13 LAND USE AND SOILS

13.1 Introduction

13.1.1 This ES Chapter assesses the impact of the Proposed Development upon Soils and Agricultural Land on the Site.

13.1.2 This ES Chapter considers the likelihood and significance of impacts due to the loss of land (agricultural), damage to soil, and loss of soil. The baseline conditions are identified and the potential environmental impacts upon the baseline (as a result of the Proposed Development) are considered for both the construction and operational phases.

13.1.3 Mitigation measures are outlined to avoid, reduce, remove, or offset any significant adverse impacts. Residual effects are considered post-implementation of these mitigation measures, informing the assessment of cumulative effects for the Site footprint, the wider project allocation, and adjacent committed developments.

13.1.4 This Chapter (and its associated figures and appendices) is not intended to be read as a standalone assessment and reference should be made to the front end of this ES (Chapters 1 – 5) as well as the final chapter, 'Summary of Residual and Cumulative Effects' (Chapter 23 and 24).

13.2 Legislation, Policy and Guidance

13.2.1 The applicable legislative framework is:

- National Development Framework (NDF) – Future Wales

Planning Policy

13.2.2 The applicable planning policies are:

- National Resource Policy (NRP):
- NDF – Future Wales: Policy 9, Policy 17, and Policy 18(11)
- National Development Framework 'Future Wales – the National Plan 2040' (2021)
- Planning Policy Wales Edition 12 (2024)[1] (PPW)
- Article 10(1), paragraph (w) of the Table to the Town and Country Planning (General Development Procedure) Order 1995 (GDPO) (S.I .No 1995/419)

Guidance

[1] Planning Policy Wales. February 2024. Visted on 13/02/2024. Available at: https://www.gov.wales/sites/default/files/publications/2024-02/planning-policy-wales-edition-12.pdf

13.2.3 The applicable guidance is summarised as follows:

- Welsh Assembly Government, 2010, Technical Advice Note 6. Annex B.[2]
- Institute of Environmental Management and Assessment (IEMA) (2022)[3]: A New Perspective on Land and Soil in Environmental Impact assessment;
- National Peatland Action Programme (NPAP) (2023)[4];
- Defra (2009). The National Strategy for England: Safeguarding our Soils[5];
- Defra (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[6];
- Institute of Quarrying (IQ) (2021) Good Practice Guide for Handling Soils in Mineral Workings[7] (succeeds MAFF's 'Good Practice for Handling Soils' (2000); and
- MAFF (1988). The Agricultural Land Classification (ALC) of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land[8].

13.3 Assessment Methodology and Significance Criteria

13.3.1 The assessment methodology draws upon the IEMA guidance 'A New Perspective on Land and Soil in Environmental Impact Assessment' which was published on 17 February 2022. This guidance comprises the first published guidance on the consideration of soils and land in EIA, but does not include a methodology for how such an assessment should be undertaken. The aim of the guidance is to encourage 'a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils'. The assessment methodology presented below reflects the most up to date industry guidance on assessing the

[2] Welsh Assembly Government, 2010, Technical Advise Note 6, Annex B. visited on 30/01/2024. Available at : tan6-sustainable-rural-communities.pdf (gov.wales)
[3] Institute of Environmental Management & Assessment (IEMA) (2022). A New Perspective on Land and Soil in Environmental Impact Assessment. Available at: https://www.iema.net/resources/blog/2022/02/17/launch-of-new-eia-guidance-on-land-and-soils
[4] Welsh Government (2023) National Peatland Action Program. Visited on 01/02/2024. Available at: https://naturalresourceswales.gov.uk/evidence-and-data/maps/the-national-peatland-action-programme/?lang=en
[5] Defra (2009) The National Strategy for England: Safeguarding our Soils. Visited on 01/02/24. Available at: https://www.gov.uk/government/publications/safeguarding-our-soils-a-strategy-for-england
[6] DEFRA (2009) Code of Practice for the Sustainable Use of Soils on Construction Sites. Visited 01/02/2024 Available at: https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites.
[7] Institute of Quarrying (2021) Good Practice Guide for Handling Soils in Mineral Workings. Visited on 01/02/2024. Available at: https://www.quarrying.org/soils-guidance
[8] MAFF (1988) Agricultural Land Classification of England and Wales: Revised criteria for grading the quality of agricultural land (ALC011) visited on 01/02/2024. Available at: https://publications.naturalengland.org.uk/publication/6257050620264448

impacts on land and soils in EIAs, which also encompasses all the ecosystem services that soils provide.

13.4 Scope of the Assessment

13.4.1 The assessment was carried out with consideration of consultation responses for Soil and Agricultural Land.

13.4.2 The scoping response from the Welsh Government's Soil, Peatland and Agricultural Land Use Planning Unit identified three issues that are "likely to be significantly affected by the development": the protection of peat resource; maintaining soil services and functions; and beneficial restoration and after use of the site.

13.4.3 Mineral, organo-mineral, and peat soils provide other ecosystem services in addition to agricultural production, which are protected in Welsh Government policies. The Natural Resources Policy (NRP)[9] requires sustainable management of soil resource to maintain the soil functions and ecosystem services provided. Additionally, Chapter 6 of Planning Policy Wales (PPW)[10] requires development proposals to safeguard peatlands from development impacts.

13.4.4 The construction of the proposed wind and solar development (as described within Chapter 5 of this ES) would result in the loss of all agricultural land within the Site through built development or a change to non-agricultural use. There is also the potential for damage to and /or loss of the soil resources present within the Site during construction as a result of unsuitable handling, storage and management.

13.4.5 The potential impact of activities associated with the construction of the Proposed Development upon the agricultural land and soil resources present has, therefore, been considered. This has been done via an assessment of the quantity and quality of the agricultural land that may be affected, as well as the sensitivity of the soil receptor (i.e. resistance and resilience of the soil environment in terms of susceptibility to erosion and/or presence of organic soils/peat and the degree of loss of soil resource) that may be affected.

Effects Not Considered within the Scope

13.4.6 Consideration of potential operational impacts upon the soil resource will be scoped out from the assessment due to any potential disturbance during operation being

[9] Welsh Government (2018) Natural Resources Policy (13 February 2018). Available online: https://www.gov.wales/natural-resources-policy [Accessed : 22 January 2024]

[10] Welsh Government (2024) Planning Policy Wales (12 February 2024). Available online: https://www.gov.wales/sites/default/files/publications/2024-02/planning-policy-wales-edition-12.pdf [Accessed: 13 February 2024]

localised and small scale (e.g. the upkeep of verges around infrastructure/maintenance of crane peds/access routes and mowing of grass).

13.4.7 All the agricultural land will be removed from production during the construction and operational phase and return to production after decommissioning. Therefore, the effects of the proposal on land loss during the operational phase has been scoped out of this assessment.

13.4.8 The results of the field survey conducted across the entire Site (Appendix 13.1) concluded that no Peat is present on the Site. All consideration of the potential impact on Peat has therefore been scoped out of this assessment.

Extent of the Study Area

13.4.9 The study area for the agricultural land quality and soil survey comprised the entire Site, which is c. 26 hectares (ha) in size, as per Appendix 1.2. The agricultural land classification of this land is illustrated in Figure 13.1 (Pending). A full project description is provided in Chapter 5 of this ES.

Assessment Methodology

13.4.10 The assessment methodology draws upon the IEMA guidance '*A New Perspective on Land and Soil in Environmental Impact Assessment*' which was published on 17 February 2022. This guidance comprises the first published guidance on the consideration of soils and land in EIA but does not include a methodology for how such an assessment should be undertaken. The aim of the guidance is to encourage '*a broader approach that involves assessing the natural capital and functional ecosystem services provided by land and soils*'. The assessment methodology presented below reflects the most up to date industry guidance on assessing the impacts on land and soils in EIAs, which also encompasses all the ecosystem services that soils provide.

Significance Criteria

13.4.11 The significance criteria set out below have been broken down into two receptors:

- Land
- Soil Resources

13.4.12 In the following section the methodology used to the assess the overall impact is detailed for each identified receptor, along with a sensitivity assessment, conditions for change of magnitude, and an assessment of the resulting effect.

Land

13.4.13 Table 2 of the IEMA guidance covers a wide range of soil functions and most cannot be appropriately placed into discrete categories for the assessment process. Therefore, assigning sensitivity involves consideration of all the available information and an element of professional judgement.

13.4.14 The land use within the Site is agriculture and the soils under consideration are organic-mineral. Based on the IEMA system, the sensitivity of soils will therefore be based on the land's ability to provide food and fuel. This has been assessed using the ALC system, with higher grades assigned higher sensitivities. The receptor sensitivity criteria for 'Land' are outlined in Table 13.1.

Table 13.1: Receptor Sensitivity (Land)

Receptor	Sensitivity	Justification
Soils supporting agricultural land quality of Grade 1 and 2	Very high	Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown (commonly including top fruit, soft fruit, salad crops and Winter harvested vegetables). Yields are high and less variable than on land of lower quality. Land with minor limitations that affect crop yield, cultivations or harvesting. Grade 2 may comprise soils that show difficulties with the production of more demanding crops (e.g. Winter harvested vegetables and arable root crops). The level of yield is generally high, but may be lower or more variable than Grade 1.
Soils supporting agricultural land quality of Subgrade 3a	High	Land capable of consistently producing moderate to high yields of a narrow range of arable crops (especially cereals) or moderate yields of a wide range of crops (including cereals, grass, oilseed rape, potatoes, sugar beet) and the less demanding horticultural crops.
Soils supporting agricultural land quality of Subgrade 3b	Medium	Land capable of producing moderate yields of a narrow range of crops (principally cereals and grass) or lower yields of a wider range of crops or high yields of grass that can be grazed or harvested over most of the year.
Soils supporting agricultural land quality of Grade 4 and 5	Low	Land with severe limitations that significantly restrict the range of crops and / or level of yields. 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.
Soils in non-agricultural or urban areas	Negligible	As per 'Low' sensitivity, but with indirect, tenuous and unproven links between sources of impact and soil functions (i.e. non-agricultural or urban). Built-up or 'hard' uses with relatively little potential for a return to agriculture.

13.4.15 The magnitude of change criteria for the receptor 'Land' is shown in Table 13.2, which has been adapted from Table 3 in Chapter 9 of the IEMA guidance.

Table 13.2: Magnitude of Change (Land)	
Magnitude	Justification
High	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading) over an area of more than 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Medium	Permanent, irreversible loss of one or more soil functions or soil volumes over an area of between 5 and 20 ha or loss of soil-related features (including effects from 'temporary developments'*).
Low	Permanent, irreversible loss over less than 5 ha or a temporary, reversible loss of one or more soil functions or soil volumes, or temporary, reversible loss of soil-related features.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use.
*Temporary developments can result in a permanent impact if resulting disturbance or land use change results in permanent damage to soils.	

Soil Resources

13.4.16 The effect of permanent and temporary development resulting from the Proposed Development will be assessed in terms of the identified soil resources, their sensitivity, and the degree of loss and damage of soil resource. The assessment criteria combine standard industry approaches, the IEMA guidance and professional experience.

13.4.17 The sensitivity of soil resources to loss is shown in Table 13.3, and is based on the soil's erodibility, i.e. the ease with which soil is lost due to environmental factors such as wind and water. It is noted that loss can also occur due to external factors, such as unauthorised export. Soil erodibility is a measure of the susceptibility of soils to loss both in-situ (i.e. as an undisturbed soil profile) and during soil stockpiling, due to wind or water erosion (natural erosion potential). Soil erodibility is considered in the rating of soil sensitivity, with the sensitivity classification of the different soils encountered at the Site being based upon data compiled by Cranfield University[11].

Table 13.3: Receptor Sensitivity (Soil Resources - Loss)		
Receptor	Sensitivity	Justification
Soils with high risk of erosion and organic soils (peat)	High	Development on these soils should be avoided. If this is not possible, they require careful consideration and site-specific planning of construction methods (e.g. use of temporary working surfaces, sensitive storage, protection from drying out) in order to preserve their functions. Soils are of high biodiversity value. High importance as a carbon store and active role in carbon sequestration, which have little capacity to tolerate change.

[11] Cranfield University (2015). Research to develop the evidence base on soil erosion and water use in agriculture. Final Technical Report.

		Increased mitigation requirements beyond standard measures are required for organically managed land.
Soils with moderate risk of erosion (organo-mineral soils: i.e., peaty soils or peaty gleys, peat < 50 cm)	Medium	Whilst standard mitigation measures will provide appropriate protection to these soils, damage is likely to occur if worked in less-than-ideal conditions (e.g. when above their plastic limit – the moisture state where soil begins to behave as a plastic material). The soils should be given appropriate consideration due to their importance for agricultural production.
Soils with low risk of erosion	Low	These soils are generally more resistant to damage and may be appropriately managed by standard good practice construction measures.

13.4.18 The sensitivity of soil resources to disturbance is based on how susceptible the soils are to damage when disturbed and includes the assumption that good working practice, such as that set out in the Defra (2009) guidance is followed. The sensitivity criteria also explore how soils with different inherent properties will have differing resilience to disturbance, and the impacts from construction may be more severe in certain situations. The receptor sensitivity criteria for the 'Structural Damage' to soil resources are shown in Table 13.4, which has been adapted from Chapter 9 Table 4 of the IEMA guidance.

Table 13.4: Receptor Sensitivity (Soil Resources – Structural Damage)

Receptor	Sensitivity	Justification
Soils with low resilience to structural damage	High	Soils with high clay and silt fractions (clays, silty clays, sandy clays, heavy silty clay loams and heavy clay loams) and organo-mineral and peaty soils where the Field Capacity Days (FCD) are 150 or greater. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where the FCDs are 225 or greater. All soils in wetness class (WC) WCV or WCVI.
Soils with medium resilience to structural damage	Medium	Clays, silty clays, sandy clays, heavy silty clay loams, heavy clay loams, silty loams and organo-mineral and peaty soils where the FCDs are fewer than 150. Medium-textured soils (silt loams, medium silty clay loams, medium clay loams and sandy clay loams) where FCDs are fewer than 225. Sands, loamy sands, sandy loams and sandy silt loams where the FCDs are 225 or greater or are in wetness classes WCIII and WCIV.
Soils with high resilience to structural damage	Low	Soils with a high sand fraction (sands, loamy sands, sandy loams and sandy silt loams) where the FCDs are fewer than 225 and are in wetness classes WCI to WCII.

13.4.19 Soils of differing texture and structural development may be subject to a range of potential impacts during and following reinstatement. For example, the incorrect handling/reinstatement of a heavy textured (clay rich) soil whilst in a plastic state may cause permanent or semi-permanent soil compaction.

13.4.20 The resulting soil profile will have a reduced natural drainage compared to the undisturbed soil profiles and a subsequent increased risk of soil loss (erosion) due to surface water run-off. In contrast, the texture of the lighter sandy soils makes them more resistant to compaction pressures and sandy soils also have a greater capacity to recover from compaction without intervention or management. Sandy soils will also remain more permeable if compaction does occur and the drainage potential of these soils is therefore more easily maintained upon reinstatement.

13.4.21 The magnitude of change criteria for soil resources (loss of soil and damage to soil) is shown in Table 13.5, which has been adapted from Chapter 9 Table 3 of the IEMA guidance.

Table 13.5: Magnitude of Change (Soil Resources)

Magnitude	Loss of Soil Resources	Damage to Soil Resources
High	<25 % of soil resources suitable for reuse and retained on-site.	Permanent change to the quality of the soil resource.
Medium	25-50 % of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to more than 25 % the soil resource.
Low	51-95 % of soil resources suitable for reuse and retained on-site.	Temporary/reversible change to less than 25 % of the soil resource.
Negligible	>95 % of soil resources suitable for reuse and retained on-site.	No change to soil resource quality.
Percentages for Loss of Soil Resources and Damage to Soil Resources ensemble the percentage of land of the total Site area that is affected by the respective receptor category.		

Classification of Effects

13.4.22 The classification of effects for loss of land (agricultural), and loss and damage of soil resources, has been assessed using Table 13.6.

13.4.23 Effects that are deemed to be Significant (in EIA terms) for the purposes of this assessment are those that are described as being Moderate or Major (beneficial or adverse).

13.4.24 Effects that are determined to be Minor or Neutral (beneficial or adverse) are considered to be Not Significant.

13.4.25 Where effects are Minor or Moderate they may be significant in EIA terms and professional judgement and sound reasoning will be used to determine the significance.

Table 13.6: Classification of Effects (Land and Soil Resources)

Sensitivity/ value of receptor	Magnitude of Change				
	High	Medium	Low	Negligible	No Change
Very High	Major (Significant)	Major (Significant)	Major or Moderate (Significant)	Minor (Not Significant)	Neutral (Not Significant)
High	Major (Significant)	Major or Moderate (Significant)	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Neutral (Not Significant)
Medium	Major or Moderate (Significant)	Moderate (Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
Low	Moderate or Minor (Potentially Significant*)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)
Negligible	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Neutral (Not Significant)

*Professional judgement will be used to determine the significance of the effect in the particular circumstances.
Note: Major, Moderate or Minor effect have the potential to be adverse or beneficial.

13.5 Baseline Conditions

13.5.1 A complete baseline for the site in terms of Land and Soil is provided Appendix 13.1.

Agricultural Land Classification

13.5.2 The site is comprised of ALC Grade 5 land as indicated on the predictive ALC map of Wales and no BMV is present. An ALC verification survey was not required as detailed in PPW paragraph 3.58 and 3.59 (BMV policy) and the Predictive Map[12] Grade 5 – Non BMV can be taken as best available information.

13.5.3 An overview of Grading for the Site is presented in the Drawing BR10167/002 (Figure 13.1). (pending).

[12] Welsh Government (2019) Predictive Agricultural Land Classification (ALC) Map 2. Available online: https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2 [Accessed 22 January 2024]

Peat on site

13.5.4 A Soil and Peat survey was undertaken on the Site in January 2024 to determine if peat is present onsite and to inform soil sensitivity analyses for this ES chapter. The survey comprised of a dynamic ecological survey to determine the presence of peat habitat onsite and a soil survey to characterise topsoil textures. Detailed descriptions on applied methodology and survey results of the site walkover are appended in Appendix 13.1.

13.5.5 The ecological survey showed that the grassland present on site is heavily grazed species-poor Upland Acid Grassland and Rush Pasture. The grassland not dominated by rush was well-drained and woven with soft branched moss which was identified as not being Sphagnum spp.

13.5.6 As such, the site does not have any peat as defined within the Soil Survey of England & Wales. Due to limited soil depth onsite, it is unlikely that the land will contribute to the hydrological functioning of peat bodies outside the project boundary.

13.5.7 Peat as a sensitive resource is not considered further within this ES assessment as the Soil and Peat survey determined that there is no Peat present within the red-line boundary of the proposed development site.

Soil Resource

13.5.8 The soil and peat survey undertaken also assessed the soil type and quality. Detailed descriptions on applied methodology and survey results of the site walkover are appended in Appendix 13.1.

13.5.9 The survey confirmed that the soils over most of the Site have been extensively disturbed (opencast coal workings, soil association 92c), which is consistent with descriptions of Soil Survey for England and Wales mapping[13] for the site. The topsoils across the Site were found to be consistent with the mapped soil associations found in the wider area surrounding the Site (site included), which is the Wilcocks 1 (721c) association. Wilcocks 1 (721c) soils are characterised by a peaty surface horizon overlying fine loamy or fine loamy over clayey upland soils. Wilcocks 1 (721c) soils are severely waterlogged near the surface (Wetness Class V and VI) due to high rainfall combined with a slowly permeable subsoil and gentle relief. The survey found dark to very dark greyish brown (10YR 4/2 or 10YR 3/1) topsoil ranging in depth from 10 to 20 cm, with deepest topsoil horizons on parts with lower altitude or shallow

[13] Soil Survey of England and Wales (1984) Soils and their Use in Wales, with accompanying 1: 250,000 map (Sheet 2). Not available online.

gradients (northern part of the Site), whilst the topsoil was shallower on the ridgeline in the western part of the Site.

13.5.10 The topsoil across the site is a mixture of heavy textured clay loam and silty clay. Across the Site, there is a thin layer of restored topsoil (10 - 20 cm) that is underlain by dark, coarse colliery spoil, which is a legacy of the historic surface coal mining in the area. This underlying spoil layer was found consistently throughout the site apart from one point in the east corner of the Site (Area 6. point 6) where a clay subsoil was recorded (see Appendix 13.1).

Table 13.7: **The Soil Associations based on the Soil Survey of England and Wales (1984).**

Soil Association	92c Disturbed soils (Opencast coal workings)	721c Wilcocks 1
Geology	Carboniferous shale and sandstone and associated drift	Drift from Palaeozoic sandstone mudstone and shale
Soil Series	N/A	Wilcocks, Kielder, Fordham
Soil characteristics	Restored opencast coal workings. The soils are characterised by a distinct mineral fine loamy or clayey surface horizon formed in at least 40 cm of artificially displaced material. The main land use is as permanent grassland. Compaction results in slowly permeable and seasonally waterlogged soils which are also susceptible to water erosion. The soils are often stony resulting in droughtiness.	The Wilcocks soil association has an acid organic surface layer 10 to 40 cm thick, with underlying clay loam or sandy clay loam horizons which are grey and strongly mottled, although the mineral layer immediately below the peat is normally stained with organic matter. Seasonally waterlogged slowly permeable soils formed above 3 m 0.D. and prominently mottled above 40 cm depth. They have no relatively permeable material starting within and extending below 1 m of the surface.
Soil Water Regime	Soils of this association are prone to waterlogging near the surface due to compaction. These soils are also susceptible to droughtiness due to thin topsoils and a high stone content.	Wilcocks soils are severely waterlogged near the surface (Wetness Class V or VI).
Erodibility*	Compaction results in increased erosion risk from runoff.	Very small risk from Upland (includes by wind) erosion[+].
[+]Locally risk of erosion is greater.		
* Cranfield University (2015). 'Research to develop the evidence base on soil erosion and water use in agriculture: Final Technical Report. pp147' Available at https://www.theccc.org.uk/wp-content/uploads/2015/06/Cranfield-University-for-the-ASC.pdf Accessed January 2024		

13.5.11 The location of the Site is characterised by a wet oceanic climate with annual rainfall of 1600 mm and 305 Field Capacity days.

Assumptions & Limitations

13.5.12 Effects from the individual elements should be read in conjunction with those assessed for the full development of the entire Proposed Development.

13.5.13 The assessment is based on the most recent site boundary and GIS shapefiles for the location and extent of the infrastructure at the time of writing.

13.5.14 The site walkover by WA found a clay subsoil on one point in the east corner of the Site, but further assessment of this point was omitted in this ES assessment as the disturbed soils are the most dominant across the site. The current parameter plan, received as GIS shapefiles from the client (Table 13.8), shows a construction compound area to be located near this location. Any specific mitigation for stripping, soil handling and soil storage of clay subsoils will need to be addressed appropriately in a site-specific detailed Soil Management Plan.

13.5.15 It has been assumed that all the agricultural land (~26 ha) will be removed from production during the construction phase and the operational phase (30 years) and that the only permanent land-take will be 1.45 ha. Following decommissioning all of the unimpacted land (26 ha) will be returned to agricultural production.

13.6 Assessment of Effects

Design Solutions and Assumptions

13.6.1 During construction, the potential effects on the loss of land and the potential damage to soil resources will be at its greatest due to heavy machinery on site, and large-scale soil stripping and storage activities.

13.6.2 Best practice guidance for the sustainable management will prevent or mitigate most of the risks to soil during construction. An Outline Soil Management Plan (OSMP; Appendix 13.2) has been created to support this potential development and this will ensure that the soil and agricultural land potential are managed sustainably, and that all management process follow recognised good practice guidance. The OSMP will be transformed into a detailed Soil Management Plan (SMP) by the primary contractor prior to the construction phase commencing. This is usually prepared by a soil scientist in collaboration with the project team and the primary contractor.

13.6.3 It is anticipated that prior to commencement of any construction activities, a Construction Environmental Management Plan (CEMP) will need to be agreed with the Local Planning Authority, which will seek to manage, and where practical, minimise the impact of the construction phase of the Proposed Development upon the Site and surrounding area.

13.6.4 It is assumed that the construction phase will last approximately 6 months.

Design considerations

13.6.5 Table 13.8 shows the proposed land take for all aspects of the Proposed Development associated with built infrastructure and remodelled land (based on Site layout January 2024 Rev D).

13.6.6 Using the breakdown in Table 13.8, the area impacting on the receptor 'damage to soil resources' was estimated to be c. 1.45 ha (including land use categories a, b, c, f, and g from Table 13.8).

13.6.7 It is estimated that 3.52 ha will be covered by solar arrays (Table 13.8; e - area under panel). There is no direct impact expected for this area in terms of soil disturbance and soil function.

13.6.8 An allowance for temporary structures has been made, including but not limited to the construction compounds (Table 13.8; h), covering c. 0.78 ha.

Table 13.8 Breakdown of impacted area

Proposed site elements	**Area (in hectares)**
a. Turbine foundation (x3)	0.14
b. Turbine hardstanding (x3)	0.38
c. Access track	0.84
d. Solar security fence	10.42
e. Area under panels	3.52
f. Substation	0.017
g. Transformers (x3)	0.006
h. Construction compounds (x2)	0.78
Total infrastructure footprint	**16.10**
Total Site area	**25.62**

Assessment of Effects

13.6.9 The identified land and soils receptors which are potentially subject to effects during construction and operation are:

- land and land use in terms of loss of Grade 5 (non BMV) agricultural land.
- soil resources in terms of potential loss.
- soil resources in terms of potential structural damage.

13.6.10 The effects on agriculture and soils receptors, which have the potential to be significant and have been taken forward for detailed assessment, are summarised in Table 13.9.

Table 13.9: Soils and ALC which may be subject to potential effects during construction and operation of the proposed development	
Receptor	Potential Effects
Land	Loss of land due to change of land-use to non-agricultural through placement of infrastructure and landscaping and the enclosure and removal of agricultural land from production during construction and operation.
	Loss of land due to permanent development (i.e., new buildings and roads).
	Loss of land due to temporary development (i.e., construction compounds, storage areas, temporary site accesses) this is likely to only occur during construction phases of the development.
Soil resources	Loss of or damage to soil resources through incorrect management including loss of soil functions, including: • Damage to the structure and compaction; • Loss of nutrients (e.g., nitrogen); • Loss of soil biota (e.g., bacteria, fungi, earthworms) and reduction of its activity; • Mixing of soil horizons (especially topsoil with subsoil) reducing their potential for reuse; and • Unauthorised export.

Construction Phase: Land

13.6.11 Based on the ALC of the land being non-BMV Grade 5, the land across the entire site has been classed as having a Low sensitivity.

13.6.12 During construction the entire Site (26 ha) will be removed from agricultural production. However, the majority (95% - ~24.7 ha) of the agricultural land will not be impacted and instead will be enclosed to form a security compound around the proposed development.

13.6.13 As all 26 ha of agricultural land will be removed from production during construction, the magnitude of this change is High.

13.6.14 The resulting effect on the receptor 'Land' during the construction phase is Moderate Adverse. As over 95% of the land will not be impacted by the construction phase, this effect is considered as Not Significant in EIA terms due to the short construction period involved.

Operational Phase: Land

13.6.15 All of the land (26 ha) will be removed from agricultural production during the 25-year operation phase, resulting in a High magnitude of change.

13.6.16 As this is Grade 5 land that is currently used for rough grazing, the lack of direct agricultural management over a 30-year period will have no effect on the ALC potential for the majority of the land.

13.6.17 The resulting effect on the receptor Land for the operational phase is therefore Moderate/Minor adverse and Not Significant in EIA terms.

Decommissioning Phase: Land

13.6.18 All solar panels and security fences will be removed, and the residual permanent land take will be ~1.45 ha. All the remaining land (24.2 ha) will be directly returned to agricultural production.

13.6.19 This results in a Low magnitude of change, and this is considered as a Minor Adverse effect and not Significant in EIA terms.

Construction phase: Soil

13.6.20 Activities associated with the construction phase of the Proposed Development will result in disturbance and damage to the soils present, which could result in a long-term adverse impact to the onsite soil resource due to loss and damage.

13.6.21 Incorrect handling and storage has the potential to damage soils. The traffic movements required during construction may also cause damage to the soil through compaction or erosion. The damage to soil resources may result in the impairment of soil function, quality and resilience, resulting in changes such as:

- Compaction and smearing (i.e. damage to soil structure);
- Conditions within the soil profile conducive to excessive drying or wetness;
- Damage or removal of vegetation layer;
- Loss of nutrients (e.g. nitrogen), biota (e.g. bacteria, fungi and earthworms) and reduction in soil fertility; and
- Loss of ecosystem services, such as the ability of the soil to support food production and habitat creation.

13.6.22 The soils on site are heavy textured clay loams and silty clays with 305 Field Capacity Days (FCD). Using Table 13.4, they are defined as having a High sensitivity with respect to soil structural damage.

13.6.23 Due to the combination of heavy textured topsoil and the disturbed nature of the soil profiles across the site, the sensitivity of the soil resource with respect to soil loss is Medium (Table 13.3).

13.6.24 The proposed development will directly impact soils over an area of 1.45 ha, as detailed in section 13.6.5, and without mitigation these soils will be lost resulting in

a High magnitude of change for both soil loss and soil damage. This will result in a Major/Moderate effect that is significant in EIA terms.

13.6.25 With adoption of the mitigation measures provided in the OSMP, both the damage and loss of soils during construction will be temporary/reversible or avoided and this reduces the magnitude of change for both soil loss and soil damage to Low (as a worst-case scenario), resulting in a Minor adverse Effect that is not significant in EIA terms.

Operational phase: Soil

13.6.26 There are no activities associated with the operational phase which would lead to structural damage or loss of the soil resource on the Site.

Decommissioning phase: Soil

13.6.27 With adoption of the mitigation measures provided in the OSMP, both the damage and loss of soils during decommissioning will be temporary/reversible or avoided. This results in a Low magnitude of change for both soil loss and soil damage (as a worst-case scenario), resulting in a Minor adverse Effect that is not significant in EIA terms.

13.7 Mitigation Measures

Agricultural Land

13.7.1 The Proposed Development will result in the permanent loss of c. 1.45 ha of agricultural land and it is not possible to mitigate for this loss as none of the agricultural land will be returned to agricultural use.

Soil Resource

13.7.2 To minimise the risk of permanent damage to / loss of the existing onsite soil resources, good practice soil storage, handling and reinstatement methods will be used as standard for all construction-related operations. This embedded mitigation will be based on such guidance as Defra's 'Construction Code of Practice' (2009) and the IQ's 'Good Practice Guide for Handling Soils in Mineral Workings' (2021). The mitigation measures will include (but are not limited to) the following:

- Avoiding or limiting soil handling after periods of heavy rainfall or during periods when soils are waterlogged to minimise compaction and damage to soil structure;
- Limiting the number of plant/machine movements within defined areas in order to minimise compaction and damage to soil structure;
- Establishment of vegetative cover on stockpiles as soon as possible to maintain

soil structure and prevent soil loss through erosion; and

- Reducing the potential for soil compaction via the use of Low Ground Pressure (LGP) tracked or wheeled tyres to spread the weight of vehicles, limiting the height of soil stockpile mounds, restricting construction traffic to demarcated working areas and loosening the area afterwards using recognised practices and equipment to remove any compaction.

13.7.3 Should planning consent be granted, the construction mitigation measures will be provided in further detail (e.g. as a detailed Soil Management Plan, detailed Construction Method Statements or similar) prior to commencement of works.

Monitoring

13.7.4 Under the 2017 EIA Regulations, the determining authority must consider whether it is appropriate to impose monitoring as a planning condition. In order to audit compliance with the Soil Management Plan, Construction Method Statements (or similar), the works will be monitored during soil handling activities; thereby ensuring that the soils are maintained in good condition permitting the continued, sustainable use of the soil resource.

13.8 Residual Effects

Agricultural Land

13.8.1 It is not possible to mitigate for the permanent loss of 1.45 ha of existing agricultural land onsite. The permanent loss of agricultural land because of the construction of the Proposed Development, therefore, remains as 1.45 ha, and the overall effect remains Minor adverse (not Significant).

13.8.2 As a result of the Proposed Development there is no permanent loss of BMV agricultural land on Site, and there is no requirement to consult the DRA under Article 10(1), paragraph (w) of the Table to the Town and Country Planning (General Development Procedure) Order 1995 (GDPO) (S.I .No 1995/419).

Soil Resource

13.8.3 With the identified mitigation measures in place, the structure, function, and resilience of soil resources will be protected and maintained. The careful consideration and site-specific planning of construction methods, coupled with good practice measures detailed within current best practice guidance will ensure that wind erosion (generation of dust emissions) and water erosion of the erosion prone soils during soil handling or from stockpiles will be minimised and the assessed effects for Loss of Soils will remain the same.

13.8.4 Whilst the topsoil depth is limited onsite, stripping and storage requirements and safe soil handling to prevent mixing of the already disturbed profile remain important for the protection of topsoils reuse onsite. For this reason, the assessed impact on the receptor 'damage to soils' is considered to be Moderate under a worst case scenario, but is considered to be not Significant in EIA terms.

13.9 Assessment of Cumulative Effects

13.9.1 When considering likely significant cumulative effects, this assessment has considered the following intra-cumulative effects (i.e. those that occur because of the Proposed Development in isolation) and inter-cumulative effects (i.e. those that occur because of the Proposed Development in combination with the other developments detailed within Chapter 2 of this ES). For the latter, where construction has commenced, the other development forms part of the existing baseline conditions as any agricultural land present will already have been affected. As a result, these developments are scoped-out of the inter-cumulative assessment.

Intra-cumulative Effects

13.9.2 No intra-cumulative effects have been identified.

Inter-cumulative Effects

13.9.3 Inter-cumulative effects (i.e. the effect of more than one development upon a single environmental receptor) are not considered relevant to the assessment of effects on soil resources, as this receptor can only be directly affected by a given development. This is because different developments do not (usually) overlap spatially and, therefore, cannot affect the soil resources at the same location. As such, inter-cumulative effects on these receptors have been scoped-out from the cumulative assessment.

13.9.4 If the agricultural land receptor is defined as all agricultural land within a local area (e.g. administrative boundaries), then the effect of cumulative land take can be quantified and assessed. The other committed developments considered are those detailed within Table 2.2 of Chapter 2 of this ES (NB – developments listed as 'under construction' have been scoped out for consideration as any agricultural land that may have been present will have been lost due to activities relating to construction and reflected in the baseline).

13.9.5 Of the developments listed in Table 2.2, a total of 17 were identified for inclusion in this assessment of cumulative effects. A summary of the ALC grades within the

application boundaries of these proposed developments is provided in Appendix 13.3.

13.9.6 Appendix 13.3 shows that all developments listed lie within areas of either Grade 4 agricultural land, Grade 5 agricultural land, or "urban" land in the Predictive ALC Map of Wales. As such, none of these developments occur on BMV agricultural land. Using Table 13.1, the sensitivity of the land where these developments are sited is Negligible to Low.

13.9.7 Information on the cumulative permanent land-take if all the developments listed in Appendix 13.3 are approved is not available. Assuming a worst-case scenario where the cumulative permanent land-take is greater than 20 ha, this would result in a High magnitude of change (Table 13.2). Using Table 13.6, this constitutes a Minor (Not Significant) to Moderate or Minor (Potentially Significant) cumulative impact.

13.10 Summary

13.10.1 This assessment considers the potential effect on Soil and Land from the proposed development of a solar array and three wind turbines on a 26 ha site in Rhymney.

13.10.2 The baseline assessment was informed by a site-specific Soil and Peat survey which found that the agricultural land involved is Grade 5 (non-BMV) land. The site has disturbed soils resulting from restoration activities following historic coal mining. The soils are heavy textured clay loams and silty clays and only a shallow topsoil layer (10-20 cm) is recoverable as a functioning soil resource, with the lower profiles consisting of colliery spoil.

13.10.3 The Soil and Peat survey determined that there is no Peat present within the red-line boundary of the proposed development site.

13.10.4 The baseline conditions have been identified, and the potential environmental impacts upon the baseline resulting from the Proposed Development are considered for both the construction and operational phases.

13.10.5 The assessment was carried out in accordance with consideration of Section 5 of the consultation responses for Soil and Agricultural Land. The significance criteria for environmental impact follows the latest IEMA guidance (2022).

13.10.6 The proposed wind and solar development would result in the loss of all agricultural land within the Site during the construction and operational phases through built development or a change to non-agricultural use. There is also the potential for damage to and /or loss of the soil resources present within the Site during construction as a result of unsuitable handling, storage and management.

13.10.7 The identified land and soils receptors which are potentially subject to effects are: land and land use in terms of loss of Grade 5 (non BMV) agricultural land, soil resources in terms of potential loss, and soil resources in terms of potential structural damage.

13.10.8 The Land resource comprises 26 ha of Grade 5 (non-BMV) agricultural land.

13.10.9 Based on the ALC grade of the land being non-BMV Grade 5, the land across the entire site has been classed as having a Low sensitivity. The resulting effect on the receptor 'Land' is Minor Adverse and not Significant in EIA terms.

13.10.10 Due to the combination of heavy textured topsoil and disturbed profiles across the site, the sensitivity of the soil resource with respect to soil loss is Medium. The impact with respect to soil loss would constitute a High magnitude of change. The resulting effect on the receptor 'loss of soils' is therefore considered to be Major/Moderate Adverse which is Significant in EIA terms.

13.10.11 Damage to soils which occurs through disturbance, handling, and trafficking is a main concern during construction phases. Using Table 13.4, the soils on site are heavy textured clay loams to silty clay with 305 Field Capacity Days (FCD), equating to a High sensitivity. The High magnitude of change for soil damage results in an overall significance of Major/Moderate Adverse which is Significant in EIA terms.

13.10.12 With adoption of the mitigation measures provided in the embedded mitigation, both the damage and loss of soils during construction will be temporary/reversible or avoided. This reduces the magnitude of change for both soil loss and soil structural damage to Low, resulting in a Minor Adverse effect that is not significant in EIA terms.