheduled Monuments and adjacent areas; World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/educational access to land covered by National Park designation.</p> <p>Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access).</p> |
| <p>High</p> | <p>Biomass production: ALC Grade 3a, or LCA Grade 3.1.</p> <p>Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, SSSI or Protected Landscapes, Special Landscape Area, and Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation (including priority habitats).</p> <p>Soil carbon: Organo-mineral soils (e.g., peaty soils).</p> <p>Soil hydrology: Important catchment pathway for water flows and flood risk management.</p> <p>Archaeology, cultural heritage, community benefits and geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens;</p> |

Sensitivity (in-situ soils) Soil resource

Regionally Important Geological and Geomorphological Sites (RIGS); Soils supporting community /recreational/educational access to RIGS and Protected Landscapes.

Source of materials: Surface mineral reserves that would be sterilised (i.e. without future access).

Medium

Biomass production: ALC Grade 3b or LCA Grade 3.2.

Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g., Local Nature Reserves, Local Geological Sites, Sites of Nature Conservation Importance, Special Landscape Areas; Non-Native Forest and woodland soils.

Soil carbon: Mineral soils.

Soil hydrology: Important minor catchment pathway for water flows and flood risk management.

Archaeology, Cultural heritage, community benefits and geodiversity: Soils with possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land.

Source of materials: surface mineral reserves that would remain accessible for extraction.

Low

Biomass production: ALC Grades 4 & 5 or LCA Grades 4.1 to 7 or Urban soils.

Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats/landscapes.

Agricultural soils.

Soil carbon: Mineral soils.

Soil hydrology: Pathway for local water flows and flood risk management.

Archaeology, cultural heritage, community benefits and geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/ educational access to land.

| Sensitivity (in-situ soils) | Soil resource |
|-----------------------------|---|
| | Source of materials: Surface mineral reserves that would remain accessible for extraction. |
| Negligible | As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions. |

Magnitude of impact relating to potential contamination

10.9.7. Where an impact is considered to be likely to occur as a result of Rosefield Solar Farm being constructed, operated and/or decommissioned, the magnitude of impact has been classified using the criteria presented in **Table 10.6**. These are also derived from CIRIA’s Contaminated Land Risk Assessment (A guide to good practice) C552³¹. The IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment³² has also been referred to in determining definitions for magnitude of impact.

Table 10.6 – Magnitude of impact criteria relating to potential contamination

| Magnitude of impact | Definition |
|---------------------|--|
| Major | <p>These impacts are likely to be important considerations at a regional or district scale, and if adverse, are potential concerns, depending upon the relative importance attached to the issue during the decision-making process. Mitigation measures and detailed design work are unlikely to remove all the impacts upon the affected communities or interests.</p> <p>Examples include short-term (acute) risk to human health likely to result in ‘significant harm’ as defined by the Environment Protection Act 1990, Part IIA³³, short-term risk of pollution of sensitive water resources; catastrophic damage to buildings or</p> |

³¹ Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.

³² Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

³³ Environment Protection Act 1990. Available online: <https://www.legislation.gov.uk/ukpga/1990/43/contents> (accessed 5 June 2024).

| Magnitude of impact | Definition |
|---------------------|--|
| | property; and short-term risk to an ecosystem or part of an ecosystem. |
| Moderate | <p>These impacts, if adverse, while important at a local scale, are not likely to be key decision-making issues. The cumulative effect of such issues may lead to an increase in the overall impacts on a particular area or on a particular resource. They represent issues where impacts will be experienced but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected communities or interests. Some residual impacts will still arise.</p> <p>Examples include chronic damage to human health ('significant harm' as defined in 'Draft Circular on Contaminated Land'³⁴); pollution of sensitive water resources; and significant change in an ecosystem or organism forming part of that ecosystem.</p> |
| Minor | <p>These impacts may be raised as local issues but are unlikely to be of importance in the decision-making process.</p> <p>Nevertheless, they are of relevance in the detailed design of Rosefield Solar Farm and consideration of mitigation or compensation measures.</p> <p>Examples include pollution of non-sensitive water resources; significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land'); and damage to sensitive buildings, structures or the environment.</p> |
| Negligible | <p>No change or a barely perceptible change from the baseline position.</p> <p>Examples include non-permanent human health impacts easily prevented by use of personal</p> |

³⁴ Department for Environment, Food and Rural Affairs. (2006). Defra Circular 01/2006 Environmental Protection Act 1990: Part 2A: Contaminated Land. Available online: <https://assets.publishing.service.gov.uk/media/5a79c677e5274a684690c059/pb12112-circular01-2006-060817.pdf> (accessed 5 June 2024).

| Magnitude of impact | Definition |
|---------------------|--|
| | protective clothing; and easily repairable damage to buildings, structures and services. |
| No change | No change from baseline conditions. |

Magnitude of impact relating to soils and agricultural land

10.9.8. Where an impact is considered to be likely to occur as a result of Rosefield Solar Farm being constructed, operated and/or decommissioned, the magnitude of the impact is classified using the criteria presented in **Table 10.7**, which is derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment³⁵.

Table 10.7 – Magnitude of impact criteria relating to soils and agricultural land

| Magnitude of impact (change) | Description of impacts restricting proposed land use |
|------------------------------|---|
| Major | <p>Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20 ha or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from ‘temporary developments’*).</p> <p><i>or</i></p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20 ha, or gain in soil-related features, as advised by other factor specialists in the EIA team (including effects from ‘temporary developments’*).</p> |
| Moderate | <p>Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 ha and 20 ha or loss of soil-related features, as advised by other factor specialists in the EIA team (including effects from ‘temporary developments’*).</p> <p><i>or</i></p> <p>Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 ha and 20 ha, or gain in soil-</p> |

³⁵ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

| Magnitude of impact (change) | Description of impacts restricting proposed land use |
|------------------------------|--|
| Minor | <p>related features, as advised by other factor specialists in EIA team.</p> <p>Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features, as advised by other factor specialists in EIA team.</p> <p>or</p> <p>Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5 ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features, as advised by other factor specialists in EIA team</p> |
| Negligible | No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use |

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

Significance of effect for land, soils and groundwater relating to potential contamination

- 10.9.9. The significance of effect is based on the sensitivity of the receptor and the magnitude of impact, as outlined in **Table 10.8**, derived from CIRIA’s Contaminated Land Risk Assessment (A guide to good practice) C552³⁶ and with reference to the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment³⁷. The significance of effect can be either adverse or beneficial.
- 10.9.10. The significance of an effect is reported as either ‘significant’ or ‘not significant’. Any effects that have been determined as ‘moderate’ or above

³⁶ Rudland, D. J., Lancefield, R. M. and Mayell, P. N. (2001). Contaminated land risk assessment, A guide to good practice (C552). Construction Industry Research and Information Association.

³⁷ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

are considered to be significant. Any effects that have been determined as ‘low’ or below are considered not significant. Where the significance matrix indicates a range for the effect significance (e.g. ‘moderate/low’), professional judgement can be applied to select one option (which would be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as ‘moderate/low’, this would be considered significant unless further information could be provided to downgrade the significance effect to ‘low’.

Table 10.8 – Significance of effect criteria relating to potential contamination

| Sensitivity | Magnitude of impact | | | |
|-------------|---------------------|--------------|--------------|--------------|
| | Negligible | Minor | Moderate | Major |
| Negligible | Very Low | Very Low | Very Low | Low |
| Low | Very Low | Very Low | Low | Moderate/Low |
| Medium | Very Low | Low | Moderate/Low | Moderate |
| High | Low | Moderate/Low | Moderate | High |
| Very high | Moderate/Low | Moderate | High | Very High |

Significance of effect for soils and agricultural land

- 10.9.11. The significance of effect is based on the sensitivity of the receptor and the magnitude of impact, as outlined in **Table 10.9**, which is derived from the IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment³⁸. The significance of effect can be either adverse or beneficial.
- 10.9.12. The significance of an effect is reported as either ‘significant’ or ‘not significant’. Any effects that have been determined as ‘moderate’ or above are considered to be significant. Any effects that have been determined as ‘low’ or below are considered not significant. Where the significance matrix indicates a range for the effect significance (e.g. ‘slight or moderate’), professional judgement can be applied to select one option (which would

³⁸ Institute of Environmental Management & Assessment Guide 2022. Available online: <https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils> (accessed 5 June 2024).

be justified by evidence, as appropriate) or an effect significance range can be applied. If a significance of effect is assigned as ‘slight or moderate’, this would be considered significant unless further information could be provided to downgrade the significance effect to ‘slight’.

Table 10.9 – Soils and agricultural land significance of effect criteria

| Sensitivity | Magnitude of impact | | | | |
|-------------|---------------------|-------------------|--------------------|---------------------|---------------------|
| | No Change | Negligible | Minor | Moderate | Major |
| Negligible | Neutral | Neutral | Neutral | Neutral or Slight | Slight |
| Low | Neutral | Neutral or Slight | Neutral or Slight | Slight | Slight or Moderate |
| Medium | Neutral | Neutral or Slight | Slight | Moderate | Moderate or Large |
| High | Neutral | Slight | Slight or Moderate | Moderate or Large | Large or Very Large |
| Very high | Neutral | Slight | Moderate or Large | Large or Very Large | Very Large |

10.10. Assessment of likely effects (without additional mitigation)

10.10.1. This section considers the effects that may arise during the construction, operation (including maintenance) and decommissioning phases of Rosefield Solar Farm in the absence of additional mitigation, taking into account the above embedded mitigation measures outlined in **Table 10.2** and assessing the reasonable worst case scenarios as outlined in **Table 10.3**.

10.10.2. The baseline review and risk assessment identified a number of potential risks that may result from Rosefield Solar Farm. These are summarised alongside the associated recommendations below. Full details are included in the PRA report (**Appendix 10.2** in **Volume 3**):

- Moderate to low risk to current or future site users due to build up of ground gases generated by waste in the current or historical landfill sites located at Calvert, potentially resulting in asphyxiation or explosion; and
- Moderate to low risk to Site buildings or infrastructure due to build up of ground gases generated by current or historical landfill sites at Calvert, potentially resulting in explosion.

Construction phase

- 10.10.3. With respect to effects on land contamination, construction activities could lead to localised contamination of soils from potential spills from construction plant during operation or refuelling activities.
- 10.10.4. If contaminated soils associated with past developments are identified, these could form a minor localised source of contamination if they are not managed correctly.
- 10.10.5. In terms of effects on groundwater, construction activities (including piling activities, earthworks, access tracks and excavation) could lead to minor damage to field drains, which may affect the localised drainage of the agricultural land and the groundwater quality of the underlying aquifer.
- 10.10.6. Spillages or leaks of fuels, oils and chemicals during construction works may lead to effects on groundwater, which could result in potential pollution to any underlying aquifers. Potential pollution may also arise from runoff associated with construction activities (e.g., silt run-off during earthworks and accidental spills and leaks from construction plant).
- 10.10.7. Effects on soil and agricultural land during the construction phase could include compaction and deterioration of soils and agricultural land. Access tracks and steep slopes within the Site are likely to be most susceptible to deterioration through erosion. Some soils are more susceptible to damage when handled during construction. Handling and moving of soil is expected to be avoided, where reasonably practicable. Some soils are, however, more susceptible to structural damage from the use of machinery and vehicular activity, depending upon soil type, climate and wetness class.

Operational (including maintenance) phase

- 10.10.8. With respect to land contamination, large numbers of vehicle movements are not anticipated within the Site during the operational (including maintenance) phase and therefore, although the potential exists for vehicles to cause contamination through fuel losses/leaks.
- 10.10.9. With respect to groundwater, maintenance works (including cleaning of the Solar PV modules and vehicle tracking) could result in spillages and leaks of fuels, oils and chemicals, which could lead to effects on groundwater resulting in potential pollution to any underlying aquifers.
- 10.10.10. The presence of piled foundations and increase in impermeable areas such as concrete hardstanding for the collector compounds, BESS and substations may locally affect the groundwater infiltration rates across the Site. It is anticipated that the BESS compound would incorporate a bund feature, which would prevent firewater from leaving the Site, should this be required. However, in the instance of a failure, there is a potential for

chemicals to infiltrate, which could result in potential pollution to the groundwater and any underlying aquifers.

- 10.10.11. With respect to soils and agricultural land, there is anticipated to be limited ground disturbance or trafficking over the soils, apart from periodic maintenance requirements, including replacement of damaged parts or cleaning and maintenance of the Solar PV modules, as described in **Chapter 3: Description of Rosefield Solar Farm**.
- 10.10.12. Rosefield Solar Farm would lead to temporary impacts to soil and agricultural land for the duration of the operational (including maintenance) phase (assumed to be 40 years), in particular the areas in which the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and operational access tracks would be located. The area of land underneath the Solar PV modules and within the field margins are expected to be used for ecological mitigation and enhancements, which would include planting (including establishment of grassland and wildflowers), which would help to reduce soil degradation and erosion during the operational (including maintenance) phase, which could lead to potential benefits.
- 10.10.13. It is anticipated that the operational (including maintenance) phase of Rosefield Solar Farm would lead to a temporary change of land use of agricultural land. Based on the ALC surveys undertaken to date, approximately 0.5% (3.0 ha) of this agricultural land is classified as Grade 2 BMV land and 1.2% (7.0 ha) is classified as Grade 3a BMV land. The area of BMV land within Site boundary is a small percentage of the wider BMV land area available in Buckinghamshire. These figures will be updated within the ES when the remaining 147 ha area has been surveyed. Given the soil types mapped on the land that has been surveyed, the Applicant anticipates the unsurveyed land to be entirely or almost entirely non-BMV land.
- 10.10.14. It is recognised that this does not account for other existing development and/or approved developments within Buckinghamshire that may lead to a reduction in available BMV land. For the purposes of this PEIR, a preliminary cumulative assessment which considers other existing development and/or approved developments that may impact BMV land is detailed in **Chapter 18: Cumulative Effects**. Consultation will be undertaken with Buckinghamshire Council to agree the list of other existing development and/or approved developments that need to be considered in the cumulative assessment. The detailed cumulative assessment will be presented within the ES.

Decommissioning phase

- 10.10.15. During decommissioning works, activities could result in effects on land contamination in the form of minor localised contamination of soils related to potential spills from plant.

- 10.10.16. With respect to soil, there is potential for erosion associated with works conducted on steep slopes located within the Site boundary. The number of vehicle movements is anticipated to be less than during the construction phase, limiting the potential for compaction of soils to occur. Decommissioning works are also less likely than construction works to adversely impact on agricultural field drains as there would be no requirement for piling, so this phase is less likely to result in deterioration of soil quality.
- 10.10.17. With respect to groundwater, decommissioning activities (including earthworks and excavation) could lead to minor damage to field drains, which may affect the localised drainage of the agricultural land and the groundwater quality of the underlying aquifer.
- 10.10.18. As a result of the decommissioning works, spillages and leaks of fuels, oils and chemicals may lead to effects on groundwater, which could result in potential pollution to any underlying aquifers. This may arise from runoff associated with activities (e.g., silt run-off during earthworks and accidental spills and leaks from machinery).
- 10.10.19. With respect to soils and agricultural land, the decommissioning phase would involve the dismantling and removal of infrastructure. Following decommissioning, it is intended that this land would be returned to the landowner.
- 10.10.20. All concrete, hardstanding areas, foundations for the infrastructure and any internal tracks would be removed to a depth of up to 1 m. It is assumed that all the below ground cables would be left in-situ as these are likely to be located at a depth greater than 1 m, therefore leaving them in the ground would limit the disturbance and impact to the soil quality.
- 10.10.21. The location of the BESS, Rosefield Substation, Main Collector Compound, Satellite Collector Compounds and access tracks will be restored using soil retained onsite, which could have been retained in managed bunds, or with new topsoil that would be brought to the Site. The trafficking of soils when conditions are unsuitable (e.g., when soils are wet) could damage soil structure, necessitating remedial activity to restore quality.

10.11. Additional mitigation

Construction phase

- 10.11.1. An Outline Construction Environmental Management Plan will be submitted in support of the DCO application. The Outline Construction Environmental Management Plan will set out measures to mitigate effects on land, soil and groundwater receptors, such as procedures to mitigate against erosion and contaminated land and include emergency procedures to manage accidental spillages and leaks.

- 10.11.2. An Outline Soil Management Plan will be submitted in support of the DCO application. The Outline Soil Management Plan will set out measures to manage any potential impacts to soil (and agricultural land) during and on completion of the construction phase.
- 10.11.3. The Outline Soil Management Plan will identify those areas within the Site which may be more susceptible to damage, for example, the temporary access tracks, Main Collector Compound, Satellite Collector Compounds and steep slopes; set out details of when soil handling should be avoided (for example when it is wet or after periods of heavy rainfall or high winds) and will advise on when soils are in a suitable condition for being handled or trafficked. The Outline Soil Management Plan will also set out measures for soil management and follow the principles of best practice to maintain the physical properties of the soil.

Operational (including maintenance) phase

- 10.11.4. An Outline Operational Environmental Management Plan will be submitted in support of the DCO application. Based on the findings of the Preliminary Risk Assessment, the Outline Operational Environmental Management Plan will describe measures to prevent damage to the land during the operational phase (including maintenance), together with measures for pollution prevention, and emergency procedures to manage accidental spillages and leaks. It will also outline procedures for managing the firewater, which may contain chemicals. In the event of a fire, any water used for fire suppression or prevention would be collected within a designated bund or suitable container, and then removed from site by tanker to prevent its release to the surrounding environment.
- 10.11.5. An Outline Battery Safety Management Plan will be submitted in support of the DCO application. The purpose of the Outline Battery Safety Management Plan will be to ensure the safe operation of the BESS and it will set out the parameters for the management of fire risk associated with the BESS.
- 10.11.6. An Outline Soil Management Plan will be submitted in support of the DCO application. For the operational (including maintenance) phase, the Outline Soil Management Plan will set out the following measures:
- Identification of those areas within the Site which may be more susceptible to damage, for example, steep slopes (which may not differ to those identified during the construction phase);
 - Definition of standard parameters to identify when soil conditions are suitable for handling or trafficking (qualities of the soil, for example when it is wet or after periods of heavy rainfall or high winds); and
 - Outline measures and principles for soil management and best practice to maintain the physical properties of the soil, with the aim of maintaining the condition of the land until the end of the lifetime of Rosefield Solar Farm.

10.11.7. An Outline Landscape and Ecological Management Plan will be submitted in support of the DCO application. The Outline Landscape and Ecological Management Plan will provide the principles of how the land within the Site would be managed during the operational phase (including maintenance), such as the requirements for the management and remediation of vegetation to ensure planting is sustained.

Decommissioning phase

10.11.8. An Outline Decommissioning Environmental Management Plan will be submitted in support of the DCO application. The Outline Decommissioning Environmental Management Plan will set out measures to mitigate likely effects relating to land contamination, soils, agricultural land or groundwater, such as best practice procedures to mitigate against erosion, measures to deal with contaminated land, and emergency procedures to manage accidental spillages and leaks.

10.11.9. An Outline Soil Management Plan will be submitted in support of the DCO application. For the decommissioning phase, the Outline Soil Management Plan will set out the following measures (some of which may differ from construction and operational (including maintenance) phases, depending on site conditions at the time of the works):

- Identification of those areas within the Site which may be more susceptible to damage, for example, steep slopes;
- Definition of standard parameters to identify when soil conditions are suitable for handling or trafficking (qualities of the soil, for example when it is wet or after periods of heavy rainfall or high winds); and
- Outline measures and principles for soil management and best practice to maintain the physical properties of the soil, with the aim of maintaining the condition of the land until the end of the lifetime of Rosefield Solar Farm.

10.12. Assessment of residual effects (with additional mitigation)

Construction phase

10.12.1. This preliminary assessment has not identified any significant sensitive receptors relating to land contamination based on the findings of the Preliminary Risk Assessment (see **Appendix 10.2** in **Volume 3**), and therefore receptors are considered to have **low** sensitivity. The magnitude of impact is considered to be **negligible** due to the application of the Construction Environmental Management Plan, and the significance of the effect is therefore **very low** and **not significant**.

10.12.2. With respect to groundwater, the aquifers are deemed to have a **medium** sensitivity. The magnitude of impact of construction activity on groundwater quality would be **negligible** due to the application of the

Construction Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.

- 10.12.3. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to mitigation that will prevent damage to the soil resource in terms of soil quality during construction, the magnitude of impact is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 3a soil (1.2% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (97% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.
- 10.12.4. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to the temporary nature of the development, the magnitude of impact during construction is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 2 and 3a soil (1.7% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (98.3% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

Operational (including maintenance) phase

- 10.12.5. The Preliminary Risk Assessment has not identified any significant sensitive receptors relating to land contamination, and therefore this issue would be considered to be of **low** sensitivity. The magnitude of impact is considered to be **negligible** due to the application of the Operational Environmental Management Plan and the significance of the effect is therefore **very low** and **not significant**.
- 10.12.6. In terms of groundwater, the aquifers are deemed to have a **medium** sensitivity. The magnitude of impact on groundwater quality during the operational phase (including maintenance) would be **negligible** due to the application of the Operational Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.

- 10.12.7. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact to soil resource quality during operation (including maintenance) is likely to be **negligible** as there would be no discernible loss or reduction or improvement of soil functions or soil volumes. Therefore, it is considered that the significance of effect would be either **slight adverse** or **neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.
- 10.12.8. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Due to the temporary nature of the development, the magnitude of impact during operation (including maintenance) is considered to be **minor**. Therefore, the significance of effect is considered to be **slight or moderate adverse** and **potentially significant** for areas of Grade 2 and 3a soil (1.7% of the Site area surveyed to date) and **slight adverse** and **not significant** for areas of Grade 3b soil (98.3% of the Site area surveyed to date). This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

Decommissioning phase

- 10.12.9. In relation to land contamination, there are not shown to be any significant sensitive receptors based on the findings of the Preliminary Risk Assessment, and therefore sensitivity is considered to be **low**. The magnitude of impact is considered to be **negligible** due to the application of the Decommissioning Environmental Management Plan and the significance of the effect is therefore **very low** and **not significant**.
- 10.12.10. The aquifers are classified as having **medium** sensitivity. The magnitude of impact on groundwater quality during the decommissioning phase would be **negligible** due to the application of the Decommissioning Environmental Management Plan and therefore the significance of effect is considered to be **very low** and **not significant**.
- 10.12.11. With respect to soil quality, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact to soil resource quality during the decommissioning phase is likely to be **negligible** as soils are expected to be managed to prevent damage to the soil resource, so far as possible

and would be returned to agricultural use. Therefore, it is considered that the significance of effect would be **slight adverse or neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

- 10.12.12. With respect to availability of agricultural land, the land upon which Rosefield Solar Farm is proposed to be located is considered to have **high** sensitivity (ALC Grade 2 and 3a, BMV) or **medium** sensitivity (ALC Grade 3b, non-BMV). Overall, the magnitude of impact on agricultural land during decommissioning is likely to be **negligible** as soils are expected to be managed to prevent damage to the soil resource, so far as possible and would be returned to agricultural use. Therefore, it is considered that the significance of effect would be **slight adverse or neutral or slight adverse** and **not significant**. This conclusion will be reviewed for the ES once the remaining 147 ha area has been surveyed. However, the Applicant anticipates the unsurveyed land to be entirely, or almost entirely, non-BMV land and therefore it is anticipated that the conclusions of this preliminary assessment would not change.

10.13. Opportunities for enhancement

- 10.13.1. There is potential that soil health could be enhanced over the 40-year period of operation of Rosefield Solar Farm (facilitated through the implementation of a Soil Management Plan), due to the proposed planting of grassland and wildflowers, which would reduce the impact of soil erosion. This will be detailed and assessed further in the ES.
- 10.13.2. Furthermore, the soil quality will be enhanced during the period that it is not used for agriculture, as there will be no significant nutrient up-take by vegetation or repeat harvests, and there will be significant reduction in soil handling due to the lack of need for farming equipment to undertake harvesting operations.

10.14. Difficulties and uncertainties

- 10.14.1. The information provided in this PEIR is preliminary and is based on the data available at the time of writing. The final assessment of likely significant effects will be reported in the ES.
- 10.14.2. Potential data gaps include:
- On some occasions, historical information may not be available due to gaps between historical OS maps. However, for Rosefield Solar Farm, there are only minor changes to field boundaries between the subsequent map editions, and therefore it is considered unlikely that significant features have been missed;

- Due to the large area of the Site, the site walkover provided an overview of land parcels and cable route search areas, but there may be some features that were not observed;
- There are no previous ground investigations available for the Site (with the exception of the ALC survey); therefore, there is no specific information on concentrations of potential contaminants in soil and groundwater. However, this information will aim to be collected during site investigation work, the results of which will be submitted in support of the DCO application;
- Details of groundwater depth and flow direction are unknown. If necessary, relevant information could be obtained during site investigation work, the results of which will be submitted in support of the DCO application; and
- Potential uncertainties exist relating to climate change impacts, including predicted increases in extreme weather events and/or predicted long-term impacts, for example rising groundwater levels.

10.15. Further work required to inform the ES

10.15.1. To form a robust ES, the following work is proposed so that all aspects will be suitably considered:

- Assessment of geological units to demonstrate the absence of likely significant effects;
- ALC survey to be completed of the remaining fields (147 ha) within the Site boundary;
- Ground investigations of the Site. Potential contaminant linkages will aim to be assessed further through appropriate site investigation. This will be completed in support of the DCO application;
- Further consultation with statutory consultees, including Buckinghamshire Council and Natural England, will be undertaken in relation to the ALC survey results and the proposed Outline Soil Management Plan as part of the ongoing assessment that will inform the ES; and
- A Minerals Safeguarding Assessment will be undertaken to inform the on-going design of Rosefield Solar Farm and will form part of the Planning Statement submitted in support of the DCO application. Consultation will be undertaken with Buckinghamshire Council to discuss the Minerals Safeguarding Assessment and to understand any future ambitions for minerals extraction within the region.



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