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11. Ground Conditions

11.1 Introduction

11.1.1 This chapter presents the assessment of the likely significant effects of the Proposed Development with respect to Ground Conditions. It includes consideration of geology, land contamination, mineral resources, and soil receptors. The assessment is based on information obtained to date. It should be read in conjunction with the Project description provided in **Chapter 4: Description of the Project** and with respect to relevant parts of the following chapters:

- **Chapter 8: Biodiversity**, healthy soil is in itself biodiverse, and soil health is integral to supporting terrestrial ecology. Sensitive ecological sites can also be potential land contamination receptors and relevant sites are discussed in this chapter;
- **Chapter 10: Water Environment**, soil carries out important hydrological cycle functions such as filtering run-off and floodwater attenuation, and groundwater and surface water are potential land contamination receptors, where relevant (e.g., where they are in proximity to a land contamination source), receptors identified in the Water Environment assessment are considered in the assessment in this chapter.

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 11.4**);
- Overall baseline (**Section 11.5**);
- 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 assessment of Ground Conditions effects for soils (**Section 11.9**);
- The assessment of Ground Conditions effects for land contamination (**Section 11.10**);
- Assessment of cumulative (inter-project) effects (**Section 11.11**);
- A summary of the significance conclusions (**Section 11.12**);
- Additional measures proposed (**Section 11.13**); and
- An outline of further work to be undertaken for the Final Environmental Statement (ES) (**Section 11.15**).

Limitations and assumptions

11.1.3 The Draft ES has been produced to fulfil Pennant Walters's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.

- 11.1.4 There are no limitations relating to Ground Conditions that affect the robustness of the assessment of the potential likely significant effects of the Project.

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 Project 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	Legislative context
Environment (Wales) Act 2016 ¹	The Act makes provisions within Wales for the planning and managing of natural resources at national and local level.
Well-being of Future Generations (Wales) Act (2015) ²	The Act does not refer explicitly to soils or land contamination; however, it requires public bodies in Wales to think about the long-term impact of their decisions. It requires them to act in accordance with sustainable development principles, with the aim of achieving well-being goals, including maintaining and enhancing a biodiverse natural environment with healthy functioning ecosystems that support social, economic, and ecological resilience and the capacity to adapt to change (for example climate change).
Environmental Protection Act (1990) ³	<p>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.</p> <p>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 the land cannot be determined as Contaminated Land under the Act.</p> <p>Appropriate embedded environmental measures have been put in place as detailed in Section 11.6 of this chapter to address risks associated with potential land contamination.</p>

¹ UK Government (2016). Environment (Wales) Act 2016. (Online). Available at: <https://www.legislation.gov.uk/anaw/2016/3/contents/enacted>. (Accessed September 2022).

² UK Government (2015). Well-being of Future Generations (Wales) Act 2015. (Online). Available at: <https://www.futuregenerations.wales/wp-content/uploads/2017/01/WFGAct-English.pdf>. (Accessed September 2022).

³ UK Government (1990). Environmental Protection Act 1990. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1990/43/contents>. (Accessed September 2022).

Legislation	Legislative context
Water Resources Act 1991⁴ as amended by the Water Act 2003⁵	<p>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.</p> <p>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.</p> <p>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 11.7.</p> <p>Appropriate embedded environmental measures have been put in place as detailed in Section 11.6 of this chapter to help ensure the protection of controlled waters.</p>
The Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015⁶	<p>Regulations implementing the European Union (EU) Directive on environmental liability setting out the principles for prevention and remedy of environmental damage.</p> <p>Construction and operational activities for the Proposed Development have the potential to cause pollution and the regulations place emphasis on businesses to proactively implement pollution prevention measures so that damage to the environment does not arise.</p> <p>Appropriate embedded environmental measures have been put in place as detailed in Section 11.6 of this chapter to help ensure the prevention of pollution.</p>
Health and Safety at Work etc. Act 1974	<p>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: make arrangements for implementing the health and safety measures identified as necessary by the risk assessment; appoint competent people to help them implement the arrangements; set up emergency procedures; provide clear information and training to employees; and work together with other employers sharing the same workplace.</p> <p>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.</p> <p>Compliance with the Act during construction and operation is an embedded measure considered in the assessment and detailed in Section 11.6.</p>

⁴ UK Government (1991). Water Resources Act 1991. (Online). Available at: <https://www.legislation.gov.uk/ukpga/1991/57/contents>. (Accessed September 2022).

⁵ UK Government (2003). Water Act 2003. (Online). Available at: <https://www.legislation.gov.uk/ukpga/2003/37/contents>. (Accessed 01 September 2022).

⁶ Welsh Government (2015). The Environmental Damage (Prevention and Remediation) (Amendment) (Wales) Regulations 2015. (Online). Available at: <https://www.legislation.gov.uk/wsi/2015/1394/introduction/made>. Accessed September 2022).

Planning policy

11.2.3 A summary of the relevant national and local planning policy is given in **Table 11.2**.

Table 11.2 Planning policy relevant to the Ground Conditions assessment

Policy	Policy context
National planning policy	
Planning Policy Wales, Edition 11, 2021⁷	<p>The 2021 Planning Policy Wales document, Distinctive and Natural Linkages chapter, page 124, states that decisions on planning 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”.</p> <p>Chapter 6, Section 6.4 Biodiversity and Ecological Networks states that development proposals must consider the need to: “safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat”.</p> <p>Chapter 6, Section 6.9.16 Land Contamination states that “<i>Whenever development or re-development potential exists the planning system will be the preferred means of addressing potential land contamination.</i>”</p> <p>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. Section 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 “<i>If contamination cannot be overcome satisfactorily, the authority may refuse planning permission.</i>”</p>
Local planning policy	
Blaenau Gwent Local Development Plan (LDP) up to 2021⁸	<p>The western parts of the Site are located in the Blaenau Gwent county boundary. The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provide maximum benefits to the community.</p>

⁷ Welsh Government (2021) Planning Policy Wales, Edition 11, February 2021. (Online). Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf. (September 2022).

⁸ Blaenau Gwent County Borough Council (2012) Local Development Plan up to 2021. (Online). Available at: [Adopted LDP | Blaenau Gwent CBC \(blaenau-gwent.gov.uk\)](https://www.blaenau-gwent.gov.uk/adopted-ldp) (Accessed September 2022).

Policy	Policy context
	<p>Policy DM1 requires new development to demonstrate sustainable design, including minimising construction waste and pollution and no adverse impact upon the water environment or an unacceptable risk to the quality of controlled waters, and that the land is made stable and capable of supporting the development without risk of damage to buildings on the site or adjoining land, and that practicable and effective measures are taken to treat, contain or control any contamination.</p> <p>Section 7.14 notes that much of the Blaenau Gwent area was subject to past underground mining activities and is therefore within a Coal Mining Referral Area. Responsibility for determining the extent and effects of these constraints rests with the developer. Where development is proposed in these areas, the developer should consult with the Coal Authority. The Local Planning Authority will be guided by advice from the Coal Authority and the Council's own technical staff whether development is acceptable and whether conditions requiring ground stability precautions should be attached to permissions. In other instances, development may affect landslip areas. In such instances, applications will need to be supported by a geotechnical investigation and stability report to identify any remedial measures to deal with any instability.</p> <p>Section 7.15 notes that the disturbance of contaminated land can have risks to public health and the environment. Where development is proposed on sites known, or suspected to be contaminated, or where the site is in the vicinity of a former landfill site, the developer will be required to carry out a risk assessment at the planning application stage. This must establish any possible pollutant pathways and identify all necessary mitigation measures, if any, to reduce the risks and allow development to proceed.</p>
<p>Torfaen LDP (2013)⁹</p>	<p>Most of the Site including its central and eastern areas are in the North Torfaen area. The LDP seeks to protect and enhance biodiversity resources including Site of Special Scientific Interest (SSSIs), SINCs (Sites of Importance for Nature Conservation) and Local Nature Reserves (Section 2.4.4) and promote the remediation of contaminated sites (Section 2.4.5).</p> <p>Policy BW1 states that development proposals will be considered favourably where they comply with the listed criteria, including:</p> <ul style="list-style-type: none"> • B Natural Environment i) The proposal does not result in unacceptable adverse effects in respect of land contamination, instability or subsidence; ...landfill gas; water pollution; or flooding, from or to the proposal, ..vi) The proposal does not have an unacceptable adverse impact upon the water environment or pose an unacceptable risk to the quality ... of controlled waters, ... • C Built Environment ...iii) Where practicable, existing construction materials on the site are re-used or recycled. <p>Section 6.1.7 notes that landscape features covered by Policy BW1 include ... peat bogs... which are... important features of the biodiversity network.</p>

⁹ Torfaen County Borough Council (2013). Local Development Plan (to 2021), Adopted December 2013, Written Statement. (Online). Available at: <https://www.torfaen.gov.uk/lgsi/en/ForwardPlanning/LocalDevelopmentPlan/Local-Development-Plan.aspx> (Accessed September 2022).

Policy	Policy context
	<p>In relation to geodiversity (the variety of soils, rocks, fossils, minerals and natural processes that make up the Earth's physical landscape and structure) and designated geological sites (either an SSSI or Regionally Important Geological Site (RIGS)), proposals affecting geodiversity assets will be assessed against Policy BG1.</p> <p>Policy BG1 states that development proposals will not be permitted where they would cause significant adverse effects to local nature conservation designated sites (including the features of SINC or RIGS unless it can be demonstrated that: a) the development could not reasonably be located elsewhere and the benefits of the Development outweigh the nature conservation or geological value of the site; and b) adequate mitigation and/or compensatory provision is made proportionate to; or an enhancement to the value of the ecological resources or geological site lost.</p> <p>Section 8.48.3 notes that the RIGS identified in the Proposals Map, which include Llanhilleth Quarry (Tir Pentwys) are mainly exposures of geological formations and that it would be easier to mitigate/compensate for their loss locally, for example by exposing other parts of the formation as part of the development proposal or a restoration scheme. The Adopted Torfaen Local Development Proposals Plan shows the Site is partially within a Special Landscape Area, includes areas designated as SINC and a Regionally Important Geological Site (RIGS) Tir Pentwys.</p> <p>Minerals</p> <p>The Proposal Map shows the Site is in a Coal Safeguarding Area and an Aggregate Safeguarding Area, and includes the Tir Pentwys Preferred Area for Aggregates (includes the former Llanhilleth Quarry and adjacent land to the south, south-east), where proposals for the extraction of 7.2 million tonnes of aggregates may be permitted.</p> <p>Policy M1 Minerals Safeguarding states that Development proposals will not be permitted which would permanently sterilise important mineral resources within the Aggregate Safeguarding Areas or Coal Safeguarding Areas identified on the Proposals Map, unless there is an overriding need for the proposed development and: -</p> <ul style="list-style-type: none"> a) the Mineral resource is recovered before the proposed development commences; or b) the developer has satisfactorily demonstrated that the extraction of the mineral is impracticable, uneconomic or environmentally unacceptable. <p>Section 8.31.1 states that in accordance with national policy the LDP should safeguard aggregates and shallow coal resources from permanent development that would prevent their future extraction, and it is noted that, according to Minerals Planning Policy Wales (MPPW - paragraph 13), safeguarding "does not necessarily indicate an acceptance of working, but that the location and quality of the mineral is known, and that the environmental constraints associated with extraction have been considered."</p> <p>Section 8.31.2 clarifies that Aggregate Safeguarding Areas (ASAs) have been identified to safeguard potential high quality sandstone and limestone aggregate resources within the County Borough, which are</p>

Policy	Policy context
	shown on the Proposals Map. It is noted that the Torfaen ASAs, are based upon the Welsh Government's recently published 'Aggregates Safeguarding Map of Wales - 2012', which includes a 200m 'safeguarding margin' around the aggregate resource. Therefore, the Torfaen ASAs do not align with the ASAs of neighbouring LDPs, which were designated before the publication of the Torfaen map and only safeguard the aggregate resource itself.

Technical guidance

11.2.4 A summary of the technical guidance for Ground Conditions is given in **Table 11.3**.

Table 11.3 Technical guidance relevant to the Ground Conditions assessment

Technical guidance document	Context
<i>The Development of Land Affected by Contamination: A Guide for Developers, version 3</i> ¹⁰	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 Land Contamination Risk Management (LCRM) (Environment Agency 2020), Development on Land Affected by Contamination: A Guide for Developers (Welsh Local Government Associations, Natural Resources Wales and the Welsh Government 2017)
<i>Contaminated Land Statutory Guidance</i> ¹¹	This 2012 guidance from the Welsh Government 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.
<i>Environment Agency, Land Contamination Risk Management (LCRM)</i> ¹²	Natural Resources Wales ¹³ refers developers or those seeking to voluntarily remediate a site to the Environment Agency LCRM guidance, which provides the technical framework for applying a risk management process when dealing with land affected by contamination.
<i>CAR-SOIL: Control of Asbestos Regulations</i>	Provides interpretation and guidance to all involved in the management of asbestos in both soils and construction and demolition arisings in

¹⁰ 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.clare.co.uk/home/news/893-new-guidance-added-to-wall>. (Accessed October 2022).

¹¹ Welsh Government (2012), Welsh Government Guidance Document, Contaminated Land Statutory Guidance – 2012, Number: WG19243. (Online). Available at: <https://gov.wales/contaminated-land-guidance-local-authorities>. (Accessed October 2022).

¹² Environment Agency (2021). Guidance: Land contamination risk management (LCRM). (Online). Available at: <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>. (Accessed October 2022).

¹³ Natural Resources Wales (2021). Land Contamination. (Online) Available at: <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/land-contamination/?lang=en&msclkid=f31e500cc14d11ec96571fe68fd7786f>. (Accessed October 2022).

Technical guidance document	Context
<i>2012, Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials</i> ¹⁴	<p>accordance with the Control of Asbestos Regulations 2012 (CAR 2012)¹⁵. 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 Proposed Development application boundary, there is potential for asbestos to be encountered during groundworks and suitable management measures are, therefore, needed.</p> <p>These are included in the embedded environmental measures in Section 11.6.</p>
Welsh Assembly Government, Environment Department, Environment Agency Land Quality Department, <i>Appraisal of state, pressures and controls on the sustainable use of soils: executive summary 2002</i> ¹⁶	<p>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.</p>
CL:AIRE, <i>Definition of Waste: Development Industry Code of Practice (DoWCoP), Version 2, 2011</i> ¹⁷	<p>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).</p> <p>The development and use of an MMP is an embedded measure, as detailed in Section 11.6.</p>
Defra, <i>Construction Code of Practice for the Sustainable Use of Soils on Construction Sites</i> ¹⁸	<p>Outlines current 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.</p>

¹⁴ Joint Industry Working Group (JIWG) (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://www.clare.co.uk/projects-and-initiatives/asbestos-in-soil>. (Accessed October 2022).

¹⁵ UK Government (2012). The Control of Asbestos Regulations 2012. (Online). Available at: <https://www.legislation.gov.uk/uksi/2012/632/contents/made>. (Accessed September 2022).

¹⁶ 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). (Online). Available at: <https://gov.wales/appraisal-state-pressures-and-controls-sustainable-use-soils-executive-summary-html>. (Accessed October 2022).

¹⁷ CL:AIRE (2011). Definition of Waste: Development Industry Code of Practice (DoWCoP), Version 2. (Online). Available at: https://www.clare.co.uk/projects-and-initiatives/38-costar/index.php?option=com_content&view=category&layout=blog&id=27&Itemid=183. (Accessed October 2022).

¹⁸ Defra (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. (Online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf (Accessed: October 2022).

Technical guidance document	Context
CIRIA, <i>Assessing risks posed by hazardous ground gases to buildings (C665)</i> ¹⁹	Measures to avoid damage to soil health/soil structure are an embedded measure in the Construction Environmental Management Plan (CEMP), as detailed in Section 11.6 . Provides guidance on ground gas monitoring and assessing the level of risk posed by ground gas, including mine gas, to developments. 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, as detailed in Section 11.6 .
Welsh Government, <i>Predictive Agricultural Land Classification Map (Wales) The Hollington Map, Guidance Note Version 2.1 - May 2021</i> ²⁰	Provides guidance on how to use the Predictive ALC Map. The Predictive Agricultural Land Classification Map replaces the Welsh 'Provisional' 1:250,000 Series of maps produced between 1967 and 1974. States that where the Predictive ALC Map identifies grades 1, 2 or 3a, a survey will be required to determine the grades present and in what proportion. For grades 3b, 4 or 5, a survey is not required. The baseline status of the Proposed Development site in relation to ALC grade is detailed in Section 11.5 .
Highways England, <i>Design Manual for Roads and Bridges, LA 109 - Geology and Soils</i> ²¹	Sets out the approach to assessing and reporting the effects of highway projects on geology and soils used on Highways England projects. As a published approach to assessing the effects of developments on soil in EIA, this can be adapted for use on other projects. The guidance stops short of providing a methodology to assess the effects of a project on agricultural land and soil functions. This guidance informs the assessment methodology for soils as set out in Section 11.8 .
Institute of Environmental Management & Assessment (IEMA) (2022) <i>IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment</i> ²²	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 11.8 .
Institute of Civil Engineers (ICE), <i>The Environmental Impact Assessment Handbook - A Practical Guide for Planners, Developers and Communities (3rd Edition)</i> ²³	Provides an approach to assessing the potentially significant effects of development projects on soil and defines the sensitivity of different soil types to handling during construction projects. The guide notes that soil is a non-renewable resource, and that disturbance should be limited as far as possible, that soil is particularly prone to structural degradation if it is handled when too wet, and that adverse effects can be mitigated by following best practice guidance, such as the Defra 2009 Code of Practice for the Sustainable Use of Soils on Construction Sites.

¹⁹ CIRIA (2007) *Assessing risks posed by hazardous ground gases to buildings (C665)*.

²⁰ Welsh Government (2021). *Predictive Agricultural Map (Wales), The Hollington Map, Guidance Note, Version 2.1 – May 2021*. (Online). Available at: <https://gov.wales/sites/default/files/publications/2021-05/agricultural-land-classification-predictive-map-guidance.pdf>. (Accessed October 2022).

²¹ Highways England (2019). *Design Manual for Roads and Bridges LA109 Sustainability & Environment Appraisal LA 109 Geology and soils* (Online). Available at: <https://www.standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaeed30b9c0> (Accessed October 2022).

²² Institute of Environmental Management & Assessment (IEMA) (2022) *IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment*. IEMA; March, UK

²³ Institute of Civil Engineers (ICE) (2019). *The Environmental Impact Assessment Handbook - A Practical Guide for Planners, Developers and Communities (3rd Edition)*. ICE Publishing; London, UK.

Technical guidance document	Context
Scottish Government, Scottish Natural Heritage (SNH), Scottish Environment Protection Agency (SEPA) (2017) Peatland Survey. Guidance on Developments on Peatland²⁴	<p>The Scottish Government, SNH (now NatureScot) and SEPA guidance for peatland survey sets out a phased approach to quantifying and qualifying peat material on site and provides advice on how to publish peat surveys as part of wider site investigations for development management applications, with a particular focus on win farm developments.</p> <p>This defines peat as: <i>“the partially decomposed remains of plants and soil organisms which have accumulated at the surface of the soil profile. Peat accumulates where the rate of input of organic material from the surface exceeds the rate of decomposition and ‘turn-over’ of this new material. A peat layer does not include a mineral fraction (hence being differentiated from topsoil)”</i> and, states that: <i>“Peat soil is an organic soil which contains more than 60 per cent of organic matter and exceeds 50 centimetres in thickness”</i>.</p>

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 4.4 of Chapter 4: Approach to preparing the Environmental Statement**.

Scoping Opinion

- 11.3.2 A Scoping Direction was issued by Planning and Environment Decisions Wales (PEDW), on behalf of the Welsh Ministers, on 6 August 2021. 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 11.4**.
- 11.3.3 The information provided in the Draft ES has addressed the comments in the Scoping Direction.

Table 11.4 Summary of EIA Scoping Direction responses for Ground Conditions

Consultee	Consideration	How addressed in this Draft ES
PEDW	<p>PEDW welcomes the assurance that a mining risk assessment will be undertaken and notes that the Coal Authority, as a Specialist Consultee, have also provided a response included in the Scoping Direction.</p> <p>The Inspectorate does not agree that effects on ground conditions receptors due to accidental spillage or leakage during construction can be scoped out, this in relation to the response from NRW</p>	<p>A CMRA has been produced for the Proposed Development, a draft of which is provided in Appendix 11A, Annex B. Available information on the baseline coal mining status of land within the Site is included in Section 11.5.</p> <p>Available desk-based information on coal mining is reported in the baseline in Section 11.5.</p>

²⁴ Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland. (Online). Available at: <https://www.gov.scot/publications/peatland-survey-guidance/>. (Accessed October 2022).

Consultee	Consideration	How addressed in this Draft ES
	<p>who have identified groundwater present on site as a sensitive receptor. An appropriate way of addressing this in the ES would be via including the draft CEMP as a technical appendix to the ES.</p> <p>In relation to geodiversity, the Inspectorate agrees that effects Llanhilleth Quarry RIGS can be scoped out.</p> <p>The Scoping Report states that, if necessary, based on the findings of the peat depth survey, detailed information and plans for peat management will be included in a Peat Management Plan presented as a Technical Appendix to the Environmental Statement. This approach is welcomed by the Inspectorate.</p> <p>The Inspectorate recommends that a peat survey area is clearly identified on a plan and that peaty areas that cannot be avoided should be surveyed in accordance with the Scottish Government Guidance “Guidance on Developments on Peatland” (2017). A 10 m by 10m grid is considered acceptable. As peat depth probing is not provided in the SR, the Inspectorate recommends that peat should be measured deeper than 1.5 m, where present. Peat depth surveys should be conducted 25 m either side of proposed tracks. The ES should identify all survey points on a Figure to illustrate the extent of the peat survey.</p> <p>The Inspectorate recommends that peat depth should be investigated deeper than 1.5 m and that survey methodology should be justified in the ES, and notes that the Applicant should consider producing a revised methodology in relation to peat and consulting NRW and the relevant LPAs on the proposed approach.</p>	<p>Potential effects on land contamination receptors have been included in the assessment in Section 11.10 and the CEMP is included as a technical appendix to the ES.</p> <p>On the basis that the only geo-conservation site within the Site is the Llanhilleth Quarry RIGS, and based on the Proposed Development including use of an existing access through the designated area but no other development, no significant effects on geodiversity are anticipated and in accordance with the Inspectorate’s decision, geodiversity has been scoped out of the assessment.</p> <p>Appendix 11A includes a report detailing the findings of a Phase 1 Peat Survey (based on 100 x 100m grid spacing) for the Scoping Boundary. The use of this survey density for a Phase 1 survey is in accordance with the Scottish Government Guidance referenced by the Inspectorate. The 2021 Phase 1 Peat Survey of the Scoping Boundary found that very little peat was present within the Scoping Boundary. Where peat was identified, the Proposed Development has been designed to avoid it. Further details of the baseline soil conditions are provided in Section 11.5 which provides information on the large areas of the Site which has been restored following historical mining activity.</p> <p>Further consultation on peat survey scope has not been completed due to the Site being found during the 2021 survey to be largely devoid of peat.</p>
Torfaen County Borough Council	<p>Torfaen County Borough Council as Local Planning Authority, is satisfied the information provided in the Scoping Report provides an acceptable basis for preparing an ES to support an application for this development subject to the comments from the Consultees as appended with their response.</p> <p>There are no comments specific to ground conditions.</p>	<p>Agreement is noted.</p>

Consultee	Consideration	How addressed in this Draft ES
Blaenau Gwent County Borough Council	In Appendix B, in relation to ground conditions, it is noted that the proposal is not likely to have any direct impacts, however it is noted that consideration should be given to ground stability matters during construction of and operation of the wind farm, particularly in relation to ground instability associated with past mining activity and natural slope stability and movement.	<p>Ground stability and other coal mining risks have been addressed in the CMRA produced for the Proposed Development, a draft of which is provided in Appendix 11A, Annex B. Available information on the baseline coal mining status of land within the Site is included in Section 11.5. The findings will be used to inform any intrusive investigations needed to further assess the coal mining risk, and to inform the final design of the Project.</p> <p>A Phase 1 Geoenvironmental Desk Study has been produced for the Proposed Development, a draft of which is provided in Appendix 11A. This provides further information on the baseline status of the land in relation to ground stability and will include recommendations for any further investigation needed such as intrusive ground investigation.</p> <p>Compliance with good practice in structural design including compliance with the Eurocodes and relevant British Standards is an embedded measure in Table 11.7.</p>
Natural Resources Wales	NRW have no specific comments on ground conditions however it is advised in relation to Hydrology and Hydrogeology that groundwater should be considered a receptor in its own right, and that consideration should be given to temporary / long-term changes to groundwater flows as part of the development.	<p>Groundwater is considered as a receptor of land contamination in the Phase 1 Geoenvironmental Desk Study produced for the Proposed Development, a draft of which is provided in Appendix 11A.</p> <p>Peat is considered as a ground conditions receptor in the assessment in Section 11.9.</p>
The Coal Authority	<p>The Coal Authority notes that the Site falls within a Development High Risk Area as defined by the Coal Authority, and that the Scoping Report acknowledges that the risk from coal mining legacy will be assessed and addressed in line with current best practice guidance (CIRIA C758D – Abandoned mine workings manual) and any formal planning application will be accompanied by the relevant geo-technical desk study.</p> <p>The Coal Authority requests that in the event that any mine entries are present where newbuild infrastructure is required, the layout affords due consideration of these mining features and avoids these areas where possible / practicable.</p>	<p>Coal mining risks have been addressed in the CMRA produced for the Proposed Development, a draft of which is provided in Appendix 11A, Annex B. Available information on the baseline coal mining status of land within the Site is included in Section 11.5. The findings will be used to inform any intrusive investigations needed to further assess the coal mining risk, and to inform the final design of the Project.</p> <p>A Phase 1 Geoenvironmental Desk Study has been produced for the Proposed Development, a draft of which is provided in Appendix 11A. This provides further information on the baseline status of the land in relation to ground stability and will include recommendations for any further</p>

Consultee	Consideration	How addressed in this Draft ES
		<p>investigation needed such as intrusive ground investigation.</p> <p>The final design will take account of coal mining features.</p>

Technical engagement

- 11.3.4 The Phase 1 geo-environmental desk study and CMRA recommend ground investigation to provide further information on the mining related ground hazards. The investigation will require drilling into Coal Measures strata and as such, the Coal Authority will be informed of the works in advance of the investigation, which will be completed preconstruction of the Proposed Development.

11.4 Data gathering methodology

Study area

Wind Farm development and Grid Connection

- 11.4.1 The study area for Ground Conditions for contaminated land receptors includes the Proposed Development application boundary ('Site') and a 250m buffer area beyond the boundary. This is considered appropriate based upon professional experience in land contamination assessment and consideration of the site conceptual model in relation to the potential for contaminants to migrate from the site to offsite receptors through the soil or in groundwater, or to migrate onto the site through soil or in groundwater from offsite sources. The conceptual model 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.
- 11.4.2 The 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 of soil for construction of buildings), that will occur within the Site. No external zone of influence for soil has been identified beyond the Site. The rationale for the study area is that the soils are geographically discrete and will not be substantially influenced by changes to their surroundings or vice versa.
- 11.4.3 In relation to excavations, the hydrogeological effects of dewatering could potentially extend beyond the Proposed Development Site. 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 11.5**.

Table 11.5 Data sources used to inform the Ground Conditions assessment

Organisation	Data source	Data provided
Department for Environment, Food & Rural Affairs (Defra)	Multi-Agency Geographic Information for the Countryside (MAGIC) interactive map. Available online at: https://magic.defra.gov.uk/MagicMap.aspx .	Topographical mapping
Natural Soil Resources Institute, Cranfield University.	LandIS Soilscales Map. Available online at: http://www.landis.org.uk/soilscales/# .	Regional soil mapping and information on soil types
British Geological Survey (BGS)	GeoIndex Onshore. Available online at: https://mapapps2.bgs.ac.uk/geoindex/home.htm	Geological information, including exploratory hole records.
British Geological Survey (BGS)	BGS sheet 1:50 000 Abergavenny Sheet 232 Solid and Drift 1990	Geological map for the study area and surrounding area
Natural Resources Wales	Welsh Peatlands Data Portal. ²⁵	<p>The Peatlands of Wales map series provides an updated distribution of Welsh Peatlands based on current evidence sources up to 2022. The data layers were created on a 50m grid whereby the presence and thickness of peat are estimated from a range of sources for each 50m grid cell across Wales.</p> <p>A peatland evidence score defines the level of confidence in the presence of peat in any given grid cell, with those cells scoring more than 2 on a scale of 1-10, captured in the 'Peatlands of Wales' peat distribution map.</p> <p>For this database and in accordance with the Welsh Government²² approach peat is defined as having a thickness of more than 40cm of organic material within the upper 80cm of a soil profile.</p>
Welsh Government	DataMap Wales: Data and maps from the Welsh public sector. Available online at: https://datamap.gov.wales/ .	Includes spatial data for various environmental and other datasets including nature and geodiversity

²⁵ Natural Resources Wales (2022). Welsh Peatlands Data Portal (Online). Available at: <https://datamap.gov.wales/maps/peatlands-of-wales-maps/>. (Accessed October 2022).

Organisation	Data source	Data provided
Welsh Government and Natural Resources Wales	Lle Geo-Portal, Predictive Agricultural Land Classification Map, Version 2. ²⁶	<p>conservation sites, historical landfill sites, agricultural land classification, and aggregates resource areas,</p> <p>Predictive Agricultural Land Classification (ALC) map for Wales, based on the principles of the Agricultural Land Classification System of England & Wales, the Revised Guidelines & Criteria for Grading the Quality of Agricultural Land (Ministry of Agriculture, Forestry and Fisheries (MAFF) 1988)²⁷. Land is categorised into one of the following grades:</p> <ul style="list-style-type: none"> ● Grade 1: excellent quality agricultural land; ● Grade 2: good quality agricultural land; ● Grade 3a: good to moderate quality agricultural land; ● Grade 3b: moderate quality agricultural land; ● Grade 4: poor quality agricultural land; and ● Grade 5: very poor quality agricultural land. <p>Grades 1 to 3a are defined in Welsh planning policy as Best and Most Versatile (BMV) land.</p>
Coal Authority	Coal Authority Interactive Map. Available online at: https://mapapps2.bgs.ac.uk/coalauthority/home.html .	Coal mining information including recorded mine entries, shallow coal mining workings, coal outcrops, fissures and breaklines, and Development High Risk Areas.
Coal Authority	Consultants Coal Mining Report, Mynydd Llanhilleth, Blaenau Gwent, The Coal Authority, Reference 51002673982001, 7 September 2021.	Site specific coal mining information identifying potential mining related risks. This report was based on the Scoping Boundary and therefore

²⁶ Welsh Government (2022). Predictive Agricultural Land Classification (ALC) Map 2 (Online). Available at: https://datamap.gov.wales/maps/new?layer=inspire-wg:wq_predictive_alc2#/. (Accessed October 2022).

²⁷ Ministry of Agriculture, Fisheries and Food (1988) Revised Guidelines & Criteria for Grading the Quality of Agricultural Land. (Online) Available at: <http://publications.naturalengland.org.uk/publication/6257050620264448> (Accessed April 2022).

Organisation	Data source	Data provided
		provides coverage of most of the Site. Additional Coal Authority information was obtained, as below, to provide full coverage of the Site.
Coal Authority	Consultants Coal Mining Report, Mynydd Llanhilleth, Torfaen, The Coal Authority, Reference 51003317521001, 11 October 2022.	<p>Site specific coal mining information identifying potential mining related risks.</p> <p>This report covers the additional land to the east of the Scoping Boundary, including the Grid Connection, to provide full coverage of the Site.</p>
Wood (2022)	Coal Mining Risk Assessment (Ref. Doc Ref. 807095-WOOD-RP-OG-00003_P01, October 2022)	<p>Mining risk assessment to assist in defining the level of risk associated with historical mining activities within the Proposed Development application boundary and to determine if further assessment is needed to quantify the risk and define mitigation measures.</p> <p>This report is included as an annex to the Phase 1 Geo-environmental desk study, included in Appendix 11A.</p>
Wood (2021)	Technical Note: Mynydd Llanhilleth Phase 1 Peat Survey Factual Report (Ref. 807095-WOOD-RP-OG-0002_P01, October 2021).	<p>Phase 1 peat depth survey results for land within the Scoping Boundary.</p> <p>This report is included as an appendix to the Phase 1 Geo-environmental desk study, included in Appendix 11A.</p>
Wood (2022)	Mynydd Llanhilleth Wind Farm, Phase 1 Geoenvironmental Desk Study (Ref. 807095-WOOD-RP-OG-0002_P01, November 2022).	<p>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 May 2022) to identify potential evidence of contamination and verify desk study information as necessary. It includes the development of a</p>

Organisation	Data source	Data provided
		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 constraints, and requirements for further assessment.

Survey work

Wind Farm development and Grid Connection

- 11.4.5 A Phase 1 peat depth survey was conducted by Wood during September 2021 within the Wind Farm development area of the Site where it is coincident with the Scoping Boundary to determine whether deep peat (defined by the Welsh Government as >0.4m of organic material within the upper 0.8m of a soil profile – see **Table 11.6**) is present on the Site. The findings are reported in the Peat Depth Survey Report (Wood, 2021) which is appended to the Phase 1 Geo-environmental desk study in **Appendix 11A**.
- 11.4.6 A site walkover of the Scoping Boundary was completed in May 2021 to inform the Phase 1 Geoenvironmental desk study. The walkover was completed by an experienced contaminated land consultant and was used to obtain photographs of key features of the Site, which were identified through desk based review of information on the Site's environmental setting and historical development. Observations from the site walkover are recorded in **Section 11.5** and are recorded in the Phase 1 Geo-environmental desk study produced to inform the ES (**Appendix 11A**).

11.5 Overall baseline

Current baseline

Wind Farm development and Grid Connection

Topography

- 11.5.1 A detailed description of topography is presented in **Chapter 10: Water Environment**. The Proposed Development is located primarily on a broad ridge which runs roughly in a north-south direction. The majority of the Wind Farm Development Area sits at elevations between 350m AOD and 450m AOD across the ridge summit, and the proposed access track via Farm Road descends to an elevation of approximately 250m AOD at the junction to the B4246.

Soils (including agricultural land)

- 11.5.2 Information reviewed on the LandIS Soilscales map²⁸ indicates the likely soil types within the Proposed Development Site, including the Wind Farm Development Area and the Grid Connection, to comprise mainly freely draining acid loamy soils over rock, with a loamy texture and medium carbon content (type 13), and restored soils, mostly from quarry and opencast spoil, there are also localised areas with very acid loamy upland soils with a wet peaty surface, a peaty texture and high carbon content (type 16).
- 11.5.3 The restored soils are shown across the central part of the Wind Farm Development Area and most of its south-eastern area, also at the eastern tip of the Grid Connection and the north-eastern end of the access road (Farm Road) as it approaches the B4246. The peaty soils are shown in the area south of the disused quarry (known as 'The Canyon' – most of which is excluded from the Proposed Development boundary), and in the north of the Wind Farm Development Area where it joins Farm Road. The peaty soils are shown continuing for around 700m along the south-western extent of Farm Road, however, some of these are likely to have been removed and replaced with alternative material during construction of the road.
- 11.5.4 The Peatland of Wales dataset shows the distribution of peat across Wales, with peat defined as having a thickness of more than 40cm of organic material within the upper 80cm of a soil profile. Within the Wind Farm development area one area of peat is shown on the Peatlands map, this is mainly outside the Wind Farm Development Area but intersects the access route at Farm Road at its south-western end. No peat is shown along the Grid Connection.
- 11.5.5 The 2021 Phase 1 Peat Survey of the Scoping Boundary found that very little peat was present. The peat survey comprised a Phase 1 peat depth survey undertaken on a 100m by 100m grid of points, with peat depth measurement taken at each point, and it covered the entire Scoping Boundary except for areas where utilities were identified and a 50m exclusion zone was applied. The survey indicated that the Site is generally not underlain by peat, as peat of ≥ 0.4 m in thickness was only found at two survey locations in the east of the site. The 2021 Peat Survey report, including a plan showing the interpolated peat depth across the Scoping Boundary, is included as an Annex to Phase 1 Geoenvironmental Desk Study in **Appendix 11A**. The majority of the Scoping Boundary was considered to have bedrock at or close to surface, with little or no cover by superficial deposits. Based on the limited peat identified, further peat delineation survey was not considered necessary.
- 11.5.6 As described in **paragraphs 11.1.1 and 11.1.2**, restored soils (made ground) are present across a large area of the Proposed Development site as a result of historical mining activity. This made ground is detailed further in **paragraph 11.1.8**.
- 11.5.7 The Predictive Agricultural Land Classification (ALC) Map 26 indicates that the agricultural land classification within the Site, which is also the relevant study area applied for soils and agricultural land, is mainly grade 5 (very poor quality agricultural land). Some Grade 4 is also present and some non-agricultural land. It can, therefore, be concluded that the Site, is not likely to include any 'Best and Most Versatile' (BMV) land (categories 1, 2 or 3a). The Welsh Government only requires an agricultural land classification survey where the Predictive ALC Map identifies Grades 1, 2 or 3a, and to provide a conservative assessment the land is assumed to be Grade 4.

²⁸ Cranfield University (2022). Soilscales (Online) Available at: <http://www.landis.org.uk/soilscales/#>, (Accessed March 2021).

Geology

- 11.5.8 The British Geological Survey (BGS) 1:50,000 scale geology mapping²⁹ shows superficial deposits as absent across most of the Proposed Development Site. The mapping generally indicates that bedrock is close to surface (<10m below ground level) or at surface. Exceptions are till deposits (diamicton) in the north of the Wind Farm Development Area underlying turbine 2) and head deposits (clay, silt, sand and gravel) at the north-eastern extent of the access road along Farm Road.
- 11.5.9 Large areas of artificial ground are shown within the Proposed Development Site, these cover a slightly larger area than the restored soils shown on the Soilscales map and occupy the majority of Proposed Development Site, and included the eastern areas of the access road at Farm Road and eastern extent of the Grid Connection, as described in **paragraph 11.1.2**, and also the area of peaty soils described in **paragraph 11.1.2** south of The Canyon. The two types of artificial ground shown are described by the BGS as worked ground (undivided) – void, and made ground (undivided) – artificial deposit. Where present, and because of historical opencast coal workings within the Proposed development Site, made ground is likely to be variable in depth.
- 11.5.10 The British Geological Survey (BGS) GeoIndex Onshore map²⁹ indicates that bedrock geology on the Proposed Development Site mainly comprises the Hughes Member of the Pennant Sandstone Formation, which is described as “*green-grey, lithic arenites ..., with thin mudstone/siltstone and seatearth interbeds, and mainly thin coals.*”³⁰ There is also an area of the Grovesend Formation (“*predominantly argillaceous, comprising mudstones and siltstones, with well developed coals; minor lithic ("Pennant") sandstones; and locally developed red mudstones*”³¹) in the centre of the site oriented approximately east-west.
- 11.5.11 At the eastern extents of the access road along Farm Road and the Grid Connection Corridor, the bedrock geology changes from the Hughes Member to the Brithdir Member (sandstone), the Deri Formation (mudstone, siltstone, sandstone), the South Wales Upper Coal Measures Formation (mudstone, siltstone, sandstone) then the South Wales Middle Coal Measures Formation (mudstone, siltstone, sandstone).
- 11.5.12 As reported in the Phase 1 Geoenvironmental Desk Study, coal seam outcrops are shown around the margin of the topographic high which forms the plateau within the Proposed Development Site. Several mine entries are shown on the flanks of the plateau, comprising both shafts and adits, where they are associated with the Mynyddislwyn seam in the west and the Cefn Glas and Brithdir seams in the east.
- 11.5.13 The Phase 1 Geoenvironmental Desk Study records several faults crossing the site. There appear to be two fault sets, one running broadly north to south and the other running west to east, which is consistent with the regional pattern. The most significant is the Trevithin Fault which runs across the southeastern Wind Farm Development Area.
- 11.5.14 There are limited BGS borehole records available for the Proposed Development Site. Boreholes referenced as SO20SE58 and SO20SE 59³² (Greenland 4 and 5 respectively) dating from 1976, completed for the National Coal Board, are located just south of the eastern end of the Grid Connection: these were drilled on the ‘Greenland Tip’ site and

²⁹ British Geological Survey (2022). Geoindex Onshore (Online) Available at: <http://mapapps2.bgs.ac.uk/geoindex/home.html>, Accessed October 2022.

³⁰ British Geological Survey (2022). The BGS Lexicon of Named Rock Units – Result Details (Online). Available at: <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=H>, (Accessed October 2022)

³¹ British Geological Survey (2022). The BGS Lexicon of Named Rock Units – Result Details (Online). Available at: <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=GDB>, (Accessed October 2022)

³² BGS ID: 263974 : BGS Reference: SO20SE58, British National Grid (27700) : 326010,202290. Available at: http://scans.bgs.ac.uk/sobi_scans/boreholes/263974/images/10527438.html. (Accessed October 2022), and, BGS ID: 263975 : BGS Reference: SO20SE59, British National Grid (27700) : 326100,202310 Available at: http://scans.bgs.ac.uk/sobi_scans/boreholes/263975/images/10527455.html.

record spoil to 4.8m to 5.25m below ground level (bgl) overlying 0.70m to 0.75m of 'probably head and/or landslip' which is logged as a clay. This is underlain by bedrock comprising predominantly mudstone and sandstone. Several seatearth layers are noted, and a thin coal seam (c. 0.4m to 0.5m thick) is noted at depths of 12.25m bgl (Greenland 4) and 17.2mbgl (Greenland 5). A cavity/soft ground is recorded in Greenland 4 between 25.4m and 27m bgl. Correspondence included within the log record notes faulting of the strata and surface landslipping. This includes a fault identified as the Greenland Fault which is inferred to underlie the Grid Connection Corridor. The log notes numerous seams have been washed out in this area.

11.5.15 **Figure 11.1** shows the identified potential mining and geological hazards.

Geodiversity

11.5.16 Information on DataMap Wales shows there are no geological Sites of Special Scientific Interest (SSSIs) located within the Proposed Development Site and no Geological Conservation Review (GCR) sites.

11.5.17 There is a Regionally Important Geological Site (RIGS) partially within the Proposed Development Site. This comprises the northern portion of The Canyon, which is the former Llanhilleth Quarry (Tir Pentwys), where the Carboniferous Grovesend Formation bedrock is visible at the quarry sides. The Proposed Development includes use of an existing access track running roughly north to south through the designated area and the track is include in the Proposed Development Site.

Minerals

11.5.18 The Proposed Development Site is within an Aggregates Safeguarding Area, Mineral Buffer Zone and Preferred Area defined in the Blaenau Gwent Local Development Plan 2012. In relation to coal resources, Welsh Government planning policy is to move away from extraction of energy minerals.

11.5.19 The BGS GeoIndex minerals dataset shows the Proposed Development Site is in an area with mines and quarries, shallow coal, fireclay and brickclay resources, is underlain by sandstone with potential for high specification aggregate, and is in a primary, secondary and tertiary opencast coal resource area.

11.5.20 Information in the Torfaen LDP and on the Torfaen Council website indicates that there is a planning application for recovery of secondary aggregates from the former open-cast coal mining spoil heap at Tir Pentwys, and construction of a new access road which would traverse the southern part of the Wind Farm Development Area from south to north to reach the existing access track through the centre of The Canyon which is part of the Wind Farm Development Area. As the wind farm development footprint will only occupy a small proportion of the Proposed Development Site and the wind turbines will not be located on the spoil heaps, effects on minerals were scoped out of the EIA.

11.5.21 Given that there are no known proposals for mineral extraction at the Proposed Development Site and that the wind farm development footprint would only occupy a small proportion of the Proposed Development Site effects on minerals have been scoped out of the EIA, as agreed with PEDW.

Land contamination

11.5.22 The Phase 1 Geo-environmental desk study (Wood, 2022) has identified potential sources of land contamination on the Proposed Development Site to include localised residual mine waste from onsite surface workings, contaminants (such as fuels, oils and wastes) from opencast mining operations, made ground (opencast backfill), historical farm

operations including use of fuels/oils, agricultural chemicals such as pesticides, dilapidated buildings with possible asbestos content which may release asbestos fibres to ground, and mine gas from former deep workings on the Site. Locations of potential sources identified in the Phase 1 Geo-environmental desk study (Wood, 2022) are shown on **Figure 11.1**. No specific areas of agricultural chemical or fuel storage have been identified.

- 11.5.23 During the walkover in 2021, evidence of the former mining was evident as demolished buildings and small piles of rubble. Building demolition is a potential source of asbestos and other contaminants such as metals. Forestry operations were ongoing in the area around The Canyons, which bounds the Site. Several areas of suspected restored opencast were identified based on the topography observed, predominantly in the areas to the north and south of The Canyons. Evidence of former mining activity was noted in the valley to the north of the Site, along which the proposed Access Road at Farm Road runs. Some limited areas of forestry were observed at the western end of Cwm Du.
- 11.5.24 There are no buildings currently on the Site, however, there is a Welsh Water main running through the Site, this runs roughly south to north through the Site west of turbines 6 and 7 then heads northwest and runs to the south of turbine 3. Water supply pipes can be a potential receptor of contaminated land
- 11.5.25 Regarding contamination from agricultural activities, any contamination present, such as that arising from fuel/oil/chemical usage or leaks/spills, or ad hoc waste disposal is likely to be localised and of limited extent.
- 11.5.26 Former mine workings are a potential source of toxic and explosive gases and the Phase 1 Geo-environmental desk study (Wood, 2022) identifies a potential risk of ground gas being present. Whilst the turbines are not associated with significant enclosed spaces, the risk relates to the proposed built environment, particularly the substation building. No historical mine gas issues have been identified at the Site based on desk study evidence.
- 11.5.27 Potential sources of contamination are present in the surrounding area including former quarries, former mining activities and associated waste disposal activities. However, no current or historical activities with the potential to impact on land quality on the Proposed Development Site were identified in the Phase 1 Geo-environmental desk study (Wood, 2022).

Environmental setting: hydrogeology, hydrology, and sensitive land uses

- 11.5.28 A detailed description of hydrology is presented in **Chapter 10: Water Environment**. The Proposed Development Area sits on a watershed between the Afon Ebwy Fach/Afon Ebwy catchment to the west, and the Afon Lwyd catchment to the east, both of which are classified as main rivers by NRW.
- 11.5.29 The Afon Ebwy Fach is situated approximately 900m west of the Proposed Development Area and flows south joining the Afon Ebwy at Aberbeeg. At its nearest point, the Afon Ebwy passes within 1km of the southwest limit of the Proposed Development Area and continues flowing south. The Afon Lwyd is situated 2km east of the Proposed Development Area and flows south through Pontypool.
- 11.5.30 The Proposed Development Area is intersected by the headwaters of several tributaries of the Afon Ebwy Fach, Afon Ebwy and Afon Lwyd which are classified as ordinary watercourses.
- 11.5.31 A detailed description of hydrogeology is presented in **Chapter 10: Water Environment**. The localised Glacial Till and Head Deposits are classified as Secondary Undifferentiated aquifers. Bedrock is classified as a Secondary A Aquifer and is a designated Water Framework Directive (WFD) groundwater body. It achieved Good quantitative status and

Poor chemical status in the 2016 WFD classification. There are no licensed groundwater abstractions on the Site identified in the Envirocheck report in **Appendix 11A**, the closest is within the Canyon, this is from a spring for general farming and domestic use at a farm. The Proposed Development Site and the wider study area are not within a Source Protection Zone (SPZ). Groundwater beneath the Site is likely to be impacted by the historical coal mining activities.

- 11.5.32 There are no statutory designated ecological sites on the Proposed Development Site. Areas of local ancient and semi-natural woodland are located around the Site on the valley slopes and locally encroach into the Site at the top of Nant Ddu, Nant-y Caws and Cwm Cnyw. None of the proposed turbine locations intersect the areas of ancient woodland. There are no RAMSAR, SSSI, SAC, SPA, AONB, National Nature Reserve, Local Nature Reserve or National Park designations on the Site. The assessment of the likely significant effects of the Proposed Development on biodiversity is presented in **Chapter 8: Biodiversity**.

Future baseline

- 11.5.33 In the absence of the Proposed Development, the current agricultural land use (mainly sheep grazing) and localised forestry use are likely to continue on the Site.
- 11.5.34 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. Therefore, it is reasonable to conclude that in the absence of the Proposed Development there would not be a change in ground conditions over time within the study area.

11.6 Embedded measures

- 11.6.1 A range of environmental measures have been embedded into the Proposed Development as outlined in **Section 4.4**. **Table 11.6** outlines how these embedded measures will influence the Ground Conditions assessment.

Table 11.6 Summary of the embedded environmental measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction			
Soil	Compaction of soil by vehicles or during stockpiling during construction leading to damage to soil structure resulting in damage to/loss of soil functions	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. This measure is integrated into the CEMP submitted alongside this ES.	CEMP and Materials Management Plan (MMP)

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Soil	Erosion of soil during construction, leading to loss of organic matter in runoff	<p>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.</p> <p>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.</p> <p>Temporary storage of soils will be carried out in accordance with the 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 refers to the MMP.</p>	CEMP and MMP

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Soil	Permanent loss of soil and associated soil functions due to construction of the wind farm	<p>Soil stockpiles will be stored for the shortest amount of time possible.</p> <p>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.</p> <p>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 is integrated into the CEMP.</p> <p>Permanently displaced soil will be reused within the Proposed Development Site where practicable in accordance with the MMP, as referenced in the CEMP.</p>	CEMP and MMP
Soil resources temporarily or permanently displaced, or to be translocated within the Proposed Development application boundary	Degradation of soil functions and agricultural land quality due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work	<p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development (Appendix 11A). This has identified potential contamination sources within agricultural areas.</p> <p>A Phase 2 geo-environmental ground investigation will be completed at the pre-construction stage to characterise soil chemistry at target areas. This will include environmental testing of soil for potential contaminants, including asbestos, metals and hydrocarbons as identified in the Phase 1 Geo-environmental desk study, in addition to geotechnical testing to inform the design and material selection. Deeper soil testing will be carried out as needed to inform the detailed</p>	CEMP, MMP and DNS condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
	<p>(post consent) design of the Proposed Development in relation to former colliery tip areas or other areas of suspected made ground. The results of the soil testing will be used to carry out a contaminated land risk assessment to confirm that the soils are suitable for use in the Proposed Development. Monitoring for gas and groundwater is to be undertaken at the proposed turbine locations and associated with mine related features beneath access/internal roads to inform the design. The contaminated land risk assessment will be completed in accordance with the Environment Agency LCRM guidance. Prior to construction, an MMP will be prepared outlining where excavated non-waste materials will be reused in line with the CL:AIRE Definition of Waste Code of Practice (DoWCoP).</p> <p>The CEMP includes a procedure for encountering unexpected contamination or suspected contamination, which will require additional testing and risk assessment to determine appropriate measures. Materials will be segregated where possible to prevent cross-contamination occurring and will only be reused if confirmed to be suitable for use and in accordance with other requirements of the MMP.</p> <p>Any temporary onsite storage of excavated materials suspected or confirmed to be contaminated will be placed on impermeable sheeting, covered over and with adequate leachate/ runoff drainage to prevent migration</p>		

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
<p>Contaminated land receptors: Site workers/site users including construction workers</p>	<p>Impacts on human health due to land contamination</p>	<p>of contaminants from the stockpile.</p> <p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development (Appendix 11A).</p> <p>Phase 2 intrusive geoenvironmental ground investigation will be completed during the pre-construction phase, including soil sampling and chemical testing, to confirm the ground conditions.</p> <p>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).</p> <p>Temporary storage of excavated materials will be in accordance with the MMP.</p> <p>Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development. The CEMP includes an unexpected contamination protocol.</p> <p>Best practice air quality management measures will be</p>	<p>CEMP, MMP and DNS condition</p>

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
<p>Contaminated land receptors: soil, groundwater, surface water, humans (site users)</p>	<p>Groundwater may be encountered during construction and may require pumping from excavations. Due to the site's historical uses, there is potential for localised contamination to be present. Uncontrolled releases of contaminated groundwater could impact on soil, groundwater or surface water quality.</p>	<p>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.</p> <p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development and the report is appended (Appendix 11A).</p> <p>If groundwater is present and needs to be pumped from excavations and is suspected to be contaminated, appropriate measures will be taken in accordance with NRW guidance and the Environmental Permitting Regulations to prevent uncontrolled or unauthorised releases of this water to ground or to the water environment.</p> <p>Phase 2 intrusive geoenvironmental ground investigation will be completed during the pre-construction phase, including soil sampling and chemical testing, to confirm the ground conditions.</p>	<p>CEMP and DNS condition</p>
<p>Contaminated land receptors: soil and groundwater, humans (site users), built environment (buildings, structures, services – water main running through the Site)</p>	<p>Leaks or spills or fuels or oils from construction vehicles or plant</p>	<p>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</p>	<p>CEMP</p>

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Built environment (buildings, structures, services)	<p>Unstable ground conditions with potential to cause damage to buildings/structures due to ground movement.</p> <p>Potential ground gas associated with former mine workings.</p>	<p>will have impermeable bases to limit the potential for migration of contaminants into groundwater following any leakage/spillage.</p> <p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development and the report is appended to the ES (Appendix 11A).</p> <p>The Phase 1 Geoenvironmental Desk Study and the Coal Mining Risk Assessment have identified coal mining hazards including known shallow abandoned mineworkings, possible unrecorded shallow mineworkings, backfilled opencast workings and associated highwalls, unstable ground and potential untreated mine entries (adits). The reports recommend a programme of Phase 2 intrusive investigation and testing to allow better quantification of the identified constraints.</p> <p>Consideration of the risks from ground gas will be given in the design of the preconstruction Phase 2 ground investigation, in areas of the Proposed Development where there could be potential for ground gas accumulation to take place in enclosed spaces (this depends on the detailed design of these buildings/structures in addition to the presence of ground gas).</p> <p>All aspects of the Proposed Development from construction to operation will comply with the Health and Safety at Work etc. Act and regulations made under the Act.</p>	DNS condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		<p>The design for the Proposed Development will comply with good practice in structural design including compliance with the Eurocodes and relevant British Standards. The design will account for the expected ground conditions and design loads, accounting for the effects of climate change. The design of the Proposed Development will be completed in accordance with CDM 2015.</p>	
<p>Built environment (buildings, structures, services)</p>	<p>Aggressive ground conditions with potential to cause damage to buildings/structures due to chemical attack.</p>	<p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development and the report is appended to the ES (Appendix 11A).</p> <p>Phase 2 intrusive geo-environmental ground investigation will be completed during the pre-construction phase, including soil sampling and chemical testing, and groundwater monitoring / testing, to confirm the ground conditions. The design for the Proposed Development will be based on the data obtained from the investigation and will comply with good practice in structural design to mitigate risks from aggressive ground conditions.</p>	<p>DNS condition</p>
Operation			
<p>Soils/agricultural land</p>	<p>Damage to soil during maintenance activities requiring excavation</p>	<p>Maintenance activities requiring ground disturbance will be infrequent and limited in extent and are therefore likely to require minimal disturbance to soil.</p>	<p>Standard operating procedures (SOPs)</p>
<p>Contaminated land receptors: soil and groundwater, humans (site users)</p>	<p>Leaks or spills of fuels or oils from vehicles or plant during wind farm or grid connection maintenance</p>	<p>During operation, vehicle maintenance and refuelling of machinery will be undertaken within defined areas where spillages can be easily contained, and machinery will</p>	<p>Standard operating procedures (SOPs)</p>

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		<p>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.</p>	
<p>Contaminated land receptors: humans (site users)</p>	<p>Impacts on site users' health due to encountering contaminants in soil</p>	<p>A Phase 1 geo-environmental desk study has been completed for all elements of the Proposed Development and the report is appended to the ES (Appendix 11A).</p> <p>A Phase 2 geo-environmental ground investigation will be completed at the pre-construction stage to assess the presence of contaminants in the shallow soil that could subsequently be mobilised e.g., as dust or loose fibres that can be inhaled, or tracked back into vehicles/enclosed spaces. this will include a human health risk assessment to confirm whether additional measures are needed. The contaminated land risk assessment will be completed in accordance with the Environment Agency LCRM guidance. The assessment will determine whether the soil is suitable for use and this information will inform the MMP. If material is not suitable for use, then it will be disposed of offsite in accordance with the Waste Management Regulations.</p> <p>All aspects of construction will be completed in compliance</p>	<p>DNS planning condition</p>

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
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.	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. The CEMP includes an unexpected contamination protocol.	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.	The Phase 1 Geoenvironmental Desk Study and the Coal Mining Risk Assessment have identified coal mining hazards including known shallow abandoned mineworkings, possible unrecorded shallow mineworkings, backfilled opencast workings and associated highwalls, unstable ground and potential untreated mine entries (adits). The reports recommend a programme of Phase 2 intrusive investigation and testing to allow better quantification of the identified constraints.	DNS planning condition

³³ CIRIA (2007) Assessing risks posed by hazardous ground gases to buildings (C665). CIRIA; UK

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
		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.	

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 soils and contaminated land. 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 covers the area of the Proposed Development contained within the red line boundary ('the Proposed Development Site'), together with the Zones of Influence (ZoIs) that have formed the basis of the study area described in **Section 11.4**.
- 11.7.3 For contaminated land receptors the Zol has been defined as an area extending 250m from the boundary of the Proposed Development Site. Due to the location of the Proposed Development Site on top of the ridge, and the Grid Connection corridor on the slope at the west side of the ridge, there is limited potential for onsite migration of contamination and the nature of the surrounding land use means there are limited potential sources.

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 (period of approximately 22 months). Consideration is also given in the assessment to potential effects on soils during the operation and maintenance (30 years), and decommissioning phases (approximately 6 months).

Potential receptors

- 11.7.6 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
Soils	
Soil resources	<p>Land within the Proposed Development Site is in agricultural use. There is no BMV agricultural land within the study area, however, grazing of sheep takes place.</p> <p>Peaty soils are present within the Proposed Development Site. 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.</p>
Soil resources: peat (having a thickness of more than 40cm of organic material within the upper 80cm of a soil profile)	Peat is present locally within the Proposed Development boundary. Peat has distinctive characteristics including high sensitivity to handling and its high organic content, healthy peatlands carry out an important carbon cycling / storage function. Peatlands areas protected through the planning system by the Welsh Government.
Land Contamination	
Humans – current and future site users (agricultural workers, maintenance workers/ operatives, public open space users)	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 or operation.
Humans – construction workers	
Controlled water: Groundwater – Secondary A aquifer (Coal Measures), Secondary (undifferentiated) aquifers (Glacial Till and Head)	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 or operation.
Controlled water; Surface water – Surface water – Nant Ddu, Nant-y-cnyw, Nant-y-Caws, Nant Cyffin	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 or operation.
Current and future buildings and services – including the Welsh Water water main running through the central area of the Site	<p>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.</p> <p>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.</p> <p>Potential for contamination caused by the Proposed Development to impact on water quality in an existing water main on the Site.</p>

Likely significant effects

11.7.7 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 11.8**.

Table 11.8 Ground Conditions receptors scoped in for further assessment

Receptor	Likely significant effects
Construction	
Soil resources/agricultural land	Compaction of soil by construction vehicles or during stockpiling leading to damage to soil structure, damage to/loss of soil functions and degradation of agricultural land.
	Erosion of soil during construction, leading to loss of organic matter in runoff, causing degradation of soil function and agricultural land quality.
	Permanent loss of agricultural land, soil, and associated soil functions when soil is removed from the Proposed Development Site for construction of the permanent features of the Proposed Development: turbine foundations, crane pads, access tracks, kiosks and substation.
	Impacts on soil quality/agricultural land quality due to cross-contamination with contaminated soil/material excavated/disturbed during soil handling for construction of the Proposed Development.
Soil resources: peat (having a thickness of more than 40cm of organic material within the upper 80cm of a soil profile)	Peat is present locally within the Proposed Development boundary. Peat has distinctive characteristics including high sensitivity to handling and its high organic content, healthy peatlands carry out an important carbon cycling / storage function. Peatlands areas protected through the planning system by the Welsh Government.
Land contamination	
Humans – current and future site users (agricultural workers, maintenance workers/ operatives, public open space users)	Effects on human health due to accidental releases of contaminants (e.g. through spills or leaks) from construction vehicles / plant or from waste storage activities (e.g. due to runoff, leaching or dust migration).
Controlled water: Groundwater – Secondary A aquifer (Coal Measures), Secondary (undifferentiated) aquifers (Glacial Till and Head)	Effects on the water environment (groundwater) due to land contamination could occur either during construction due to spills or leaks of fuels / oils or run-off from inappropriately managed wastes.
Controlled water; Surface water – Surface water – Nant Ddu, Nant-y-cnyw, Nant-y-Caws, Nant Cyffin	Effects on the water environment (groundwater) due to land contamination could occur either during construction due to spills or leaks of fuels / oils or run-off from inappropriately managed wastes.
Current buildings and services (including water main on the Site)	Potential for contamination caused by the Proposed Development during construction due to spills or leaks of fuels / oils to impact on water quality in an existing water main on the Site.
Operation	
Contaminated land receptors: future site users (agricultural workers,	Exposure to land contamination via numerous pathways (e.g., inhalation, direct contact, ingestion) resulting in health effects to site users.

Receptor	Likely significant effects
maintenance workers/ operatives, public open space users)	
Contaminated land receptors: future site users (agricultural workers, maintenance workers/ operatives, public open space users), future buildings and services	Accumulation of mine gas within enclosed spaces leading to potentially toxic and/or explosive atmospheres in enclosed spaces.
Decommissioning	
The potential effects during decommissioning are similar to those during construction.	

11.7.8 The receptors/effects detailed in **Table 11.10** have been scoped out from being subject to further assessment because the potential effects are not considered likely to be significant.

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

Receptors/potential effects	Justification
Construction	
Geology (geodiversity)	There are no geological features with statutory or non-statutory designations for conservation of geodiversity within the study area. Due to the nature of the Proposed Development, no significant effects are likely on the adjacent RIGS site at The Canyon.
Minerals	Although the Wind Farm development site and the Grid Connection site are within an Aggregates Safeguarding Area, Mineral Buffer Zone and Preferred Area, there are no known proposals for mineral extraction on the Site and the Wind Farm development footprint would only occupy a small proportion of the Site. Additionally, in relation to coal resources, Welsh Government planning policy is to move away from the extraction of energy minerals.
Contaminated land receptors: Site users (agricultural workers, maintenance workers, operatives (e.g., solar farm workers), public open space users) – impacts on human health due to encountering land contamination	The embedded measures include a commitment that 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), and protection of the general public e.g., through site security measures to prevent access to construction areas and control of dusts. Contamination if found will be subject to appropriate risk assessment and if necessary, either removed, treated and/or mitigated as part of the Proposed Development.
Contaminated land receptors: Construction workers – impacts on human health	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

Receptors/potential effects	Justification
from known, suspected or unexpected land contamination	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.
Built environment (buildings, structures, services) - Aggressive ground conditions with potential to cause damage to buildings/structures due to chemical attack.	The embedded measures include a commitment to the basis of the structural design for the Proposed Development being completed in general accordance with design standards. Any peat is likely to be acidic and sulphate minerals may be present within the Coal Measures strata. This 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.
Built environment (buildings, structures, services) – Land instability with potential to result in subsidence	Potential for unstable ground conditions arising from former coal mining activity will be dealt with through the embedded measures. These include the geohazard and mining hazard assessments completed to date (Phase 1 Geoenvironmental Desk Study and Coal Mining Risk Assessment in Appendix 11A), and intrusive ground investigation, to be completed during the pre-construction phase. The ground investigation will inform the development of a remediation strategy if one is needed. Remediation verification will be undertaken if remediation is subsequently undertaken. With these embedded measures, the basis of the structural design for the Proposed Development will be completed in general accordance with design standards and land instability is not considered further in the assessment.
Operation	
Soils/agricultural land	Maintenance activities requiring ground disturbance will be infrequent and limited in extent and are therefore likely to require minimal disturbance to soil.
Contaminated land receptors: soil and groundwater, humans (site users) - Leaks or spills of fuels or oils from vehicles or plant during wind farm or grid connection maintenance	The embedded measures include limitations on where and how refuelling/maintenance of plant and vehicles can take place during operation. Vehicle maintenance and refuelling of machinery will only be permitted 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.
Built environment (buildings, structures, services) - Aggressive ground conditions with potential to cause damage to buildings/structures due to chemical attack.	The embedded measures include a commitment to the basis of the structural design for the Proposed Development being completed in general accordance with design standards. Any peat is likely to be acidic and sulphate minerals may be present within the Coal Measures strata. This will be assessed through ground investigation completed during the pre-construction to determine the requirements for in ground concrete structures. No significant effects are, therefore, likely relating to chemical attack on structures.

Receptors/potential effects	Justification
Built environment (buildings, structures, services) – Land instability with potential to result in subsidence	Potential for unstable ground conditions arising from former coal mining activity will be dealt with through the embedded measures. These include the geohazard and mining hazard assessments completed to date (Phase 1 Geoenvironmental Desk Study and Coal Mining Risk Assessment in Appendix 11A), and intrusive ground investigation, to be completed during the pre-construction phase. The ground investigation will inform the development of a remediation strategy if one is needed. Remediation verification will be undertaken if remediation is subsequently undertaken. With these embedded measures, the basis of the structural design for the Proposed Development will be completed in general accordance with design standards and land instability is not considered further in the assessment.

11.8 Assessment methodology

- 11.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to preparing the Environmental Statement**, and specifically in **Sections 2.7 to 2.10**. 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 11.9** for 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.

11.9 Assessment of Ground Conditions effects

Overview

- 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: Description of the Proposed Development**.

Wind Farm Development Area and Grid Connection

- 11.9.2 The permanent development features within the Wind Farm Development Area comprise the following:
- The (maximum of) eight 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 eight turbine foundations will therefore be 0.25ha;

- 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 (12.5m²). The eight kiosks will, therefore, require a total area of 100m² (0.01ha);
- 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 2,500m² in area, the maximum total area of the eight crane pads will therefore be 2.0ha;
- The wind farm will require internal access tracks, of approximately 10.1km in length, of which 5.8km is existing track (i.e. 4.3km of new track is needed, and 2.2km of existing track will require upgrades. The Site Access point for the development, proposed from the B4246 through an unnamed road onto Farm Road, will involve the upgrading of the junction which connects the B4246 and Farm Road, whilst Farm Road itself will require improvements to ensure it is suitable for construction vehicles. These works will include widening, earthworks, and vegetation clearance. Some earthworks and widening will be needed to improve the existing track through The Canyon. The access tracks will be approximately 5m wide and will have a 2m wide grassed verge on either side. The total track area (including existing tracks) will therefore be approximately 5.05ha and the verges will occupy an area of 4.04ha. Soil will be disturbed / removed to construct the verges however it is likely that some will be reused within the verge. The assessment assumes a worst case figure of 9.09ha as the maximum area of soil loss for the access tracks;
- The Wind Farm development requires an internal substation 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 0.14ha; and
- The substation welfare facilities will include a water supply system which is likely to be rainwater fed.

11.9.3 Based on the above details, the total area of permanent development where soil is likely to be permanently removed or sealed will be 11.49ha (this includes the verges in order to provide a worst-case assessment).

11.9.4 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 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, occupying approximately 65m² (0.0065ha) during the construction works; and
- Temporary ground disturbance will be required to install the underground cables running between the turbines and the substation, these will be placed in cable trenches approximately 0.45m wide and 0.75m deep. The length of cable is not

known, therefore, a length of the new access track of 5.0km has been used as a likely total given the turbine layout, giving a total cable trench area of 0.23ha.

- 11.9.5 The maximum area of soil to be disturbed and/or temporarily displaced because of the Proposed Development Site would therefore be approximately 0.49 hectares.
- 11.9.6 The total area of land that will undergo temporary and / or permanent disturbance because of the Wind Farm Development is therefore estimated at 11.98ha.
- 11.9.7 As detailed in **Section 11.5**, available information on the soil on the Site indicates the absence of deep peat across most of the Wind Farm Development Area, however localised areas of peat $\geq 0.4\text{m}$ ($>40\text{cm}$) in thickness were confirmed during the Phase 1 Peat Survey (Wood, 2021). The design of the Wind Farm has been adapted to avoid these. Any further avoidance needed would be achieved through micrositing. There is potential for extensive made ground within the Site, where the original soils will have been removed / replaced following historical mining activity. Some of the Site is likely to have the original soils still in situ and these may be relatively undisturbed. Based on desk study information these are likely to comprise a combination of very acid loamy upland soils with a wet peaty surface, a peaty texture and high carbon content, and freely draining acid loamy soils over rock, with a loamy texture and medium carbon content. These are soils which are likely to have medium to high sensitivity to handling.
- 11.9.8 As described in **Chapter 4**, the exact construction / installation method for the Grid Connection is to be confirmed. A corridor has been identified between the Wind Farm Development Area and a point which intersects with the existing WPD overhead line network to the east of the Site near Tal-Ochor Farm, west of Pontnewynydd.
- 11.9.9 The Grid Connection is likely to be between approximately 1.5km to 2km in length. The underground cable will be laid into a trench, using an open cut method, with a depth of up to 1.5m. The exact width of the trench is dependent on the final specification of the cable; however, it will be in the region of 600mm to 1.5m. The installation of the cables will further require a clearance distance of 5m either side of the trench, creating a corridor approximately 11.5m wide. Upon completion of the installation of cables the ducts will be backfilled with sand before the remaining area is backfilled with the excavated material.
- 11.9.10 A tee-off structure will also be required at the point of connection, this will likely comprise a wooden H-Pole. Based on standard design parameters this H Pole will be 11m tall, upon which the line will be connected to the existing overhead line network.
- 11.9.11 Based on a worst case scenario, the maximum area of soil to be disturbed and/or temporarily displaced to install the Grid Connection cables would therefore be a cable corridor of 2.3ha where soil may need to be temporarily removed. The majority could be replaced following construction.
- 11.9.12 Overall, the Wind Farm Development and the Grid Connection combined will entail temporary disturbance of up to 2.79ha of soils and permanent development of 11.49ha.
- 11.9.13 The total area of land that will undergo temporary and / or permanent disturbance due to the Proposed Development, including the Wind Farm Development and the Grid Connection is therefore estimated at 14.28ha.

Assessment methodology: Soils

- 11.9.14 The magnitude/consequence of the loss or damage to soil resources is based upon the:
- Likely nature and scale of soils effects (positive, neutral, or negative) during the construction and operational phases of the project, 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.

11.9.15 The sensitivity of the soil on the Proposed Development Site has been assigned based on the findings of the Phase 1 peat survey and the desk-based information detailed in **Section 11.5**. The classifications in **Table 11.10** are intended to reflect the importance of soils in relation to their soil organic matter content and climate change resilience and mitigation, biodiversity, and flood management functions, as well as the Welsh Government's Peatland Policy³⁴.

Table 11.10 Sensitivity classifications for soils (including agricultural land)

Value / Sensitivity	Description Example
Very high	Soils: soils (<i>other than peat</i>) directly supporting an EU designated site (e.g., SAC, SPA, Ramsar) <i>designated peatlands (any statutory designation including SSSI)</i> Agricultural land: Grade 1 and 2 agricultural land ³⁵ according to the Agricultural Land Classification (ALC) system ³⁶
High	Soils: soils (<i>other than peat</i>) directly supporting a UK designated site (e.g., SSSI) <i>peat: deep peat with no designation</i> Agricultural land: Grade 3a agricultural land ³⁷ according to the ALC system
Medium	Soils: soils (<i>other than peat</i>) supporting non-statutory designated sites (e.g., Local Nature Reserves (LNR), LGSS, Sites of Nature Conservation Importance (SNCIs)) <i>peat: peaty soils</i> Agricultural land: Grade 3b agricultural land according to the ALC system
Low	Soils: soils (<i>other than peat</i>) supporting non-designated notable or priority habitats Agricultural land:

³⁴ Welsh Government (2020). Welsh Government launches National Peatlands Action Programme to help lock in carbon and reinvigorate vital habitats. (Online) Available at: <https://gov.wales/welsh-government-launches-national-peatlands-action-programme-help-lock-carbon-and-reinvigorate> (Accessed April 2022).

³⁵ 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.

³⁶ 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).

³⁷ 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.

Value / Sensitivity	Description Example
	Grade 4 ³⁸ and 5 agricultural land according to the ALC system
Very Low	Soils: soils (<i>other than peat</i>) on previously developed land formerly in 'hard uses' with little potential to return to agriculture

11.9.16 The approach to assigning the consequence of any damage or loss will be based on the DMRB LA 109 guidance and IEMA guidance summarised in **Table 11.11**.

Table 11.11 Magnitude classifications soils (including agricultural land)

Magnitude	Description Example
Major	Soils and agricultural land: physical removal or permanent sealing of >20 ha soil resource or agricultural land.
Moderate	Soils: 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	Soils: 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	Soils: no discernible loss / reduction of soil function(s) that restrict current or approved future use.
No change	Soils: no loss / reduction of soil function(s) that restrict current or approved future use.

11.9.17 The determination of significance combines the sensitivity and magnitude using the matrix presented in **Table 11.12**.

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

³⁸ 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.

	Magnitude of change				
	No change	Negligible	Minor	Moderate	Major
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 of Soils Effects (including agricultural land): Construction phase

Introduction

11.9.18 Given the similar ground conditions on the Wind Farm Development Area and Grid Connection, and the likelihood that similar construction methods and standard best practice construction techniques will be used for the Grid Connection as will be used for the Wind Farm Development Area, the two areas have been assessed collectively below for the Proposed Development.

Assessment of soils effects: Wind Farm Development Area and Grid Connection

11.9.19 As described in **Section 11.5**, the agricultural classification for the Site, including the Wind Farm development site and the Grid Connection is assumed, for the purposes of the assessment, to be Grade 4, and based on the criteria in **Table 11.10** the agricultural land sensitivity is Low. Most of the Proposed Development Site is provisionally classed as Grade 5, with some Grade 4 and some non-agricultural land.

11.9.20 Based on the presence of peaty soils on the Wind Farm development site, combined with restored soils and freely draining acid loamy soils over rock, the soil sensitivity is assessed based on the criteria in **Table 11.11** to be Low to Medium.

Compaction of soil by vehicles or during stockpiling during construction leading to damage to soil structure resulting in damage to/loss of soil functions

11.9.21 The maximum area of soil to be disturbed and/or temporarily displaced because of the proposed Wind Farm and Grid Connection would be approximately 2.79 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.

11.9.22 The Draft CEMP includes measures for the storage and handling of soil 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.

11.9.23 Based on the Low sensitivity of the agricultural land receptor and potential for a Minor magnitude of change, this results in a **Neutral or Slight negative** effect which is not significant.

11.9.24 For soils, based on Low to Medium sensitivity of the soil and a Minor magnitude of change, the effect is **Neutral or Slight negative** or **Slight negative**. 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.

Erosion of soil during construction, leading to loss of organic matter in runoff

- 11.9.25 The maximum area of soil to be disturbed and/or temporarily displaced because of the proposed Wind Farm and Grid Connection would be approximately 2.79ha. Soil stripping and stockpiling will be needed for the permanent development elements which cover an area of approximately 11.49 hectares, giving a total area of 14.28 hectares where soil would be temporarily or permanently removed. Embedded environmental measures include measures defined in the Draft CEMP to avoid soil compaction in the areas of the Proposed Development where temporary disturbance to soils will occur, as soil compaction can cause/exacerbate soil erosion. Embedded measures also include measures to minimise surface runoff from stockpiles.
- 11.9.26 Based on the Low sensitivity of the agricultural land receptor and potential for a Minor magnitude of change, this results in a magnitude of change of **Neutral or Slight negative**, which is not significant in EIA terms.
- 11.9.27 For soils, based on Low to Medium sensitivity of the soil and a Minor magnitude of change, the effect is **Neutral or Slight negative** or **Slight negative**. For the temporarily displaced soil, the embedded mitigation measures will limit the potential for soil erosion to occur during handling and storage, or because of soil compaction. No significant effects are therefore anticipated.

Permanent loss of agricultural land, soil, and associated soil functions when soil is removed from the Wind Farm development site for construction of the permanent features of the Proposed Development: turbine foundations, crane pads, access tracks, kiosks and substation

- 11.9.28 The maximum area of potential permanent/long-term loss of soil/agricultural land due to the proposed Wind Farm and Grid Connection is 11.49 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.
- 11.9.29 Based on the Low sensitivity of the agricultural land receptor this results in a magnitude of change of **Slight negative**, which is not significant in EIA terms.
- 11.9.30 For soils, based on the Low to Medium sensitivity of the soil and a Moderate magnitude of change, the effect is **Slight negative**, which is not significant in EIA terms, or **Moderate negative**, which is potentially significant in EIA terms. Measures in the design include location of the turbines off the areas likely to have peaty soils. This brings the overall effect down to **Slight negative**.

Degradation of soil functions and agricultural land quality due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work

- 11.9.31 The maximum area of soil to be temporarily displaced because of the Wind Farm and Grid Connection would be approximately 2.79 hectares, and the maximum area of permanent/long-term loss of soil/agricultural land is 11.49 hectares, giving a total of 14.28 hectares of soil potentially subject to excavation, handling and storage for reinstatement/reuse or offsite disposal. The embedded environmental measures to avoid cross-contamination of soils include completion of a pre-construction targeted Phase 2

geo-environmental ground investigation to investigate and characterise potentially contaminated areas and identify any further measures needed to ensure the suitability of the soils for use in the Proposed Development.

- 11.9.32 The working methods will include compliance with an MMP. Materials will be segregated where possible to prevent cross-contamination of soils occurring. Such materials will only be reused if they are confirmed as suitable for use in line with the requirements of the MMP. The Draft CEMP includes a procedure for encountering unexpected/suspected contamination, and any temporary onsite storage of excavated materials suspected/confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile.
- 11.9.33 Based on the Low sensitivity of the agricultural land receptor and potential for a Minor magnitude of change, this results in a magnitude of change of **Neutral or Slight negative**, which is not significant in EIA terms.
- 11.9.34 For soils, based on Low to Medium sensitivity of the soil and a Minor magnitude of change, the effect is **Neutral or Slight negative** or **Slight negative**, which is not significant in EIA terms.

Degradation of peat, due to damage caused by handling and storage during construction works (with loss of peat functions including carbon storage and peatland habitat biodiversity functions)

- 11.9.35 Peat within the Wind Farm development site is not subject to any statutory nature conservation designation and is not identified on The Peatlands of Wales map, however as localised peat of 0.4m thickness was recorded on the Site this considered to be a high sensitivity receptor. Based on the available peat survey information (see 2021 Peat Survey report included as an Annex to Phase 1 Geoenvironmental Desk Study in **Appendix 11A**) it is anticipated that the Proposed Development can avoid peat, as defined in **Table 11.5** through design e.g. through micrositing. Avoidance of peat is an embedded measure in **Table 11.6** in accordance with the peat hierarchy. The Proposed Development will therefore not result in significant effects on peat. Handling of peaty soils during construction will be in accordance with the embedded measures in **Table 11.6**, which include that the 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 is integrated into the Draft CEMP.

Permanent displacement of peat, due to construction of permanent development (e.g. wind turbines, access tracks, substation)

- 11.9.36 Based on the available peat survey information (see 2021 Peat Survey report included as an annex to Phase 1 Geoenvironmental Desk Study in **Appendix 11A**) it is anticipated that the Proposed Development can avoid peat, as defined in **Table 11.5** through design e.g. through micrositing. Avoidance of peat is an embedded measure in **Table 11.6**. Excavation and permanent loss of peat will therefore be avoided by the Proposed Development, and significant effects on peat due to the loss of peat as waste, will be avoided.

11.10 Preliminary assessment of land contamination effects

Assessment methodology: Land Contamination

11.10.1 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 Proposed Development Site and the Zol. This information is then used to inform the assessment of the likely land contamination status resulting from the Proposed Development.

Risk assessment

11.10.2 The process of managing land contamination, as set out in the Environment Agency guidance *Land Contamination: Risk management* (LCRM), is based on risk assessment. The assessment of risks from contaminated land 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.

11.10.3 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 integrity of the pathway.

11.10.4 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.

11.10.5 The likelihood classifications for the contaminant linkages being realised is presented in **Table 11.13**.

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.

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

11.10.6 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure *via* the linkage being examined. 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.	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. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.

Classification	Human Health	Controlled Water	Ecology	Property / Structures/ Crops and animals	Examples
Mild	Exposure to human health unlikely to lead to "significant harm".	Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality; marginal effect on amenity value, agriculture, or commerce.	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species of special interest that would endanger the long-term maintenance of the population.	Minor damage to crops, buildings, or property.	Exposure could lead to slight short-term effects (e.g., mild skin rash). Surface spalling of concrete.
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.

11.10.7 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

11.10.8 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

- 11.10.9 To use risk assessment as the basis for the evaluation of the significance of effects in relation to land contamination, it is necessary to evaluate the change in risk from baseline conditions to those during the construction, operation and decommissioning of 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.
- 11.10.10 **Table 11.17** 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)
	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)

		Risk Post-development (including embedded environmental measures)				
		Very Low	Low	Moderate / Low	Moderate	High
		Risks that remain at moderate, high, or very high post-development are unlikely to be considered acceptable and further environmental measures will be required to enable the development to proceed.				

Preliminary assessment of Land Contamination Effects

Land contamination and subsequent impacts on land contamination receptors (humans - current and future site users, agricultural workers, maintenance workers/ operatives, public open space users), controlled waters (groundwater and surface water), buildings and services (existing water main on the Site) due to spills or leaks of fuels / oils or run-off from inappropriately managed wastes

- 11.10.11 Vehicles, plant and machinery using liquid fuels and oils are already used within the Site on occasion due to its use for farming, however, as a result of the Proposed Development, use of these items would increase on the Site. With the implementation of the embedded measures in **Table 11.6**, specifically measures in the CEMP to ensure vehicle maintenance and refuelling of machinery will be undertaken within designated areas where spillages can be easily contained, machinery will be routinely checked to ensure it is in good working condition, and 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. Based on a pre-existing risk level for the agricultural land use (in the Phase 1 Geoenvironmental Desk Study, **Appendix 11A**) of low for human health and buildings and services receptors and very low for controlled waters, and no change to these risks during the development, the effect is **negligible** (not significant).

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

- 11.10.12 The embedded measures (**Table 11.6**) during the construction phase include development and implementation of an MMP for the reuse of soils within the Proposed Development Site and a protocol in the Draft 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.
- 11.10.13 The current risk level to site users from the identified potential sources of contamination on the Site, ranges from very low (based on a mild consequence, the limited potential sources present, and a likelihood of a contaminant linkage being realised of 'unlikely') to moderate/low risk (based on a severe consequence, for ground gas, and a likelihood of unlikely – based on there being limited enclosed spaces currently on the Site). With regard to contaminants present in soils there is no change in the risk level for the future site users. With regard to ground gas, there will be new enclosed spaces present in the Proposed Development, including the substation which will be occupied occasionally, and this increases the risk to site users from gas accumulation in enclosed spaces. Without the embedded measures, the risk level increases to moderate (based on a severe consequence and a low likelihood). However, with the embedded measures, the risk level can be reduced to moderate/low, as the likelihood of a contaminant linkage is reduced to unlikely. On this basis, the maximum risk level to site users is moderate/low, which is an increase from low (with no enclosed spaces present currently, the consequence is medium, and likelihood unlikely, giving a low risk), and the effects of the Project on human

health receptors during the operation phase are considered to be **minor negative**, which is **Not Significant** in EIA terms.

11.11 Assessment of cumulative (inter-project) effects

- 11.11.1 A cumulative effects assessment (CEA) will be undertaken for the Project 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 2.8 of Chapter 2**.
- 11.11.2 Effects on soil and agricultural land are limited in extent within the Proposed Development Site. Peat is a high sensitivity receptor, however the embedded measures in **Table 11.6** include avoidance of peat. There are no other high sensitivity soil or agricultural land receptors present. With the embedded environmental measures, there will be limited permanent effects on soil and agricultural land from the Proposed Development. It is, therefore, unlikely that there will be any effects which could act cumulatively with effects from other developments to produce significant cumulative effects on soil or agricultural land receptors at a local or national level.
- 11.11.3 For land contamination receptors, a ZoI of 250m from the edge of the Proposed Development site 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. No other developments have been identified within the study area and there are, therefore, no identified cumulative ground conditions effects relating to land contamination.

11.12 Significance conclusions

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

Table 11.18 Preliminary summary of significance of effects: soils

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
<u>Agricultural land</u> Compaction of soil by vehicles or during stockpiling during construction leading to damage to soil structure resulting in damage to/loss of soil functions	Low	Minor	Neutral or Slight negative effect (Not 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.
<u>Soil</u> Compaction of soil by vehicles or during stockpiling during construction leading to damage to soil structure resulting in damage to/loss of soil functions	Low to Medium	Minor	Neutral or Slight negative or Slight negative (Not 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.
<u>Agricultural land</u> Erosion of soil during construction, leading to loss of organic matter in runoff	Low	Minor	Neutral or Slight negative effect (Not significant)	For the temporarily displaced soil, the embedded mitigation measures will limit the potential for soil erosion to occur during handling and storage, or because of soil compaction.

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
Soil Erosion of soil during construction, leading to loss of organic matter in runoff	Low to Medium	Minor	Neutral or Slight negative or Slight negative (Not significant)	For the temporarily displaced soil, the embedded mitigation measures will limit the potential for soil erosion to occur during handling and storage, or because of soil compaction.
Agricultural land Permanent loss of agricultural land, soil, and associated soil functions when soil is removed from the Wind Farm development site for construction of the permanent features of the Proposed Development: turbine foundations, crane pads, access tracks, kiosks and substation.	Low	Moderate	Slight negative effect (Not 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.
Soil Permanent loss of agricultural land, soil, and associated soil functions when soil is removed from the Wind Farm development site for construction of the permanent features of the Proposed Development: turbine foundations, crane pads, access tracks, kiosks and substation.	Low to Medium	Moderate	Slight negative (Not significant) or Moderate negative	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. Measures in the detailed design, based on information from the peat survey (appended within Appendix 11A), supplemented by the pre-construction ground investigation, such as avoidance of areas with known peat or peaty soils, and reuse of existing tracks,

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
			(Potentially significant)	can be employed once additional information on ground conditions is available, to bring the overall effect down to Slight negative.
<u>Agricultural land</u> Degradation of agricultural land quality due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work	Low	Minor	Neutral or Slight negative effect (Not significant)	The assessment is based upon the area of soil to be temporarily or permanently displaced, and the embedded environmental measures including completion of a pre-construction targeted Phase 2 geo-environmental ground investigation to investigate and characterise potentially contaminated areas and identify any further measures needed to ensure the suitability of the soils for use in the Proposed Development. The embedded environmental measures include the use of a MMP to ensure materials will only be reused if they are confirmed as suitable for use in line with the requirements of the MMP, and the Draft CEMP including a procedure for encountering unexpected/suspected contamination, and any temporary onsite storage of excavated materials suspected/confirmed to be contaminated will be on impermeable sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile.
<u>Soil</u> Degradation of soil functions due to cross-contamination of topsoil with contaminated soil/material excavated/disturbed during construction work	Low to Medium	Minor	Neutral or Slight negative or Slight negative (Not significant)	The assessment is based upon the area of soil to be temporarily or permanently displaced, and the embedded environmental measures including completion of a pre-construction targeted Phase 2 geo-environmental ground investigation to investigate and characterise potentially contaminated areas and identify any further measures needed to ensure the suitability of the soils for use in the Proposed Development. The embedded environmental measures include the use of a MMP to ensure materials will only be reused if they are confirmed as suitable for use in line with the requirements of the MMP, and the Draft CEMP including a procedure for encountering unexpected/suspected contamination, and any temporary onsite storage of excavated materials suspected/confirmed to be contaminated will be on impermeable

Receptor and summary of predicted effects	Sensitivity/ importance/ value of receptor ¹	Magnitude of change ²	Significance ³	Summary rationale
				sheeting, covered over and with adequate leachate/runoff drainage to prevent migration of contaminants from the stockpile.
Soil: Peat Degradation of peat, due to damage caused by handling and storage during construction works (with loss of peat functions including carbon storage and peatland habitat biodiversity functions)	High	None	No effect	As peat is localised within the Proposed Development Site, the embedded measures include the avoidance of peat through design in accordance with the peat hierarchy.
Soil: Peat Permanent displacement peat, due to due to construction of permanent development (e.g. wind turbines, access tracks, substation)	High	None	No effect	As peat is localised within the Proposed Development Site, the embedded measures include the avoidance of peat through design in accordance with the peat hierarchy. This will be achieved through design informed by further peat survey.

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 (very low, low, medium, high, and very high).
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

Potential effect	Baseline Assessment			Assessment with Proposed Development			Change in Risk (Significance)
	Likelihood	Consequence	Risk	Likelihood	Consequence	Risk	
Operational phase:							
<u>Human health and controlled waters</u> Land contamination and subsequent impacts on land contamination receptors (humans - current and future site users, agricultural workers, maintenance workers/ operatives, public open space users), controlled waters (groundwater and surface water), buildings and services (existing water main on the Site) due to spills or leaks of fuels / oils or run-off from inappropriately managed wastes	Medium	Unlikely	Low	Medium	Unlikely	Low	Negligible (Not significant) Embedded measures (Table 11.6) contained in the Draft CEMP include vehicle maintenance and refuelling of machinery being undertaken within designated areas where spillages can be easily contained, and machinery will be routinely checked to ensure it is in good working condition. 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.
<u>Human health</u> Exposure to land contamination via numerous pathways (e.g.,	Severe	Unlikely	Moderate/low	Severe	Unlikely	Moderate/low	Negligible (Not significant)

Potential effect	Baseline Assessment			Assessment with Proposed Development			Change in Risk (Significance)
	Likelihood	Consequence	Risk	Likelihood	Consequence	Risk	
inhalation, direct contact, ingestion) resulting in health effects for site users							<p>Embedded measures (Table 11.6) include ground investigation pre-construction, including soil, groundwater and gas monitoring, and during construction, measures include development of an MMP for the reuse of soils within the Proposed Development and a protocol in the Draft CEMP 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. 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.</p>

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 11.8**