Contents

11 Ground Conditions

11.1 Introduction

11.1.1. This chapter presents the preliminary assessment of the likely significant effects of the Proposed Development with respect to Ground Conditions, including geology (geodiversity), minerals, soil receptors (including peat), and land contamination. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the development description provided in **Chapter 4: Development Description** and with respect to relevant parts of the following chapters:

- **Chapter 8: Biodiversity** – a large proportion of the biodiversity in terrestrial ecosystems is present in soil, and pollutants associated with land contamination have the potential to impact on biodiversity, this chapter should therefore be read in conjunction with Chapter 8 which considers the potential for significant effects on biodiversity.
- **Chapter 10: Water Environment** – the water environment chapter considers the likely significant effects of the Proposed Development on water resources, there are common receptors between water environment and land contamination receptors, and there is interaction between the water environment and soil resources e.g., in relation to land drainage, soil compaction, and erosion/runoff.

11.1.2. This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 11.2**);
- consultation and engagement that has been undertaken and how comments from consultees relating to Ground Conditions have been addressed (**Section 11.3**);
- the methods used for baseline data gathering (**Section 11.3.5**);
- overall baseline (**Section11.5**);
- embedded measures relevant to Ground Conditions (**Section 11.6**);
- the scope of the assessment for Ground Conditions (**Section 11.7**);
- the methods used for the assessment (**Section 11.8**);
- the maximum design scenario applied in the assessment (**Section 11.9**);
- the preliminary assessment of Ground Conditions effects for soils including peat (**Section 11.10**);
- the preliminary assessment of Ground Conditions effects for land contamination (**Section 11.11**);
- preliminary assessment of cumulative (inter-project) effects (**Section 11.12**);
- a summary of the preliminary significance conclusions (**Section 11.13**); and
- an outline of further work to be undertaken for the Final Environmental Statement (ES) (**Section 11.14**).

11.1.3. The Ground Conditions chapter refers to specific components of the Proposed Development due to the previous and future survey requirements. For the purposes of the baseline and assessment

defined within this chapter and to ensure the reader understands the information presented in this Draft ES Chapter, the 'Site' refers to the overall EIA Assessment Area, but specific reference is also defined as:

- 'Main Windfarm Site' - This encompasses the proposed windfarm development site and surrounding parcels at Rhyswg Farm; and
- 'Access track' - This captures the proposed access route between T2 and the southernmost track of the Proposed Mynydd Maen project.

11.1.4. These areas are shown on **Figure 11.1.**

Limitations and assumptions

11.1.5. The information provided in this Draft ES is preliminary, the final assessment of likely significant Ground Conditions effects will be reported in the Final ES. This Draft ES has been produced to fulfil the Applicants Pre-Application Consultation (PAC) responsibilities and enable consultees to develop an informed view of the likely significant effects of the Proposed Development based on latest current information.

11.1.6. There are no limitations relating to land contamination that affect the robustness of the preliminary assessment of the potential likely significant effects of the Proposed Development.

11.1.7. The assessment for effects on soil resources is preliminary. Although peat depth survey has been completed for the proposed Main Windfarm Site and has confirmed the absence of deep peat in this area (see **Section 11.4**), peat survey is still to be completed for the proposed Access Track between Turbine 2 and the southernmost tracks of the proposed Mynydd Maen project. This is due to the potential for localised deep peat to be present (see baseline information **Section 11.5**). The assessment for the Final ES will therefore be updated based on the findings of a peat survey along the proposed access track. The peat survey will also provide data on other soils present on the access track.

11.1.8. The Applicant is also committed to completing a soil resources survey for the Main Windfarm Site, this will be used to provide data to inform detailed soil handling and management measures in the Soil Management Plan (SMP) (see embedded measures in Table 11.).

11.1.9. A preliminary assessment of effects associated with the offline access track between Pantside and the unclassified road (see inset A on Figure 1-2) has not been undertaken as part of the Draft ES as the design is yet to be determined. The Final ES will be updated to consider any effects associated with this segment of track.

11.2 Relevant legislation, planning policy and technical guidance

11.2.1. This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Ground Conditions. Further information on policies relevant to the Proposed Development is provided in **Chapter 5: Legislation and Policy overview**.

Legislation

11.2.2. A summary of the relevant legislation is given in **Table 11.1.**

Table 11.1 Legislation relevant to the Ground Conditions assessment.

Legislation	Context
Health and Safety at Work etc. Act 1974[1]	The Health and Safety at Work etc. Act and regulations made under the Act place responsibilities upon employers to carry out a risk assessment for every work activity and to document it. Besides carrying out a risk assessment, employers also need to: plan for implementing the health and safety measures identified as necessary by the risk assessment; appoint competent people to help them implement the plan; set up emergency procedures; provide clear information and training to employees; and work together with other employers sharing the same workplace. Land contamination poses a hazard to groundworkers and potentially others in proximity to the construction work. Appropriate risk assessments must be carried out and arrangements made to protect the health and safety of workers directly involved in groundworks for the Proposed Development and other human receptors who could be affected. Compliance with the Act during construction and operation is an embedded measure considered in the assessment and detailed in **Table 11..**
Environmental Protection Act (1990)[2]	Part 2 of the Act makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the regulatory basis for the identification, designation, and remediation of contaminated land. The potential for the Proposed Development to be built on land potentially affected by historical contamination requires assessment to ensure it is suitable for the proposed land-use and that, where necessary, remediation is carried out to ensure that following development, the land cannot be determined as Contaminated Land under the Act.dAppropriate embedded environmental measures have been put in place as detailed in **Table 11.** of this chapter to address risks associated with potential land contamination.
Water Resources Act 1991[3] **as amended by the Water Act 2003**[4]	The Water Resources Act 1991 states that it is an offence to cause or knowingly permit polluting, noxious, poisonous or any solid waste matter to enter controlled waters. The Act was revised by the Water Act 2003, which provides the definition of and regulatory controls for the protection of water resources, including the quality standards expected for controlled waters. The 2003 Act sets out the definition of controlled waters, which has been used to define the scope of receptors for the assessment in **Section 11.11**. Appropriate embedded environmental measures have been put in place as detailed in **Table 11.** of this chapter to help ensure the protection of controlled waters.
Control of Asbestos Regulations 2012[5]	The Control of Asbestos Regulations 2012 (CAR 2012) apply to employers who carry out work which disturbs, or is likely to disturb, asbestos. This includes groundworks where there is asbestos present or suspected to be present in the ground as loose fibres or as asbestos containing materials (ACMs).

[1] UK Government (1974) Health and Safety at Work etc. Act 1974. (Online). Available at: https://www.legislation.gov.uk/ukpga/1974/37/contents. (Accessed August 2025).
[2] UK Government (1990). Environmental Protection Act 1990. (Online). Available at: https://www.legislation.gov.uk/ukpga/1990/43. (Accessed August 2025).
[3] UK Government (1991). Water Resources Act 1991. (Online). Available at: https://www.legislation.gov.uk/en/ukpga/1991/57/contents. (Accessed August 2025).
[4] UK Government (2003). Water Act 2003. (Online). Available at: https://www.legislation.gov.uk/ukpga/2003/37/contents. (Accessed August 2025).
[5] UK Government (2015). The Control of Asbestos Regulations 2012. (Online). Available at: https://www.legislation.gov.uk/uksi/2012/632/made. (Accessed August 2025).

	To comply with CAR 2012, in respect of asbestos-contaminated soil and construction and demolition materials, employers must consider people other than their own employees in the risk assessment required by Regulation 6, and in the action taken to prevent or control exposure required by Regulation 11. The other key regulation relevant to the Proposed Development is the requirement under Regulation 16 to prevent or reduce the spread of asbestos. Every employer must prevent or, where this is not reasonably practicable, reduce to the lowest level reasonably practicable, the spread of asbestos from any place where work under the employer's control is carried out. During construction works for the Proposed Development there is the potential for localised asbestos containing materials or soils to be encountered in the ground. Asbestos can be found on agricultural land or in any made ground e.g., due to historical ad hoc waste disposal to land, incorporation of demolition material into made ground or releases of fibres from Asbestos Containing Materials ('ACM') structures in poor condition, and subsequent spread by vehicle movements.bCompliance with CAR 2012 during construction is an embedded measure considered in the assessment and detailed in **Section 11.6**.
Well-being of Future Generations (Wales) Act (2015)[6]	The Act does not refer explicitly to geology, soils or land contamination, but is concerned with improving the environmental well-being of Wales, including by maintaining and enhancing a biodiverse natural environment. It requires public bodies in Wales to think about the long-term impact of their decisions, and to act in accordance with sustainable development principles, with the aim of achieving well-being goals. These include maintaining and enhancing healthy functioning ecosystems that support social, economic, and ecological resilience and the capacity to adapt to change (for example climate change).
The Construction (Design and Management) Regulations 2015[7]	The Construction (Design and Management) Regulations (CDM) place specific duties on clients, designers, and contractors, so that health and safety is considered throughout the life of a construction project from its inception to its subsequent final demolition and removal. They include the requirement to appoint a Principal Designer and Principal Contractor to co-ordinate health and safety aspects during construction. Under the CDM regulations, designers must avoid foreseeable risks so far as reasonably practicable by eliminating hazards from the construction, cleaning, maintenance, and proposed use and demolition of a structure; reducing risks from any remaining hazard; and giving collective safety measures priority over individual measures. Construction of the Proposed Development will fall under the requirements of the Regulations requiring consideration of health and safety to be incorporated into the design of the Proposed Development components and at construction stage. PCompliance with CDM during construction is an embedded measure considered in the assessment and detailed in **Table 11..**
Environment (Wales) Act 2016[8]	The Act makes provisions within Wales for the planning and managing of natural resources at the national and local level, with natural resources including animals, plants and other organisms, water and soil, minerals, and geological features and processes.

[6] UK Government (2015). Well-being of Future Generations (Wales) Act 2015. (Online). Available at: https://www.legislation.gov.uk/anaw/2015/2/contents. (Accessed August 2025).
[7] UK Government (2015). The Construction (Design and Management) Regulations 2015, Available at: The Construction (Design and Management) Regulations 2015. (Accessed August 2025).
[8] UK Government (2016). Environment (Wales) Act 2016. (Online). Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted. (Accessed August 2025).

Planning Policy

11.2.3. A summary of the relevant national and local planning policy for Ground Conditions is given in Table 11..

Table 11.2 Planning policy relevant to the Ground Conditions assessment.

Planning policy	Context
National planning policy **Planning Policy Wales, Edition 12, 2024**[9]	Planning Policy Wales Distinctive and Natural Linkages chapter, page 128, states that decisions on DNS applications must consider the policy topics of the Distinctive and Natural Places theme, including *"opportunities in all areas to improve the resilience of ecosystems by addressing building on floodplains, diffuse pollution, soil compaction and sealing, ensuring the protection of peat resources"* and *"opportunities to improve health and well-being are taken, in particular, to… ensure water sensitive design, address soil carbon management… so as to improve capacity for adaptability to the challenges of climate change, such as flood risk and increased temperatures".* Chapter 6, Section 6.4 Biodiversity and Ecological Networks, paragraph 6.4.3, states that development proposals must consider the need to*: "safeguard protected species and species of principal importance and existing biodiversity assets from direct, indirect or cumulative adverse impacts that affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water, air and soil, including peat".* Chapter 6, paragraph 6.9.16 Land Contamination states that *"Whenever development or re-development potential exists the planning system will be the preferred means of addressing potential land contamination."* 6.9.17 states that where land potentially meets the definition of contaminated land under Part 2A, the onus will remain with the developer to ensure that the land is suitable for its proposed use and would not meet the legal definition of contaminated land under Part 2A. Paragraph 6.9.19 states that *"Where land contamination issues arise, the planning authority will require evidence of detailed investigation and risk assessment prior to the determination of the application"* as well as *"If contamination cannot be overcome satisfactorily, the authority may refuse planning permission."*
Welsh Government (2021) Future Wales: the national plan 2040: Our National Development Framework	Policy 9 – Resilient Ecological Networks and Green Infrastructure advocates the sustainable management of natural resources including minerals, soils and geodiversity resources, and measures which reduce pollution. The embedded measures in **Table 11.** includes measures to avoid or minimise effects on minerals, soils and geodiversity resources, and to avoid construction activities resulting in land contamination.
Local planning policy **Caerphilly County Borough Council, Caerphilly County Borough Local Development Plan**	No specific policies in relation to soil or peat. A key objective of the LDP is to "*encourage the re-use and/ or reclamation of appropriate brownfield and contaminated land and prevent the incidence of further contamination and dereliction"* In relation to geodiversity, policy CW4 states that development proposals that affect locally designated natural heritage features,

[9] Welsh Government (2024) Planning policy Wales. (online). Available at: https://www.gov.wales/planning-policy-wales. (Accessed August 2025).

(LDP) up to 2021. Adopted November 2010[10]	will only be permitted *"within, or in close proximity to sites designated as … Regionally Important Geological Sites (RIGS), …., where proposals either: conserve and where appropriate enhance the … geological importance of the designation, or are such that … harm is minimised by mitigation measures and offset as far as practicable by compensation measures designed to ensure that there is no reduction in the overall value of the area or feature".* aMinerals Policy SP8 relates to minerals safeguarding and states that the Council will contribute to regional demand for a continuous supply of minerals by *"safeguarding known resources of coal, sand and gravel and hard rock".* *"Proposals for permanent development uses within identified mineral safeguarding areas will not be approved unless:* *i The applicant can demonstrate that the mineral is no longer of any value or potential value, or* *ii The mineral can be extracted satisfactorily prior to the development taking place, or* *iii There is an overriding need for the development, or* *iv The development comprises infill development within a built up area or householder development or an extension to an existing building."* The Site, and most of the land within the Caerphilly boundary, is located within a sandstone resource area shown on the local plan constraints map.[11]
Caerphilly County Borough Council, Caerphilly County Borough Local Development Plan – Review Report, 2021[12]	The Review Report considers the progress made in implementing the adopted Local Development Plan (LDP) and considers the issues that inform the decision on whether the adopted LDP needs to be revised. The report concluded that a full review of the adopted LDP should commence immediately. In relation to natural resources, including geodiversity, minerals and land contamination, no requirement for policy change was identified in the review. In relation to the protection and enhancement of nature conservation, earth science interest and biodiversity, the objective to identify, protect and enhance sites was assessed as not being met as proposed. ,The Strategic Environmental Assessment/Sustainability Appraisal (SEA/SA) monitoring review found that the objective to *"make the most efficient use of land and to reduce contamination and safeguard soil quantity, quality and permeability"* was generally not met during the nine years up to 2019.

Technical Guidance

11.2.4. A summary of the technical guidance for Ground Conditions is given in Table 11..

Table 11.3 Technical guidance relevant to the Ground Conditions assessment

Technical Guidance document	Context

[10] Caerphilly County Borough Council (2010) Caerphilly County Borough Local Development Plan (LDP) up to 2021. Adopted November 2010. (online). Available at: https://www.caerphilly.gov.uk/business/planning-and-building-control-for-business/local-development-plan/local-development-plan-2010-(adopted). Accessed August 2025.
[11] Caerphilly County Borough Council (2025) Constraints Map. (online). Available at: https://www.caerphilly.gov.uk/business/planning-and-building-control-for-business/local-development-plan/local-development-plan-2010-(adopted). (online) Accessed August 2025.
[12] Caerphilly County Borough Council (2021) Caerphilly County Borough Adopted Local Development Plan Up to 2021, Review Report, 1st June 2021. (online) Accessed August 2025.

The Development of Land Affected by Contamination: A Guide for Developers, version 4[13]	The guidance outlines the information planning authorities require on the land contamination status of proposed development sites and how associated planning conditions will be discharged. The document sets out best practice for land contamination management procedures, these follow a phased approach and require the development and refinement of a conceptual model. The process starts at initial desk-based assessment, then may progress to site investigation, to remediation options appraisal, development of a remediation strategy and implementation and verification of remediation, as set out in the Environment Agency Land Contamination Risk Management (LCRM) Guidance (see below).
Environment Agency, Land Contamination Risk Management (LCRM)[14]	LCRM provides a technical framework for applying a risk management process when dealing with land affected by contamination.
Welsh Government, Contaminated Land Statutory Guidance: 2012[15]	This guidance outlines the legal framework for dealing with contaminated land in Wales under Part 2A of the Environmental Protection Act 1990. It elaborates on the remediation provisions of Part 2A, such as the goals of remediation, and how enforcing authorities should ensure that remediation requirements are reasonable.
CAR-SOIL: Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials (2016)[16]	Provides interpretation and guidance to all involved in the management of asbestos in both soils and construction and demolition arisings in accordance with the Control of Asbestos Regulations 2012 (CAR 2012). Requirements include the use of measures to prevent the spread of asbestos during construction work. As made ground and demolished buildings are present within the EIA Assessment Area, there is potential for asbestos to be encountered during groundworks and suitable management measures are, therefore, needed. These are included in the embedded environmental measures in **Table 11.**.
Welsh Assembly Government, Environment Department, Environment Agency Land Quality Department., Appraisal of state, pressures and controls on the sustainable use of soils: executive summary 2002[17]	This document notes that the treatment of stripped soil materials is covered in guidance to the mineral extraction industry, but no such guidance is given to the building and construction industry. To date no guidance specifically for the management of soils during construction has been published for Wales.

[13] Welsh Land Contamination Working Group and Natural Resources Wales (2023) Development of Land Affected by Contamination: A Guide for Developers (online) Available at: https://www.srs.wales/Documents/Pollution/Contaminated-Land/Development-of-Land-Affected-by-Contamination-Developers-Guide-2023.pdf. Accessed August 2025.
[14] Environment Agency (2020) Land contamination risk management (LCRM) How to assess and manage the risks from land contamination, 8 October 2020, last updated June 2025. (Online). Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm. (Accessed October 2025).
[15] Welsh Government (2012) Welsh Government, Contaminated Land Statutory Guidance: 2012. (online). Available at: https://www.gov.wales/contaminated-land-guidance-local-authorities. Accessed August 2025.
[16] CL:AIRE (2016) CAR-SOIL: Control of Asbestos Regulations 2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials (Online). Available at: https://staging.claire.co.uk/projects-and-initiatives/asbestos-in-soil.html. (Accessed August 2025).
[17] Welsh Government (2002) Appraisal of state, pressures and controls on the sustainable use of soils: executive summary. (online). Available at: https://www.gov.wales/appraisal-state-pressures-and-controls-sustainable-use-soils-executive-summary-html. Accessed August 2025.

CL:AIRE, Definition of Waste: Development Industry Code of Practice (DoWCoP), Version 2, 2011[18]	The Definition of Waste: Development Industry Code of Practice (DoWCoP) is a voluntary Code launched in September 2008 (applicable to England and Wales) and updated in 2011 to provide a clear, concise, and auditable process to enable the sustainable remediation and development of land and suitable reuse of recovered materials/resources, including topsoil, subsoil, and potentially contaminated soil, that may initially be classified as waste/contaminated, by the use of a Materials Management Plan (MMP). The development and use of an MMP is an embedded measure, as detailed in **Table 11.**.
Department for Environment, Food & Rural Affaires (Defra) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[19]	Outlines guidance and legislation concerning the use of soil in construction projects, before offering stage by stage guidance on the use, management, and movement of soil on site, and the completion of appropriate soil resource surveys to inform the site working strategy (e.g., Site Waste Management Plan or Material Management Plan) and for the construction phase preparation of a Soil Resource Plan. The main document from 2009 is out of date regarding the legislation and guidance it references, however it still provides best practice guidance for the protection of soil resources on construction projects. Measures to avoid damage to soil health/soil structure are an embedded measure in the Construction Environmental Management Plan (CEMP), as detailed in **Table 11.**.
Institute of Environmental Management & Assessment (IEMA) (2022) IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment[20] (Note: IEMA is now known as the Institute of Sustainability & Environmental Professionals (ISEP))	Provides information and guidance on how the practical implications of soil functions, soil biodiversity, soil health, ecosystem services and natural capital should be applied within the overarching framework of climate change, to incorporate them effectively into the EIA process. This guidance informs the assessment methodology for soils as set out in Section 0.

11.3 Consultation and Engagement

Overview

11.3.1. The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 2.4** of **Chapter 2: Approach to Environmental Impact Assessment.**

Scoping Opinion

11.3.2. A Scoping Direction was issued by the Planning and Environmental Decisions Wales (PEDW), on behalf of the Welsh Ministers, on 04 December 2024 (reference DNS CAS-03701-H3V4Y3:

[18] CL:AIRE (2011) Definition of Waste: Code of Practice, Version 2 (online) Available at: https://staging.claire.co.uk/projects-and-initiatives/dow-cop. Accessed August 2025.
[19] Defra (2009) Guidance: Code of practice for the sustainable use of soils on construction sites. (online). Available at: https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites. Accessed August 2025.
[20] Institute of Environmental Management & Assessment (IEMA) (2022) IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment. IEMA; March, UK. (online). Available at: https://www.iema.net/media/3xejdu0u/2022-iema_land_and_soils_guidance.pdf. Accessed October 2025.

Rhyswg Wind Farm). A summary of the relevant responses received in the Scoping Opinion in relation to Ground Conditions and confirmation of how these have been addressed within the assessment to date is presented in Table 11..

11.3.3. **Appendix 1B** outlines the comments made in the Scoping Direction in relation to Ground Conditions and **Table 11.** describes how these have been addressed within this Draft ES.

11.3.4. The information provided in the Draft ES is preliminary and not all of the Scoping Direction comments have been addressed at this stage, however, all comments will be addressed within the Final ES.

Table 11.4 Summary of EIA Scoping Direction Responses for Ground Conditions.

Consultee	Consideration	How addressed in this Draft ES
PEDW	Ground Conditions: NRW note that no site-specific information has been provided regarding Ground Conditions, as such they concur with scoping Ground Conditions into the ES. The applicant is advised to submit surveys to inform the Ground Conditions chapter as a technical appendix to the ES.	A peat survey was completed for the Scoping Report and is included in the Phase 1 Geoenvironmental Desk Study, which forms an **Appendix 11A** to the Draft ES. A Soil resources survey will be undertaken for the Site, and a peat survey will be undertaken along the access track to confirm the soil profiles present in the the Site and confirm whether peat is present along the access track. The Phase 1 Geoenvironmental Desk Study includes recommendations for ground investigation needed to provide further information on Ground Conditions in regard to land contamination and/or ground stability. A Coal Mining Risk Assessment (CMRA) has been undertaken for the Proposed Development and this is included as **Appendix 11A.**
PEDW	Groundwater: Caerphilly CBC concur with the approach in the ES that surface water and ground water would be affected by the proposal and that the effects on these should be assessed and included in the ES. NRW highlight that groundwater beneath the site is considered high sensitivity and therefore at a heightened risk from contamination impacts that could occur during the operational life of the windfarm. These potential impacts must be fully addressed in the ES.	Consideration of the effects of construction on groundwater and surface water resources in relation to potential changes in surface/subsurface drainage is included in **Chapter 10: Water Environment.**
Planning & Environment Decisions Wales (PEDW)	Peat: The evidence used to inform the peat assessment is welcomed. The ES should demonstrate how peat soils have been considered, defined and avoided. In the event	The Proposed Development is committed to the avoidance of peat and implementation of the peat mitigation hierarchy in relation to shallow peat soil, as advised by

	that the site layout does not avoid peat, the ES should set out likely impacts and proposed measures to mitigate those impacts.	Natural Resources Wales in the Peatland Action Programme reports[21]. A peat survey was completed for the Scoping Report and is included in the Phase 1 Geoenvironmental Desk Study, which forms **Appendix 11A** to the ES. Significant effects on peat were scoped out of the assessment in the Scoping Report, however design changes since scoping have necessitated additional baseline data gathering. This is detailed in Section 11.5. For the access track between T2 and Mynydd Maen, due to soil mapping showing peaty soils and the potential for deep peat to be present, a peat and soil survey is being undertaken to inform the assessment in the Final ES and detailed design of the access track. Available baseline information for the access track in relation to peat is included in Section 11.5.
PEDW	Mineral soils: LQAS recommend that a soil management scheme is provided to inform the ES. The scheme should be informed by a baseline soil resources and physical characteristics report and should set out how all soils and their functions will be conserved and reinstated at decommissioning. The applicant should refer to detailed comments from LQAS at appendix 1. PEDW advise that the soil management scheme should be included as technical appendix to the ES.	A soil resources survey is being undertaken for the main wind farm site for the Proposed Development. This will provide details of the physical characteristics of the soils and suitable soil handling measures to protect mineral soils that will be disturbed or excavated as a result of the Proposed Development will be set out in an accompanying Soil Management Plan (SMP). The Soil Resources Survey report and SMP will be included as appendices to the Final ES. For the access track, due to soil mapping showing peaty soils and the potential for deep peat to be present, a peat and soil survey is being undertaken to inform the assessment in the Final ES and detailed design of the access track. Available baseline information for the access track in relation to peat is included in Section 11.5.
PEDW	Construction Environmental Management Plan (CEMP): It is noted that the potential effects on land or water quality during construction are proposed to be scoped out as these risks can be adequately managed through the CEMP. PEDW advise that the	The embedded measures in **Table 11.** include measures to prevent construction activities resulting in pollution of land or the water environment. These will be secured in the CEMP (and draft Outline CEMP is provided in **Appendix 4A**).

[21] Natural Resources Wales (2025) National Peatland Action Programme: Year 5 Report, 2024/25. (online) Available at: https://naturalresourceswales.gov.uk/evidence-and-data/maps/the-national-peatland-action-programme/?lang=en. Accessed October 2025.

	CEMP should be included as a technical appendix to the ES.	
PEDW	Drainage assessment: Dewatering may be required for turbine foundation excavations, which can affect the local water environment. NRW therefore advise that a drainage assessment, to cover both construction and operation, should submitted as a technical appendix to the ES. The nature of the ground and groundwater conditions at each of the proposed turbine locations should be used to inform upon the risk profile for construction and operation.	Consideration of the effects of construction dewatering on the local water environment is included in **Chapter 10: Water Environment**. The baseline information collated to date for peat indicates that there is no peat within the main windfarm site and no significant dewatering effects on peat are therefore anticipated due to construction of the Main Windfarm Site. Additional baseline information is being collected for the access track, which although it does not encounter any peatland mapped on the Peatlands of Wales map[22] or geological maps produced by the BGS, is in an area of mapped peaty soils. Further information is provided in the baseline in Section 11.5. Embedded measures to ensure that effects on peat are minimised are detailed in **Table 11.**.
PEDW	Pollution from microplastics and PFAS: PFAS (Per- and polyfluroalkyl substances) can used in various parts of wind turbines which leak during installation or dismantling. Should the turbines proposed include PFAS, appropriate measures need to be put in place to ensure that pollution PFAS into the local environment does not occur and this should be addressed in a proportionate manner for soil and water in the ES. The applicant's attention is also drawn to comments from Motvind, within which they further note the potential for impacts from microplastics. The applicant should consider these potential impacts.	A description of the proposed decommissioning of equipment is provided in **Chapter 4: Development Description.** The potential for impacts on sensitive environmental receptors including soils and water because of unintended releases of contaminants present in materials used in the operational parts of the wind farm during the operational phase or during decommissioning is considered in the assessment in Section 11.11 and in the embedded measures in **Table 11.**.
Natural Resources Wales (NRW)	Turbine foundation excavations can require some degree of dewatering and these activities can affect the local water environment. We therefore advise that a drainage assessment, covering both the construction and operational phase of the development, should be scoped into the ES. The nature of the ground and groundwater conditions at each of the proposed turbine locations should be used to inform upon the risk profile for construction and operation.	Consideration of the effects of construction dewatering, due to potential changes in surface/subsurface drainage during the operational phase due to the access track, is included in **Chapter 10: Water Environment.** A description of the proposed decommissioning of equipment is provided in **Chapter 4: Development Description.** The potential for impacts on sensitive environmental receptors including soils and water because of unintended releases of contaminants present in materials

[22] Natural Resources Wales (2022) Peatlands of Wales.

	We note the reference to decommissioning within the Scoping Report. A Decommissioning Assessment Report should be provided as part of the EIA process, which should detail how infrastructure and drainage provisions would be decommissioned.	used in the operational parts of the Proposed Development during the operational phase or during decommissioning is considered in the assessment in Section 11.11 and in the embedded measures in **Table 11.**.
Welsh Government, Soil, Peatland & Agricultural Land Use Planning Unit, Department for Climate Change & Rural Affairs, Department for Climate Change Landscapes, Nature & Forestry Division	The department agrees with the soils approach noted in section 5.7.31 to 5.7.35 of the Scoping Report. A soil management scheme should be prepared by the developer, informed by a baseline soil resources and physical characteristics report, and be considered as part of the ES process. This should be a clear scheme and programme setting out how all soils and their functions will be conserved and reinstated at decommissioning. The Scheme should be presented in sufficient detail for the determining authority and statutory consultees to form a judgement as to its feasibility, and should include: - • Soil stripping programme - volumes and types of soils affected; • Soil handling techniques and procedure; • Size, location, construction, management and period of soil storage dumps; • Proposed after use and restoration programme, including techniques and aftercare programme.	A soil resources survey will be undertaken for the Proposed Development. This will provide details of the physical characteristics of the soils within the Main Windfarm Site and suitable soil handling measures to protect mineral soils that will be disturbed or excavated as a result of the Proposed Development will be set out in an SMP. The Soil Resources Survey report and SMP will be included as appendices to the Final ES. For the access track between T2 and Mynydd Maen, due to the potential for peaty soils to be present, a peat survey is being undertaken to inform the assessment in the Final ES and detailed design of the access track. Information on soils will also be collected. Available baseline information for the access track in relation to peat is included in Section 11.5.
Welsh Government, Soil, Peatland & Agricultural Land Use Planning Unit, Department for Climate Change & Rural Affairs, Department for Climate Change Landscapes, Nature & Forestry Division.	The Department does not hold any information on detailed ALC field surveys for the site. The department agrees with the assessment at section 5.7.8. According to the Predictive ALC Map for Wales2, the site is at best Grade 4. As per published guidance, the Department does not recommend an ALC field survey is undertaken as the site is unlikely to contain Best and Most Versatile (BMV) agricultural land.	Agreement with the approach not to carry out ALC survey is noted. A soil resources survey will be undertaken for the Proposed Development. This will provide details of the physical characteristics of the soils within the Main Windfarm Site and suitable soil handling measures to protect mineral soils that will be disturbed or excavated as a result of the Proposed Development will be set out in an SMP. The Soil Resources Survey report and SMP will be included as appendices to the Final ES.
Welsh Government, Soil, Peatland & Agricultural Land Use Planning Unit,	The proposals should include a detailed scheme for site decommissioning that can be	A description of the proposed decommissioning of equipment is

Department for Climate Change & Rural Affairs, Department for Climate Change Landscapes, Nature & Forestry Division.	confidently conditioned against. This is essential to meet the requirements of Policy 18(11) of Future Wales in terms of acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration. This is to ensure we sustainably manage our soil resource (organic, mineral and peaty), to build resilience and maintain the soils functions and ecosystem services our soils provide ensuring beneficial restoration and after use of site.	provided in **Chapter 4: Development Description.** Measures to avoid or minimise impacts on soil resources including peat are set out in **Table 11.**.
MotVind	We believe it is crucial to assess the potential release of PFAS and microplastics resulting from blade erosion, coatings degradation, and repairs during service work. These contaminants pose serious environmental risks and should be considered in the EIA.	The potential for impacts on sensitive environmental receptors including soils and water because of unintended releases of contaminants present in materials used in the operational parts of the wind farm during the operational phase or during decommissioning is considered in the assessment in **Section 11.11**.
The Coal Authority (now known as the Mining Remediation Authority)	The Coal Authority confirms that it has reviewed the site location plan and can confirm that the site falls within the Coal Authority's defined Development Low Risk Area. On this basis no specific comments are made. However, in the interest of public safety, it is requested that the Coal Authority's Standing Advice note is drawn to the applicant's attention, where relevant.	For the Main Windfarm Site coal mining and other potential ground hazards are considered in a Phase 1 Geoenvironmental Desk Study, which forms **Appendix 11A** to the Draft ES. The proposed access track between T2 and Mynydd Maen runs through areas of high-risk development. A Coal Mining Risk Assessment has therefore been produced and is included as an appendix to the Phase 1 Geoenvironmental Desk Study, which forms **Appendix 11A** to the Draft ES.

Technical Engagement

11.3.5. No additional technical engagement with consultees has taken place in relation to Ground Conditions.

11.4 Data gathering methodology

Study Area

11.4.1. The Study Area for Ground Conditions includes the EIA Assessment Area and a 500m buffer area for land contamination receptors, and a 250m buffer area beyond the boundary for all other receptors, as described below.

11.4.2. The conceptual model for land contamination considers the environmental setting (including geology, hydrogeology and hydrology) and the nature and extent of the identified potential contamination sources, potential receptors and available pathways for receptors to be exposed to contaminants.

11.4.3. Likely significant effects of the Proposed Development on soil receptors include temporary effects during construction activity, such as vehicle/plant movements, soil handling, storage, and reinstatement, and permanent effects (e.g., permanent removal or sealing of soil for construction of buildings), that will occur within the Site. Effects on geological receptors could include permanent damage during construction, or permanent change to geological features or public access to these features due to construction of buildings or other structures in or around the geological feature(s). Based on the nature of the Proposed Development and the baseline conditions described below in **Section 11.5**, an external zone of influence of 250m beyond the EIA Assessment Area has been assigned. The rationale for the Study Area is that the soils and geology are geographically discrete and are unlikely to be substantially influenced by changes to their surroundings or vice versa. However, the inclusion of a 250m buffer means that effects such as damage to a sensitive offsite geological feature due to ground disturbance during construction, or in relation to excavations, hydrogeological effects of dewatering on sensitive offsite receptors such as peat, are considered in the assessment. Assessment of hydrogeological effects is included in **Chapter 10: Water Environment**.

Desk Study

11.4.4. A summary of the organisations that have supplied data, together with the nature of that data is outlined in Table 11..

Table 11.5 Data sources used to inform the Ground Conditions assessment.

Organisation	Data source	Data provided
British Geological Survey (BGS)	British Geological Survey (BGS) Onshore GeoIndex[23] for geological information, including exploratory hole records.	Information on superficial and bedrock geology, historical borehole records.
The Coal Authority (now known as the Mining Remediation Authority)	Consultants Coal Mining Report: Rhyswg, Wales (Ref: 71009828911001).	Site specific coal mining information identifying potential mining related risks. This report provides coverage of the Site. It should be noted that the Consultants Coal Mining Report is based on the draft DNS application boundary (**Figure 1-1**) which covers an area larger than the EIA Assessment Area.
Mining Remediation Authority	Interactive Map for mining information[24]	Coal mining information including recorded mine entries, shallow coal mining workings, coal outcrops, fissures and breaklines, and Development High Risk Areas.
Groundsure	Groundsure Insight report: Order ref: WSP-SWB-9WF-DEP-5QX	Environmental dataset and historical maps for the Site, plus a minimum 500m buffer.

[23] BGS GeoIndex. Available at: https://www.bgs.ac.uk/map-viewers/geoindex-onshore/. Accessed October 2025.
[24] Mining Remediation Authority. Available at: https://datamine-cauk.hub.arcgis.com/. Accessed October 2025.

LandIS	Soilscapes Map[25]	Regional soil mapping and information on soil types
National Library of Scotland	Historical maps[26]	Historical OS maps available to view online.
Welsh Government	Datamap Wales[27] • Predictive Agricultural Land Classification Map • Unified Peat Map of Wales • Geological Conservation Review (GCR) Site Boundaries • Regionally Important Geodiversity Sites (RIGS) • Aggregates Resource Areas Sites of Special Scientific Interest and other statutory and non-statutory environmental conservation designations	Main source of public sector environmental data for Wales, available to view on the online map viewer or to download.
Wood (2021)	Trecelyn Wind Farm – Peat Depth Survey Report (Ref. 807379-WOOD-RP-OG-00001_P01.01, November 2021).	Peat depth survey results for land within the EIA Assessment Area. It should be noted that the peat survey was completed prior to agreement of the EIA Assessment Area and it includes areas to the north of the Site which form part of a separate wind farm planning application (Trecelyn Wind Farm, DNS CAS-02114-J9X4S6). This report is included as an appendix to the Phase 1 Geo-environmental desk study, included in **Appendix 11A.**
WSP (2025)	Phase 1 Geoenvironmental Desk Study (Preliminary Risk Assessment)	Desk study to assist in determining whether the Site is suitable for its proposed use, included in **Appendix 11A**. The report includes a review of selected contemporary information including geological, environmental, hydrological and hydrogeological data, review of historical mapping for the Site and its surroundings, and a walkover of the key elements of the site (conducted in October 2025) to identify potential evidence of contamination and verify desk study information as necessary. It includes the development of a Conceptual Model (CM) and a Tier 1: Preliminary Risk Assessment, to assess the status of potential contamination and identify potentially significant contaminant linkages that require further consideration in line with current guidance including Land Contamination Risk Management (LCRM) guidance published by the Environment Agency. It also identifies information gaps, geo-environmental development

[25] LandIS. Soilscapes. Available at: https://www.landis.org.uk/soilscapes/; Accessed October 2025.
[26] National Library of Scotland. Map Viewer. Available at: (available online https://maps.nls.uk/. Accessed October 2025.
[27] Welsh Government. Available at: available online at: https://datamap.gov.wales/. Accessed October 2025.

		constraints, geohazards and requirements for further assessment.
WSP (2025)	Coal Mining Risk Assessment	Mining risk assessment to assist in defining the level of risk associated with historical mining activities within the Site and to determine if further assessment is needed to quantify the risk and define mitigation measures. This report is included as an annex to the Phase 1 Geo-environmental desk study, included in **Appendix 11A.**

Survey work

11.4.5. A Phase 1 peat depth survey was completed by WSP (previously Wood) in 2021. The survey was undertaken on a 100m x 100m grid (roughly one point per hectare) of points across land within the Main Windfarm Site. No peat areas were identified during the Phase 1 peat survey, and no further peat delineation work was therefore undertaken. Further peat survey is being undertaken by the Applicant to provide coverage of the proposed access track between T2 and the Mynydd Maen project, which was not included in the 2021 survey.

11.4.6. A site walkover of the Site was completed on 24 October 2025 to inform the Phase 1 Geoenvironmental desk study (PRA) and Coal Mining Risk Assessment (CMRA). The walkover was completed by experienced contaminated land and geotechnical consultants and observations and photographs are recorded in the Phase 1 Geo-environmental desk study (PRA) (**Appendix 11A**) and CMRA for the Proposed Development.

11.5 Overall baseline

Current baseline

11.5.1. For the purposes of this baseline section, the Proposed Development is described in two parts as follows:

- the proposed Main Windfarm Site approximately centred at 323588, 194773;
- the proposed Access Track for the Proposed Development via the proposed Mynydd Maen Wind Farm running from approximate national grid coordinates 325757, 196406 in the north to 323957, 194998 in the south. Additional access route(s) between the turbines are included in the Main Windfarm Site. The proposed access route passes over Registered Common Land under the Countryside and Rights of Way Act 2000[28].

Land use and environmental setting

11.5.2. The EIA Assessment Area is located on upland plateau between the Nant Gwyddon and Nant Carn River valleys, approximately 370m to the northwest and 600m southeast, respectively. Tributaries of the Nant Carn are present 320m east of the Main Windfarm Site and 180m southeast of the proposed Access Track. The Nant Gwyddon and Nant Carn flow generally west to discharge to the Ebbw River which is 1.3km west of the Site. A tributary of the Ebbw River, the Nant Gofapi,

[28] UK Government (2000) Countryside and Rights of Way Act 2000. (Online) Available at: https://www.legislation.gov.uk/ukpga/2000/37/section/1. Accessed 7 November 2025.

rises as a spring within the east of the Site and flows generally southwest. Further details of surface water features in and around the Site are provided in **Chapter 10: Water Environment**.

11.5.3. The EIA Assessment Area is currently used for agriculture, mainly sheep grazing, and some limited crop growing. Some agricultural buildings and structures are present within the main site in central and eastern areas. Farm buildings and a business, Atlas Travel Group, are located west of the main site, and agricultural buildings are present south of the eastern area of the main site. A tank is located in the centre of the Main Windfarm Site. The proposed access track is bound to the southeast by woodland at its southern end. Access to the main site can be gained from a single-track road to the north of the site, which is accessed via the A467 at Abercarn then Rhyswg Road.

11.5.4. The Site is partly within two Sites of Importance for Nature Conservation (SINC) designated by Caerphilly County Council. The Main Windfarm Site partly overlaps the Cwm Gofapi Woods, Cwmcarn SINC (Ref. NH 3.134, SINC 142), an area of mixed woodland on sloping valley-sides, including stands of ancient broadleaved woodland and replanted ancient woodland. Grassland in the SINC is recorded as supporting a high density of anthills, some rock exposures are also recorded. The access track runs through the Mynydd Maen, East of Newbridge SINC (Ref. NH3.113 (SINC 111a)), an area of upland common with extensive areas of acid grassland, heath and bracken. Frequent plant species are recorded as including Bilberry, Mat-grass, Wavy hair-grass, purple moor-grass, heath bedstraw and tormentil. Crowberry is recorded as locally abundant, and areas of flushes supporting purple moor-grass and Sphagnum mosses, with several locally significant bryophyte species. Vegetation expected to be present within the SINC and potentially within the Site therefore includes peat-forming vegetation (purple moor-grass and Sphagnum mosses). The Gwyddon Valley Woodlands SINC abuts the northern boundary of the Main Windfarm Site. This is an area of forestry plantation on former ancient woodland.

11.5.5. Further details of the terrestrial ecology baseline for the EIA Assessment Area are provided in **Chapter 8: Biodiversity**.

Soils

11.5.6. Information reviewed on the LandIS Soilscapes map[29] indicates that the soil type within the proposed main site predominantly comprises freely draining acid loamy soils over rock (Soilscape 13), with a loamy texture and medium carbon content. These soils typically drain to local groundwater and the river network. At the eastern edge of the main site there is an area shown as having very acid loamy upland souls with a wet peaty surface (Soilscape 16), a peaty texture and high carbon content. These soils typically drain to the local stream network. This soil type extents north-eastwards from the main site along the access track.

11.5.7. Peat is defined by the Welsh Government as >40cm thickness organic 'O' horizon material within the upper 80cm, or, >30cm organic 'O' horizon material resting directly on bedrock[30]. The Peatlands of Wales map shows no peat within the EIA Assessment Area. The Peatlands of Wales Evidence map was also consulted, and this shows no peat within the Main Windfarm Site. Along the Access Track there is one area in the northeast where a low potential for peat is shown (evidence score of '1', meaning there is low confidence that peat is present based on the available

[29] Cranfield Environment Centre (2025) LandIS Soilscapes viewer. (Online) Available at: https://www.landis.org.uk/soilscapes/. Accessed 7 November 2025.
[30] Welsh Government (2022) Production of the Peatlands of Wales map: Soil Policy Evidence Programme, March 2022, Report code: SPEP2020-21/03. Available at: https://www.gov.wales/production-peatlands-wales-map. Accessed 7 November 2025.

data). Approximately 240m northeast of the Access Track the Peatlands of Wales map shows an area of peatland. This does not currently have a nature conservation designation.

11.5.8. Although there was limited potential for peat within the Main Windfarm Site, a peat survey was completed for the Scoping Report. The boundary was slightly different for Scoping however most of the Main Windfarm Site was covered by the survey. The survey comprised a Phase 1 peat survey undertaken in 2021 (as part of surveys associated with the proposed Trecelyn Wind Farm). The survey was carried out in accordance with best practice guidance document "Peatland Survey. Guidance on Developments on Peatland"[31] which is published by the Scottish Government and NatureScot (there is no Welsh equivalent). The survey was on a 100m x 100m grid of points across land within the Scoping boundary with peat depth measurement taken at each survey point. Within the Main Windfarm Site, the probes found potential peat depths in the range of 0.0m to 0.1m. The peat survey report is appended to the Phase 1 Geoenvironmental Desk Study, included as **Appendix 11A**.

11.5.9. Peat survey has been undertaken as part of a separate windfarm application by RES[32] on land north of and slightly overlapping the northeast end of the Access Track for the Proposed Development. The survey area is located largely in the same soil type (Soilscape 16) as occurs on the access track for the Proposed Development. The RES survey included almost 4,000 points completed by peat probing, with some peat coring to confirm peat probe depth measurements. This found multiple localised areas of deep peat[33], although in most of the area surveyed no peat was measured. One area of deep peat (indicated to be up to 0.75m thick) confirmed by the RES survey occurs partly within the footprint of the access track for the Proposed Development . The design of the access track will be subject to further design consideration for the Final ES in accordance with the peat mitigation hierarchy.

Geology and geodiversity

11.5.10. Natural Resources Wales information on DataMap Wales[34] shows that there are no Regionally Important Geodiversity Sites (RIGS) within the Site and no Sites of Special Scientific Interest (SSSI)[35] designated for geological or other nature conservation purposes.

11.5.11. The bedrock geology shown on BGS 1:50,000 scale mapping beneath the main windfarm site and the proposed access track is the Hughes Member Sandstone (Pennant Sandstone Formation). This comprises green-grey, lithic arenites with thin mudstone/siltstone and seatearth interbeds, and mainly thin coals. A geological fault runs through the east of the Main Windfarm Site from north to south. The Hughes Member Sandstone is classed as a Secondary A aquifer, this classification relates to rock with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. Further information on hydrogeology is provided in **Chapter 10: Water Environment**.

[31] Scottish Government (2017) Peatland survey: guidance: Guidance on carrying out peatland site surveys, updated in 2017. (online) Available at: https://www.gov.scot/publications/peatland-survey-guidance/. Accessed 7 November 2025.
[32] RES (2025) Mynydd Maen Wind Farm: Planning Submission. (online). Available at: https://www.mynyddmaen-windfarm.co.uk/planning-application/.
[33] RES (2025) Mynydd Maen Wind Farm, Figure 9.3 Peat Depth Plan. (online) Available at: https://mynyddmaen-windfarm.co.uk/media/2644796/figure-93-peat-depth-plan.pdf. Accessed October 2025.
[34] Natural Resources Wales (2025) DataMap Wales: Regionally Important Geodiversity Sites (RIGS). Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_RIG_SITES. (online) Accessed September 2025.
[35] Natural Resources Wales (2025) DataMap Wales: Sites of Special Scientific Interest (SSSI). Available at: https://datamap.gov.wales/layers/inspire-nrw:NRW_SSSI. (online) Accessed September 2025.

11.5.12. No superficial deposits are shown within the Site or Study Area, this means that superficial deposits are likely to be thin if present (e.g., <1m in thickness).

11.5.13. In the wider surrounding area to the northeast, east and south, on the lower slopes and valleys, localised head deposits are shown (clay, silt, sand and gravel). Alluvium (clay, silt, sand and gravel), and some glaciofluvial sand and gravel deposits and river terrace deposits (undifferentiated sand and gravel) are present to the west and northwest, along the route of the Ebbw River (Afon Ebwy) and its tributaries.

11.5.14. There are no BGS borehole records available in the Main Windfarm Site or the access track. A BGS borehole completed in 1982 approximately 675m southwest of the wind farm site[36] records made ground to 0.7m depth, directly underlain by bedrock of greywacke (sandstone) to 5.45m, underlain by 'coaly partings' of coal and sandstone to 5.5m, then greywacke to 5.9m, a clay layer to 6.6m, then mainly greywacke to the base of the borehole at 35.2m. No groundwater observations were recorded.

11.5.15. A ground investigation report is available for the proposed Mynydd Maen Wind Farm to the north of the EIA Assessment Area[37], this included one trial pit and rotary open hole borehole (T11 RO/TP) approximately 600m north of the Site (at grid coordinates 325741, 196966). This recorded 0.2m of peat, directly underlain by bedrock (weathered Hughes Member) recorded as sandy gravel with sandstone cobbles. The rotary borehole T11-RO confirmed weathered sandstone (Hughes Member) to 1.0m then grey sandstone (Hughes Member) to 20.0m. No groundwater was recorded.

Minerals

11.5.16. LDP Policy SP8 identifies that the EIA Assessment Area (Main Windfarm Site and Access Track), is within the Caerphilly CBC boundary and is safeguarded for minerals (Sandstone Safeguarded Area). It states that the Council will safeguard known resources from permeant development that would prevent their future working. The Site is identified as the maximum extent of land potentially subject to the development for scoping purposes and the identification of land within its boundary does not necessarily mean that it will be developed upon.

11.5.17. The Site, and most of the land within the Caerphilly boundary, is located in a Sandstone Resource and Sandstone Safeguarded Area shown on the Caerphilly County Borough Council local plan constraints map. No proposals to extract sandstone are currently active within the Site or Study Area.

11.5.18. The Mining Remediation Authority interactive map shows the Site is within a Coal Mining Reporting Area. There are no mine entries recorded within the Site. However, the proposed access track intersects two areas shown as Development High Risk Areas, these correspond to coal outcrops. There are entries in the Abandoned Mines Catalogue for the Site and Study Area. The Site and entire Study Area, as well as the surrounding land in Caerphilly, are within a surface coal resource area. No surface coal mining is recorded within the Site or in the Study Area. No mine entry zones of influence are identified within the Site.

11.5.19. A Coal Authority Consultants Coal Mining Report (CCMR) was obtained for the Site (and an additional area to the north which does not form part of the red line boundary for the Proposed

[36] BGS (2025) Borehole record: BGS ID: 384378: BGS Reference: ST29SW18, British National Grid (27700): 323038, 194041 (online). Available at: https://api.bgs.ac.uk/sobi-scans/v1/borehole/scans/items/384378. Accessed October 2025.
[37] RSK Geosciences (2023) Renewable Energy Systems Limited, Mynydd Maen Wind Farm, Phase 2 Site Investigation – Coal Mining Risk Assessment. Ref. 315198-R02 (03). (online) Available at: https://www.mynyddmaen-windfarm.co.uk/planning-application/.

Development) and is appended to the CMRA which forms an annex to the Phase 1 Geoenvironmental Desk Study (**Appendix 11A**). This identifies one coal seam worked beneath the Site at depths of between 200m and 400m below ground level. No investigative or remedial activity is recorded within the site or within 50m of it. The CMRA identifies potential for unrecorded shallow mine workings within the Site and recommendations are made in the CMRA to mitigate the associated ground stability risks.

Land contamination

11.5.20. The Site has remained in agricultural use since first mapping. Historical mapping from 1922 shows a former sheepfold centrally in the Main Windfarm Site and another in the east of the Main Windfarm Site. A well is shown in the Main Windfarm Site at 'Rhyswg-ganol' farm buildings in the east, south of the sheepfold. A well is also shown at the 'Rhywg Fawr' farm buildings 70m west of the Main Windfarm Site in the west. A 1971 map shows a disused quarry 201m west of the Main Windfarm Site (and down slope from the Site). Groundsure information records a small area of worked ground dating from the 1980s, 16m northeast of the Main Windfarm Site.

11.5.21. A Phase 1 Geoenvironmental Desk Study (Preliminary Risk Assessment) has been undertaken for the Site and is included as **Appendix 11A**. This presents the preliminary conceptual model for the Site and an environmental risk assessment.

11.5.22. Limited potential contamination sources have been identified within the Site, these comprise:

- Historical unrecorded mining/ mineral extraction (quarrying), associated waste disposal and possible infilling of worked ground;
- Other made ground (e.g., local to current and former farm buildings);
- Agricultural practices including the use of fuels and oils, fertilisers and pesticides;
- Above ground tank (possible fuel tank) in the centre of the Main Windfarm Site;
- Mine gas (associated with coal seams and potentially unrecorded mine entries); and,
- Offsite, historical quarries are present, the nearest being a former quarry 16m north-east of the Main Windfarm Site.

11.5.23. Regarding contamination from agricultural activities, contamination, arising from fuel/oil/chemical usage or leaks/spills, or ad hoc waste disposal, is likely to be localised and of limited extent.

11.5.24. Potential receptors identified within the Site and Study Area are detailed in **Table 11.7.**

Future baseline

11.5.25. In the absence of the Proposed Development, the current agricultural land use (mainly sheep grazing, and some limited crop growing) is likely to continue at the Site.

11.5.26. With respect to land contamination, this is managed in Wales by Part 2A of the Environmental Protection Act 1990. Part 2A requires county councils to identify potentially contaminated land in their area and ensure potential risks from historical contamination are assessed and mitigated accordingly. For future developments, The Town and Country Planning Act 1990 requires the consideration of the potential for contamination to be present and ensure a site is suitable for the proposed end use.

11.5.27. Climate change due to continued emission of greenhouse gases is ongoing globally and will result in further rises in the earth's temperature and long-lasting changes in the climate, such as increased frequency and duration of heatwaves and more intense rainfall. In Wales, as in the rest of the UK, the climate is already variable, however it is expected that there will be more intense rainfall, more flooding in low-lying coastal areas and hotter, drier summers, also more extremely warm days, milder and wetter winters, less snowfall and frost as well as lower groundwater levels.

11.5.28. For the Site, the potential effects of climate change are expected to relate to greater variation in river flows (low flows and high flows) with associated flooding during high flow, and the effects on soils and agricultural land of longer dry spells. Consideration of the flood risk at the Site is detailed in **Chapter 10: Water Environment**. Lack of water availability could limit crop production (which is recorded as taking place at the site), and the BGS state that soil characteristics such as "soil chemistry, erosion, saturation and regeneration could all be affected by climate change"[38]. As the Site is in agricultural use the land and soil is already managed to an extent, and as such, there is scope for alternative management approaches to both mitigate negative effects and promote positive effects of climate change.

11.5.29. The effects on soils (soil health and soil functions) are overall likely to be negative rather than positive, however it is not possible to quantify these at present given the lack of baseline information on soil health regionally and lack of models to predict the likely changes on a regional basis.

11.5.30. Climate change effects will interact with land contamination, potentially resulting in new contaminant migration pathways and distribution of contaminants. However, given the Site's elevated position, the surrounding land uses, and the localised or diffuse nature of the identified potential contamination sources, significant changes to the Site's land contamination status as a result of climate change are not likely to occur.

11.5.31. Therefore, it is reasonable to conclude that in the absence of the Proposed Development there would not be a significant change in Ground Conditions relating to land contamination, or significant change with regard to the condition of the soil / the agricultural land quality status, within the Study Area, up to and within the period of operation.

11.5.32. In regard to land stability, which may be affected by climate change, **Table 11.** includes an embedded measure that the design of the Proposed Development will account for the expected Ground Conditions and design loads, accounting for the effects of climate change.

11.6 Embedded measures

11.6.1. A range of environmental measures have been embedded into the Proposed Development as outlined in **Section 4.9 of Chapter 4**. Table 11. outlines how these embedded measures will influence the Ground Conditions assessment.

11.6.2. No potentially significant effects on Ground Conditions receptors have been identified for the operational phase of the Proposed Development. Effects during decommissioning are during decommissioning anticipated to be similar to those during the construction phase but smaller in scale.

[38] BGS (2025) Soil and agriculture: BGS Climate Change Products. Available at: https://www.bgs.ac.uk/about-bgs/services/climate-change-and-geohazards/sector-profiles-soil/. Accessed 7 November 2025.

Table 11.6 Summary of the embedded environmental measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction (and decommissioning*)			
Soil resources	Compaction of soil by vehicles or during soil stockpiling/ handling leading to damage to soil structure and damage to/loss of soil functions	A soil resources survey will be completed by a soil scientist / experienced soil specialist for the main windfarm site prior to construction. The findings of the soil resources survey will be used to inform the construction phase SMP and Soil Resources Plan (which may be part of a Materials Management Plan, MMP). Peat survey is being completed for the proposed access track, this will also provide information on the soils present and the findings of the survey will be used inform soil handling during construction. Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure and help to minimise soil compaction, and associated measures will be detailed in the SMP. The SMP will be submitted to the local authority for comment prior to construction. If Ground Conditions require it, a temporary trackway of either metal, wood, or plastic, would be used for vehicles to access the working areas. This would be removed once construction is complete. During topsoil stripping, machinery with low ground pressure will be used to minimise soil compaction, including during construction of the access tracks, the tracks will then be available for heavier vehicles to use to avoid impacts on other areas. Temporary storage of soils will be carried out in accordance with a MMP. This document will outline where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). The MMP will include a declaration by a Qualified Person that the MMP has been completed in accordance with the DoWCoP and that best practice is being followed. The CEMP will refer to the MMP. If peat cannot be avoided, then a Peat Management Plan will be developed for the Proposed Development.	SMP, MMP and CEMP secured via DNS condition

Soil resources	Erosion of soil due to vegetation stripping, or soil handling and storage, leading to loss of organic matter in runoff	A soil resources survey will be completed for the main windfarm site by a soil scientist / experienced soil specialist prior to construction and the findings of the soil resources survey will be used to inform the construction phase SMP for soil handling and measures to minimise soil erosion from exposed (stripped) soils or stockpiled soils. Measures to avoid soil compaction (which can result in soil erosion by increasing surface run-off) are integrated into the CEMP to avoid damage to soil. The CEMP refers to the MMP which will detail how temporary storage of soils is to be managed. Soil stockpiles will be stored for the shortest amount of time possible. If peat cannot be avoided, then a Peat Management Plan will be developed for the Proposed Development.	SMP and CEMP secured via DNS condition
Soil resources	Permanent loss of soil and associated soil functions due to construction of the wind farm and access route	Elements of the Proposed Development which require removal of topsoil during construction and where topsoil cannot be reinstated will be kept to the minimum footprint required for the Proposed Development. Storage and handling of soil will be informed by the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure. This measure included in the CEMP (**Appendix 4A**) will be updated following the proposed peat and soil survey (in support of the Final ES). Permanently displaced soil will be reused within the Site where practicable in accordance with the MMP. The measures contained in CEMP (**Appendix 4A**) will be updated in support of the Final ES. A soil resources survey will be completed for the Main Windfarm Site by a soil scientist / experienced soil specialist prior to construction and the findings of the soil resources survey will be used to inform the construction phase SMP for soil handling and storage, which will allow excavated soil that is surplus to the Proposed Development to be retained in good condition and potentially reused offsite (in accordance with the MMP). Where it is identified through soil resource and materials management	SMP, MMP and CEMP secured via DNS condition

		planning that topsoil or subsoil cannot be reinstated at its original location, sampling and testing of excavated topsoil and subsoil will be completed in accordance with BS:3882:2015 and BS:8601:2013, respectively, at the earliest opportunity, to inform the reuse of these soils elsewhere within the Proposed Development or at a suitable offsite receptor site in compliance with the Definition of Waste: Code of Practice (CL:AIRE, 2011) and the MMP. Peat depth survey has been completed for the Main Windfarm Site and has confirmed the absence of peat. Peat survey is being completed for the access track to collect data on where peat is present along the route. This data will inform detailed design, to enable the Proposed Development to avoid peat where possible and will inform the assessment in the Final ES. If peat cannot be avoided, then a Peat Management Plan will be developed for the Proposed Development.	
Land contamination receptors (various)	Mobilisation of contaminants due to ground disturbance e.g., dust generation, contaminated run-off, creation of new pollutant migration pathways during excavation or construction, failure to manage and segregate excavated materials appropriately, resulting in effects on land contamination receptors.	A Phase 1 geo-environmental desk study has been completed for the Proposed Development (**Appendix 11A**). Phase 2 intrusive geo-environmental ground investigation will be completed during the pre-construction phase, including soil sampling and chemical testing, to confirm the Ground Conditions. Potential risks to human health from any known, suspected or unexpected ground contamination will be avoided by adopting appropriate working methods and all aspects of construction will be completed in compliance with the Construction (Design and Management) Regulations 2015, CAR 2012 and the Health and Safety at Work Act (1974) and regulations made under the Act. These legal obligations include the requirement for risk assessments and method statements for all construction related activities and the use of appropriate working methods, training and Personal Protective Equipment (PPE). Temporary storage of excavated materials will be in accordance with the MMP. Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated	MMP and CEMP secured via DNS condition

		and/or mitigated as part of the Proposed Development. The CEMP includes an unexpected contamination protocol (**Appendix 4A**). Best practice air quality management measures will be applied as described in Institute of Air Quality Management (IAQM) (2014) guidance on the Assessment of Dust from Demolition and Construction 2014, version 1.1.	
Contaminated land receptors: humans (site users), buildings	Accumulation of mine gas within enclosed spaces leading to potentially toxic and/or explosive atmospheres in enclosed spaces.	In accordance with LCRM, a Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development, and the report is appended to the Draft ES (**Appendix 11A**). Further investigation or remediation will also be undertaken in accordance with LCRM.	CEMP and DNS planning condition
Built environment (buildings, structures, services)	Aggressive or unstable Ground Conditions with potential to cause damage to buildings/structures due to ground movement or chemical attack.	A Coal Mining Risk Assessment (CMRA) has been competed for the Site and includes recommendations to address potential ground instability risks associated with former deep coal mining and possible unrecorded shallow mine workings. To ensure that land stability issues are understood and adequately addressed in the design, intrusive investigation will be completed during the pre-construction phase, as recommended in the CMRA, i.e., boreholes and trial pits. Remediation may subsequently be needed. The planned intrusive investigations and any remediation work required based on the findings of these investigations will be communicated to the Mining Remediation Authority in advance of undertaking the works. The basis of the structural design for the Proposed Development will be completed in general accordance with design standards to minimise the risk of future structural or geotechnical instability.	DNS planning condition
Land contamination receptors (various)	Unintended release of contaminants to the environment from materials used in the operational parts of the Proposed Development during operation or decommissioning	Materials selected for the above and below ground wind farm equipment will be suitably resistant to weather and Ground Conditions and have sufficient anticipated lifespan to ensure that they are unlikely to significantly degrade during the operational phase. In the event that damage to above ground equipment is observed, appropriate action will be taken to investigate any potential impacts to ground (soils and groundwater) in accordance with LCRM.	CEMP secured via DNS condition

	Underground electrical cables installed for the Proposed Development will not be oil-filled. Buried cables will be protected from damage/ deterioration by the use of sand/ soil cushioning to avoid them being in contact with sharp stones/ objects, and placement of marker tape above the cables will help to alert anyone digging to their presence.

***Effects during decommissioning are anticipated to be similar to those identified for the construction phase but smaller in scale, with the exception that during the decommissioning phase no effects associated with permanent loss of soil resources are expected, as no additional permanent land take should be needed.**

11.7 Scope of the assessment

The Proposed Development.

11.7.1. This section sets out the scope of the assessment for Ground Conditions, specifically in relation to geology (and geodiversity), minerals, soils (including peat) and land contamination. This scope has been developed as the design of the Proposed Development has evolved, and in response to the feedback to date as set out in **Section 11.3**.

Spatial Scope

11.7.2. The spatial scope of the assessment of Ground Conditions effects covers the area of the Proposed Development contained within the EIA Assessment Area, together with the Zones of Influence (ZoIs) that have formed the basis of the Study Area are described in **Section 11.4**.

11.7.3. The Study Areas applied for Ground Conditions are considered appropriate based upon professional experience. For the assessment of effects on land contamination receptors this includes consideration of the conceptual site model in relation to the potential for contaminants to migrate from the Site to offsite receptors on or through the soil or in groundwater, or to migrate onto the Site through soil or in groundwater from offsite sources. The conceptual site model has been developed in the Phase 1 Geoenvironmental Desk Study, which forms **Appendix 11A** using the information sources listed in **Table 11.** and a site walkover as described in **Section 11.4**.

Temporal Scope

11.7.4. The temporal scope of the Ground Conditions assessment in relation to land contamination is consistent with the period over which the Proposed Development would be carried out and, therefore, covers the construction (approximately 22 months), operational (30 years) and decommissioning (approximately 6 months) periods.

11.7.5. In relation to effects on soils and agricultural land, the highest potential for significant effects applies to the construction of the Proposed Development. Consideration is also given in the assessment to potential effects on soils during the operation and maintenance and decommissioning phases.

11.7.6. Further details of the programme for the Proposed Development are provided in **Chapter 4: Development Description**.

Potential Receptors

11.7.7. The principal Ground Conditions receptors that have been identified as being potentially subject to effects are summarised in **Table 11.7.**

Table 11.7 Ground Conditions receptors subject to potential effects

Receptor	Reason for consideration
Soil resources	Soil resources within the Site are in land mainly in agricultural use. There is no BMV agricultural land within the Study Area and the land is at best ALC Grade 4 (poor quality agricultural land). However, the soils support grazing of sheep, and some limited crop growing. Peat survey on the Main Windfarm Site has found that this area is not underlain by peat, the soils present there are likely to be predominantly mineral soils. However, peaty soils and potentially peat meeting the definition in **Section 11.5** may be present along the proposed access track. Key soil functions on the land include supporting livestock grazing and crop growth, storage of organic carbon, providing habitat and supporting terrestrial biodiversity and a role in the hydrological cycle.
Land contamination receptors	
Humans – current and future site users (agricultural workers, maintenance workers/ operatives, public open space users) **Humans – ground workers**	Potential for human health impacts to these receptors has been identified in the Phase 1 geo-environmental desk study due to land contamination. Effects could occur either during construction, operation, or decommissioning.
Controlled waters: Groundwater – Secondary A aquifer (Hughes Member Sandstone)	Groundwater has been identified as a potential receptor in the Phase 1 Geo-environmental Desk Study. Effects on the water environment due to land contamination could occur either during construction, operation, or decommissioning.
Controlled water: Surface water – Nant Gofapi, Nant Gwyddon, Nant Carn, ponds	Surface water has been identified as a potential receptor in the Phase 1 Geo-environmental Desk Study. Effects on the water environment due to land contamination could occur either during construction, operation, or decommissioning.
Property: Current and future buildings and services **Property: Agricultural property (livestock, crops)**	Potential for impacts on the built environment (future wind farm development) due to land contamination have been identified in the Phase 1 geo-environmental desk study. Agricultural property (livestock and limited crops) is present, and identified as a potential receptor in the Phase 1 geo-environmental desk study. Potential for impacts on the built environment (future wind farm development) due to land

	instability have been identified in the Phase 1 geo-environmental desk study and Coal Mining Risk Assessment.

* Note: Land contamination receptors include: Human health: future site users and adjacent site users (by direct contact, inhalation or ingestion pathways), controlled waters: groundwater and surface water, property (crops, grazing animals, built environment including services), and soil resources.

Likely significant effects

11.7.8. The effects on Ground Conditions receptors which have the potential to be significant and have been taken forward for detailed assessment are summarised in Table 11.

Table 11.8 Summary of effects scoped into the Ground Conditions assessment

Receptors	Potential changes and effects	Justification
Soil resources	Compaction of soil by vehicles or during soil stockpiling/ handling leading to damage to soil structure and damage to/loss of soil functions Erosion of soil during construction, due to vegetation stripping, or soil handling and storage, leading to loss of organic matter in runoff Permanent loss of soil and associated soil functions due to construction of the wind farm and access route	Land within the Site is in agricultural use. There is no BMV agricultural land within the Study Area, however, grazing of sheep takes place, also some crop growing (small scale). Key soil functions on the land include supporting grassland / forage plant growth, storage of organic carbon, providing habitat and supporting biodiversity and a role in the hydrological cycle. Soil (and peat) takes so long to form (e.g., 100s or 1,000s of years to form a cm of topsoil) that it is effectively a finite and non-renewable natural resource.
Land contamination receptors (various)	Mobilisation of contaminants due to ground disturbance e.g., dust generation, contaminated run-off, creation of new pollutant migration pathways during excavation or construction, failure to manage and segregate excavated materials appropriately, resulting in effects on land contamination receptors can result in receptors being exposed to contaminants via numerous pathways (for humans these can include inhalation, direct contact, ingestion, resulting in health impacts) during operation.	Potential sources of land contamination have been identified in the Phase 1 geo-environmental desk study. The site includes farm properties and public rights of way. Mobilisation of contaminants can occur due to ground disturbance e.g., dust generation or contaminated run-off from excavated (contaminated) material, creation of new pollutant migration pathways during excavation or construction.
Land contamination receptors: humans (site users), buildings	Accumulation of mine gas within enclosed spaces leading to potentially toxic and/or explosive atmospheres in enclosed spaces during operation.	New enclosed structures will be built for the Proposed Development, and the site has been identified as having a risk of mine gas being present.
Land contamination receptors (various)	Unintended release of contaminants to the environment from materials used in the operational parts of the Proposed	Consultees noted the potential for pollution from microplastics and PFAS (Per- and polyfluroalkyl

	Development during operation or decommissioning	substances) as these can occur in various parts of wind turbines and could then be released due to the environment though wear and tear or damage.

11.7.9. The effects scoped out of the Ground Conditions assessment are included in Table 11.9

Table 11.9 Summary of effects scoped out of the Ground Conditions assessment

Receptors/potential effects	Justification
Construction	
Soil resources and agricultural land - degradation of soil functions and agricultural land quality due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work	Degradation of soil functions due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work. Given the limited and localised potential contamination sources present on the Site, and the likelihood that the Proposed Development can avoid disturbance of these, and with the embedded measures in **Table 11.6** including compliance with LCRM in risk assessment, completion of a pre-construction Phase 2 intrusive geo-environmental ground investigation, including soil sampling and chemical testing, to confirm the Ground Conditions, soil survey and development of an SMP and use of an MMP in accordance with The Definition of Waste: Development Industry Code of Practice (DoWCoP), there is little likelihood that agricultural and soil will become degraded during construction due to the mixing of clean soil resources with material affected by contamination.
Construction, operation and decommissioning Agricultural land	Potential effects on best and most versatile agricultural land, are scoped out due to the Predictive Agricultural Land Classification (ALC) Map 2 showing the absence of any land above Grade 4.
Geology (geodiversity) – damage to notable geological feature	There are no geological features with statutory or non-statutory designations for conservation of geodiversity within the Study Area.
Minerals – including sterilisation of resources	Although the Site is within a Sandstone Safeguarded Area, there are no known proposals for mineral extraction within the Study Area. Additionally, in relation to coal resources, Welsh Government planning policy is to move away from the extraction of energy minerals.
Construction workers – impacts on human health from known, suspected or unexpected land contamination	Risks to construction workers will be dealt with under the Health and Safety at Work Act (1974) and regulations made under the act. Site-specific contamination data obtained from all site investigations will be included in the pre-construction information (requirement of Construction Design and Management Regulations, 2015) for the proposed

	works, to enable appointed contractors to address and manage potential risk from contamination as necessary in their risk assessments and method statements.
Contaminated land receptors: soil and groundwater, humans (site users - agricultural workers, maintenance workers, public open space users) – impacts on human health or the water environment due to leaks or spills or fuels or oils from construction vehicles or plant	The embedded measures (**Table 11.6**) include limitations on where and how refuelling/maintenance of plant and vehicles can take place. During construction, vehicle maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. These areas at risk of spillage or containing hazardous materials, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils, and chemicals) will comply with industry good practice, be bunded, have appropriate containment and segregation. Additionally, the bunded areas will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage.
Controlled waters receptors: Surface water – Nant Gofapi, Nant Gwyddon, Nant Carn **Groundwater – Secondary A aquifer (Hughes Member)**	There is limited potential for shallow groundwater to be present on the Site. Groundwater is likely to be present at depth within the Hughes Member below the Site. Given the low or very low risks assessed to groundwater in the Phase 1 Geoenvironmental Desk Study (PRA) and the limited potential sources present (which are typically in areas that should not require to be disturbed by the Proposed Development), and with the embedded measures in **Table 11.6** including compliance with LCRM in risk assessment, completion of a pre-construction Phase 2 intrusive geo-environmental ground investigation, including soil sampling and chemical testing, to confirm the Ground Conditions, and use of an MMP in accordance with The Definition of Waste: Development Industry Code of Practice (DoWCoP), there is little likelihood that the site's groundwater quality could be significantly altered by the Proposed Development. A tributary of the Ebbw River, the Nant Gofapi, rises as a spring within the east of the Site and flows generally southwest. The Site is located on upland plateau between the Nant Gwyddon and Nant Carn river valleys, c.370m to the northwest and c.600m southeast, respectively. Tributaries of the Nant Carn are present c.320m east of the Main Windfarm Site and c.180m southeast of the proposed access track. The risks to surface water are assessed to be very low, as surface water receptors are either not located near potential sources, or the source, if present, is likely to be of limited extent and unlikely to result in significant degradation of water quality. Given this scenario and the embedded measures described above and including use of measures to be detailed in the CEMP (**Appendix 4A**) to ensure that stockpiled excavated materials are well controlled to prevent release to ground or contaminated surface run-off, there is little likelihood that the Proposed Development will impact significantly on surface

	water quality in the Study Area either during construction or during operation when soils have been restored.
Agricultural property (livestock, crops)	Agricultural receptors are present on the Site including sheep, and some limited crops. Given the very low risks assessed to agricultural property in the Phase 1 Geoenvironmental Desk Study and the limited potential sources present (which are typically in areas that should not require to be disturbed by the Proposed Development), and with the embedded measures in **Table 11.6** including compliance with LCRM in risk assessment, completion of a pre-construction Phase 2 intrusive geo-environmental ground investigation, including soil sampling and chemical testing, to confirm the Ground Conditions, and use of an MMP in accordance with The Definition of Waste: Development Industry Code of Practice (DoWCoP), there is little likelihood that agricultural receptors will be significantly affected by the Proposed Development.
Built environment (buildings, structures, services) – land instability with potential to result in subsidence	The stability of the ground, in so far as it affects land use, is a material consideration that is taken into consideration in DNS application decisions. Land stability in relation to the Ground Conditions on the Site will be addressed throughout the design and construction process by compliance with the Construction (Design and Management) Regulations 2015 and will be informed by the Phase 1 Geo-Environmental Desk study (PRA), the Coal Mining Risk Assessment (CMRA), and any further relevant surveys undertaken. It is not considered in the assessment in **Section 11.11**. These actions are embedded measures in **Table 11.6**.
Built environment (buildings, structures, services) - aggressive Ground Conditions with potential to cause damage to buildings/structures due to chemical attack.	The embedded measures in **Table 11.6** include a commitment to the basis of the structural design for the Proposed Development being completed in general accordance with design standards. Localised peaty soils may be present on the Site. The potential for aggressive Ground Conditions will be assessed through ground investigation completed during the pre-construction to determine the requirements for in ground concrete structures. Therefore, no significant effects are likely relating to chemical attack on structures.

11.8 Assessment methodology

Overview

11.8.1. The generic project-wide approach to the assessment methodology is set out in **Chapter2: Approach to Environmental Impact Assessment**, and specifically in Section **2.5** to **2.8**. However, whilst this has informed the approach that has been used in this Ground Conditions assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this Ground Conditions assessment.

11.8.2. The approach to assessment is set out in **Section 11.8** for geology, agricultural land and soils, and land contamination. The methodology for land contamination considers the change in risk level to various land contamination receptors because of the Proposed Development, whereas the approach to agricultural land and soil assessment considers the magnitude/consequence of potential effects on soils caused by the Proposed Development.

Assessment methodology: Soils

11.8.3. The magnitude/consequence of the loss or damage to soil receptors is based upon the:

- Likely nature and scale of soils effects (positive, neutral, or negative) during the construction and operational phases of the Proposed Development, and during decommissioning (which is anticipated to have the potential for similar effects as the construction phase but smaller in scale);
- Likelihood of the Proposed Development to result in significant effects; and
- Issues requiring further assessment and the methods to be applied.

11.8.4. The sensitivity of the soil on the Site has been assigned based on the findings of Phase 1 peat survey to date, and desk-based information detailed in **Section 11.5**. The classifications in Table 11. are intended to reflect the importance of soils in relation to their soil organic matter content and climate change resilience and mitigation, agricultural (biomass production) function, and biodiversity, as well as the Welsh Government's Peatland Policy[39].

Table 11.10 Sensitivity classifications for soil resources

Value / Sensitivity	Description Example
Very high	Soils *(other than peat)* directly supporting an EU designated site (e.g., SAC, SPA, Ramsar) *designated peatlands (any statutory designation including SSSI)* Soils in Grade 1 and 2 agricultural land (and Subgrade 3a in Wales)[40] according to the Agricultural Land Classification (ALC) system[41]
High	Soils *(other than peat)* directly supporting a UK designated site (e.g., SSSI) *Peat: deep peat with no designation*
Medium	Soils *(other than peat)* supporting non-statutory designated sites (e.g., Local Nature Reserves (LNR), LGSs, Sites of Importance for Nature Conservation (SINCs)) *Peat: peaty soils* Soils in Grade 3b agricultural land according to the ALC system
Low	Soils *(other than peat)* supporting non-designated notable or priority habitats Soils in Grade 4[42] and 5 agricultural land according to the ALC system

[39] Welsh Government (2025). The National Peatlands Action Programme. (Online) Available at: https://naturalresources.wales/evidence-and-data/maps/the-national-peatland-action-programme/?lang=en, (Accessed October 2025).
[40] Grade 1: Excellent quality agricultural land with no or very minor limitations to agricultural use. Grade 2: Very good quality agricultural land with minor limitations which affect crop yield, cultivation or harvesting. Subgrade 3a: Good quality agricultural land capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.
[41] Welsh Government (2021) Agricultural land classification, frequently asked questions, May 2021. (Online). Available at: https://gov.wales/sites/default/files/publications/2021-05/agricultural-land-classification-frequently-asked-questions.pdf. (Accessed February 2022).
[42] Grade 4: Land with severe limitations which significantly restrict the range of crops and/or the level of yields. It is mainly suited to grass with occasional arable crops (e.g., cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Very Low	Soils *(other than peat)* on previously developed land formerly in 'hard uses' with little potential to return to agriculture

Table 11.11 Magnitude classifications soils

Magnitude	Description Example
Major	Physical removal or permanent sealing of >20 ha soil resource or agricultural land.
Moderate	Permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use of 1ha to 20ha (e.g., through degradation, compaction, erosion of soil resource.)
Minor	Temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g., through degradation, compaction, erosion of soil resource.)
Negligible	No discernible loss / reduction of soil function(s) that restrict current or approved future use.
No change	No loss / reduction of soil function(s) that restrict current or approved future use.

11.8.5. The determination of significance combines the sensitivity and magnitude using the matrix presented in **Table 11.1**.

Table 11.12 Soil effects significance evaluation matrix

		Magnitude of change				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity/importance/value	**Very high**	Neutral	Slight	**Moderate or large**	**Large or very large**	**Very large**
	High	Neutral	Slight	Slight or moderate	**Moderate or large**	**Large or very large**
	Medium	Neutral	Neutral or slight	Slight	Moderate	**Moderate or large**
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Note: Significant effects are those identified as 'Very large' or 'large'. 'Moderate' effects have the potential to be significant, and they would normally be deemed to be significant, however in some instances these are deemed to be acceptable based on professional judgment.

Assessment methodology: Land Contamination

11.8.6. For land contamination receptors, the effect of the Proposed Development has been assessed through desk-based studies to understand the baseline condition land contamination status within the Site and the ZoI. A Phase 1 Geoenvironmental Desk Study is included as an appendix (**Appendix 11A**) to the Ground Conditions assessment. This information has been used to inform the assessment of the likely land contamination status resulting from the Proposed Development.

Risk assessment

11.8.7. The process of managing land contamination, as set out in the Environment Agency guidance *Land Contamination: Risk management* (LCRM), which is also adopted by Natural Resources

Wales[43], is based on risk assessment. The assessment of risks from land contamination is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of a:

- Source of contamination;
- Receptor that can be adversely affected by the contamination; and
- Pathway capable of exposing a receptor to the contaminant.

11.8.8. The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both of the following.

- The magnitude of the potential consequence (for instance, severity). It considers both the potential severity of the hazard and the sensitivity of the receptor; and
- The magnitude of probability (for instance, likelihood). It considers both the presence of the hazard and receptor and the potential for a pathway to be realised between them.

11.8.9. The definitions for the qualitative risk assessment have been taken from "*Guidance for the Safe Development of Housing on Land Affected by Contamination"* Annex 4 R&D Publication 66: 2008 Volume 2.

11.8.10. The likelihood classifications for the contaminant linkages being realised is presented in **Table 11.**.

Table 11.13 Likelihood classifications for contaminant linkages

Classification	Definition	Examples
High Likelihood	There is contaminant linkage, and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing several USTs, having been in operation on the same site for over 50 years.
Likely	There is contaminant linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/ groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low Likelihood	There is contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned

[43] Natural Resources Wales (2025) (online) Advice for developers: Land contamination. Available at: https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en. Accessed October 2025.

		but there is no integrity testing or evidence of leakage.
Unlikely	There is contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 years old containing a double skinned UST with annual integrity testing results available.

11.8.11. The classification of consequence is presented in **Table 11.14**.

Table 11.14 Classification of consequence

Classification	Human Health	Controlled Water	Ecology	Property / Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency (EA) Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (e.g. cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	Significant damage to crops, buildings or property.	Exposure could lead to acute or chronic health effects which are significant as defined in the Contaminated Land Statutory Guidance. Damage to building rendering it unsafe to occupy e.g., foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to	Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse	Minor damage to crops, buildings, or property.	Exposure could lead to slight short-term effects (e.g., mild skin rash). Surface spalling of concrete.

Classification	Human Health	Controlled Water	Ecology	Property / Structures/ Crops and animals	Examples
	“significant harm”.	quality; marginal effect on amenity value, agriculture, or commerce.	change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.		
Minor	No measurable effects on humans.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

11.8.12. The risk matrix to link the likelihood and consequence is shown in **Table 11.15**.

Table 11.15 Risk Matrix

Likelihood / Potential Consequence	Unlikely	Low	Likely	High
Severe	Moderate/Low Risk	Moderate Risk	High Risk	Very High Risk
Medium	Low Risk	Moderate/Low Risk	Moderate Risk	High Risk
Mild	Very Low Risk	Low Risk	Moderate/Low Risk	Moderate Risk
Minor	Very Low Risk	Very Low Risk	Low Risk	Low Risk

11.8.13. The overall risk definitions are summarised in **Table 11.16**.

Table 11.16 Risk Definitions

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

Significance evaluation methodology

11.8.14. There is no established guidance on how to use the LCRM risk assessment approach as the basis for the evaluation of the significance of effects within the EIA process.

11.8.15. The methodology used in this assessment has, therefore, been developed using professional judgment, evaluating the change in risk from baseline conditions to those during and following the Proposed Development. To define the baseline risk, the initial assessment and classification of risk is carried out for the Study Area in its pre-development state. A separate assessment of risk will then be conducted based on the Proposed Development taking place (including environmental

measures inherently embedded in the development) to enable an evaluation of the change in risk due to the Proposed Development.

11.8.16. In considering the post-development risks, the embedded measures in Table 11.. have been taken into account.

11.8.17. **Table 11.18** uses the risk classification pre- and post-development as the basis for a significance evaluation matrix for the purposes of EIA.

Table 11.17 Land contamination effects significance evaluation matrix

			Risk Post-development (including embedded environmental measures)					
			Very Low	**Low**	**Moderate / Low**	**Moderate**	**High**	**Very High**
Risk Pre-development	**Existing receptors**	**Very High**	Major Positive (Significant)	Major Positive (Significant)	Moderate Positive (Potentially significant)	Moderate Positive (Potentially significant)	Minor Positive (Not Significant)	Negligible (Not Significant)
		High	Major Positive (Significant)	Moderate Positive (Potentially significant)	Moderate Positive (Potentially significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)
		Moderate	Moderate Positive (Potentially significant)	Moderate Positive (Potentially significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)
		Moderate / Low	Moderate Positive (Potentially significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)
		Low	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)
		Very Low	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)

			Risk Post-development (including embedded environmental measures)					
			Very Low	**Low**	**Moderate / Low**	**Moderate**	**High**	**Very High**
	No Receptor Present Pre-development	**N/A**	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)	Major Negative (Significant)
Risks that remain at moderate, high, or very high post-development may require further measures during the construction phase to mitigate those risks depending on the specific circumstances (for example remediation in line with LCRM)..								

11.9 Assessment of preliminary Ground Conditions effects

Maximum design scenario

11.9.1. The assessments in this chapter for Ground Conditions receptors, including soils and land contamination receptors, is based on the maximum design scenario to establish the potential maximum (worst-case) adverse effect on ground condition receptors. During construction of the Proposed Development some soil would be removed and not reinstated. These areas are summarised below and detailed in **Chapter 4: Development Description**.

11.9.2. The permanent development features of the Proposed Development comprise the following:

- Up to three wind turbines will each require foundations, likely to be formed by a reinforced concrete slab base approximately 20m in diameter, the total area required for all three turbine foundations will therefore be 942.5m^2 (0.09) ha;
- Each turbine will also require a transformer; in some instances, this can be incorporated into the base of the tower itself, however, for a worst-case assessment it is assumed that an external kiosk is needed to house the transformer and that this would have a maximum area of 5.0m x 2.5m (12.5m^2). The three kiosks will, therefore, require a total area of 37.5m^2 (0.004ha);
- Each wind turbine requires an adjacent area of hardstanding for use as a crane pad, and these will be left in place during the operational phase for use during maintenance / replacement of parts and could also be used during decommissioning. Each crane pad will require approximately 2,200m^2 in area; the maximum total area of the three crane pads will therefore be 0.66ha;
- The wind farm will require internal access tracks (**Figure 11-1**), new track of approximately 4.65km in length, which includes 4.45km of new track and 190m of existing tracks which will require upgrades. Works will include widening, earthworks, and vegetation clearance. The access tracks will be approximately 5.0m wide and will have a 2.0m wide grassed verge on either side. Tracks will be approximately 0.6m deep (ground conditions dependent). It is also assumed that new verges will be needed for existing tracks being widened. The total new track (including road widening) for the Proposed Development will therefore require an area 2.23ha and the verges for the new track and existing track will occupy an area of 1.86ha. Soil will be disturbed / removed to construct the verges, and it is likely that most will be reused within the verge. However, the assessment assumes a worst-case figure of 4.08ha as the maximum area of soil loss associated with access tracks and widening of existing roads;
- Underground cables will link the turbines to an on-site substation situated in the east of the Site. Detailed construction and trenching specifications will depend on the Ground Conditions encountered at the time, but typically cables will be laid in a trench 750mm deep and 450mm wide. To minimise ground disturbance, cables will be routed alongside the proposed access tracks. **Figure 4.5** in **Chapter 4: Development Description** shows a typical cable trench detail; and,
- The Proposed Development requires an internal substation in the east of the Main Windfarm Site to connect the wind farm into the national distribution system. This may require a transformer within the substation compound within a stoned area of approximately 37.5m x 35m. The substation building will be a single storey building, approximately 14m x 10m, housing metering, protection and control equipment, storage and welfare facilities. To provide a worst-case assessment it is therefore assumed that the substation building, and transformer compound will require a total area of 0.13ha.

11.9.3. The substation welfare facilities will include a water supply system which is likely to be rainwater fed, no connection to mains water supply is proposed.

11.9.4. Based on the above details, the total area of permanent development where soil is likely to be permanently removed or sealed will be 4.97ha (this includes verges for new and existing track to provide a worst-case assessment).

11.9.5. In addition to long term/permanent loss of soil due to the Proposed Development, some elements of the Proposed Development require the temporary removal of soil that can be stockpiled and reinstated on completion of construction. These features are summarised below:

- Temporary use of land will be required for a construction compound, there will be one compound requiring an area of around 50 x 50m (0.25ha). Once the erection and commissioning of the wind turbines is complete, the compound would be removed, and the soil reinstated during the construction phase.
- A temporary site office will be needed; this will be located within the above temporary compound. Temporary buildings will not have connection to mains water supply or any below ground water pipes.
- Temporary ground disturbance will be required to install the underground cables running between the turbines and the substation, this will require up to 5m width either side of the cable trench. The cables will be placed in cable trenches approximately 0.45m wide and 0.75m deep, however for the purposes of the assessment, a maximum width has been applied for the cable trench at ground surface of 1.5m. The length of cable is not known, therefore, the length of the new and widened access track of 4.65km has been used as a likely total given the turbine layout (based on 11.5m wide working corridor), giving a total cable trench area of 5.34ha.
- Based on the above details, in addition to the permanent development area, the maximum area of soil that would be disturbed and/or temporarily displaced because of the Proposed Development would be approximately 6.25 hectares.
- The maximum area of land and soil likely to be affected either by temporary soil disturbance / soil displacement or permanent development (generally requiring some soil removal and / or sealing) because of the Proposed Development is therefore estimated at 10.60ha.

11.9.6. As detailed in **Section 11.5** desk-based information indicates the soil type in the EIA Assessment Area is mainly freely draining acid loamy soils over rock, with a loamy texture and medium carbon content. In the north-east of the Site there is an area shown with very acid loamy upland soils with a wet peaty surface, a peaty texture and high carbon content.

11.9.7. Disturbance of soil cannot be avoided by the Proposed Development and soil is a living material which is vulnerable to damage during handling and storage, even if the effect is only temporary, with some soil types being less resilient to handling than others. However, where soil is handled carefully and replaced, it is expected that over time the original functions of the soil will be restored. For the purposes of the assessment, soil sensitivity is assessed on a soil function basis rather than the soil's structural qualities. However, it is acknowledged that during the construction phase of the Proposed Development, the soil type and its structural qualities can influence its sensitivity to handling, storage and placement. Soil's resilience to structural damage during soil handling (including soil stripping, storage in stockpiles and restoration) is correlated to the interaction between soil texture and soil moisture. These differences will be addressed through the embedded measures in Table 11..

11.10 Preliminary assessment of soil (including peat) effects

Soil resources: Compaction of soil by vehicles or during soil stockpiling/ handling leading to damage to soil structure and damage to/loss of soil functions

11.10.1. As described in the baseline in **Section 11.5**, the ALC grade for soils within the Site, is assumed, for the purposes of the assessment, to be Grade 4, and based on the criteria in **Table 11.10** the soil sensitivity on this basis is therefore Low for the Main Windfarm Site.

11.10.2. Based on the potential localised presence of peaty soils with high carbon content along the access track, and based on the land being in a SINC (Mynydd Maen SINC Ref. NH3.113, SINC 111a), the soil sensitivity in this area, based on the criteria in Table 11. would be Medium, and potentially High in localised areas of peat.

11.10.3. The maximum area of soil to be temporarily disturbed and/or temporarily or permanently displaced because of the Proposed Development is approximately 11.22 hectares. Embedded environmental measures include the use of machinery with low ground pressure during topsoil stripping to minimise soil compaction, including during construction of the access tracks, the tracks will then be available for heavier vehicles to use to avoid impacts on other areas.

11.10.4. An SMP will be developed for the Main Windfarm Site once soil resources survey has been completed. The CEMP (**Appendix 4A**) includes measures for the storage and handling of all soil, including along the proposed access track, based on the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites to avoid damage to soil structure and help to minimise soil compaction. The CEMP will be updated in support of the Final ES and any further measures arising from future surveys will be included. If peat cannot be avoided along the proposed access track, then a Peat Management Plan will be developed for the Proposed Development. These measures should lower the impact magnitude to Minor.

11.10.5. Applying a Low to High soil sensitivity (based on the most sensitive soils being Medium or High sensitivity peaty soils on the proposed access track), and a Minor impact magnitude, results in **a Neutral or Slight negative** effect which is not significant.

11.10.6. The baseline review in **Section 11.5** indicates potential for localised deep peat along the proposed access track, this is not expected to be extensive in area and the Applicant is committed to implementation of the peat mitigation hierarchy (see embedded measures in Table 11.) in the final design, if possible. The sensitivity will therefore be revisited for the Final ES once further information is available for the soil conditions along the access track. For the temporarily displaced soil, the embedded mitigation measures will limit the potential for soil to be damaged during handling, storage, and reinstatement. No significant effects are therefore anticipated.

Soil resources: Erosion of soil due to vegetation stripping, or soil handling and storage, leading to loss of organic matter in runoff

11.10.7. As described in the baseline in **Section 11.5**, the ALC grade for soils within the Site, is assumed, for the purposes of the assessment, to be Grade 4, and based on the criteria in **Table 11.10** the soil sensitivity on this basis is therefore Low for the Main Windfarm Site.

11.10.8. Based on the potential localised presence of peaty soils with high carbon content along the access track, the soil sensitivity in this area, based on the criteria in **Table 11.** would be Medium, and potentially High in localised areas if deep peat is present.

11.10.9. The maximum area of soil to be temporarily disturbed and/or temporarily or permanently displaced because of the Proposed Development would be approximately 11.22 hectares. Soil stripping and stockpiling will be needed for the permanent development elements which cover an area of approximately 4.97 hectares, soils will also be temporarily removed for cable trenching, crane pads and the construction compound topsoil over a further area of 6.25ha. Embedded environmental measures in **Table 11.** include minimising the time that soils are stockpiled and control of runoff from stockpiles or exposed soils. Measures for the avoidance of soil compaction are also included, as soil compaction can cause/exacerbate soil erosion.

11.10.10. An SMP will be developed for the Main Windfarm Site once soil resources survey has been completed. The CEMP (**Appendix 4A**) includes measures for the storage and handling of all soil, including along the proposed access track, based on the Defra (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. If peat cannot be avoided along the proposed access track, then a Peat Management Plan will be developed for the Proposed Development. The CEMP will also be updated in support of the Final ES to capture any additional measures. These measures will lower the impact magnitude to Minor.

11.10.11. The baseline review in **Section 11.5** indicates potential for localised peat along the proposed access track, however the Applicant is committed to implementation of the peat mitigation hierarchy (see embedded measures in **Table 11.** in relation to peat survey for the access track) in the final design, if possible, and the sensitivity will therefore be revisited for the Final ES once further information is available for the soil conditions along the access track. For the temporarily displaced soil the embedded mitigation measures will limit the potential for soil to be damaged during handling, storage, and reinstatement.

11.10.12. Applying a Low to High soil sensitivity (based on the most sensitive soils being Medium sensitivity peaty soils on the proposed access track), and a Minor impact magnitude, results in a **Neutral or Slight or Moderate negative** effect which is not significant.

Soil resources: Permanent loss of soil and associated soil functions due to construction of the wind farm and access track

11.10.13. The maximum area of potential permanent/long-term loss of soil/agricultural land due to the Proposed Development is 4.97 hectares. The area of permanent loss of soil is less than 20 hectares, and the magnitude of impact is assessed to be Moderate. Embedded environmental measures include the requirement to keep the permanent removal of topsoil to the minimum footprint required for the Proposed Development.

11.10.14. Most of the permanent development occurs in the Main Windfarm Site where soils of Low sensitivity are present, based on the criteria in Table 11.. However, permanent development is also required for the proposed access track and soils in this area are anticipated to meet the criteria for Medium sensitivity , with potential to be High sensitivity, if deep peat is present, in localised areas. Based on the criteria in **Table 11.**, the area affected would result in a Moderate magnitude of change.

11.10.15. Based on the Low to High sensitivity of the soil and a Moderate magnitude of change, the effect is **Slight negative,** which is potentially significant, or **Moderate or Large negative**, which is

significant. Given the embedded measures, the layout of the Proposed Development, which means that most impacts would affect soils of Low sensitivity, the likelihood that peat can be avoided (by obtaining peat survey data along the access track and through design measures to avoid any identified peat), and that the natural soils and existing land use can be maintained around wind farm structures and tracks where soil will need to be removed or covered, based on professional judgement the overall effect is considered to be not significant.

11.11 Preliminary assessment of land contamination effects

Land contamination receptors: Exposure to land contamination via numerous pathways (e.g., inhalation, direct contact, ingestion) resulting in health effects for site users during operation.

11.11.1. The sensitivity of land contamination receptors varies, depending on the receptor type (for example, human health, controlled waters, ecological receptors or property), and the land use context (for example, in a residential use there are sensitive receptors such as young children who may come into direct contact with soil, as opposed to a commercial site use where only adults are likely to be present and they are unlikely to come into contact with soil due to the presence of buildings and hard paving or roads). The assessment methodology therefore considers whether there is potential for a change in the baseline risk level to a sensitive receptor due to the Proposed Development as explained in **Section 11.8**.

11.11.2. The embedded measures (**Table 11.**) during the construction phase include development and implementation of an MMP for the reuse of soils within the Site and a protocol to be included in the CEMP for dealing with potentially contaminated soils requiring disposal as opposed to reuse. There is also a commitment to ensure that the land subject to construction will be suitable for the proposed future use in line with LCRM guidance (Environment Agency, 2020). This means that any contaminated soils encountered during the construction phase that are not suitable for reuse on the Site will be removed or otherwise remediated. The associated risk assessments, waste documentation and remediation verification reports will demonstrate that the land is suitable for the future use and there are no significant risks to human health.

11.11.3. The current risk level to site users from the identified potential sources of contamination on the Site (excluding mine gas), ranges from very low to low, based on a mild or medium consequence, and a likelihood of unlikely for the identified sources. Due to the limited potential sources present on the Site, and with implementation of the embedded measures including the Phase 1 Geoenvironmental Desk study (**Appendix 11A**) completed in line with LCRM, the risk level will remain very low to low, based on a mild or medium consequence, and a likelihood of unlikely for the identified sources. On this basis, there is no change to the risk level as a result of the Proposed Development, and the effect is **Negligible** and not significant.

Land contamination receptors: Human health impacts due to accumulation of mine gas within enclosed spaces leading to potentially toxic and/or explosive atmospheres in enclosed spaces during operation.

11.11.4. The Phase 1 Geoenvironmental Desk study (**Appendix 11A**) produced in line with LCRM has identified a Moderate/low risk to future site users in regard to mine gas, which is a higher risk than in the current scenario, as explained further below.

11.11.5. The current risk level to site users from mine gas is low, given there are limited enclosed spaces currently on the Site and no recorded mine gas issues. The Proposed Development will introduce new enclosed spaces, although these will not be routinely occupied. In this scenario, the hazard has a medium consequence, due to potential for gas accumulation in enclosed spaces to result in asphyxiation or explosion/fire risk. With a low likelihood, the risk to future site users with the Proposed Development if no mitigation were to be applied would be moderate/low.

11.11.6. However, the embedded measures (**Table 11.**) include a commitment to ensure that the land subject to construction will be suitable for the proposed future use in line with LCRM guidance (Environment Agency, 2020) and the recommendations in the Phase 1 Geoenvironmental Desk study (**Appendix 11A**), completed in line with LCRM, include monitoring for ground gas which should be undertaken at the proposed turbine and substation locations. Consideration of the risks from ground gas (in particular, enclosed spaces where ground gas can accumulate) is therefore an embedded measure through compliance with LCRM and obtaining ground investigation data preconstruction to confirm the risk level from mine gas.

11.11.7. Based on implementation of this mitigation, either the ground investigation data will demonstrate that the hazard from mine gas is absent at levels that could result in explosion or asphyxiation (in which case both the pre- and post-development risks would be very low (based on a mild consequence and unlikely likelihood) which represents a **negligible** effect which is not significant) or it will identify that a post development mine gas risk is present and there is the need for physical gas protection mitigation measures to be incorporated into the design of structures.

11.11.8. In the absence of ground investigation data at this stage, a conservative assessment has been considered to ensure the EIA identifies the potential worst case. In this scenario, the worst case is considered to be a situation where mine gas risks are identified by the ground investigation and whilst gas protection measures are incorporated into the Proposed Development, the likelihood of realising a worst-case severe consequence is not reduced below 'unlikely'. This would result in the pre- to post development risk changing from low risk to Moderate/low risk, which based on **Table 11.17** is a **minor negative** effect which is not significant.

Land contamination receptors: Unintended release of contaminants to the environment from materials used in the operational parts of the wind farm during operation or decommissioning

11.11.9. During all phases of development, there is the potential for degradation of or damage to above and below ground wind farm infrastructure, which could result in release of hazardous chemicals to ground resulting in pollution of soils and groundwater (and potential impacts on surface water quality) including PFAS and microplastics. Wind turbine paints and coatings can contain PFAS, this is due to the desirable properties of PFAS which include heat resistance, water resistance, and

anti-reflectiveness[44]. In normal operating conditions there should be a very low potential for release of PFAS contaminants to the environment from the turbines due to wear and tear, given the expected lifespan of the wind turbine parts and components.

11.11.10. As outlined in **Chapter 4: Development Description**, there will be regular onsite maintenance of the turbines and high voltage equipment (substation) by technicians (typically at 6 monthly internals). Technicians would also visit turbines to repair faults, identified through remote monitoring of the wind farm performance. At regular periods through the project life, oils and components will require changing which will increase the service time on site per machine. Gearbox oil changes are required approximately every 18 months. Blades would be inspected annually, either by drone or rope access.

11.11.11. In the unlikely event of damage to above ground wind farm equipment appropriate action will be taken to investigate any potential impacts to ground (soils and groundwater) in accordance with LCRM (**Table 11.**) including, where appropriate, testing of soils and groundwater for contaminants including PFAS.

11.11.12. Other key mitigation measures include the commitment for the Proposed Development to comply with good practice in structural design including compliance with the Eurocodes and relevant British Standards (**Table 11.**). The design will account for the expected Ground Conditions and design loads, accounting for the effects of climate change. Materials selected for the wind farm equipment and associated above and below ground infrastructure will be suitably resistant to weather and Ground Conditions and have sufficient anticipated lifespan to ensure that they are unlikely to significantly degrade during the operational phase (**Table 11.**).

11.11.13. Electrical transformers will be located within containers which will serve as bunds for oils used within the transformers, lowering the potential for a leakage of oil to reach the ground.

11.11.14. In relation to conventional contaminants such as fuels and oils, relevant embedded environmental measures (**Table 11.**) that will influence the magnitude of change by limiting the potential for uncontrolled releases of contaminants to ground from the above or below ground infrastructure during the operational phase of the Proposed Development (**Table 11.**). These relate to the implementation of best practice for storage of potentially polluting substances or materials, set up of construction work (to ensure compliance with The Construction (Design and Management) Regulations 2015, and the Health and Safety at Work Act etc.1974), control of construction activities and drainage, including incident management, and compliance with legislation and guidance for pollution prevention, such as Pollution Prevention Guidance Notes (PPGs) and Guidance for Pollution Prevention Notes (GPPs) (both maintained by NetRegs and provide environmental good practice guidance for the UK, and environmental regulatory guidance directly to Northern Ireland, Scotland, and Wales only)[30] .

11.11.15. Whilst construction, operation and decommissioning of the Proposed Development will introduce potential contamination sources, implementation of the embedded environmental measures presented in **Table 11.** reduces the potential for an impact on land contamination receptors, with any release expected to be a mild impact at most.

11.11.16. Based on the Proposed Development resulting in the introduction of a potential Mild impact on human health receptors, with a likelihood of Unlikely, this results in a new Very Low risk to

[44] UK Parliament (2025) UK Parliament POSTnote 747. (online) Available at: https://researchbriefings.files.parliament.uk/documents/POST-PN-0747/POST-PN-0747.pdf. Accessed 7 November 2025.

human health, which using the significance evaluation in **Table 11.17** results in a **Minor Negative** effect, which is not significant.

11.12 Preliminary assessment of cumulative (inter-project) effects

11.12.1. A preliminary cumulative effects assessment (CEA) has been undertaken for the Proposed Development which considers the combined impacts with other developments on the same single receptor or resource (inter-project effects). The detailed method followed in identifying and assessing potential cumulative effects is set out in **Section 2.9** of **Chapter 2**.

11.12.2. Effects on soil receptors are limited in extent within the EIA Assessment Area. There are no high sensitivity soil receptors present in the main site, and most of the permanent development is in the main site, where soils of Low sensitivity are present. However, permanent development is required for the proposed access track and soils in this area are anticipated to meet the criteria for Medium sensitivity, with limited potential to be High sensitivity.

11.12.3. The access track for the Proposed Development overlaps the footprint of a proposed windfarm development known as Mynydd Maen Wind Farm, which is being proposed by RES. The details for the Mynydd Maen Wind Farm[45] indicate that the development will include 13 turbines, a substation, and 8.65km of new and existing tracks. The Mynydd Maen Wind Farm is therefore likely to result in similar effects on soils to the Proposed Development, albeit on a larger scale. The Mynydd Maen Wind Farm avoids BMV agricultural land however peat survey completed for the development has confirmed the presence of localised peat and peaty soils.

11.12.4. There will be some cumulative effect on soils resources in terms of a relatively small-scale loss of some local and national soil resource, with the Proposed Development in combination the Mynydd Maen Wind Farm, and this will potentially include some peat (as further survey is needed to confirm whether the Proposed Development can avoid peat). Both developments require construction work which will permanently remove or seal localised areas of existing in situ soils. Peat survey is still required for the access track, therefore the potential for the Proposed Development to act cumulatively with effects from the Mynydd Maen Wind Farm development to produce significant cumulative effects on soil functions at a local or national level, with regard to peat, will be reviewed for the ES once peat data has been obtained for the access track.

11.12.5. For land contamination receptors, a ZoI of 500m from the edge of the EIA Assessment Area has been applied for the CEA to assess the potential for direct and indirect cumulative effects. This Study Area accounts for shared receptors that could experience an effect due to the Proposed Development and other developments. A Phase 1 Geoenvironmental Desk Study has been completed for the Mynydd Maen Wind Farm proposed by RES. Limited potential contamination sources were identified on land where the Mynydd Maen Wind Farm development is proposed. The DNS application for the Mynydd Maen Wind Farm includes evidence of compliance with the contaminated land regime for planning, as set out in the Welsh guidance 'The Development of Land Affected by Contamination: A Guide for Developers'[46]. Given the similar land uses on both

[45] RES, Mynydd Maen Wind Farm, public information. Available at: https://www.mynyddmaen-windfarm.co.uk/planning-application/. Accessed November 2025.
[46] Welsh Local Government, Natural Resources Wales & Welsh Government (2017) The Development of Land Affected by Contamination: A Guide for Developers, version 3 May 2017. (Online). https://www.claire.co.uk/useful-government-legislation-and-guidance-by-country/81-project-management-info-pm/193-guidance-specific-to-particular-industrial-or-commercial-sectors-info-pm1. (Accessed October 2023).

sites, similar potential contamination sources and contaminated land receptors, and measures being in place to mitigate potential effects so that the developments do not result in significant effects on a receptors, it is unlikely that there will be any effects from the Proposed Development that could act cumulatively with effects from the Mynydd Maen Wind Farm development to result in significant cumulative effects on land contamination receptors.

11.13 Preliminary significance conclusions

11.13.1. A summary of the results of the preliminary Ground Conditions assessment is provided in **Table 11.18** and **11.19.**

Table 11.18 Preliminary summary of significance of effects: soil resources

Receptor and summary of predicted effects	Sensitivity / importance / value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Soil resources **Compaction of soil by vehicles or during soil stockpiling/ handling leading to damage to soil structure and damage to/loss of soil functions**	Low to High	Minor	Neutral or Slight or **Moderate** negative effect **(Potentially significant)**	The assessment is based upon the area of soil to be disturbed and/or temporarily displaced, and the embedded environmental measures to limit and avoid soil compaction.
Soil resources **Erosion of soil due to vegetation stripping, or soil handling and storage, leading to loss of organic matter in runoff**	Low to High	Minor	Neutral or Slight or **Moderate** negative effect **(Potentially significant)**	The assessment is based upon the area of soil to be disturbed and/or temporarily displaced, and the embedded environmental measures to limit and avoid soil erosion.
Soil resources **Permanent loss of soil and associated soil functions due to construction of the wind farm and access tracks**	Low to High	Moderate	Slight negative (Not significant) or **Moderate or Large negative (Significant)**	The assessment is based upon the area of soil to be permanently lost and the embedded measures which include minimising the footprint required for the Proposed Development, it assumes that the soil will be removed from the Site as waste and not reused within the Proposed Development. Most impacts would affect soils of Low sensitivity, it is possible that peat can be avoided (confirmed through peat survey to be completed along the access track), and the natural soils and existing land use can be maintained around wind farm structures and tracks where soil will need to be removed or covered. However, if high sensitivity peat soils are confirmed along the access track there is potential for a significant negative effect., This assessment will be revisited for the Final ES once additional peat survey information is available.

1. The sensitivity/importance/value of a receptor is defined using the criteria set out in **Section 11.8** and is defined as very low, low, medium, high and very high.
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 11.8** and is defined as no change, negligible, minor, moderate and major.
3. The significance of the environmental effects is based on the combination of the sensitivity/importance/value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor/negligible (not significant), subject to the evaluation methodology outlined in **Section 11.8**.

Table 11.19 Preliminary summary of significance of effects: land contamination receptors

Receptor and summary of predicted effects	Baseline Assessment			Post Development Assessment			Change in Risk (Significance)
	Consequence	**Likelihood**	**Risk**	**Consequence**	**Likelihood**	**Risk**	
Human health Exposure to land contamination via numerous pathways (e.g., inhalation, direct contact, ingestion) resulting in health effects for site users	Medium / Mild	Unlikely	Low / Very low	Medium / Mild	Unlikely	Low / Very low	Negligible (Not significant) Embedded measures (**Table 11.**) include ground investigation pre-construction, including soil monitoring, and during construction, measures include development of an MMP for the reuse of soils within the Proposed Development and a protocol to be included in the CEMP (**Appendix 4A**) for dealing with potentially contaminated soils requiring disposal as opposed to reuse. There is a commitment to ensure that the land subject to construction will be suitable for the proposed future use in line with LCRM guidance (Environment Agency, 2020). This will demonstrate the land is suitable for the future use and there are no significant risks to human health.
Human health	Medium	Unlikely	Low	Medium	Low likelihood	Moderate/low	Minor Negative (Not significant)

Accumulation of mine gas within enclosed spaces leading to potentially toxic and/or explosive atmospheres in enclosed spaces.							Embedded measures (**Table 11.6**) include ground investigation pre-construction, including gas monitoring at the proposed turbine and substation locations. There is a commitment to ensure that the land subject to construction will be suitable for the proposed future use in line with LCRM guidance (Environment Agency, 2020). This will demonstrate the land is suitable for the future use and there are no significant risks to human health. Consideration of the risks to the built environment from ground gas (in particular, enclosed spaces where ground gas can accumulate) is an embedded measure through compliance with LCRM. Assessment has been made using a worst-case scenario where ground investigation identifies the presence of mine gas as a hazard and even with implementation of gas protection measures, the likelihood cannot be reduced below unlikely.
Human health Unintended release of contaminants to the environment from materials used in the operational parts of the wind farm during operation or decommissioning	Not applicable	Not applicable	No risk present pre-development	Unlikely	Mild	Very Low	Minor Negative (Not significant) Controls are in place, as outlined in the embedded mitigation measures in **Table 11.** for the appropriate installation, use and maintenance of materials and substances that will be introduced to the Site as a result of the project, such that any impact

	to land should be limited to a mild impact at most.

1. The approach to assessment of the significance is based on the change in the level of risk from the baseline condition, as a result of the Proposed Development, subject to the evaluation methodology outlined in **Section 11.9**.

11.14 Further work to be undertaken

11.14.1. The information provided in this Draft ES is preliminary, the final assessment of likely significant effects will be reported in the Final ES. This section describes the further work to be undertaken to support the Ground Conditions assessment presented in the Final ES.

Baseline

11.14.2. Soil resources survey will be undertaken for the main windfarm site. The soil resources survey will be used to provide data on the soil types, textures, and thicknesses. This will be used to inform soil handling, with measures to protect soils during construction of the Proposed Development detailed in an outline SMP.

11.14.3. A peat survey will be completed for the access track between T2 and the southernmost track of the proposed Mynydd Maen project to collect data on whether peat is present along the route.

Assessment

11.14.4. The additional peat survey will aid in the refinement of the proposed access track at Final ES stage and subsequently result in the updated assessment of potential impacts.